ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA JANUARY/FEBRUARY 2023

# INNOVATION

## TOWERS IN THE TREES

### CELL SERVICE ON ITS WAY TO REMOTE FOREST OPERATIONS

## CONCRETE SHAKE UP

## MARINE LIFE THRIVES AGAIN


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# INNOVATION

JANUARY/FEBRUARY 2023 | VOLUME 27 NUMBER 1



## COVER STORY

### TOWERS IN THE TREES

Break-through technology is bringing high-speed cell service to remote forest locations for the first time – improving safety and efficiency in forestry operations.

### CONCRETE SHAKE UP

A UBC assistant professor has been tasked with shaking and breaking reinforced concrete to find resilient concrete solutions, so buildings not only withstand natural disasters, they survive damage free.


### MARINE LIFE THRIVES AGAIN

A year after the award-winning Maplewood Flats marine restoration project was completed, marine life is once again thriving in the previously lifeless nearshore area.


## NEWS / DEPARTMENTS



## COMMENT



## OTHER



ON THE COVER

FPInnovations and Tolko Forest Products are bringing cell service to the forest industry, recently running a successful test from this LTE tower in Sugar Lake.
PHOTO: MITHUN SHETTY, FPINNOVATIONS

THIS DIGITAL EDITION OF *INNOVATION* INCLUDES VIDEO EXTRAS. LOOK FOR THIS PLAY ICON, AND CLICK ON IT TO VIEW VIDEO AND OTHER MULTIMEDIA CONTENT. AN INTERNET CONNECTION IS REQUIRED.

ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA

## FROM COUNCIL TO BOARD: NEW TERMS, SAME FOCUS

Over the past few years, Engineers and Geoscientists BC and our registrants have been navigating several major changes introduced by the *Professional Governance Act (PGA)*.

In this issue, you'll learn about some upcoming changes to our terminology for Council. Beginning this Spring, Council will be referred to as the Board, our councillors will become board members, and the President and Vice President will become the Chair and Vice Chair, respectively.

These changes are driven by amendments to the *PGA*, but some may ask: why focus on something seemingly so minor? The answer is because words and their connotation matter. The goal of these changes is to ensure the terminology we use is in line with the organization's transition from an association with a dual mandate to protect the public interest and promote the interests of our registrants, to a regulator with a singular focus on public protection.

Alongside these terminology changes, we are also changing the way the Chair (President) is elected. Rather than registrants voting for the Chair, starting in 2023, board members will elect the Chair from among all Board members. This is currently the process for the Vice President and will remain for the Vice Chair.

This change is driven by governance best practice, with the same process in place for most large, complex regulatory bodies. Enabling the Board to select its own leadership will allow us to identify individuals with the right skills, experience, and knowledge and maintain organizational stability. In addition, the role of the President itself has evolved. It requires someone with not only technical and industry knowledge, but expertise in strategy, finance, and risk management as well as the leadership to create and promote inclusive cultures, manage interpersonal dynamics, and facilitate meaningful dialogue. These are all things that are best observed in practice, at the Board table.

While this new terminology and process may seem like small changes to some and big changes to others, they are all important ways for us to support our ongoing effort to modernize the governance practices of the organization in the interest of public protection.

MARK ADAMS. P.ENG., President

*president@egbc.ca*

INNOVATION

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The closing date for advertising for each edition is outlined in the media kit. Generally, advertising bookings closed on or near the first of the month preceding each edition (e.g., May 2 for the May/June issue).

Design/Production & Advertising Sales:
AdvertisingInPrint
Sales Representative: Monique Nguyen
Tel: 604.681.1811
Email: advertising@egbc.ca

Printed in Canada by Mitchell Press Ltd on recycled paper

Subscription rates per issue $4.50; six issues yearly $25.00. (Rates do not include tax.)



ISSN 1206-3622
Publications Mail Agreement No 40065271. Registration No 09799.

Return undeliverable Canadian addresses to *Innovation*,
Suite 200 - 4010 Regent Street, Burnaby, BC V5C 6N2.

## COUNCIL TO BE RE-NAMED AS BOARD THIS SPRING

When registrants vote in the 2023 Council election, it's going to look slightly different. To align with best governance practices for regulatory bodies and amendments to the *Professional Governance Act (PGA)*, the terminology and process currently used for Council will be adjusted.

Going forward in the spring, Council will be referred to as the Board, and the head of the Board will be the Chair, instead of the President; Vice Chair replaces Vice President and Board member replaces Councillor. The functions are not altered; only the titles will change.

### GOVERNANCE STRUCTURE NOT CHANGED

The Council structure will stay the same. The Engineers and Geoscientists BC Council has eight elected Councillors, including the President and Vice President, and four Councillors appointed by the provincial government.

Registrants will continue to elect the organization's registrant Board members. However, the Chair will be elected by the Board members – elected and appointed – rather than elected separately by only the registrants. This election process is currently in place for the Vice President position and will remain in place for that role. Only elected Board members are eligible for leadership positions.

With the leadership choosing the President, they can select a leader with the right skills, experience, and knowledge to maintain organizational stability and lead the organization's strategic goals.

| TERMINOLOGY CHANGES | |
|---|---|
| CURRENT | NEW (effective Spring 2023) |
| Council | Board |
| Councillor | Board member |
| President | Chair |
| Vice President | Vice Chair |

All regulators under the *PGA* are required to update their terminology to better reflect their roles as regulatory bodies. Terms such as President and Vice President are generally associated with membership-based organizations rather than regulatory bodies, which is contrary to the intention of the *PGA*.

### ALIGNING TO *PGA*

Engineers and Geoscientists BC is introducing the change to the process to elect the President to support its drive to modernize the governance practices of the organization. Best practice in regulatory bodies is for registrants to elect Board members and for the Board to select its own leadership. All regulatory bodies under the *Health Professions Act*, the Architectural Institute of British Columbia, and the Chartered Professional Accountants of BC follow this practice.

Council confirmed the changes at its November 2022 meeting. The changes will be implemented in the spring of 2023 and be on the voting ballots for the fall 2023 elections.

Carol Park, Past President of Engineers and Geoscientists BC.
Photo: Wendy D Photography



## MAKE A DIFFERENCE AS A BOARD MEMBER

Are you passionate about building a resilient province, enhancing public safety, and supporting strong governance? If so, consider applying to serve as a Board member (currently councillor) for Engineers and Geoscientists BC. (When Council is re-named as the Board in the spring, councillors will be called Board members. See article page 5).

The organization is seeking registrants to fill three board positions in 2023. We encourage diverse candidates to apply, including those with different genders, orientations, ethnicities, professional backgrounds, and experiences.

Board members work together to govern the organization, set its policy and strategic direction, and ensure that Engineers and Geoscientists BC fulfills its regulatory mandate and lives its values. Serving as a Board member is a remarkable leadership opportunity that allows registrants to give back to the professions, protect the public and the environment, and ensure that engineers and geoscientists have a positive and enduring impact in B.C.

"It was a great honour to serve on our Council and to impact the regulation of my profession," says Carol Park, Past President of Engineers and Geoscientists BC. "Each councillor's unique knowledge, insights, and leadership are critical to our success as a regulator. I am very proud of what we continue to accomplish as a team working in the public interest."

The organization supports equity, diversity, and inclusion (EDI) in its governance by promoting different perspectives and new ideas and ensuring our organization and the public benefit from all available talent. Diversity is a key driver of strong governance, and best represents the unique cultural mosaic of our province and the professions.

Last year, Council introduced a Remuneration Policy that allowed councillors to be compensated for meeting time and travel expenses associated with meetings. Remuneration enables a wider breadth of candidates to serve on the Board, regardless of their identity, background, or employer.

The call for nominations is now open, and the deadline to apply for this opportunity is 5 p.m. on March 13, 2023. If you are interested in being considered but are unable to submit your application before the deadline, please contact *nominations@egbc.ca*.

For more information on the application process and the positions available, visit *egbc.ca/Council-Nominations*.

## UPDATED BYLAWS ADDRESS DISCIPLINE FINDINGS IN OTHER JURISDICTIONS

Engineers and Geoscientists BC's Bylaws have been updated, including a revised process to address disciplinary decisions in another jurisdiction.

In the previous Bylaws, when Engineers and Geoscientists BC learned of discipline findings or decisions against a BC registrant in another jurisdiction, a Discipline Hearing Panel had to be appointed to determine whether to impose a similar discipline order on the registrant in BC. However, in some cases, the issue is either relatively minor or there is little added benefit of imposing a duplicate disciplinary order. The Bylaw amendment enables the Investigation Committee to review the issue first to determine whether it is in the public interest for a Discipline Hearing Panel to be appointed to consider disciplinary action for the registrant.

The Bylaw updates also address recent amendments to the *Professional Governance Act (PGA)*. They incorporate a terminology change in the *PGA* from "inspector" to "investigator," and adjust the requirement for chairs of committees to be appointed in accordance with merit-based selection principles. In addition, the updated Bylaws also address references to amended or repealed *PGA* sections and correct several minor typographical errors.

Engineers and Geoscientists BC's current Bylaws, and links to previous versions of the Bylaws, can be accessed online at *egbc.ca/Bylaws*. Registrants are encouraged to review the Bylaws to ensure they are aware of their professional and ethical obligations.

Engineers and Geoscientists BC Past President Carol Park, left, and current President Mark Adams. Photo: EGBC

## NOVEMBER 25, 2022

*Engineers and Geoscientists BC's Council of elected registrants and government representatives meets throughout the year to conduct the business of organizational governance. The following are the highlights of its November 25, 2022, meeting.*

### CHANGES TO THE PROCESS TO SELECT THE PRESIDENT

Effective Spring 2023, Council titles will change to align with best practices for regulatory bodies, as per recent amendments to the *Professional Governance Act (PGA)*. Council will be referred to as the Board and the head of the Board will be the Chair, instead of the President; Vice Chair replaces Vice President.

Alongside these changes, Council approved a new process to select the Chair. Registrants will continue to elect the organization's registrant board members; however, the Chair will be elected by the Board members, rather than elected separately by registrants. This practice is common in regulatory bodies and non-regulatory organizations and is being introduced to support Engineers and Geoscientists BC's drive to modernize its governance practices. For more information on these changes, see page 5.

### BYLAW AMENDMENTS

Council approved a series of amendments to its Bylaws. The amendments include some changes arising from recent amendments to the *PGA*, as well as an amendment that clarifies Engineers and Geoscientists BC's procedure for addressing disciplinary decisions in another jurisdiction, and corrections to minor typographical errors. For more information on these updates, see page 7.

Engineers and Geoscientists BC's current Bylaws are available at: *egbc.ca/Bylaws*.

### SUSTAINABILITY GUIDELINES APPROVED

Council approved the *Professional Practice Guidelines – Sustainability, Version 2.0*, which will be published following legal and editorial review. The new version provides additional clarity through examples of actions that individual and firm registrants can take to bring the "lens of sustainability" to their practice. It also incorporates input from registrants that was collected through a series of focus groups comprised of professionals from various sectors. Guidelines and other professional practice resources can be accessed at *egbc.ca/Guidelines*.

## MAKE YOUR SUBMISSIONS FOR *INNOVATION* PROJECT HIGHLIGHTS EDITION

*Innovation* Magazine invites Engineers and Geoscientists BC registrants to submit project photos and project descriptions for the annual Project Highlights edition, planned for the May/June 2023 edition. This annual project highlights pictorial features the diverse activities of BC's professional engineers and geoscientists at home and abroad.

Registrants, licensees, and firms are invited to submit photographs and project descriptions of engineering or geoscience projects for inclusion in this edition of *Innovation*. To be considered for inclusion, projects must be currently underway, or have been completed on or after the end of June 2022. Projects must also involve registrants or licensees of Engineers and Geoscientists BC.

More information about submission criteria is provided at *egbc.ca/Pictorial*, where you can also find a link to the submission form. The form must be submitted by 11:59 PM Pacific Time on **March 3, 2023**. Late submissions will not be accepted.

Due to space limitations, *Innovation* is unable to accommodate all submissions. We encourage registrants working for large companies to coordinate their project submissions. Only one submission per company is typically selected.

If you have any questions, email *innovation@egbc.ca*.


**The 2022 project highlights were published in *Innovation* last spring.**

## 2023 AWARD NOMINATIONS NOW OPEN

Nominations for Engineers and Geoscientists BC Awards are now open. The awards recognize exemplary professional, technical, and volunteer contributions made by Engineers and Geoscientists BC registrants towards public safety and environmental protection.

We ask registrants to help us recognize the outstanding work and contributions of their peers by submitting a nomination in the following seven award categories:

**The McLachlan Award for Outstanding Achievement in Engineering** recognizes a leader who has made significant professional and technical achievements to professional engineering and has demonstrated substantial volunteer service, preferably for Engineers and Geoscientists BC.

**The Westerman Award for Outstanding Achievement in Geoscience** recognizes a leader who has made significant professional and technical achievements to professional geoscience and has demonstrated substantial volunteer service, preferably for Engineers and Geoscientists BC.

**The Meritorious Achievement Award** recognizes a registrant who has received distinction and achieved outstanding goals associated with their profession that have enhanced the safety, wellbeing, or interest of the public.

**The Lambert Award for Volunteer Service** recognizes a registrant who has made a substantial or sustained contribution of professional service through leadership and dedication in a volunteer capacity to Engineers and Geoscientists BC.

**The Young Professional Award** recognizes a registrant under 40 years of age who has made professional and technical achievements in engineering and/or geoscience and has demonstrated volunteer service, preferably for Engineers and Geoscientists BC.

**The Equity, Diversity, and Inclusion Award** recognizes a registrant who has made significant contributions to equity, diversity, and inclusion (EDI) in the engineering and/or geoscience professions in British Columbia.

**The Innovation in Sustainability Award** recognizes an engineering or geoscience project that addresses environmental protection and environmental enhancement, developing solutions to address a changing climate, and seeking to realize sustainable outcomes. This award has an earlier application deadline, and more information can be found on our website.

We look forward to celebrating the 2023 award recipients in person this year once again. The awards will be presented during our Annual Conference in Whistler, BC on October 27, 2023.

**2023 Award Deadlines**

Nominations for all awards are now open. The deadline to submit the initial application for the Innovation in Sustainability award is Tuesday, February 28, at 5 p.m. The deadline to submit complete applications for all other award categories is Friday, April 7, at 5 p.m. For detailed information about the nomination procedures, awards terms of reference, and eligibility, visit *egbc.ca/Awards*.

2022 Engineers and Geoscientists BC Awards Winners: from left, Dr. Rishi Gupta, P.Eng., FEC, Lindsey Ogston, Charlotte Olson, P.Geo., Anja Lanz, P.Eng. FEC, Damineh Akhavan-Zanjani, P.Eng. FEC, Pierre Friele, P.Geo., P.L.Eng., Monica Mannerström, P.Eng., and Simon Diemert, P.Eng.
Photo: Wendy D Photography

## SEEKING PRESENTERS FOR THE 2023 ANNUAL CONFERENCE

Engineers and Geoscientists BC is seeking presenters — industry experts, thought-leaders, innovators, technology experts, and professional speakers — for its Continuing Education (CE) program for the 2023 Annual Conference.

The conference is returning to its popular in-person format after several years as a virtual event. Industry professionals across B.C. will gather for two days of learning, networking, and idea exchange on October 26-27, 2023, in Whistler, BC.

The CE sessions at this year's conference will focus on four, core learning areas: technical, ethical, regulatory, and communications and leadership. These topics are in alignment with CE Program requirements.

Conference presenters will share their expertise and present their topics to a diverse audience that will include engineers, geoscientists, technologists, academics, government representatives, industry leaders, and other members of the community. Presenters can also network and engage with potential future clients and expand their business portfolio.

Presentations are one hour, including time for questions and answers. Presentations should be educational and tailored to registrants of the organization. Presentations that promote or sell specific products, services, or providers will not be considered.

Submit your proposal through our online form (*egbc.ca/Continuing-Education/Annual-Conference/2023-Annual-Conference*) by March 3, 2023. Proposal requirements are also available on the website.

For more information, please email *conference@egbc.ca*.

*These webinars, and other professional practice-related webinars, are provided at* egbc.ca/Events.

## UPCOMING PROFESSIONAL PRACTICE WEBINARS

*egbc.ca/Events*

**Seismic Retrofit Guidelines 2020 Edition Workshop:** February 10, 2023
This full-day workshop will provide training on the new edition of the Seismic Retrofit Guidelines and the updated Seismic Performance Analyzer (Analyzer I Version 4.0). This training is required for all engineers providing services on Ministry of Education funded school seismic upgrade projects.

**Air Tightness Testing:** February 16, 2023
This 1.5-hour session will introduce technical and practical considerations for airtightness testing from the perspective of a building enclosure engineer, an energy modeller, and an architect.

## FREQUENT PROFESSIONAL PRACTICE INQUIRIES

### Can I retain my status as a practising professional registrant if my role does not involve the practice of professional engineering or professional geoscience?

Due to changes under the *Professional Governance Act (PGA)* related to the new Continuing Education (CE) program, Practice Advisors at Engineers and Geoscientists BC have received many inquiries related to practising designation, non-practising status, and resignation related to ongoing professional practice. It is important for registrants to be aware of the implications of each of these categories in order to make the most appropriate choice for their current employment and practice.

In short, if you are practising professional engineering or professional geoscience in BC, you must maintain your practising designation with Engineers and Geoscientists BC. The definitions of regulated practice are included in the Engineers and Geoscientists Regulation (BC Reg. 14/2021). Being registered in another jurisdiction in Canada does not grant practice rights in BC.

If you are *not* engaging in the practice of professional engineering or professional geoscience as defined in the Engineers and Geoscientists Regulation, you may choose to resign your registration with Engineers and Geoscientists BC, move to non-practising status with Engineers and Geoscientists BC, or retain your practising designation with Engineers and Geoscientists BC.

Resignation and non-practising designation do not convey practice rights; resigned and non-practising registrants have no greater right to engage in the practice of professional engineering or professional geoscience than any other member of the general public.

Practising registrants may maintain their practising designation, even when their day-to-day role does not require the practice of professional engineering or professional geoscience. However, all practising registrants – regardless of their employment or role – have the same obligations with respect to:

1. Following Engineers and Geoscientists BC Bylaws.
2. Following the Code of Ethics, which is binding on individuals, no matter what type of employment or work they are engaged in.
3. Meeting the requirements of mandatory programs under the *PGA*, such as Annual Information Reporting, CE, Audit and Practice Review Programs, and Regulation of Firms. Many of these programs can be adjusted to suit a role where responsibilities do not involve engaging in reserved practice. For example, registrants can tailor their CE activities to their current role and responsibilities.

Registrants should regularly re-evaluate whether their role involves the practice of professional engineering or professional geoscience as this is likely to have implications for their registration with Engineers and Geoscientists BC, for their firm's registration with Engineers and Geoscientists BC, and for their work.

For more information related to professional practice inquiries, please contact *practiceadvisor@egbc.ca*.

Alice Kruchten, P.Eng.
Practice Advisor


FPInnovations senior researcher Mithun Shetty, P.Eng, at the Sugar Lake site. Photo: Cameron Rittich, FPInnovations

# BRINGING CELL SERVICE **TO THE FOREST**

HAVING CELL SERVICE IN THE REMOTE FORESTS OF B.C. IS GOING TO CHANGE HOW THE FOREST INDUSTRY OPERATES WITH IMPROVED SAFETY AND EFFICIENCY AT THE TOP OF THE LIST. ONCE THE FINAL TECHNOLOGY TRIALS ARE COMPLETED, CELL TOWERS COULD START BEING INSTALLED THIS SPRING.

Darcy Nybo

Cell reception during the demos was crystal clear. Photo: Mithun Shetty, FPInnovations

Deep in the woods, on a chilly mid-December day, Travis Kiel, Manager of Woodland Improvement at Tolko Industries, made a cell phone call. When Woodlands Superintendent Mark Fichtner answered at Tolko's offices in Lumby, they were making history.

This was the first cellular call made from Tolko's remote Sugar Lake operations in the north Okanagan to Lumby – or anywhere. A new cell tower, just installed at the site for a trial in minus 21-degree weather, did the job. Until then, a cellular connection was impossible. In fact, it is impossible in over 70 percent of BC's forested area that doesn't have internet coverage.

That situation is about to change in a big way.

FPInnovations, a Canadian not-for-profit organization specializing in forest-sector solutions, and partner Tolko Industries, a forest-product company based in Vernon, are building a reliable high-speed cellular network that will transform the forestry industry – and have other far-reaching applications.

Mithun Shetty, P.Eng., senior researcher for FPInnovations' Transportation and Infrastructure group, said, "After almost four years of testing, it's now possible to bring LTE (Long Term Evolution) networks to the remote forests of BC."

Once trials like the one in Sugar Lake are complete, the first cell systems in forest operations could start as early as this spring.

## IMPROVING FOREST OPERATIONS

For the forest industry, having reliable, real-time communication in remote forest locations, will significantly improve operations.

Kiel said, "A primary focus is around safety where communication and safety devices can ensure everyone in the area gets home safely. It's also great for ordering parts, preventive maintenance and knowing about machine down-time. Most equipment has telematic devices that show engine hours, speed, location, and fuel consumption, so contractors can keep track of their equipment."

According to Kiel, having cell service could easily translate to a five to 10 percent increase in productivity as improved connectivity aids in decreasing the downtime of workers and machines.

As well, Shetty noted, "With this setup, a dealer's technician doesn't have to come all the way into the bush to troubleshoot their machinery. This will also make it easier for forestry workers to order the right parts. By having better communication, we can get machines working again much more quickly."

## CURRENT COMMUNICATION CHALLENGES

Currently, getting connected in a remote forest area requires GEO-based satellite technology, VHF (very high frequency) radios, or satellite phones. All are limited. The backhaul, which links the forest to the outside world, for GEO-based satellite can only be used for transmitting short bursts of data one way. VHF radios are only for local voice communication. Satellite phones are unreliable due to limited bandwidth and longer latency, preventing timely information flow from forest to data centres and offices.

There are no mobile cellular networks that can be easily and cost-effectively deployed in forest operations.

In large mining sites, there are some cellular networks being used, however, they are not mobile. Because forest operations are dynamic in nature, moving to various sites, a cellular solution required the capability to easily move the communication tower to different locations.

## SOLVING THE CONNECTIVITY PROBLEM

In approaching the research to build a sustainable cellular operation, FPInnovations had several goals. They wanted to accelerate the introduction of connected and automated vehicle technologies, create automated data management systems for acquiring live telematic data from forest machines, support setting up connectivity solutions for remote camp sites and facilitate regulatory changes for frequency access to forest industry.

Tolko Industries was already working on a similar project with logging contractors Tsi Del Del and San Jose Logging from Williams Lake. They joined forces with FPInnovations.

In early 2021, FPInnovations and Tolko tested an LTE system with a high-speed satellite backhaul at the edge of a cut block deep in the forest near Williams Lake. Tolko purchased a 30-metre, portable cell tower and FPInnovations equipped the tower with a five dBi (decibel relative to isotrope) gain omni-directional antenna on top. This was connected to a high-speed, satellite backhaul terminal that connected the LTE system to the internet.

The result was broad coverage with access to a stable high-speed internet connection, even in heavily forested areas.

“When you’re somewhere in the middle of the forest where you don’t have cell coverage, you need to create multi-hop microwave backhaul setup to bring cellular coverage into the forest,” Shetty explained. A multi-hop system requires using a series of towers to get from the nearest mobile internet tower to a remote site.

The first mini tower trial had a range of 800 metres.
Photo: Craig Evans, FPInnovations

A tower-mounted amplifier significantly improved range.
Photo: Mithun Shetty, FPInnovations

"This approach is cost prohibitive, so we tried high-throughput GEO-based satellite backhaul, but the target bandwidth required wasn't enough." High-throughput, or data speed, is essential for connectivity.

"With the latest LEO (low earth orbit) constellations, the data throughput requirements were met, thus we can give workers better service," added Shetty.

Increasing the tower height was the next step. Shetty explained, "We needed 30-metre towers to gain enough antenna height on the relatively flat ground surrounded by heavy vegetation. Tower height is important so the antenna can transmit signals above the tree canopy. If we can make use of accessible higher elevations located around the forest operations, then we can go with a shorter version of a tower. Installing the tower at a high point gives better line of sight to the operations."

### TRIALS AND TEST RESULTS

Along the way, the companies faced multiple challenges. "We learned a lot in the early stages and know what does and doesn't work now," Shetty said. "If you deploy a single tower in the operation, the geography may not allow for ubiquitous coverage. There will likely be blind spots you may want to cover. You might need a second tower or a repeater.

"The point-to-point communication between towers may work in some areas, but not in others. Having a multiple independent system with 30-metre towers with satellite backhaul is the best and easiest way to deploy in forest operations."

The first mini tower they tried had a range of 800 metres. The coverage difference between downlink and uplink of mobile devices was considerable. If anyone was in a range greater than 800 metres from the tower, their device would not connect to the tower.

By using the tower-mounted amplifier, they achieved a significant boost in range and a reduction of the link-budget imbalance, which is the difference in coverage; when a worker drives away from the tower, the coverage distance will be more, but if they lose connection, then they need to come closer to the tower to get connected again. Because everything in the forest is non-line of sight, the tower mounted amplifier significantly helped the coverage.

Shetty remembers the day they ran one of their tests. "We did a demo of this technology from deep in the forest. It was so clear I felt like I was in an office in the city. We had 30 or 40 participants from all across Canada who joined in. It was quite an historical moment."

### NEXT STEPS

The testing phase is almost complete, and they are moving into a support and implementation phase.

"We must go slow at first," Shetty said, "as some things aren't quite ready yet. We need to make sure workers have access to their phones, see how it works, and what is required of them. From there we can do some fine tuning with feedback from the forest workers. As we hit the fire season, we can have communication between them and wildfire workers directly or through the app."

Kiel added, "Even as we are testing this, technology is changing. We may even be able to take this to the public with the help of telecommunication companies. Time will tell."

Kiel said they are eager to work with vendors to bring connectivity in remote areas. "It will be a game changer if we can solve the last couple remaining issues. We are working where people have never had cell service. We came into their space, and they saw us talking on our cell phone and they were shocked as they were still on the sat phones," Kiel said.

## FUTURE POSSIBILITIES

Shetty said while this LTE technology isn't new, they now know what works and what doesn't in the remote forest. "Now telecom companies can piggy back on it," he said. "One of our goals was to get them on board. Now that it's viable and we have mobile stations, they can expand their reach by partnering with forest companies.

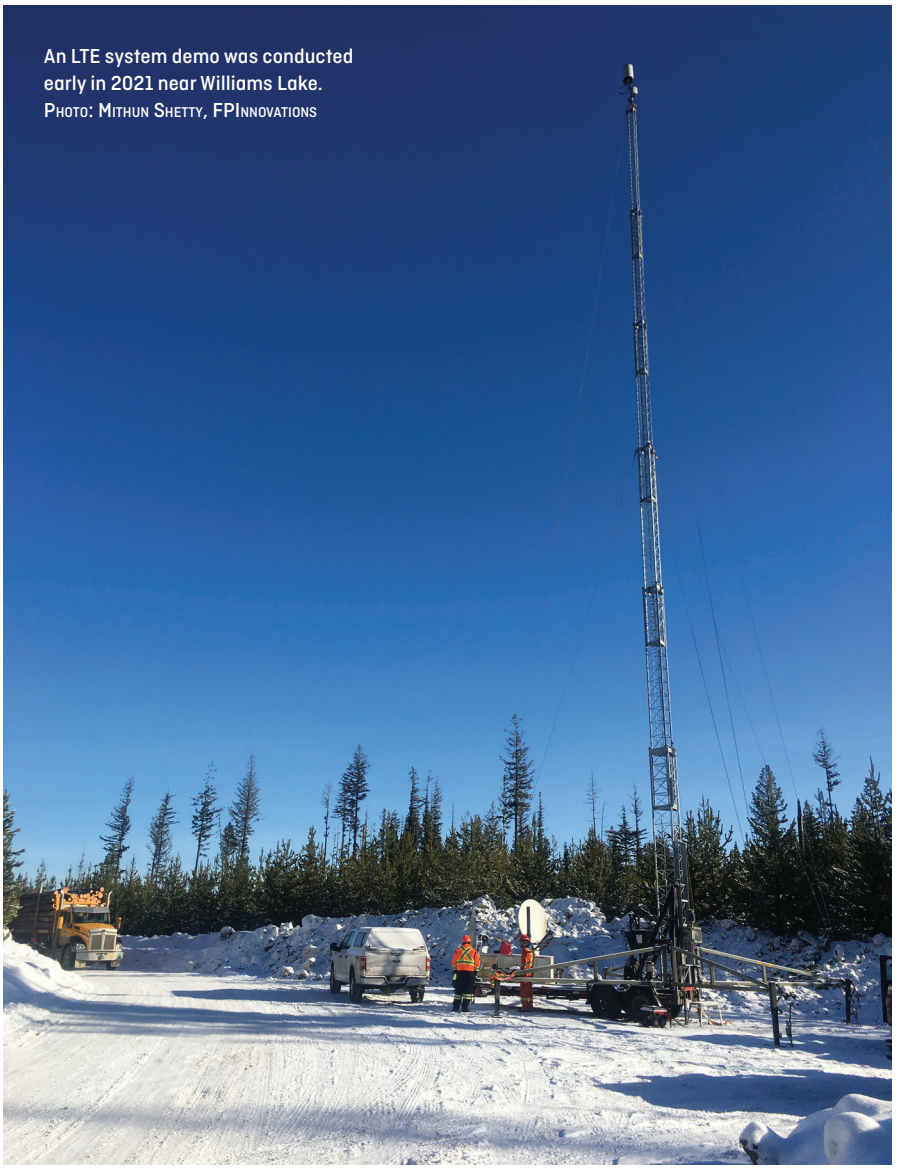
Shetty noted, "This LTE network will impact the forestry industry, First Nations communities, wildfire workers, remote camp workers and any others who require mobile LTE technology. An added plus is that it can also be used in case of natural disaster and times when emergency response is needed."

With this connectivity, the industry can use real-time kinematic (RTK) systems for high-precision machine locations. RTK is used in surveying to correct errors now found in today's satellite navigation (GNSS) systems. This technology will help with road surveys and building new roads.

Looking further ahead, Shetty added, "There is a labour shortage right now. Having this internet in place will help attract new workers, retain existing workers and improve communication between crew members and office staff. It also improves communication with first responders.

"We'll have improved connectivity and, in the future, could have more automation. These internet connections enable future technology expansion.

"Our initial part was to make sure forestry workers were connected and safe," Shetty said. "It's a proud moment for BC being the first adopter of this technology and for Tolko's leadership in this endeavour. Soon this technology will be ready to be scaled up for the rest of Canada to bring digital transformation to the forest sector." ♦



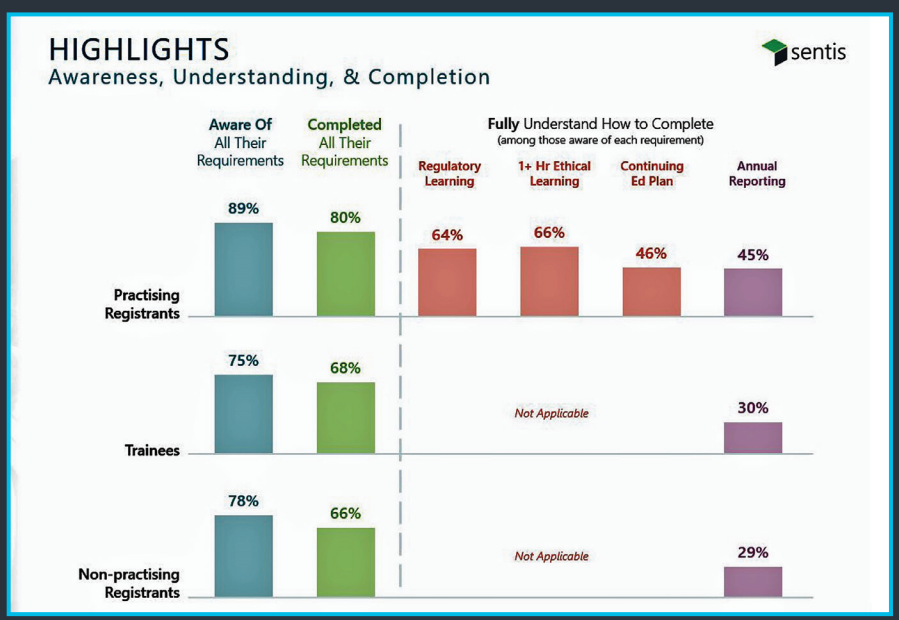
An LTE system demo was conducted early in 2021 near Williams Lake.
Photo: Mithun Shetty, FPInnovations

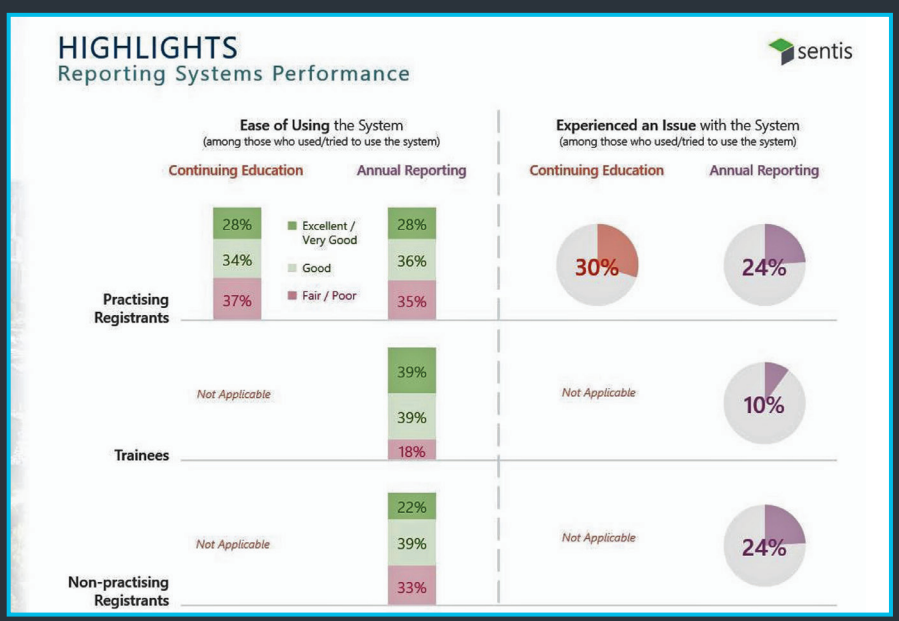
## SURVEY IDENTIFIES ISSUES USING NEW REPORTING PROCESS

Engineers and Geoscientists BC launched new Continuing Education (CE) Program requirements this year, with registrants being required to report their CE and update their contact and practice-related information by June 30.

While more than 70 percent of registrants completed their requirements by the deadline, for some, the experience didn't go as smoothly as hoped. Many registrants were frustrated and confused while working through the reporting process for the first time.

Recognizing the need to make reporting more approachable for future periods, Engineers and Geoscientists BC decided to ask registrants what significant issues they faced with reporting. As a result, Sentis Research was commissioned to survey registrants from August 25 to September 11, 2022.




The results of the in-depth survey reveal that while the vast majority of those surveyed, 82 percent, said they were aware of the new requirements, only 40 percent said they completely understood them. (See Awareness, Understanding & Completion chart below for more details.)

"This program was a big change for our registrants, and it was also a big change for us," said Heidi Yang, P.Eng., Engineers and Geoscientists BC's CEO. "The intent behind continuing education is a philosophy of lifelong learning – getting better, continuously – and that applies to our organization, too. We're committed to continuous improvement and to making sure our requirements are clear and registrants understand how to meet them. So it was really important to us to hear feedback from registrants about how we can improve for future years."

The reporting changes were implemented when the *Professional Governance Act (PGA)* was introduced in 2021. Engineers and Geoscientists BC registrants with practising status are now required to complete CE reporting each year. All registrants, including trainees and non-practising registrants, are also required to update their contact and practice-related information through a process called Annual Reporting (AR), which was required for the first time in 2021.

### DRILLING THROUGH THE SURVEY RESULTS

The survey, which was sent to 37,704 registrants and had 4,480 completions, separated registrants into practising, trainee, and non-practising categories. For those practising, results were also divided by those working in a firm (2,956 respondents) and those who are sole practitioners (554 respondents). Trainees (390 respondents) and non-practising registrants (408 respondents)

do not have to complete the same CE requirements as registrants.

To remain in compliance, registrants must complete their yearly reporting requirements by June 30 or face paying a fine. If registrants do not comply by September 30, they are suspended until outstanding requirements are met and fines are paid. If not compliant by December 31, registrants are removed from the registrer and must apply to be re-instated.

Overall, the majority of practising registrants polled said they completed their AR and CE requirements on time in 2022. Those practising in a firm recorded higher compliance, at 81 percent, compared to sole practitioners at 72 percent (results are weighted by numbers polled). According to the poll comments, this difference may be attributed to sole practitioners not having colleague support and having to take extra time after work hours to do their paperwork.

## ISSUES WITH REPORTING

Annual reporting requires registrants to verify contact and practice-related information and complete declarations annually. Registrants report their information by completing a five-step process from their Engineers and Geoscientists BC online account.

Registrants polled were evenly split about the ease of using the reporting system; about one-third each felt the system was either easy to use, okay or poor. (See Reporting System Performance chart on page 20.) Between 10 and 24 percent of registrants polled had problems with the AR process, mainly from not being able to tell when the process was completed and having to log into the system several times to complete the process.

For CE compliance, 30 percent of practising registrants said they had issues with the system. The main concerns were not being able to tell if requirements were met, that courses, webinars, or modules were not getting recorded in the system and not understanding where to record completed items.

## SUGGESTIONS FOR IMPROVEMENT

Registrants suggested the following improvements:

- Having all Engineers and Geoscientists BC courses that registrants take automatically appear in the CE system
- Including a dashboard in the user account that shows registrants which requirements are met and which are outstanding
- Being able to complete CE and AR in the same system

Registrants were almost evenly divided about aligning the current AR and CE reporting deadline, June 30, with the day when fees are due, December 31.

## ISSUES WITH COMMUNICATION

Information about the changes and process were communicated by Engineers and Geoscientists BC to registrants starting in 2019, ramping up through 2022.

Most registrants, 73 percent, said they heard about the new processes by direct email. To understand the reporting requirements, most registrants sought out information on the Engineers and Geoscientists BC website, followed by direct e-mail, talking to colleagues, and attending webinars.

Rating the effectiveness and understanding of the communications was divided with one-third saying it was excellent, one-third saying it was good and the balance saying fair or poor. For those who felt it was poor, the primary reason was too many emails sent by Engineers and Geoscientists BC, leading to information getting lost in email volume.

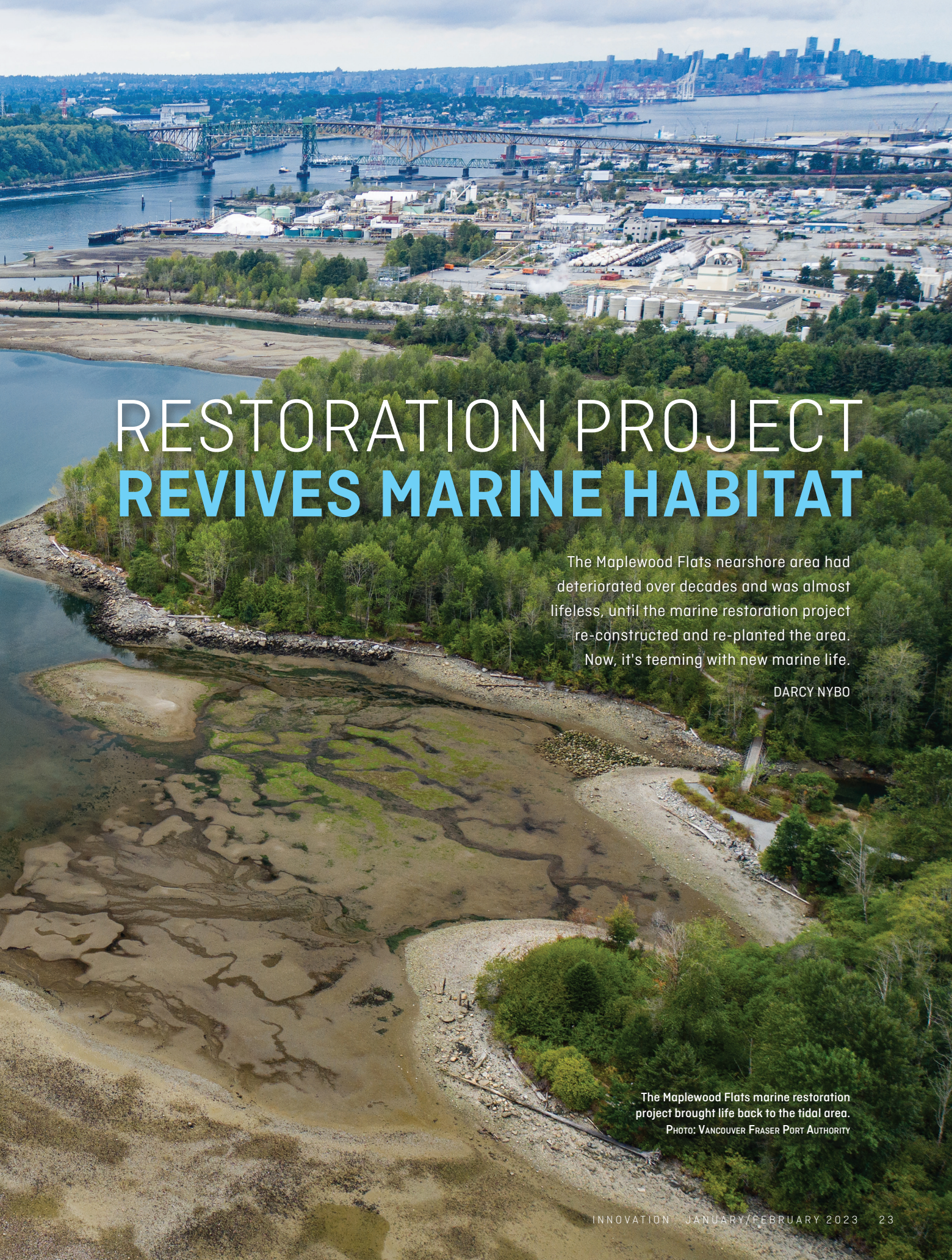
## IMPROVING THE PROCESS

Going forward, Engineers and Geoscientists BC is reviewing the results carefully and looking for areas of improvement to its systems, communications, and reporting process. We will update registrants on any confirmed changes early in the spring.

## 2022 ENGINEERS AND GEOSCIENTISTS BC AWARD WINNER

The Maplewood Marine Restoration Project received the Innovation in Sustainability Award in 2022 from Engineers and Geoscientists BC. The award recognizes an engineering or geoscience project that addresses environmental protection and environmental enhancement, developing solutions to address a changing climate, and seeking to realize sustainable outcomes.

The organization's annual awards recognize exemplary professional, technical, and volunteer contributions made by Engineers and Geoscientists BC. Nominations for 2023 awards are now open. For more information, please see article page 10 or go to *egbc.ca/Awards*.



# RESTORATION PROJECT REVIVES MARINE HABITAT

The Maplewood Flats nearshore area had deteriorated over decades and was almost lifeless, until the marine restoration project re-constructed and re-planted the area. Now, it's teeming with new marine life.

DARCY NYBO

The Maplewood Flats marine restoration project brought life back to the tidal area.
Photo: Vancouver Fraser Port Authority

Top: Port authority senior project coordinator Vanessa Koo, in front, and Anthony Nahanee, a member of the Squamish Nation and a shore crew team member, hand prepare individual eelgrass shoots.

Bottom: The eelgrass shoots are fitted with steel washers to anchor them to the marine sediment. PHOTOS: VANCOUVER FRASER PORT AUTHORITY

In the fall of 2021, over 4.5 hectares of uninhabitable marine nearshore habitat was painstakingly restored so native plants and animals could once again flourish. A year later, the results show it's working.

“It’s like they say, if you build it, they will come,” said Charlotte Olson, P. Geo. PMP, Manager, Infrastructure Habitat Development, for the Vancouver Fraser Port Authority. “It’s like a habitat mosaic. We couldn’t turn it back into exactly what it was, but we did the best we could with the site and the existing conditions we had.”

The Maplewood Marine Restoration Project was led by Olson under the port authority's Habitat Enhancement Program. The area, in Burrard Inlet, two kilometres east of the Ironworkers Memorial Bridge in North Vancouver, was identified as a nearshore marine restoration priority by the Tsleil-Waututh Nation. The project entailed filling in the area and planting eelgrass, a seagrass commonly used to re-establish marine environments.

“Even a few years ago, it was difficult to find a crab or a clam anywhere in Maplewood Flats," she said. "We just finished our year-one monitoring program in 2022 and are seeing more finfish, kelp, crabs, clams and other marine organisms in the restored area as well as reciprocal growth in the eelgrass. This is a definite improvement in the species richness and diversity at the site.”

The once almost-absent Dungeness crab population has grown considerably. "It is very good news that our site is already providing benefits for this species. It will continue to do so as the eelgrass continues to establish over the next few years,” Olson said.

The Tsleil-Waututh Nation flagged the site to the port authority and, seeing the value of the project, the port authority went ahead and started concept-design work in the fall of 2017.

It took about two years to design, seek permits, and complete Indigenous and community consultation. The port authority worked in collaboration with the Tsleil-Waututh Nation, and with involvement from the Musqueam Indian Band and Squamish Nation. AECOM, an international infrastructure corporation focused on sustainability, played a critical role for the project led by design manager Neil Snowball, P.Eng.

## YEARS OF DETERIORATION

The project site has been used by Indigenous nations since time immemorial and currently lies within the Tsleil-Waututh Consultation area. In 1940, the area was dredged to extract gravel for upland construction. Prior to dredging, it would have been contiguous tidal-flat habitat. Watersheds within Burrard Inlet wound their way across the tidal flats and created thriving environments for plants and animals.

**After one year of planting, the eelgrass is thriving and attracting new marine life.** Photo: Vancouver Fraser Port Authority

In the 1970s, the dredged basin area was used for log storage. Over the decades, accumulated wood waste and sediment created a murky bottom that was almost uninhabitable.

"A few years ago, this area had very low habitat complexity and diversity," Olson said. "The dredged basin was very deep, had low light penetration, and lots of wood waste on the bottom. You could almost count on one hand how many Dungeness crabs were utilizing the basin pre-restoration."

### MAKING THINGS RIGHT

At the marine site, two hectares were restored as tidal flat, one-and-a-half hectares were planted with eelgrass and over a hectare included a created rock reef.

Over 230,000 cubic metres, or approximately 300 barges, of dredged Fraser River sand was beneficially reused to raise the Maplewood basin floor to reach the tidal flat elevation, and to create an area where eelgrass, a long, ribbon-like type of seagrass, could be transplanted and grow. Over 13,000 tonnes of rock were also placed to create a one-hectare rock reef to support various kelp and marine species.

"We raised it up to a target elevation and let nature do the rest. We simply placed clean Fraser River sand and imported rock into the area as per the design requirements. Now we are seeing colonization of baby clams and a variety of other bivalves and marine organisms on the tidal flat."

Crews test and monitor the area a year after the Maplewood tidal flats restoration is complete. Photo: Vancouver Fraser Port Authority

A variety of juvenile clams, a larger horse clam and a clam worm are among the marine organisms found during a sampling one year after the restoration. Photo: Vancouver Fraser Port Authority

The newly created rock reef has seen some impressive changes. "After just one year of monitoring, we are already seeing species diversity and richness comparable to the reference site," Olson said. "It is well known that rock reefs tend to colonize very quickly and provide highly productive habitat to a variety of marine species to use right away."

The marine construction was completed in 2020. Then it was time to transform the rest of the area by transplanting eelgrass in 2021.

## THE IMPORTANCE OF EELGRASS

One of the main components of the project was transplanting eelgrass from existing healthy eelgrass donor sites into the Maplewood basin. The port authority worked with Indigenous Nations on the planning and implementation of the transplanting work.

The fast-growing eelgrass provides important shelter and acts as a nursery habitat for young fish, including salmon, as well as a variety of shellfish including Dungeness crab. Bringing their numbers back up was of ecological, cultural and recreational importance.

Over 125,000 eelgrass shoots were transplanted to a 1.5-hectare eelgrass bed, the largest eelgrass transplant ever performed in Burrard Inlet.

To create this biodiverse area, Olson explained, “It’s a three-step process. We had divers carefully harvest the eelgrass shoots from the donor sites. Then they were brought onto the shore where workers from Inlailawatash, a Tsleil-Waututh Nation-owned business, hand prepared the shoots."

The shore crew attached small loonie-size steel washers to individual eelgrass shoots to anchor them to the marine sediment. The rust from the anchors is expected to chelate with sulphites in the surrounding sediment to improve the environment for establishing the eelgrass.

Once all the washers were attached and the eelgrass was bundled together, it was time to hand them over to the underwater dive transplant crew.

“The divers strategically and carefully planted them on a meticulous grid. It was one metre on-centre planting with a bundle of eight shoots over a 1.5-hectare area. On average, the divers were able to plant about 3,000 eelgrass shoots a day. It took about 50 days to complete the process.”

## MONITORING AND THE FUTURE

The project is already showing positive results after a year and the port authority is working with Indigenous Nations on the long-term effectiveness monitoring program.

Another benefit of the project extends to animals and birds in the neighbouring wildlife conservation area, immediately south of the site.

“There are a variety of bird species in the area. Every time I go out there,

AECOM biologist Kathleen Moore, left, port authority project coordinator Tim Wu, top, and AECOM biologist Micki Steeman sift through sediment to identify aquatic species.
Photo: Vancouver Fraser Port Authority

I see at least one blue heron fishing on the tidal flats," Olson explained.

The project is also a catalyst for similar marine restorations.

“The success of this project can inform other future large restoration and offsetting projects in the Pacific Northwest,” Olson said. “This project supports gateway growth and creates a highly productive habitat area. The port authority extends its thanks to Tsleil-Waututh Nation for all their collaboration on this project, and to Musqueam and Squamish Nations for their involvement.”

“We are always looking for restoration and enhancement opportunities within the port authority's jurisdiction,” Olson said. “We continue to explore partnerships with all levels of government, ENGOs, and Indigenous communities. There’s a lot more work to be done." ♦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# RESILIENT, REINFORCED CONCRETE COULD SHAKE UP THE CONSTRUCTION INDUSTRY

FOR THE NEXT TWO YEARS, UBC OKANAGAN'S DR. LISA TOBBER WILL HOLD THE BC HOUSING PROFESSORSHIP IN RESILIENT REINFORCED CONCRETE BUILDINGS. HER FOCUS IS TO FIND NEW WAYS TO CONSTRUCT BUILDINGS THAT CAN WITHSTAND THE EFFECTS OF CLIMATE CHANGE AND NATURAL DISASTERS.

ROBIN J. MILLER

Different concrete materials can address environmental impact.
Photo: Joanne Vincent/ Fotolia

New concrete design can make buildings more resilient. Photo: Alex Lyubar/Adobe Stock



"If I don't break it, shake it, or burn it, I'm not interested," said Dr. Lisa Tobber, EIT, assistant professor in civil engineering at UBC Okanagan (UBCO) and the first recipient of the BC Housing Professorship in Resilient Reinforced Concrete Buildings.

"I love my UBCO lab," she said, which has a three-storey-high ceiling, a large crane and a one-and-a-half-metre thick concrete floor, "because it's more like an industrial factory. We build a wall then use hydraulic actuators to push forces of upward of 200,000 pounds at it and observe how the concrete behaves as it breaks.

"Day to day, a concrete building behaves one way, but when it gets pushed beyond the normal, like by an earthquake or a heat dome, a fire or a flood, then it begins to bend and elongate, and the damage starts to happen. We need to understand that behaviour first, in order to figure out how to make it more resilient."

## INSPIRED TO FIND SEISMIC RESILIENCY SOLUTIONS

Tobber's interest in the field has roots going back to when she was working in administration for a construction company and saw the company's engineers in action. "Seeing how the entire process worked, from a design on paper to the finished structure, was magic." The light bulb went on, and today, she said, "I still have a soft spot for construction."

It was that soft spot that eventually led Tobber to Ph.D. research on earthquake resilient high-rise buildings, "where we were trying to create damage-free buildings using novel technology." Once at UBCO, however, she saw an opportunity to broaden her focus.

"I started thinking, first, how can we create new structures that can be easily adapted into the construction industry, and second, what kind of solutions are needed to meet not just seismic resiliency, which is vitally important" — especially in B.C., which has the highest earthquake risk in Canada — "but also climate adaptation and the climate crisis, the housing crisis, and more.

'We have compounding crises where we are having to build a lot of buildings under conditions we've never experienced before during a period of extreme labour shortages. And there are no easy answers for how we are going to do this."

## CHANGING THE CONSTRUCTION INDUSTRY

The key, Tobber believes, lies not just in developing better concrete but also in changing the way the construction industry currently thinks and works.

"There's a lot of research out there about wood and timber structures but I kept going back to the fact that concrete is the most-used material in the world, apart from water," she said, largely because it is long-lasting and versatile. "I don't see concrete ever going away entirely, so my question is, what's next? Is it a new concrete material? Is it precast concrete? Is it a hybrid system where we do some concrete and some wood? And what's next specifically for our Canadian industry? What's going to help us deal with so many issues at once?"

With those questions in mind, Tobber is currently studying precast concrete, which is created by pouring concrete into molds in a temperature- and humidity-controlled environment. The finished components are then transported to the construction site where they are lifted into place.


**Dr. Lisa Tobber shipped 15 metres of precast concrete wall built in B.C. to a larger lab at Shanghai's Tongji University in China, to be shake-table tested to simulate earthquakes and to analyze resiliency.** Photo: Courtesy of Lisa Tobber

Significantly cheaper, faster and more reliable in quality than concrete mixed and poured onsite, precast concrete is used extensively in other jurisdictions, including Ontario, but rarely here.

"That's one of the things I want to change," said Tobber. She believes the construction industry could be more proactive in doing its own research and adopting new ideas, and that greater collaboration between structural and construction engineers, architects, city planners and regulators could mean that good ideas are implemented more quickly.

## DAMAGE-FREE GOAL

In addition to precast concrete, "The example I tend to use is base isolation, a technology that's been

New concrete materials and design could re-shape the construction industry. Photo: Lucas Inacio/ Adobe Stock



around for decades and decades for smaller buildings, where you can place your entire building on rubber or Teflon-sliding bearings. When an earthquake hits, it actually decouples the building and can result in minimal damage. It's used in New Zealand, in the U.S. and in Japan, but we have few examples of it being used in Canada."

For larger, mid- and high-rise buildings, Tobber is aiming for that same goal of almost zero damage. "Right now, in B.C., we design tall buildings to absorb earthquake energy through damage," she said, which means the people inside will be able to escape the structures in a disaster, but that's all. In many cases, residents and businesses may never be able to return to their buildings which, in a city full of

concrete towers like Vancouver, means hundreds of thousands of people could be displaced in a matter of minutes.

To avoid that, "you need to design the walls a little differently than we do now. You disconnect them from the foundation and you allow them to rock, then you add energy dissipation to reduce damage to core walls," perhaps — as she and her Advanced Structural Simulation and Experimental Testing (ASSET) Group at UBCO are investigating — by combining precast or hybrid wood/concrete systems with earthquake-resilient structural systems and technologies, such as coupling beams and damped outrigger systems that work like shock absorbers on a car.

### GREEN AND LEAN WAYS

At the same time, Tobber and her team are also looking at ways to decrease the environmental impact of making concrete, which is a leading cause of greenhouse gas emissions. This includes exploring if it's possible to design buildings so that they will resist the same loads but use less concrete, and testing new, "green" concrete materials (concrete made with industrial waste) to see how they would function in the event of a disaster.

They are also looking at how to reduce the time it now takes for concrete construction and the amount of specialized labour it requires. "The labour shortage, along with supply chain issues, is really beginning to make people think," said Tobber.

"If we don't have labour, what are we going to do? The construction industry is willing to listen, but we need to come to the table with some solutions, some ideas, so they can participate. And that's what we are trying to promote. We need to design, analyze, study a few example buildings and then bring those case studies into industry." ◆

Dr. Lisa Tobber, EIT. Photo: UBCO

## RESEARCH FORCES CONCRETE TO THE LIMITS

In October 2022, Dr. Lisa Tobber was awarded the first BC Housing Professorship in Resilient Reinforced Concrete Buildings — a research project created through a partnership between BC Housing and the UBC faculty of applied sciences.

For two years, Tobber and her Advanced Structural Simulation and Experimental Testing (ASSET) Group at UBCO will investigate:

- Seismic and wind performance of typical reinforced concrete buildings in B.C.
- Solutions for maintaining the functionality of reinforced concrete buildings after strong earthquakes.
- Seismic design methods for precast concrete construction for mid-rise and high-rise buildings.
- Practical design of connections for hybrid systems (using different materials for lateral-force resisting systems and gravity force-resisting systems) in B.C. building construction.
- Specific challenges faced by reinforced concrete buildings in terms of climate adaptation.
- Structural performance of new concrete materials (such as green concretes, recycled concrete, ultra-high strength) in B.C. building construction.
- Other possible research areas and opportunities for interdisciplinary collaboration on such topics as air quality, equitability, and energy efficiency.

Engineers and Geoscientists BC's website contains information on the complaint, investigation, and discipline processes. You can contact us at 604.558.6647 or toll-free at 1.888.430.8035 ext. 6647, or by email at *complaints@egbc.ca*. The full text of Consent Orders can be found in the Discipline Notices section of our website, at *egbc.ca/Discipline-Notices*.

## DISCIPLINE NOTICE: ALIREZA (DANYAL) BAHRAMI, P.ENG.

Mr. Bahrami is the subject of two unrelated summary discipline notices. In this first matter, on September 9, 2022, Mr. Bahrami agreed to a Consent Order, in which his registration with Engineers and Geoscientists BC is suspended for a period of six months.

In 2018, Mr. Bahrami signed and sealed an inadequate crane inspection report (the Report), prepared by an unsupervised crane inspector, and certified that the structural components of the crane were safe for use. The Report was rejected by WorkSafeBC as it did not cover all the necessary crane inspection requirements. A second engineer completed an inspection which identified numerous structural deficiencies with the crane that rendered it unsafe for use. During the investigation, Mr. Bahrami demonstrated a lack of understanding regarding the inspection requirements and identifying immediate and emerging maintenance issues.

In the Consent Order, Mr. Bahrami admitted that he demonstrated unprofessional conduct, incompetence, or negligence with respect to the Report and that he acted contrary to the Bylaws of Engineers and Geoscientists BC. Mr. Bahrami agreed that he failed to:

- adequately instruct and/or supervise the crane inspector and delegated responsibility to the crane inspector to determine whether defects, including bends, cracks or other deficiencies were acceptable or required repair;
- undertake adequate independent checks to confirm the contents or accuracy of the crane inspection report, which ultimately failed to address the mechanical and control elements of the crane; and
- ensure that the report identified several defects with the structural components of the crane, including defects requiring immediate repair, repair in advance of the next annual inspection, or monitoring.

Mr. Bahrami is restricted from conducting any crane or hoist inspections. If he wishes to lift this practice restriction, following his suspension, Mr. Bahrami must engage a peer reviewer to review his crane inspections for two years.

Mr. Bahrami paid $2,000 toward the legal costs of Engineers and Geoscientists BC. Mr. Bahrami must also complete and pass the Professional Practice Examination and the Professional Engineering and Geoscience in BC Online Seminar.

## DISCIPLINE NOTICE: ALIREZA (DANYAL) BAHRAMI, P.ENG.

Mr. Bahrami is the subject of two unrelated summary discipline notices. In 2017, Mr. Bahrami was asked by a colleague to assist with designing a fire suppression system for a dental office in Surrey, BC. Mr. Bahrami was involved in the preparation of the drawings, which were then signed and sealed by the colleague. Mr. Bahrami utilized a design method only permitted for a single family or duplex residential occupancy, rather than a commercial space. In addition to containing several errors and deficiencies, Mr. Bahrami's drawings did not meet the design standard pursuant to the National Fire Protection Association (NFPA).

On September 13-15, 2021, the Panel conducted a hearing concerning Mr. Bahrami's involvement in the deficient design of the fire suppression system. On May 2, 2022, the Panel released their decision, finding Mr. Bahrami demonstrated unprofessional conduct by failing to design a fire suppression system to the reasonable standard expected of a professional engineer and in accordance with the standards set out in the NFPA. The Panel also found that during the investigation, Mr. Bahrami failed to provide a copy of his complete file, despite repeated requests.

On September 29, 2022, the Panel issued their decision on penalty and costs. Mr. Bahrami is restricted from performing any work related to fire suppression systems. There are several conditions Mr. Bahrami must meet if he wishes to lift or modify the practice restriction.

Mr. Bahrami was ordered to pay a fine of $2,500 and $25,000 toward the legal costs of Engineers and Geoscientists BC.

Mr. Bahrami is also required to successfully complete the Professional Practice Examination and the Professional Engineering and Geoscience Practice in BC Online Seminar.

## DISCIPLINE NOTICE: ROBERT (ROY) KEERY, P.ENG.

On November 4, 2022, Mr. Keery agreed to a Consent Order, in which his registration with Engineers and Geoscientists BC is suspended for a period of two months.

In 2017, Mr. Keery designed and installed a sewerage system for a property in Prince George, BC. Mr. Keery authenticated and filed a letter of certification with the Northern Health Authority confirming the sewerage system was designed and constructed in accordance with the *Sewerage System Standard Practice Manual* (SPM). In 2018, the sewerage system prematurely failed.

In the Consent Order, Mr. Keery admitted that he demonstrated unprofessional conduct with respect to his design of the sewerage system and that he acted contrary to the Bylaws of Engineers and Geoscientists BC. Mr. Keery agreed that, among other things, he failed to:

- design the sewerage system in a manner consistent with the SPM;
- conduct adequate field reviews and maintain project documentation in regard to the design and/or installation of the sewerage system; and
- comply with the *Sewerage System Regulations* (SSR) by affirming that the plans and specifications were consistent with standard practice, when he knew or ought to have known the sewerage system had not been constructed in accordance with standard practice.

After the two-month suspension, Mr. Keery is restricted from practising in the area of wastewater sewerage systems. Specifically, Mr. Keery agreed that he will not act as an Authorized Person as defined in the SSR and the SPM, or conduct any engineering work related to sewerage systems.

To practice in this area, he must successfully complete a course in the area of sewerage systems and Mr. Keery's work relating to wastewater sewerage systems must be peer- reviewed for at least two years. Following the peer review period, Mr. Keery must complete a practice review conducted by the Audit and Practice Review Committee.

Mr. Keery must also complete the Authentication of Documents online course and the Professional Engineering and Geoscience Practice in BC Online Seminar. As part of the Consent Order, Mr. Keery paid $8,000 toward the legal costs of Engineers and Geoscientists BC.

## DISCIPLINE NOTICE: JOHN BRITTAIN

In a November 21, 2022, Consent Order, John Brittain admitted that he was convicted of four counts of murder and the convictions render him unsuitable for registration or licensing with Engineers and Geoscientists BC. Mr. Brittain's registration with Engineers and Geoscientists BC is cancelled.

In 2020, Mr. Brittain pled guilty to and was convicted of one count of second-degree murder and three counts of first-degree murder. On November 21, 2022, Mr. Brittain agreed to a Consent Order, admitting that the nature of circumstances of the offences of which he was convicted render him unsuitable for registration or licensing with Engineers and Geoscientists BC. Mr. Brittain's registration with Engineers and Geoscientists BC is cancelled.

## IN MEMORIAM

Engineers and Geoscientists BC announces with regret the passing of the following registrants.

Mr. Derek John Barratt, P.Eng.

Mr. Erik Bodtker, P.Eng. (Non-Practising)

Mr. Robert Frank Brett, P.Eng. (Non-Practising)

Dr. Barry Neil Church, P.Eng. (Retired)

Mr. Lloyd Arthur Clay, P.Eng. (Non-Practising)

Mr. Paul Keith Glen, P.Eng.

Mr. Richard Westley Graydon, P.Eng. (Non-Practising)

Mr. John Edward Hardy, P.Eng. (Retired)

Mr. Derek Jones, P.Eng.

Mr. John MacKechnie McLeod, P.Eng. (Non-Practising)

Mr. Roy Austin Macdonald, P.Eng. (Non-Practising)

Mr. Jonathon Lai Wa Ng, P.Eng. (Retired)

Mr. Alan John Otter, P.Eng. (Non-Practising)

Mr. Dennis Ronald Westhoff, P.Eng. ♦

# CONTINUING EDUCATION: REQUIREMENTS

**CONTINUING EDUCATION REQUIREMENTS**

*The Continuing Education Program is mandatory and applies to all registrants with practice rights. Registrants without practise rights (Non-Practicing or Retired) must complete minimum requirements to maintain ethical and regulatory competency. Engineers-in-training, geoscientists-in-training, and Life Members are exempt. The end of the first reporting year is June 30, 2022. By June 30 each year, the Ethical Learning and Regulatory Learning Modules and CE Plan must be completed and recorded in the online reporting system. More information, including our Guide to the Continuing Education Program, a CE Plan Template, a CE Plan Example, and a link to the Reporting System is provided at* **egbc.ca/Continuing-Education**.

| DESIGNATION | TOTAL HOURS REQUIRED | ETHICAL/REGULATORY | TECHNICAL, COMMUNICATIONS AND LEADERSHIP | CE PLAN |
|---|---|---|---|---|
| P.Eng., P.Geo, P.L.Eng., P.L.Geo. | 60 CE Hours per 3-year rolling period | The Mandatory Regulatory Learning Module (once per reporting year)<br>One CE Hour of Ethical Learning (once per reporting year) | Balance of Hours | Required |
| Non-practising/Retired | 2 CE Hours per 3-year rolling period | The Mandatory Regulatory Learning Module and one CE Hour of Ethical Learning per 3-year rolling period | Optional | Optional |
| Struct.Eng. | 120 per 3-year rolling period | The Mandatory Regulatory Learning Module (once per reporting year)<br>One CE Hour of Ethical Learning (once per reporting year) | Balance of Hours, Including 60 Technical Hours | Required |
| EIT/GIT, Non-Practising Life Member | Optional | Optional | Optional | Optional |

## PROFESSIONAL SERVICES

# CONTINUING EDUCATION

## UPCOMING WEBINARS

*egbc.ca/Events*

### SHARE YOUR IDEAS WITH CONFIDENCE

*February 14, 2023 | Eligible for 1 CE Hour*

In this session, we'll explore how to communicate ideas with clarity and confidence by learning the importance of having a positive message and clear call to action, even in the most challenging situations.

### ADOPT A POWERFUL PRESENCE

*February 21, 2023 | Eligible for 1 CE Hour*

In this session, participants will learn about presence and that the purpose of true leadership presence is to inspire, not to entertain. They will explore the concept of authentic presence and learn how to connect what they say to how they say it.

### BUILD YOUR LEADERSHIP BRAND

*February 28, 2023 | Eligible for 1 CE Hour*

In this session, participants learn how to create a leadership brand and will explore the key elements of brand (authenticity with audience-centeredness) to learn how to balance their own needs with the needs and preferences of their audience.

### INTRODUCTION TO BUSINESS DATA ANALYTICS FOR ENGINEERS, GEOSCIENTISTS, AND MANAGERS

*March 3, 2023 | Eligible for 7.5 CE Hours*

This is an introduction to business data analytics to improve decisions by analyzing datasets to identify patterns and trends and generate insight that can feed into organizational decision making. Participants examine descriptive, predictive, and prescriptive analytics, and use MS Excel to conduct database analytics.

### EMOTIONAL INTELLIGENCE AND TEAM EFFECTIVENESS

*March 9, 2023 | Eligible for 3.75 CE Hours*

What is the role of emotional intelligence in the development of trust, psychological safety, and effective team performance? This webinar will discuss what you need to know about emotional intelligence to help you and your teams perform at their best.

### IDENTIFYING AND OVERCOMING CHALLENGES IN CREATING A NI 43-101 TECHNICAL REPORT

*April 5, 2023 | Eligible for 2.75 CE Hours*

This short course provides the participant with the knowledge and guidance to identify many of the common factors that can impact report creation, as well as avoid the traps that lead to technical reports that don't comply with NI 43-101.

### LEADING WITH EMOTIONAL INTELLIGENCE

*April 20, 2023 | Eligible for 7 CE Hours*

Join David Cory, executive coach and leadership development specialist, as he shares with you what the most progressive companies in the world are doing to develop their leaders' emotional intelligence and what you need to know about emotional intelligence to help you and your teams perform at their best.

**Regulatory Learning** **Ethical Learning** **Technical Learning** **Communications/Leadership Learning**

*We encourage you to take advantage of the new Knowledge Centre, at* **egbc.ca/Knowledge-Centre**, *which provides on-demand educational opportunities. The Centre now hosts more than 100 on-demand recorded and self-directed courses on a variety of topics.*

## KNOWLEDGE CENTRE

*egbc.ca/Knowledge-Centre*

### MANDATORY: REGULATORY LEARNING MODULE FOR 2022-2023

*Eligible for 1.5 CE Hours*

As part of the Continuing Education (CE) Program, each year, the Regulatory Learning module will cover essential regulatory topics relevant to all Engineers and Geoscientists BC registrants. This year's module is focused on Truth and Reconciliation with Indigenous peoples and what reconciliation means for engineering and geoscience professionals working in B.C.

### 21ST CENTURY ENERGY TRANSITION: THE GLOBAL CHALLENGE OF OUR TIME

*Eligible for 2 CE Hours*

In this webinar, we will examine the complexity of energy issues confronting humanity today to gain insights on how best to deal with the global challenges of energy transition.

### PREPARING FOR YOUR COMPLIANCE AUDIT

*Eligible for .5 CE Hours*

As a condition of the permit, firms are required to participate in mandatory compliance audits. This session provides insight into the process of conducting compliance audits for firms and helps registrants better prepare themselves for the compliance audit.

### PROFESSIONAL PRACTICE GUIDELINES: PEER REVIEW

*Eligible for 1 CE Hour*

This course will review what your professional obligations are when completing a peer review, requesting a peer review, or when having your own work reviewed by another professional.

### EQUITY, DIVERSITY, AND INCLUSION (EDI) FOR ENGINEERS AND GEOSCIENTISTS

*Eligible for 1 CE Hour*

This free, self-paced online course provides foundational training on equity, diversity, and inclusion (EDI) to help individuals develop competencies in inclusive behaviours and emotional intelligence.

## CALL FOR PRESENTERS

Are you an expert in your field who would like to contribute to engineering and geoscience practice? Engineers and Geoscientists BC is actively seeking members to present on a variety of topics. For more information, please visit *egbc.ca/Practice-Resources/Professional-development*.

ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA

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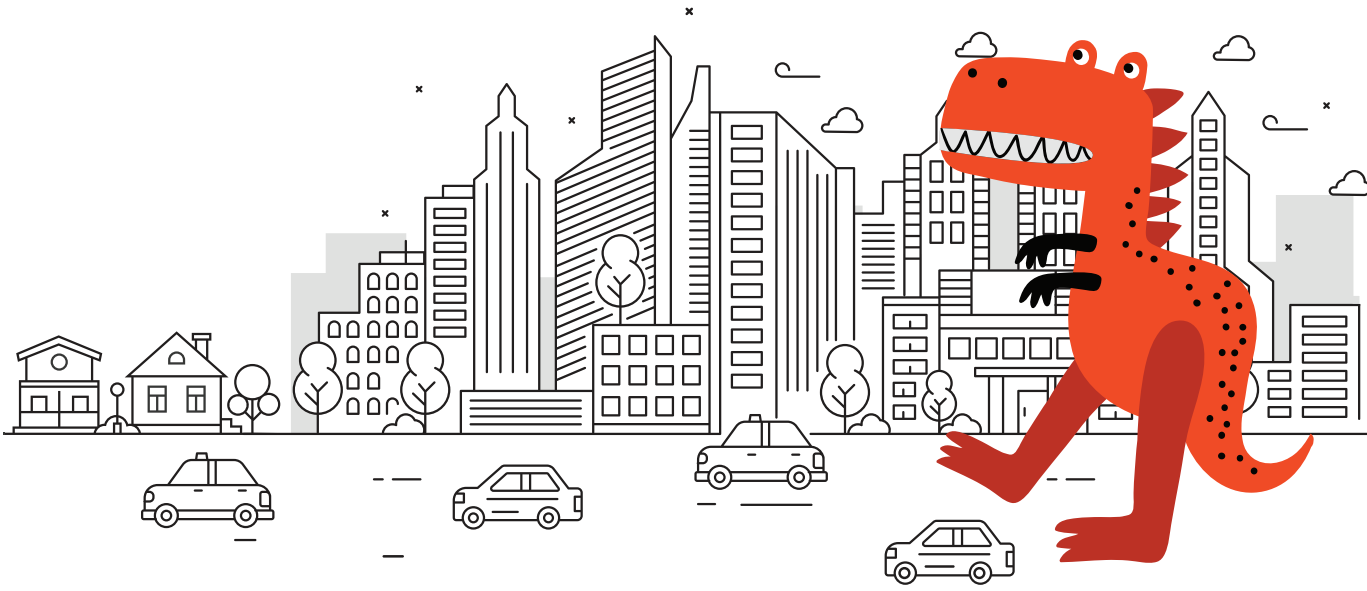

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