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ENGINEERING DIMENSIONS



FEATURE

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By Marika Bigongiari and Adam Sidsworth

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If you suspect a person or company is practising engineering without a licence, contact PEO's enforcement hotline at 800-339-3716, ext. 1444, or by email at enforcement@peo.on.ca.



THE TRAITS OF GREAT INNOVATORS

By Nicole Axworthy



When people are asked about today's innovative companies, the usual suspects likely come to mind first: Apple, Tesla and other large players who dominate Top

Tech lists around the world. But there are also many smaller, lesser-known companies in a variety of traditional and emerging disciplines that are developing or advancing cutting-edge materials and technologies. They often get overlooked because their innovations are not driven by consumers' needs and therefore don't get the same attention as the latest iPhone.

But Canada needs these innovations now more than ever. More often than not, they are driven by individuals who are willing to challenge the status quo, reimagine a product you didn't know you needed or attempt something that has never been done before. They are created by leaders instead of followers who have the ability to turn their ideas into assets while also realizing the value of the people and employees who help get them there.

Each of the professional engineers interviewed for our Canadian innovations feature this issue possess these traits. In "The innovation engine: 6 sensational engineering projects driving change" (p. 16), we'll introduce you to the individuals and teams behind the country's latest innovations, including the first

original zero-emission concept vehicle built collaboratively by Canada's automotive supply sector and select universities, the first 3D-printed house that brings new technology to the construction sector and an artificial intelligence-driven healthcare platform that is transforming the country's health research.

This kind of ingenuity is very much valued in the engineering profession. On November 26, the 74th Ontario Professional Engineers Awards virtual gala will celebrate the achievements of professional engineers who have made similar notable contributions to their profession and community, including in the research and development and entrepreneurship categories. Head over to page 10 to read about this year's recipients.

On a final note, with PEO's modernization efforts underway, *Engineering Dimensions* will be making a few changes, too, starting with saying goodbye to paper copies of the magazine. With the March/April 2022 issue, we will be going fully digital and no longer offering readers the option to receive a hard copy. Though I will certainly miss the days when fresh copies of the latest issue arrived on my desk, it's an important step in PEO's goal of becoming a digital organization. Flip (or click) to page 63 for more details. **e**

THIS ISSUE Canada is a country of innovation, and engineers are at the forefront. From 3D printing of new homes to zero-emission concept vehicles, engineers are improving Canadians' lives while propelling the economy forward. In this issue, we highlight six innovative entrepreneurial projects with engineers in leadership roles.

DEFINING SELF-REGULATION

By Christian Bellini, P.Eng., FEC



Self-regulation: It is a key concept that guides PEO's work as we tackle the enterprise-wide transformation project to modernize the organization. Over my many years as a PEO volunteer, self-regulation has been the most critical part of our DNA as a regulated profession in Ontario. Indeed, many professions in Canada have been granted the privilege of

self-regulation. But if you ask a group of engineers or other professionals to define self-regulation, it becomes apparent there is no universally accepted definition. And yet, to preserve it as the backbone of our mandate, we need to come to a common understanding of what it means.

To some, the idea is epitomized by our volunteers. PEO has nearly 800 volunteers contributing in different ways—at chapters, on committees or serving on Council—and performing functions such as organizing chapter events, interviewing applicants to assess their experience for licensure and serving on committees. So, does having engineer volunteers perform these tasks contribute to our status as a self-regulator? In the above examples, I would argue that only experience assessment contributes directly to our regulatory work. The other work, although important, primarily supports PEO as an organization.

To others, self-regulation means turning first to engineers to solve any issues—engineering or otherwise—that come up at PEO. Need to set a budget? Find a licence holder with finance/accounting experience. Need legal advice? Track down a member with a legal background. Need a governance review? Surely there is an engineer with governance experience who can help. I personally do not subscribe to this approach. If we are pursuing excellence in our regulatory work, we need to seek out the best legal advice we can find. Or the best accounting advice. Or the most experienced governance consultant. Do we do a disservice to the concept of self-regulation when we look outside our profession for professional advice? On the contrary, I believe the disservice comes when we limit expertise by insisting it comes bundled with an engineering background. As a regulator, we insist that engineering work be done by engineers. In deference to our fellow regulated professions, so too should we insist that non-engineering work be done by experts in their professional fields.

MAKING USE OF ENGINEERING EXPERTISE

I believe the role of engineers in self-regulation is the most important component of our regulatory framework. It is directly tied to their engineering experience, and the professional expertise they bring to the table is paramount. I believe it is the most critical ingredient in our regulatory framework.



THROUGHOUT PEO'S TRANSFORMATION PROJECT, THE KEY THRUST OF OUR WORK IS TO ENSURE WE HAVE THE RIGHT ENGINEERING VOLUNTEERS IN THE RIGHT PLACES WITHIN OUR REGULATORY FRAMEWORK.

According to the *Professional Engineers Act*, PEO's role is to "regulate the practice of professional engineering and to govern its members, holders of certificates of authorization, holders of temporary licences, holders of provisional licences and holders of limited licences in accordance with this act, the regulations and the bylaws in order **that the public interest may be served and protected.**" Seen through this lens, it is clear this work can only be done by engineers. The best people to set engineering practice standards? Engineers who practise in that field. The best people to determine licensing requirements? Engineers. The best people to evaluate the risks of engineering works to the public and take steps to control those risks? Engineers who specifically work on those projects. The protection of the public interest hinges on the knowledge and experience of those involved in the regulation of the profession.

THE RIGHT PEOPLE IN THE RIGHT PLACES

Throughout PEO's transformation project, the key thrust of our work is to ensure we have the right engineering volunteers in the right places within our regulatory framework—whether it be on Council, on regulatory committees, taking part in tribunals or generally supporting the volunteer network. As we evaluate each existing structure, we need to examine it through the lens of how we take the best advantage of the engineering expertise our volunteers bring to the table and couple that with the support of other professional experts to support the non-engineering elements of what we do. Experienced engineers in the right places will be key to our success as a self-regulating profession.

We are entering the final phase of our governance project. This is the phase where we will be evaluating all PEO's volunteer structures, particularly non-regulatory/non-governance roles, based on their outputs and determine their ongoing purpose in supporting our work. We have a capable and committed Council working on this, and I am excited to see where we will take it. Our goal of emerging as a modern, effective regulator is close, and with this final push, we will be there. [e](#)

FROM FOUNDATION TO FRAME

By Johnny Zuccon, P.Eng., FEC



It's been a long 20 months since we had a full complement of staff in our office. Of course, we haven't vacated the building completely by any stretch, as I've noted frequently in this space. Select staff continue to access our office on an as-needed basis and voluntarily while adhering to screening procedures that include providing

proof of full vaccination. I'm happy to report that, despite the lingering imposition of the COVID-19 pandemic, good things are happening at PEO, and we continue to steadily advance our enterprise-wide transformation process.

Throughout this process, I've espoused the need to embrace a new way of thinking to successfully shift our organization in the desired direction. This new way requires us to focus our business rules and decisions from a different perspective—one that originates from the outside and looks inwards rather than from the inside looking out. The new way is about ensuring our outputs, and everything we do, support PEO's public-interest objectives. By keeping these two principles in the forefront, we will develop the capacity and capabilities to become a more agile and responsive organization. The new way also fosters innovation while embracing automation. And it will lead us to becoming an employer of choice that embodies the best aspects of inclusivity through a strong sense of community and empowerment within a hybrid work environment that amplifies the value of our staff and volunteers.

Indeed, our road towards transformation is a deliberate and calculated one.

BUILDING A STRONG FOUNDATION

I like to compare the progress of our work with the construction of a high-rise building. For those at street level, it can seem to take forever to complete the foundational stage. Although there is constant activity at this stage, there can be little visible results that resemble the structure of a completed building. Thankfully, the commitment to establishing the foundational pieces for a new PEO has been embraced by Council, and I'm excited that we're now beginning to see some tangible results. These pieces under our three transformation pillars (governance, operational, organizational) are starting to bear fruit, and we're moving closer to constructing the basic frame of our new organization.

On the governance side, Council is now operating as a direction and control governance board. This has fueled new operational protocols to support the shift away from past practices as an operational and intervening board. And Council now functions through four governance committees charged with performing the due diligence aspects for Council's fiduciary role of control. Staff in our new governance division are developing standard operating protocols

from a centralized model that will be adopted by the respective staff advisors and staff supports. By the end of this Council term, additional pieces will emerge that will clarify the purpose of PEO's current non-regulatory and non-governance activities, which will further inform our internal operations.

Within the regulatory operations pillar, we're taking steps to complete the stabilization projects associated with our licensing processes. In concert, the legislation and policy division will be recommending front-end business rule changes to the new Regulatory, Policy and Legislation Committee, which aim to address many of the concerns outlined in our external regulatory performance review.

OPERATIONAL PRIORITIES

At the organizational level, we are now primed to build the necessary capacity and capabilities to reflect Council's new direction and PEO's strategic priorities. These include:

- Designing and implementing a mandatory CPD program;
- Reviewing, simplifying and modernizing the P.Eng. licensing process;
- Eliminating COVID-19-related accumulation of non-CEAB applications requiring review by the Academic Requirements Committee;
- Creating a strategic plan with strategies under our three transformational pillars; and
- Establishing a plan for a hybrid workplace.

These priorities are in addition to several strategic initiatives to support completing various stages within the existing transformational pillars.

With this direction from Council in place, we're set to take advantage of our new organizational framework, which was implemented earlier this year to improve the connections across all departments. The framework's top-down accountability approach will enable each of our staff to have their own set of performance-linked SMART goals that align with those of the organization. This will help to ensure everyone at PEO is pulling in the same direction to achieve our common goals.

Although building the new PEO will take time and perseverance, I'm encouraged with the results the transformation process has produced so far. Staying the course and remaining true to our change vision will allow us to become the modern regulator we aspire to be. [e](#)

PEO UNDERGOES DIGITAL TRANSFORMATION OF LICENCE APPLICATION FILES

By Adam Sidsworth



PEO continues to undergo its pilot Information Discovery and Digitization Capability Project (IDDC) to transfer PEO from its current paper-based recordkeeping of licensing and registration application files to a modern, digital storage method.

The IDDC began earlier this year to digitize 21,000 active licence application files as part of PEO's modernization efforts and is in keeping with a recommendation from the external review of PEO's performance as a provincial engineering regulator. In their report, the regulatory experts recommended: "PEO should commission a full digital strategy for the organization. This should include implementation of an electronic case management system and a database to manage licensing and [certificate of authorization] applications, [continuing professional development] and complaints and discipline. It should aim for automation of processes."

The IDDC, which follows best practices defined by the Canadian General Standards Board, is PEO's strategy to bring the regulator's licensing and registration recordkeeping into the 21st century. With the implementation of the IDDC, PEO will be able to, among other things, meet legal standards accepted by Ontario and other Canadian courts, apply data tracking and keyword searchability to all documents and improve the efficiency of its automated registration and member application process.

IMPROVING EFFICIENCY

"With paper-based applications, PEO's application process was restricted, as only one person could work on the file at a time," says Michelle Wehrle, PEO's director, information technology. "By digitizing the information, PEO can now have multiple people accessing documents simultaneously, thereby allowing for an evaluation of academic transcripts at the same time as reviewing experience-related documents. The ability to perform parallel activities has the potential to shorten the time an application can be processed."

The IDDC project follows the implementation of an email-based application process for licence and certificate of authorization applicants, which was introduced in June 2020 in response to the initial COVID-19 lockdown. With the new process, applicants download an electronically fillable PDF form from PEO's website, populate the fields and email the

form to PEO. Consequently, no new paper-based applications are being added to the 21,000 existing active files.

Linda Latham, P.Eng., PEO's vice president, regulatory operations and deputy registrar, added: "These are exciting and long overdue initiatives to bring PEO's processes into the 21st century. It is being fully embraced by staff, and PEO is now assessing which other departments with large volumes of paper-based files could benefit from digitization."

HOW THE DIGITIZATION IS HAPPENING

The IDDC's 12-member team, composed of a mix of permanent and contract staff, are focusing their efforts on digitizing the active licence application files into usable digital information accessible from PEO's licensing and licence holder system. The pilot project will develop the business rules, put the technology in place and train the staff, enabling PEO to more easily digitize other paper-based files in the future.

The four-stage process includes classifying and scanning files and applying optical character recognition, a layer of additional text on the document that will allow for keyword searches. No paper-based record is shredded for at least three months, allowing the file's digitization to be validated. Each step of the digitization process has a rigorous quality assurance process, ranging from making sure the file is legible to ensure there is no physical damage to the file, and it is this quality assurance process that explains in part why each file takes as long as it does to be fully digitized.

THE DIGITIZATION PROCESS BY NUMBERS

As of the first week of October, nearly 3000 of the 21,000 active paper-based files have been entirely digitized. On average, it takes a classification speed of 34 minutes per file and a digitization speed of 36 minutes. When the IDDC first began, their indexing and digitization speeds were roughly twice as long. However, the team predicts that both speeds will be under 10 minutes by the first quarter of 2022, particularly with the introduction of a robotic process automation, which will automate the scanning, conversion, optical character recognition, uploading to PEO's SharePoint and apply metadata tasks. This will reduce the time of these steps from roughly 30 minutes to one minute.

PEO CHAPTERS HOST VIRTUAL SEMINAR ON CLIMATE CHANGE

By Adam Sidsworth



Three PEO chapters held a panel discussion on virtual meeting platform Zoom on September 22 to discuss the role of professional engineers and Canada's provincial and territorial engineering regulators in a world affected by rapidly evolving climate change.

The event, organized by PEO's West Toronto Chapter and co-sponsored by the York and East Toronto chapters, invited representatives from Engineers Canada and PEO's sister regulators, Engineers and Geoscientists British Columbia (EGBC) and Engineers Geoscientists Manitoba (EngGeoMB), to discuss their respective organizations' evolving approaches to climate change.

"In November 2019, a group of more than 11,000 scientists from 153 countries issued a warning to humanity that named climate change as an emergency that would lead to untold human suffering if no big shifts in action take place," asserted event organizer and West Central Region Councillor James Chisholm, P.Eng., FEC. "We as engineers have a role to play in finding ways to mitigate or adapt to climate change. What is that role?" And in her introductory remarks, PEO Past President Marisa Sterling, P.Eng., FEC, noted: "In Canada, global warming is happening at twice the global rate and is only expected to increase unless we reduce carbon dioxide emissions. And if we don't slow down global warming, extreme weather will continue to risk the life, health and property of Canadians—the same thing that engineers are licensed to help protect. We as engineers and regulators need to have a climate crisis plan, and we need to deliver it in the next five years."

DESIGNING INFRASTRUCTURE FOR CLIMATE CHANGE

The evening's first speaker was David Lapp, P.Eng., FEC, practice lead, globalization and sustainable development for Engineers Canada, who explored the adaptation and

resiliency that engineers can assert when designing infrastructure in the era of climate change. Adaptation and resiliency was defined by Engineers Canada in its 2018 guideline *Principles of Climate Adaptation and Mitigation For Engineers*, which Lapp was heavily involved in drafting, as engineers "integrat[ing] an understanding of the impacts of climate change, weather and resiliency into the normal day-to-day design, operation, maintenance, planning and procurement activities for which [engineers] are professionally responsible."

Lapp noted that engineers need to rethink how they approach a project: "With our climate changing, we can see changes in temperature, the extreme winds and precipitation and so forth. And all of these changes we have to deal with in our infrastructure, which has a lifecycle of anywhere between 25 and 100 years." Engineers Canada's adaptation and mitigation document has 11 recommendations that Lapp encouraged engineers to become familiar with. "If you don't consider climate change in your practice, you may be subject to professional liability," Lapp predicted.

NEW CLIMATE CHANGE TOOLS IN BC AND MANITOBA

The bulk of the evening's discussion was devoted to recent climate change standards introduced by EGBC in March 2021, entitled *Climate Change Action Plan*. The plan includes provisions to update the registration and competency processes to ensure engineers and geoscientists incorporate climate change practices and provide them with appropriate education and knowledge sharing. Harshan Radhakrishnan, P.Eng. (BC), manager, climate change and sustainability initiatives for EGBC, told attendees that the plan—which grew out of a member submission at EGBC's 2018 Annual General Meeting—was developed after a lengthy consultation process with the regulator's registrants, senior staff and Council. "Our senior government, provincial governments, industry associations...and professional and regulatory associations have all stepped up to the plate to provide support to taking action on climate change," Radhakrishnan said. "And EGBC as an organization wanted to figure out how we can act in a manner that is significant to climate change and promotes sustainability." Radhakrishnan noted that EGBC surveyed its members, who overwhelmingly support action on climate change.

Radhakrishnan was joined by Malcolm Shield, PhD, P.Eng. (BC), current member of EGBC's Climate Change Advisory Group. "It's an approach we would like to see other regulators take," Shield said. "Fundamentally, what are the current issues, what are the emerging issues, how do we look at solutions and risk management and the opportunities for the regulator and our practitioners?"

The last speaker of the evening was Curt Hull, P.Eng. (Manitoba), project director with Climate Change Connections. Hull is helping EngGeoMB develop its version of the

Building Regional Adaptation Capacity and Expertise Program along with EGBC experts Radhakrishnan and Shield. The program, which was developed by Natural Resources Canada and works in partnership with the provinces, aims, in part, to train engineers, business owners and decision makers to incorporate climate change adaptation into their practice. EngGeoMB's project is currently under development and is expected to be approved by its Council by March 2022. "Ninety-one per cent of EngGeoMB members acknowledged that greenhouse gas emissions contribute to climate change," Hull said. "The landscape is shifting after what EGBC did. And we hope to work collaboratively with more organizations."

The evening closed with remarks from PEO CEO/Registrar Johnny Zuccon, P.Eng., FEC, who acknowledged the positive initiatives of EGBC and EngGeoMB. Zuccon encouraged future PEO Councils to explore climate change initiatives once PEO has fully gone through its regulatory and governance transformations.

MEET THE 2021 WINNERS OF THE ONTARIO PROFESSIONAL ENGINEERS AWARDS

By Nicole Axworthy



This year marks the 74th anniversary of the Ontario Professional Engineers Awards (OPEA), an awards program founded by PEO in 1947 to recognize professional engineers in Ontario who have made outstanding contributions to their profession and community. The awards recognize individual achievements in categories that include engineering excellence, research and development, entrepreneurship and young engineer. The program also recognizes a team of engineers that has had a positive impact on society, industry and/or engineering with the Award for Engineering Project or Achievement.

Award recipients are recognized at an annual gala, which has since 2005 been presented jointly by PEO and the Ontario Society of Professional Engineers. This year, the following 10

awardees will be celebrated at a virtual gala on November 26. Visit www.opeatwards.ca for more information.

PROFESSIONAL ENGINEERS GOLD MEDAL

As the chairman/CEO of the Halsall group of companies, **Peter Halsall, P.Eng.**, led the integration of sustainability into all aspects of its businesses and services and its growth to over 350 employees. Halsall Associates delivered structural engineering, building evaluation/restoration and green building engineering. After Halsall's sale to an international company, he built the company's global sustainability program. Halsall was also executive director of the Canadian Urban Institute, where he led the development of solutions for a low-carbon future, leading projects such as implementing LED street lighting, preparing municipal green development standards and creating a national infrastructure report card. Halsall has also helped establish two firms with co-workers from Halsall: Synergy Partners, a building restoration firm; and Purpose Building, a company committed to accelerating real estate to planet positive performance, where he currently works. He also helped found Purpose Analytics, a non-profit working to make data analytics available to the non-profit sector.

ENGINEERING MEDAL—ENGINEERING EXCELLENCE

Baher Abdulhai, PhD, P.Eng., is a professor of civil and mineral engineering at the University of Toronto (U of T), where he develops artificial intelligence-based traffic control and solutions to major urban transportation management problems. Abdulhai's work on traffic control using reinforcement learning and deep learning has resulted in patented technologies, including his MARLIN smart traffic lights control software—a machine learning-based control software system for self-optimized traffic lights that reduces delays at intersections without requiring infrastructure expansion. Recently, Abdulhai created a new system, MiND, that considers both traffic and public transit to minimize delays for all users. In 2000,

Abdulhai founded the Intelligent Transportation Systems Centre, which became the core facility of the university's Transportation Research Institute. He has trained generations of students in advanced areas of traffic management and modeling, with most of these students moving on to positions in academia and industry.

Ishwar K. Puri, PhD, P.Eng., dean of the faculty of engineering and professor of mechanical engineering at McMaster University, is recognized for experiential learning programs. At McMaster, a year-long 13-credit course integrates core engineering curricula across all engineering disciplines and focuses on human-centred engineering design and ethics. Puri's engineering research is globally recognized, with inventions ranging from a facile 3D printer for human cells and tissues to a novel "1U" heat exchanger that can be directly mounted in computer racks in data centres. This latter research led to a startup, NanoSpin, which invented the first cooling system for computers and electronic devices using a liquid dispersion of magnetic nanoparticles to dissipate waste heat. Puri is also a founder of Celerite Labs, an Ontario startup that uses a magnetic 3D printer to print tissues and organoids. Based on this technology, printed segments of the human lung and liver are being used as alternatives to animal testing to develop therapies for liver cirrhosis.

Prabhat Kumar (Ted) Tandon, P.Eng., vice president of JNE Group of Companies, has a body of engineering design work that can be seen throughout Hamilton and the Golden Horseshoe, including standout projects such as the Pearson International Airport Control Tower, the Institute for Applied Health Sciences and the Mathematics Centre, the Canadian Warplane Heritage Museum and the Transport Canada Aircraft Hangar. Over the course of his long and successful career, Tandon progressed from a site engineer in North Bay to a design engineer, manager and member of the board of directors at C.C. Parker in Hamilton. Upon Stantec's acquisition of C.C. Parker, he became a group manager at Stantec before moving to JNE Consult-

ing. As industrial division manager at JNE, he was responsible for the delivery of complex, multi-discipline engineering on projects for a diverse industrial client base. Tandon has been instrumental in JNE's growth, particularly in the company's diversification across different industries.

ENGINEERING MEDAL-MANAGEMENT

Hugo Blasutta, P.Eng., president of HJB Advisory Group Inc., has more than 40 years of management experience in the consulting engineering industry. His numerous executive roles include partner at Yolles Partnership Inc., CEO of MMM Group Limited and president and CEO of WSP Canada Inc. In these roles, he instituted a high-performance culture, recruited and developed leading technical and business talent, and developed and implemented ambitious strategic plans. He also spearheaded technical and business innovations that put the companies he led at the forefront of the industry and resulted in significant improvements in performance and profitability. In 2020, Blasutta formed HJB Advisory Group Inc., through which he provides management advisory services to engineering firms in Canada and the United States. Blasutta currently serves on the Industry Advisory Board for U of T's department of civil and mineral engineering, providing guidance to support the department's collaborative research activities with industry and enhance opportunities for experiential learning for students.

Michael D'Andrea, P.Eng., chief engineer and executive director, engineering and construction services, City of Toronto, currently leads a team of more than 600 professional and technical staff providing engineering design and construction services to both internal and external municipal clients. D'Andrea has led projects such as the \$2.3 billion Gardiner Expressway Strategic Rehabilitation Plan, which uses an accelerated bridge construction approach to rebuild the elevated expressway section to reduce the overall construction schedule and traffic impacts; and the Basement Flooding Protection Program, Toronto's climate change adaptation plan to address the urban flooding impacts of more frequent extreme storms. D'Andrea demonstrates engineering leadership, having led the transformation and development of his team and strategic planning to address the challenges of a growing population,

continued on p. 12

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continued from p. 11
aging infrastructure, traffic congestion and the impacts of climate change on a densely populated city.

ENGINEERING MEDAL—RESEARCH AND DEVELOPMENT

Michael F. Cunningham, PhD, P.Eng., professor of chemical engineering at Queen's University, has contributed to sustainable engineering. He has spent over 25 years studying how to reduce the environmental and health-related impacts of processes used to make polymeric materials, which comprise a major segment of the global materials market. His focus has been on replacing environmentally harmful processes that employ organic solvents with environmentally benign water-based processes. At Queen's University, he leads a research program that has developed water-based alternatives to VOC-based processes, new composite materials based on renewable natural polymers and new stimuli-responsive polymer materials that use CO₂ as a benign trigger. Cunningham has over 200 publications in refereed journals and 30 patents or patent applications. He began his career at the Xerox Research Centre of Canada, where he developed water-based coatings to replace existing solvent-based processes, for which he received 26 US patents.

Moncef L. Nehdi, PhD, P.Eng., professor, department of civil and environmental engineering at Western University, is a global leader in research on machine learning and computational intelligence modelling of civil engineering materials and structures, such as his award-winning use of drones equipped with infrared tomography for remote sensing of bridge decks and his research on stimuli-responsive materials, self-healing concrete and nano-fibres incorporating phase change materials for energy storage. Nehdi has applied his research to several world landmark projects, including solving challenges in the construction of the world's second-tallest building (Kingdom Tower), the world's third-tallest building (Makkah Clock Tower) and the world's deepest and second-largest wastewater pumping station. His research also empowers capacity building in developing countries, including a low-cost processor to produce rice husk ash cement additive in rural construction, currently used in Egypt and India.

ENGINEERING MEDAL—YOUNG ENGINEER

Eric Diller, PhD, P.Eng., associate professor of mechanical and industrial engineering at U of T, has made a name for himself by bringing magnetic wireless small-scale robots from an untested concept to application. He has developed new capabilities for actuation and control of biomedical microdevices as well as new devices such as miniaturized surgical tools—tiny robots that can be wirelessly controlled and moved and enable a new approach to non-invasive medical procedures. Diller is currently collaborating with both a neurosurgeon and a company to develop a new class of miniaturized neurosurgical tools using his techniques. He is also developing a wireless "smart pill" that takes bacteria samples from anywhere inside the intestine. Diller has published 68 peer-reviewed publications in top journals such as *Science Robotics*, *Nature Communications* and *Advanced Functional Materials*, and his papers have been cited around 2700 times.

PROFESSIONAL ENGINEERS CITIZENSHIP AWARD

Sandra Odendahl, P.Eng., vice president, social impact and sustainability at Scotiabank, leads the team responsible for developing strategies and executing programs in corporate sustainability, global donations, employee engagement and ESG reporting. Previously, as CEO of CMC Research Institutes, she helped secure partnerships to scale up carbon-reducing technology for industry. Earlier in her career, she held several pioneering sustainability and social innovation roles at Royal Bank of Canada. Odendahl's volunteer contributions are wide-ranging and include serving as a director for the Canadian Institute for Climate Choices, the Transition Accelerator and NEXT Canada. She previously served as director and chair of the Toronto Atmospheric Fund, and recently completed a four-year term as a director and audit committee chair at the Ontario Clean Water Agency. In addition to serving on not-for-profit boards, Odendahl has served on several national committees and advisory panels related to the environment, clean innovation and/or sustainable finance.

UNIVERSITY OF TORONTO INTRODUCES MENTAL HEALTH BURSARY FOR ENGINEERING STUDENTS

By Adam Sidsworth

The University of Toronto (U of T) introduced a new bursary to help undergraduate engineering students access mental health services throughout the school year. The Skule Mental Health Bursary launched in September by the U of T applied science and engineering faculty in co-operation with the University of Toronto Engineering Society (EngSoc).

“One of the problems is the cost of mental health support for engineering students, who already have financial burdens and often can’t access university services due to wait times and scheduling and already have a great deal of academic stress,” observes Sheral Kumar, who was the 2020–2021 director of Skule Mental Wellness. The \$450 bursary aims to help cover the costs of mental health aids such as support products, services and prescriptions that are not sufficiently covered by student or provincial health insurance plans when comparable services are not already provided by U of T.

“I have been a part of Skule Mental Wellness since my first year,” notes Kumar, an engineering science student. “In the past, we’ve focused on promoting learning, creating awareness and running destressing events within the community. However, this work often did not directly address the root causes and unique stressors that affect the mental wellness of engineering students, such as difficult academic workloads, lack of free time and finances.”

Kumar’s observations were reinforced by her successor as director of Skule Mental Wellness, Vanessa Elizabeth Ayoung-Chee, a third-year civil and mineral engineering student. “As a student, I have noticed two main barriers [to accessing mental health services],” said Ayoung-Chee, who is also on the Skule Mental Health Bursary adjudication committee. “One is the stigma of admitting you need help. And two, the resources are usually given out during frosh week, before the semester starts and the stresses kick in, and by then, you have no idea what aid is out there.”

THE BURSARY BECOMES A REALITY

Kumar and former EngSoc president and recent engineering science graduate Christopher Kousinioris approached the applied science and engineering faculty about developing and promoting a bursary that engineering students could access. “They were very supportive and eager to help us bring this idea to fruition,” Kumar notes. “We had countless meetings with faculty and staff from various departments, including student life and financial aid, and everyone was ready to help make this bursary a reality. They were very instrumental in the creation of the bursary. We could not have done it without their ongoing support and willingness to help.”

Melissa Fernandes, mental health programs officer for U of T’s faculty of applied science and engineering, says the bursary is currently a permanent offering with two application cycles through the school year, with deadlines in October and January. Funding currently comes from an initial contribution made by both EngSoc and the faculty. However, Fernandes says they are actively accepting donations. “To further enhance the fund, both the engineering society and Dean Christopher Yip, PhD, P.Eng., will match all contributions to the Skule



Mental Health Bursary in a 2:1 match, to a maximum of \$50,000 that potentially triples the impact of a donation,” she adds.

SUPPORTING STUDENTS’ WELL-BEING

The bursary comes at a time when U of T’s faculty of applied science and engineering recognizes the importance of supporting the mental and social health of its students, stating in its *Academic Plan 2017–2022* that “we have committed to improve the quality and delivery of academic advising and also create resources and initiatives that support good mental health and well-being.”

Fernandes’ own position was created from a series of recommendations from the faculty’s 2019 Joint Task Force on Academic Advising and Mental Health, which noted that mental health is a pressing concern for the faculty. “My role is to strengthen the capacity to support student mental health in the faculty,” Fernandes explains. “I do this by addressing relationships across the faculty and the broader university for the purpose of increasing student access to mental health services and supports.”

Fernandes encourages U of T engineering students looking for help to access many of the faculty’s and university’s services, such as Health; Navi; U of T My Student Support Program, a 24-hour counselling system; and the inclusion and transition advisor.

30 BY 30 REVEALS NEWLY LICENSED WOMEN ENGINEERS IN CANADA NOW REPRESENT 20 PER CENT

By Marika Bigongiari



Joyce He, PhD, assistant professor of management and organizations at the Anderson School of Management at University of California, Los Angeles, leads a presentation on getting past gender bias in the workplace at the 30 by 30 check-in.

PEO held its second annual 30 by 30 check-in to continue discussions on best practices and share metrics on how stakeholder groups are working towards achieving Engineers Canada's goal of raising the percentage of newly licensed engineers in Canada who are women to 30 per cent by 2030. The event was held virtually once again due to constraints related to the COVID-19 pandemic.

"[The representation of women] is a critical issue that's loomed over the profession for a long time and must be addressed, and we need to be intentional about it going forward," said Christian Bellini, P.Eng., FEC, PEO president and 30 by 30 Task Force vice chair. "We need to study our regulatory structures and processes to ensure they do not present systemic barriers to [women's] representation in the profession."

PEO CEO/Registrar Johnny Zuccon, P.Eng., FEC, thanked the task force members for their perseverance and efforts, which he described as a critical part of PEO's enterprise-wide transformation, saying they have his full support. "We're laying the foundational pieces for what we want our vision to be, which is to become a modern regulator, and I think some of the work we're going to hear

about tonight is a pivotal part of the foundational pieces at an organizational level," Zuccon said. He also outlined several initiatives put in place to create a more inclusive work environment at PEO, such as implementing mandatory equity and inclusion training for all staff.

Representing Engineers Canada at the meeting was Jeanette Southwood, P.Eng., FEC, vice president, corporate affairs and strategic partnerships, and Cassandra Polyzou, manager, equity, diversity and inclusion. They provided updated data from the 2021 *National Membership Report* spanning January 1 to December 31, 2020, including information on the growth of the profession in Canada, sex representation in engineering and the conversion from engineering student to professional engineer. The number of woman engineers continued to grow, and for the first time on the journey to 30 by 30, numbers of newly licensed woman engineers exceeded 20 per cent.

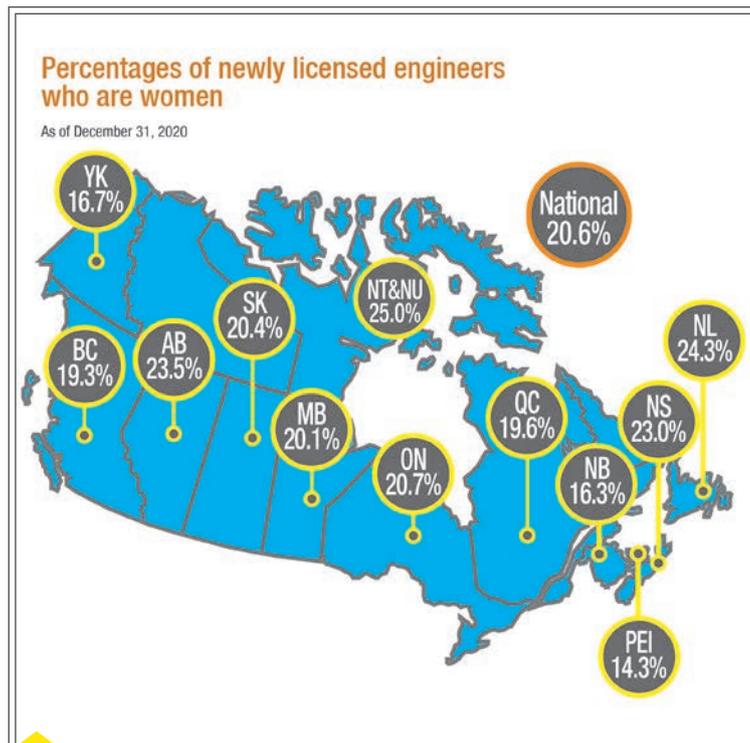
CLOSING THE GAP

Keynote speakers Joyce He, PhD, assistant professor of management and organizations at the Anderson School of Management at University of California, Los Angeles, and Sonia Kang, PhD, associate professor of organizational behaviour and human resources management and Canada research chair in identity, diversity and inclusion at the University of Toronto's Rotman School of Management, discussed how women navigate gender biases in the labour market and how organizations can create more diverse talent pools by redesigning their internal processes. The pair is currently applying these insights to a gender audit on PEO's licensing process and internal operations (see *In Council, Engineering Dimensions*, July/August 2021, p. 23).

Why has progress on women's representation in male-dominated domains stalled despite widespread efforts to close the gap? And what works to really close the gap? The researchers considered these questions and looked at nudge theory—identifying easy-to-implement and economical ways to change behaviours by structuring the choices of individuals—and opt-in versus opt-out scenarios. It was noted that even when women and men perform equally well, women are less likely to select into competition. However, when opt-out framing is used, gender differences in competition are eliminated—and, importantly, there is feasible intervention to implement in organizations to capture the full talent pool of eligible candidates.

PROGRESS REVEALED IN KEY METRICS

Because PEO's 30 by 30 Task Force reports annually to Council on the previous year's results, data presented at the check-in was based on year-end results for 2018 and 2019. Licensing metrics showed that the percentage of women obtaining licensure in Ontario increased incrementally from 2018 to 2019—from 17.9 to 18.2 per cent. Notably, percentages in several categories approached or exceeded the 30 per cent target: 28 per cent of EITs who participated in PEO's Licensure Assistance Program and obtained a licence are women, 30 per cent of PEO committee and task force chairs and vice chairs are women and 32 per cent of P.Engs on Council are women.



An Engineers Canada graph shows the national average of newly licensed women engineers is 20.6 per cent, with the Northwest Territories and Nunavut leading the way at 25 per cent.

PEO's 30 BY 30 ACTION PLAN

At the meeting, task force chair Helen Wojcinski, P.Eng., FEC, updated participants on proposed actions for the coming year, which include items assigned to PEO, employers and universities. PEO's action items are primarily centered on internal operations in keeping with PEO's mandate and include:

- Conducting a gender audit;
- Targeting women graduates to pursue licensure through PEO programs such as the Licensure Assistance Program;
- Featuring practising women engineers in PEO publications, such as *Engineering Dimensions*, as role models;
- Encouraging women engineers to serve on and assume leadership roles on PEO committees, task forces and chapters;
- Actively recruiting women engineers to run for PEO Council; and
- Tracking the progress being made in reaching the 30 per cent goal and provide annual reports to PEO Council.

As a final note, Wojcinski advised that the task force will be stood down in December 2021 and ownership will be transferred to PEO staff, chapters and key stakeholders. "It's very important that we pass the baton on to PEO staff and the key stakeholders along the pathway to licensure," Wojcinski said.

BITS & PIECES



Graphene-enhanced concrete is an innovative material that can both increase the resistance and impermeability of concrete and reduce the number of other

materials normally required to make it, resulting in a more environmentally friendly and sustainable material with a longer lifespan. Photo: H. Raab



Direct air capture technology removes CO₂ from the atmosphere to be permanently stored in deep geological formations or used in the production of

fuels, chemicals, building materials and other products. Approximately 15 direct air capture plants operate worldwide, capturing more than 9000 tonnes of CO₂ per year. Photo: Dmitry Makeev



THE INNOVATION ENGINE

**SENSATIONAL ENGINEERING
PROJECTS DRIVING CHANGE**

Photo: APMA

WHAT MAKES SOMETHING INNOVATIVE? By definition, innovation is the implementation of ideas that results in making something better or delivering something new. It can be disruptive, completely changing the landscape of the technology or industry it seeks to change; or it can be a seemingly small improvement that makes everyday life easier. When it comes to innovation, Canadian engineers push the envelope across industries, and evidence of it is everywhere. Without it, the world would be far less accessible and interesting. Here, we present six exciting new projects that illustrate Canadian engineering innovation, from a novel liquid-repelling substance that keeps healthcare workers safe to Canada's first 3D-printed house that brings trendsetting technology to the construction sector.

MULTI-EXPERT TEAM BUILDS FIRST CANADIAN ZERO-EMISSION CONCEPT VEHICLE

A new Arrow is headed our way, but this one has wheels. Project Arrow, an initiative of the Automotive Parts Manufacturers' Association (APMA), is the first original full-build zero-emission concept vehicle in Canada. The Arrow—named in honour of the Avro Arrow, the famed 1950s Canadian supersonic interceptor jet aircraft that was considered one of Canada's greatest engineering achievements—is being designed, engineered and built collaboratively by the Canadian automotive supply sector and select Ontario post-secondary institutions to answer Prime Minister Justin Trudeau's call for a zero-emissions future by 2050. The project brings together the best of Canada's electric-drive, alternative-fuel, connected and autonomous and light-weight technology companies, and in doing so, APMA hopes it will enjoy the same level of engineering excitement behind its namesake.

APMA, Canada's national association representing original equipment manufacturers of parts, advanced technology and services for the worldwide automotive industry, has high hopes for Project

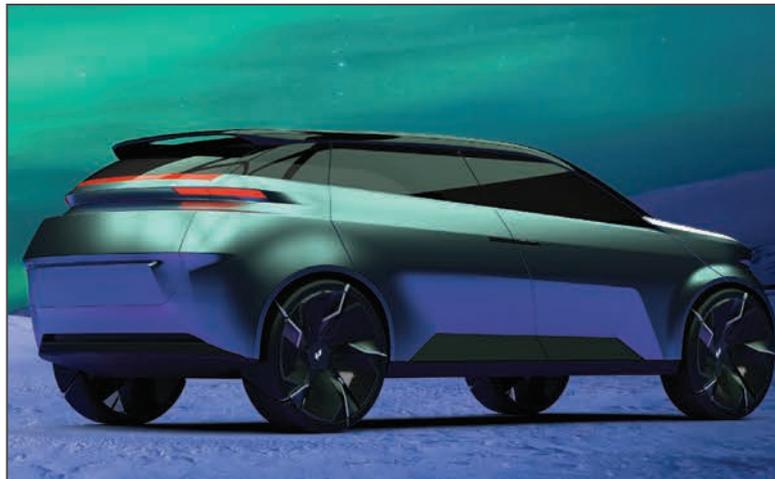
Arrow, which officially launched at CES 2020, an influential global tech event. The project will progress in four phases: Phase 1 is the design competition and selection; Phase 2 is the engineering specifications release and supplier RFP; Phase 3 is the design unveiling; and Phase 4 is the concept car release and tour. Last fall, a team of four students from Carleton University's School of Industrial Design won the design concept competition to wrap up Phase 1, and Phase 2 is currently underway, with Ontario

Tech University taking the lead on engineering development of the vehicle in Oshawa, ON. As part of Phase 2, a digital twin of the vehicle is also being tested using virtual reality technology at the WindsorEssex Economic Development Corporation's Cave Automatic Virtual Environment (CAVE), allowing designers and engineers to test and validate the technologies and other design aspects in real time before committing to a physical build. Phase 3 and 4 are estimated to take place in 2022 and 2023, respectively.

Ontario Tech University and its research and development centre, the Automotive Centre of Excellence (ACE), are the driving force behind the current phase. Here, engineering specifications and aerodynamic testing to convert Project Arrow designs into real products featuring the latest

in connected and autonomous vehicle (CAV) and propulsion technologies are underway. "Ontario Tech University is perfectly positioned to lead the build of the Project Arrow prototype vehicle through ACE's powerful legacy as a world-leading R&D and innovation centre," says Paula Ambra, P.Eng., Autonomous Vehicle Innovation Network project manager at ACE. "ACE's array of testing equipment and chambers, including one of the largest and most sophisticated climatic wind tunnels on the planet, has attracted a wide range of product development partnerships with many Canadian automotive suppliers."

Project Arrow's engineering team headquarters are at the ACE Innovation Garage, a collaborative space that brings industry, academics and students together. At ACE, Ambra provides technical and business advisory services to Ontario-based companies by leveraging its exhaustive facility to assist in the development of new CAV products and technologies, including testing, validation and prototyping. "ACE's climatic wind tunnel can re-create any weather conditions a test object like the Arrow electric vehicle will experience anywhere in the world," Ambra explains. "From blistering 60 C desert heat with solar load to -40 C Arctic conditions, along with any form of precipitation, be it torrential rain, freezing rain or a blizzard." In the climatic wind tunnel, ACE can also test vehicles operating under full load with crosswinds and wind speeds of up to 280 kilometres per hour.



A conceptual drawing of the Arrow zero-emission vehicle. A Carleton University team from the School of Industrial Design won the design competition in fall 2020 during Phase 1 of Project Arrow. Photo: APMA

In August 2021, a \$5 million FedDev Ontario investment was announced for APMA to support Project Arrow, in anticipation that the project will lead the transformation of Canada's automotive sector from traditional fuel to zero-emission vehicle development, while showcasing the capabilities of the Canadian automobility and digital technology sectors to compete on the global stage. The investment also recognizes that, as Canada moves closer to a zero-emission future, there is a growing need to manufacture and supply made-in-Canada solutions within its automotive sector.

Evelyn Allen, P.Eng., is the CEO and co-founder of Evercloak, a Kitchener, ON, startup that has perfected the manufacture of a multi-purpose nanofilm membrane. Notably, Evercloak is marketing its use on HVAC to help reduce energy consumption. Photo: Evercloak



EVERCLOAK DEVELOPS NANOFILM MANUFACTURING TECHNOLOGY TO HELP SAVE ENERGY

According to the International Energy Agency, air conditioners (ACs) and electric fans produce one-fifth of the total electricity of the world's buildings; and by 2050, ACs will be the second-largest source of global electricity demand, with 5.6 billion ACs around the globe (up from 1.6 billion in 2018). Ontario startup Evercloak is looking to lessen ACs' impact on greenhouse gases (GHGs) and climate change by ushering in innovative manufacturing production technologies that allow Evercloak to engineer high-performance nanofilms for a wide variety of applications—including, notably, as a dehumidifying membrane that allows AC technology to be much more energy efficient.

"Graphene oxide is not a new material; it's been around," observes Evercloak CEO and co-founder Evelyn Allen, P.Eng., of the material from which Evercloak is creating its film membranes. "But to date, no company has been able to manufacture it in a scalable way. With our unique, patented approach, we are able to manufacture larger nanofilm membranes in a low-cost way that hasn't been done yet. And that really opens up breakthrough energy reduction opportunities and applications that include air conditioning and cooling."

Allen, who began her career in engineering consulting, is quick to note that today's ACs are notoriously energy inefficient, since they simultaneously cool a room's temperature while removing the humidity through condensation. "The inefficiency increases further in humid areas, where removing the humidity drops the temperature below the comfortable level, requiring additional air energy to heat the room temperature back up to comfortable temperatures," Allen explains. However, Evercloak's dehumidification

membrane removes the humidity from the air before it enters the AC, allowing for conventional vapour compression to cool the remaining air. "The ability of our membrane is that it blocks all gases and allows water vapours to pass through really quickly," observes Allen, who asserts that Evercloak's membrane needs 90 per cent less area to achieve the same performance as today's membranes.



Mahshid Chekini, PhD, a scientist with Evercloak, works with nanofilm at Evercloak's Kitchener, ON, facilities. Photo: Evercloak

Evercloak is now teaming with Barrie, ON-based Environmental Systems Corporation (ESC), which designs and builds critical environments for cleanrooms, in a \$4.6 million two-year partnership to advance large-scale manufacturing of graphene and thin-membranes they hope to incorporate into future HVAC technology. Indeed, Evercloak has been successful in receiving multiple grants and awards to develop and expand. Among them, the company has received \$250,000 from industry-led, non-profit organization Next Generation Manufacturing Canada; \$800,000 from the Women in Cleantech Challenge, co-sponsored by Toronto innovation hub MaRS and Natural Resources Canada; and \$25,000 from the Ontario Power Generation and Spark Innovation Centre Ignite Start-up Pitch Competition. These grants allowed Allen to leave her full-time position at the University of Waterloo—where, ironically, she matched researchers with corporate partners in the cleantech, biotechnology and medical technology sectors.

Allen is also one of 10 2020 winners of the federal government's Breakthrough Energy Solutions Canada program, which provides access to funding, expert advice from private-sector partners and yearly accelerator events. "We did our due diligence and modelling to showcase [to Breakthrough Energy Solutions Canada] that we can reach those targets," observes Allen, noting that Evercloak could potentially reduce GHGs by 0.5 gigatonnes globally annually. Additionally, Evercloak remains optimistic that its manufacturing partnership with ESC can result in the development of the world's first net-zero cleanroom by 2030.



Imagia's EVIDENS digital platform uses artificial intelligence to leverage healthcare data and augment the expertise of clinicians to achieve personalized medicine.

IMAGIA SUPERPOWERS HEALTHCARE WITH AI

What if healthcare leveraged the power of artificial intelligence (AI) to make innovative medical treatments possible? AI expert Alexandre Le Bouthillier, PhD, co-founder and chief corporate officer at Montreal, QC-based AI and healthcare startup Imagia, sought to explore that question in the wake of losing his father to cancer. Le Bouthillier wanted to turn his loss into something positive that could help people achieve better outcomes with the creation of a company that develops digital medical innovations to improve the health of cancer patients and those with other heavy-burden diseases.

Although AI expands the diagnostic playing field significantly, the next step for AI-driven medical breakthroughs goes beyond detection and treatment to prevention—a goal that may be attainable by leveraging the power of data. Access to data and its interpretation as a key to medical discovery is the driving philosophy behind Imagia. Its EVIDENS digital platform is a customizable, modular grouping of software that enables hospitals, medical device manufacturers, pharmaceutical companies and diagnostic companies around the world to access and utilize healthcare data by creating a digital collaborative ecosystem.

At a hospital, for example, EVIDENS is integrated into the infrastructure, where it ingests hospital-wide data sets within a given set of parameters and aggregates and structures the data to make it AI-ready. EVIDENS then uses machine learning to develop insights, refine algorithms and enable collaboration between key medical groups. The goal is to leverage the data for medical discovery and enable personalized medicine, so the right treatments are prescribed at the right time. And with the ability to quickly search, filter, annotate and map data, the platform is highly conducive to research studies. "If you develop an AI model that allows you to predict breast cancer within medical records, for example, it's very powerful, because now you're automatically augmenting the capabilities of an oncologist or a clinician," explains Benjamin Bazso, ing.

Imagia's director of engineering. "What we're developing helps clinicians be more effective."

Bazso oversees the engineering teams that put the necessary infrastructure in place and build scalable, enterprise-grade products that demand a high level of engineering expertise. But there are challenges that come with the development of technologies that track and store vast amounts of medical data. Privacy, for instance, has emerged as a growing and important topic in Canadian healthcare. As a strategic partner to hospitals and government, Imagia understands that developing AI responsibly is of paramount importance. "If you start to discover things about people and about the findings of the data, there are certain ethics to consider around what you do with that data and those findings," Bazso observes. "Ensuring security and privacy by design is key."

Another challenge when creating AI-driven technologies is the importance of achieving generalizability and avoiding potential bias in AI models. "Creating something at the medical-grade level demands a high level of accuracy. It can't discriminate, and it has to perform," Bazso says. "Building that into our engineering practices and ensuring you're building something that is safe is important."

In 2020, Imagia began working with the Terry Fox Research Institute as part of a \$200 million healthcare initiative with Innovation, Science and Economic Development Canada. The partnership created the Digital Health and Discovery Platform (DHDP), representing over 97 consortium partners and linking hospitals and research organizations across Canada. DHDP, which is supported by a federal investment of \$49 million, will employ the EVIDENS platform to digitally enable research collaboration, facilitate world-class clinical trials and attract and train top talent in machine learning and other fields. The initiative aims to advance next-generation data governance principles and technology to transform health research as an economy-building ecosystem that links healthcare data with AI and other technologies to improve health outcomes for Canadians.

A key aspect of the DHDP is its function as a distributed learning ecosystem where clinical, genomic, biological and other data will stay where it is collected and be made more easily accessible, while remaining fully compliant with privacy laws and institutional policies. The potential findings in the sheer volume of data from a discovery point of view is exciting, Bazso says: "It helps to get more hospitals on board for these types of shared initiatives. This is a huge project being implemented in Canada with international visibility."

Additionally, Imagia's growing ecosystem of healthcare, AI expertise and industry partners is expanding internationally. They have partnered with Illumina, the California-based global leader in DNA sequencing and analysis, where the EVIDENS platform will be used to link the analysis of genomic data to patient outcomes for reproducible data-driven precision medicine research.

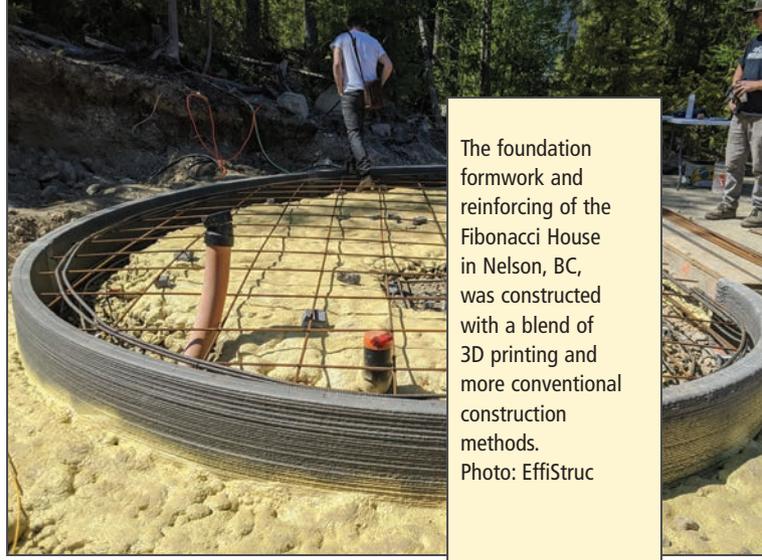
BC ENGINEERING FIRM CONSTRUCTS CANADA'S FIRST 3D-PRINTED HOUSE

It was through the recommendation of Jim Ziemiński, research and development centre site manager for Twente Additive Manufacturing (TAM), that EffiStruc Consulting Principal Don Willems, P.Eng. (BC), became involved in the design and construction of Fibonacci House in Nelson, BC. "He recommended our work because we're a smaller firm willing to take on projects where there is more of a risk involved," Willems explains. "The work of our practice has [focused on] rebuilding and alternative building systems since our inception."

The 240-square-foot Fibonacci House—so called because its design follows the Fibonacci sequence—is the first 3D-printed house in Canada. Its construction, completed earlier this year, was spearheaded by TAM, which specializes in the 3D printing of buildings. The company has partnered with Vancouver, BC-based non-profit World Housing to develop a 3D-printed, affordable community in Nelson with the goals of making a long-term sustainable impact on homelessness while simultaneously showcasing the potential advantages of 3D printing as an innovative technology to the construction sector. World Housing claims 3D-constructed houses are less expensive, more efficient and less wasteful than traditional building techniques, and it had already partnered with an American firm to build seven homes for chronically homeless people in Austin, TX, in 2018 using 3D printing, subsequently repeating the process in Tabasco, Mexico. However, it is EffiStruc that led the design and construction of Fibonacci House in Canada.

Willems states that EffiStruc's background in alternative construction methods helped them in the 3D construction project. "Ten or 20 per cent of our building volume of engineering is in alternative building systems," says Willems, who worked on the project with structural engineer Morgan Deschuymer, P.Eng. (BC). "We're using various things like straw bale houses to cob houses—a lot are green building materials that many people are interested in working with in residential buildings."

Willems notes that the building was hybrid, constructed with both 3D and more traditional construction methods. The foundation and walls were 3D printed but the roof was made with traditional methods and materials. "It would be possible to build a building using 3D printers in its entirety, but it's not really an efficient use of the material or the technology," Willems observes. "We want to use the right material for the right application. The concrete foundation was site built. And then came the exterior wall panels and the 3D-printed panels. And then came the roof structure, made with wood frames. It's one of the cornerstones of our engineering practice that we use materials in an efficient manner. We used wood, and we strived for a 100-mile diet. The wood used for the roof was probably less than 10 kilometres from site."



The foundation formwork and reinforcing of the Fibonacci House in Nelson, BC, was constructed with a blend of 3D printing and more conventional construction methods.
Photo: EffiStruc



The assembled Fibonacci House prior to the roof framing. The structure's roof was made from wood, which was sourced from within 10 kilometres of the site.
Photo: EffiStruc

Willems notes that the 3D-printed wall sections and panels were produced at TAM and shipped and assembled on site. In the future, he foresees changing the process: "We might assemble on site and then print the materials in place. So instead of having to ship these larger pieces [and] use cranes and equipment, we would need to only bring things to site in bag format and then apply those materials bead by bead, inch by inch. We would bring a robotic arm to site and print into a foundation."

Willems and his team at EffiStruc will likely have more opportunities to work on 3D-printed houses in Nelson. World Housing plans on erecting five two-bedroom houses in the Nelson area to complete the 3D community. "The design concept for the next houses will be somewhat larger, probably twice the size of the one we've built," Willems predicts. "We also need to go back and revisit these buildings in a year or five years to see how they're actually performing... You want to be cognizant that you're building a building with a 50- to 100-year lifespan. You want to make sure these buildings are both durable and aesthetically durable."

UBCO DEVELOPS NOVEL LIQUID-REPELLING SUBSTANCE

Researchers at the Okanagan Polymer Engineering Research and Applications (OPERA) Lab at the University of British Columbia Okanagan (UBCO) have developed an innovative liquid-repelling material that repels virtually all substances off a surface. The versatile new coating has widespread applications, but its immediate aim is to simplify the cleaning of personal protective equipment (PPE) and assist frontline healthcare workers in the fight against COVID-19. Acting like an invisible force field, the new liquid coating can eliminate complex disinfectant procedures for protective face shields and provide an extra layer of protection. The new spray-on solution can potentially make any surface from paper to metal omniphobic—meaning it can repel a broad range of liquids—whereas the applicability of similar coatings has historically been limited to surfaces such as smooth glass.

The substance is known as a PDMS brush. PDMS, or polydimethylsiloxane, is the common substance silicone that is found in products such as kitchen utensils and implants. “Being a brush means that, rather than a bulk piece of rubber like traditional silicones, we’ve attached single molecules to the coated surfaces,” explains Kevin Golovin, PhD, P.Eng. (BC), former assistant professor at UBCO’s School of Engineering and director of OPERA, where he led the project’s research team. “Most importantly, the molecules are only bonded at a single point, leaving the rest of the chain free to move, stretch, slide and flow.”

The coating works by exhibiting the properties of both solids and liquids. The liquid-like nature of the brushes means that substances in contact with the surface cannot strongly adhere. Droplets simply slide off the material as if the surface was lubricated, and they cannot attach due to the low coefficient of friction. “Essentially, the surface stays clean and dry as nothing can get a good grip to the surface,” Golovin explains. “Those features arise from the liquid-like property. But the chemical bonding of the PDMS brushes to the underlying substrate means the coating is durable and not easily removed, much like a solid coating or paint.” Golovin likens this effect to greasing up a pan to reduce the sticking of baked goods during the baking process. “Our brushes work like that but are permanent coatings—like a non-stick pan on steroids,” he says.

Golovin, who now teaches mechanical and industrial engineering at the University of Toronto, where he leads the Durable Repellent Engineered Advanced Materials Laboratory, received COVID-19 funding for the project from the Natural Sciences and Engineering Research Council to optimize the coating for healthcare face shields, in partnership with Kelowna-based survivability products manufacturer PRE Labs Inc., which is currently engaged in research and devel-

opment to take the product to market. “COVID-19 particles are carried within droplets that impinge on PPE, like face masks or shields,” Golovin explains. “If the droplets cannot stick, the virus will end up further away from the respiratory tract and therefore less likely to infect the individual.”

The substance has many other uses that range from anti-fingerprint phone screens and outdoor apparel to cookware and air filters. And if the coating becomes damaged, it can easily and repeatedly be repaired to fully restore its omniphobic properties. “Anywhere unwanted things are sticking to surfaces, our coatings can help,” Golovin says. “One of the key features of the brushes is that they are a potential replacement for perfluorinated compounds—the hazardous components within many hydrophobic coatings—and offer similar performance while remaining non-toxic and environmentally friendly.”

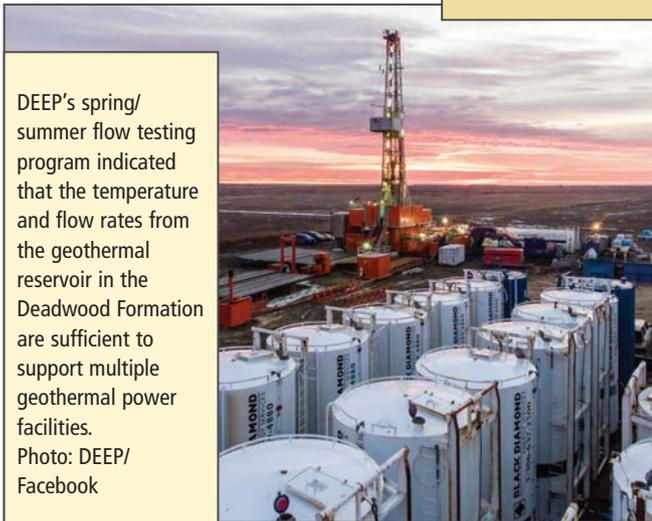


Chief Scientist at PRE Labs Mazeyar Parvinezadeh Gashti, PhD, tests how different substances react on a protective face shield. Photo: Kevin Golovin

And notably, the substance retains its ability to repel all types of liquid in harsh conditions, such as when it is exposed to UV light, acids and extreme temperatures. It also exhibits what is known as ice-phobicity, the ability to reduce the adhesion between ice and a coated surface. This could allow applications on aircraft wings, turbine blades, car windshields and in refrigeration infrastructure. “The same set of mechanics means the PDMS brushes can also reduce biofouling, such as mussel and barnacle adhesion to water vessels, as well as keeping 3D printer beds clean in the additive manufacturing realm,” explains Golovin, who recently embarked on an exciting side project involving the substance to aid in the search for extraterrestrial life on the Jovian moon Europa and Saturnian moon Enceladus. “To find life anywhere, you try and find liquid water; in the case of Europa or Enceladus, the water can be up to 25 kilometres below solid ice.” Golovin is exploring if a cryobot—a robot that uses heat and gravity to melt and penetrate ice—could be coated with the substance to prevent it from getting stuck in kilometres-thick lunar ice. “It seems like daily we’re finding new uses for the brushes,” he observes.



DEEP has five drilling projects located in southern Saskatchewan, including this drill, located outside of Torquay, which has reached a depth of over 3500 metres to source geothermal energy from a heated aquifer.
Photo: DEEP/
Facebook



DEEP's spring/summer flow testing program indicated that the temperature and flow rates from the geothermal reservoir in the Deadwood Formation are sufficient to support multiple geothermal power facilities.
Photo: DEEP/
Facebook

SASKATCHEWAN COMPANY TO BRING GEOTHERMAL ENERGY TO CANADA

"We are developing a unique power facility in southern Saskatchewan," says Kirsten Marcia, P.Ge. (Saskatchewan), president and CEO of Deep Earth Energy Production (DEEP), a privately owned company focused on developing Saskatchewan's geothermal resources for power generation. "This is a project that could establish the first geothermal power facility for Canada and launch a brand new Canadian renewable industry." Indeed, DEEP has acquired 5016 hectares of mineral rights for four subsurface mineral rights permits along the Saskatchewan and North Dakota border in addition to the 39,120 hectares of leased space for which it has the geothermal rights to potentially develop 100 megawatts of geothermal energy.

DEEP, which has engineers in leadership positions, has had private and government partnerships dating back several years in its bid to tap the underground resources of

heated aquifers to develop what DEEP calls the only renewable energy source that can produce baseload power 24/7. "Drilling is now underway with the deepest well ever drilled in Saskatchewan," Marcia says. "We're drilling down to 3500 metres into a very hot aquifer, hot enough to generate power. We'll harvest the heat from the water and convert it into clean baseload power. We're using conventional drilling and power-generating technology, which is well established all around the world. But what makes this project unique is that we're pairing it with a deep hot aquifer."

In 2014, DEEP completed a \$2 million prefeasibility study funded in part by Natural Resources Canada and SaskPower, the provincial power generator. SaskPower states that geothermal energy will prove to be a reliable source of energy with no GHG emissions and with a relatively small environmental footprint compared to other energy sources. However, SaskPower also acknowledges the great deal of expense to initiate the geothermal sector, since it requires extensive drilling and research.

Yet DEEP has sustained support in high places, including ongoing financial support from Natural Resources Canada, which in January 2019 announced millions of dollars in funding from its Emerging Renewable Power Program to help DEEP delineate geothermal energy. "The Government of Canada will provide \$25.6 million in funding for the five-megawatt facility, which will produce enough energy to power approximately 5000 homes, all while taking the equivalent of the yearly emissions of 7400 cars out of the atmosphere," wrote the prime minister's office. "The project will create 100 jobs during construction, provide the provincial power grid with clean, renewable energy and create new business opportunities for local communities." DEEP notes that the entire project will cost \$51.3 million.

So far, DEEP has five wells, of which the first was drilled to 3530 metres by the end of 2018, retrieving over 212 metres of core from its targeted reservoir. During the summer of 2019, it produced a 1500-cubic-metre tank farm over three days. DEEP has drilled four additional wells throughout 2019 and 2020, including Canada's first-ever geothermal horizontal well, which has a depth of 3500 metres and 2000 metres of lateral length.

DEEP is quick to note the multiple potential benefits of geothermal energy, including constant baseload power (unlike wind and solar power), almost zero GHGs, and no cost fluctuations like that of coal, natural gas and nuclear power. "We're mining heat to produce sustainable, renewable power," Marcia notes. "The benefits of geothermal are huge: Geothermal energy comes straight from the earth itself. There are no emissions, and it has a very small environmental footprint. It is an extremely reliable source of power, providing baseload power that runs 24/7. Geothermal can be part of a rational mix of supply options for our province as we reduce our greenhouse gas emissions. I like that this is a made-in-Saskatchewan renewable energy solution."

DEEP may be the pioneer of an expensive but more environmentally sustainable source of energy that is expanding to other parts of Canada. In March 2021, Natural Resources Minister Seamus O'Regan announced \$40.5 million in funding for an Indigenous-owned and -led geothermal electricity production facility in British Columbia. O'Regan said: "Geothermal will help northern and remote communities use less diesel and more of this new clean energy technology. This is how we get to net-zero." [e](#)

NATASHA VAZ BECOMES FIRST WOMAN TO LEAD ONTARIO MINING ASSOCIATION

By Adam Sidsworth

As a mining engineer, Natasha Vaz, P.Eng., chief operating officer of Canadian gold producer Kirkland Lake Gold (KL), has a commitment to the environment and communities. And it is this commitment that Vaz brings to her two-year term as chair of the century-old Ontario Mining Association (OMA), a trade organization dedicated to promoting the province's mining industry. "Ontario is rich in natural resources," Vaz says. "This is [why] we need to get our voice in public policy and get our voices heard."

In the appointment notice announcing Vaz as its new chair earlier this year, OMA lauded her as the first woman chair in its history, noting that it is an important milestone for the organization. Vaz, however, would rather emphasize her 20 years of operational and technical experience in mining engineering that she is drawing on to promote the mining sector's commitment to environmental responsibility. "The best way of doing this is from an [environment, sustainability and governance] perspective to show we are progressing on the environmental side, getting communities involved and benefitting society," Vaz says. "That should be our biggest focus." She points to the use of battery-powered electric vehicles in KL's Macassa mine in Kirkland Lake, ON, as an example of an innovative solution to lowering mining's carbon footprint. "We are looking at ways to reduce emissions and become more agile. A lot of the technologies we use are not for profitability but to keep people safe," she points out, citing the increased use of Wi-Fi in mines to allow for the development of proximity detection so equipment knows where other pieces of equipment—and people—are.

LEARNING ON THE JOB

Vaz pursued her degree in mining engineering from the University of Toronto in part because of the versatility of the mining engineering sector. "And I like travelling to different parts of the world," admits Vaz, who says she has been able to see northern Ontario, the United States and Australia during her career. Before climbing the corporate ladder, though, she began her career by doing taxing field work for various contractors sinking shafts—the building of vertical shafts that eventually lead into what becomes a mine. Vaz's first employer was Dynatec. "I put in 12, 14 hours a day. I was working in Sudbury; the contract was for Inco. We were sinking shafts and then handing over the shaft to the company so they could get in and do the mining," Vaz observes. "Not a lot of people have an opportunity to sink a shaft. It's a large investment." Importantly, at Dynatec Vaz met fellow mining engineer Tony Makuch, P.Eng., who would play an important mentoring role in Vaz's career.

Natasha Vaz, P.Eng., is the COO of Kirkland Lake Gold and the first woman chair of the Ontario Mining Association, a role that enables her to draw on 20 years of mining engineering experience.



Vaz continued working on the operational side of mining engineering, including at Goldcorp's Red Lake mine in northwestern Ontario. "I had never travelled that far up north," Vaz admits. "You can drive 20-plus hours north of Toronto and still be in Ontario. I got to sink my teeth in all things mining engineering related: surveying, ground control, ventilation, design planning." Vaz then joined Lake Shore Gold Corp's mine near Timmins, ON, where she accepted increasingly technical roles that included project evaluations. After 11 years with Lake Shore, Vaz was invited by Makuch, now president and CEO of KL, to join him at KL. "[KL] was evolving at a larger scale," Vaz says. "I was able to expand my reach." Indeed, Vaz quickly rose to the role of vice president of technical services to senior vice president of technical services and innovation and, eventually, to her current role.

MOVING MINING FORWARD

Prior to the COVID-19 pandemic, Vaz was on the road 60 per cent of the time, including visiting KL's Australian mine eight times. Since Ontario's lockdown restrictions eased in the later part of 2021, Vaz has again made frequent trips to KL's Macassa and Detour Lake mines in northern Ontario. She credits her strong support system, including her husband and extended family, for allowing her to put in the time commitment her career entails.

And it is a strong support system like this that Vaz wants to bring to Ontario's mining industry. Noting that she is the first KL employee named to the OMA chair, Vaz observes: "I want...to create a unified voice. Initially, the chairperson was always from one of the bigger companies. The OMA gives us a platform to promote the industry in Ontario. It gives us an opportunity to have a unified voice on issues in our sector and on matters of public policy. This is where we get our voice heard in public policy." But above all, Vaz wants to improve the environmental image of the mining sector. "Collaboration is the key," Vaz says. [e](#)

DECISION AND REASONS

In the matter of a hearing under the *Professional Engineers Act*, R.S.O. 1990, c. P.28; and in the matter of a complaint regarding the conduct of ASHRAF H.H. ELGENDUI, P.ENG., a member of the Association of Professional Engineers of Ontario, and TRINUS ENGINEERING INC., a holder of a certificate of authorization.

The panel of the Discipline Committee convened to hear and determine allegations of professional misconduct on the part of the respondents, Mr. Ashraf H.H. Elgendui (the member), a member of the Association of Professional Engineers of Ontario (the association or PEO) and Trinus Engineering Inc. (the holder or Trinus), a holder of a certificate of authorization from the association, which had been properly referred to us by the decision of the Complaints Committee dated March 1, 2018. The panel heard this matter on May 25 and 26, 2021, by means of an online video conference platform that was simultaneously broadcast in a publicly accessible format over the internet. All participants in the proceedings, including the member, counsel for the member and holder, counsel for the association and independent legal counsel (ILC) attended via videoconference.

AGREED STATEMENT OF FACTS

Counsel for the association advised the panel that the association and the member and holder had reached agreement on the facts. Counsel for the association introduced an Agreed Statement of Facts signed by the member and holder on May 19, 2021, and by the association on May 20, 2021, with a correction agreed to by the parties on May 25, 2021.

The Agreed Statement of Facts, as revised on May 25, 2021 (the Revised Statement of Facts), provided as follows (although we reproduce the Revised Agreed Statement of Facts in whole below, including the references to schedules that were attached, the schedules themselves are not included here):

1. The respondent Ashraf H.H. Elgendui, P.Eng. (Elgendui), is a professional engineer licensed pursuant to the *Professional Engineers Act*. Elgendui's training and practice are primarily in the field of mechanical engineering. At all material times, Elgendui was licensed as a professional engineer with PEO.
2. The respondent Trinus Engineering Inc. (Trinus) is an Ontario corporation. At all material times, Trinus held a certificate of authorization (C of A) and Elgendui was the individual accepting professional responsibility for engineering services provided under the C of A.
3. The complainant, Ryan Verschuere, P.Eng., was at all material times a professional engineer employed as the project manager for Wescast Industries Inc., an automotive parts maker (Wescast).
4. In or about 2015, Wescast retained C&R Engineered Solutions Inc. to complete pre-start health and safety reviews (PHSRs or PSRs) on four Mazak machines Wescast had recently installed. C&R found that the Mazak IVS 400II machine did not have sufficient safeguards in place (the 2015 C&R Report). Attached hereto as Schedule "A" is a copy of the 2015 C&R Report.
5. Darren Scholl, who was Wescast's project manager at the time, raised the apparent safety issues with Mazak and was assured by Mazak that their machines complied with the relevant safety regulations in Ontario. Specifically, Mazak wrote to Scholl: "[Trinus'] take on this is that your inspector [C&R] is reviewing the requirements with much more detail that is above and beyond the requirements to pass. As it stands your machines do conform to the PSR regulations in Ontario."

ENFORCEMENT HOTLINE Please report any person or company you suspect is practising engineering illegally or illegally using engineering titles. Call the PEO enforcement hotline at 416-840-1444 or 800-339-3716, ext. 1444. Or email enforcement@peo.on.ca. Through the *Professional Engineers Act*, *Professional Engineers Ontario* governs licence and certificate holders and regulates professional engineering in Ontario to serve and protect the public.

6. In 2017, a minor safety issue occurred (an operator had her finger pinched by a machine) at Wescast, triggering an investigation by Verschuere, who was Scholl's successor as Wescast's project manager. In the course of his investigation, Verschuere reviewed the 2015 C&R Report, as well as the assurances Mazak and the respondents had provided to Scholl in 2015 regarding the safety of the Mazak machines.
7. In January 2018, Wescast commissioned a new Mazak IVS 400II machine (serial number 289232) (the Machine). Wescast retained ZCS AKIA Engineers Inc. to complete a PHSR on the Machine. ZCS AKIA Engineers Inc. came to similar conclusions as had C&R, finding that the Machine did not have sufficient safeguards in place and that it had PHSR deficiencies under sections 24, 25 and 26 of Regulation 851 under the *Occupational Health and Safety Act* (Report ZCS3016). Attached as Schedule "B" is a copy of Report ZCS3016.
8. When Verschuere approached Mazak about the apparent deficiencies, Mazak sent the respondents to complete a second PHSR of the Machine. On February 12, 2018, Elgendui on behalf of Trinus signed and sealed PHSR report that stated the Machine satisfied sections 24 and 25 of Regulation 851, and that it met CSA requirements (Report TR07290). Trinus included with its report, a "Letter of Safety Compliance." Attached as Schedule "C" is a copy of Report TR07290.
9. On March 12, 2018, Verschuere filed a formal complaint with PEO, which alleged that the respondents had inappropriately downgraded the risk category when they reviewed the Mazak machines based on "previous experience" (incident history) and "familiarity" with the machines rather than any safeguard built into the machines (the complaint). The crux of the complaint is that the Mazak machines do not have sufficient safeguards, but the respondents nevertheless passed them as being compliant with the applicable safety standards. On this basis, Verschuere alleged the respondents were negligent and had disregarded the safety and welfare of the public. Of particular concern to Verschuere was the fact that the respondents claimed to have performed "hundreds" of PHSRs for Mazak, potentially based on the same (allegedly) flawed methodology.
10. The applicable standard is CSA Z432, published by the Canadian Standards Association. Attached as Schedule "D" is a copy of the relevant portions of this standard. Also applicable, depending on the circumstances, are other standards, such as those published by the American National Standards Institute, and guidelines published by the Ministry of Labour, as further explained and referred to in the reports referred to in paragraphs 4, 7, 11 and 13 of this ASF.
11. PEO retained Jim Van Kessel, P.Eng. (Van Kessel), to prepare an independent expert report. He prepared a report dated July 17, 2018, a copy of which is attached as Schedule "E" hereto (the Expert Report). The Expert Report concluded in part as follows:

"Elgendui and Trinus Engineering failed to reference the appropriate type C standard for this type of machine and as such they have not correctly identified the severity of the risks associated with these machines.

...

Elgendui and Trinus Engineering has failed to meet the expectations of a reasonable and prudent practitioner in the circumstances. They have not followed the guidelines published by the Ministry of Labour, and they have not used the correct standards when they performed the reviews of this machinery. The information presented in the various reports is not consistent even though the machines are all very similar."
12. Elgendui responded to the Expert Report. A copy of his response, dated November 15, 2018, is attached as Schedule "F."
13. Van Kessel replied. A copy of this Reply Report, dated December 27, 2018, is attached as Schedule "G." The Reply Report concludes as follows:

"I have reviewed the information presented along with the reports, and I have not seen anything to change my mind, so I stand by my original report.

"Elgendui and Trinus Engineering has failed to meet the expectations of a reasonable and prudent practitioner in the circumstances. They have not followed the guidelines published by the Ministry of Labour, and they have not used the correct standards when they performed the reviews of this machinery. They have not assessed the risks associated with this equipment properly. The information presented in the various reports is not consistent, even though the machines are all very similar."

14. Van Kessel subsequently attended at Westcast's premises to examine the Machine, and thereafter issued a further report dated September 21, 2020, a copy of which is attached as Schedule "H." Mr. Elgendui later provided a report by Len Cicero, who is not a professional engineer. Section 7 of the *Occupational Health and Safety Act* requires that PHSRs be carried out by professional engineers. A copy of Cicero's report is attached as Schedule "I." Van Kessel responded by a further report dated February 23, 2021, a copy of which is attached as Schedule "J."
15. Van Kessel also provided a document entitled "Safety Systems," a copy of which is attached as Schedule "K," which the parties agree correctly sets out the step-by-step process involved in evaluating machine safety systems.
16. The respondents admit that they failed to properly assess certain important risks associated with the Machine. Among other errors, Elgendui and Trinus:
- failed to reference any machine specific type C standards available for the Machine in their PHSR report;
 - concluded that the risks associated with the equipment could be controlled by a single channel safety circuit with monitoring;
 - approved the control system of the Machine, even though it does not meet the requirements specified by the applicable standards;
 - failed to include in the PHSR report an assessment of the risks associated with loading and unloading parts; and
 - failed to include in the PHSR report an assessment of the possible failure modes of the equipment.
17. For the purposes of this proceeding, the respondents accept as correct the findings, opinions and conclusions contained in the 2015 C&R Report (except for the page entitled guarding review at page 131 of the Disclosure Book) and in the "Findings" section of the Expert Report and in the Reply Report. The respondents admit that they failed to meet the minimum acceptable standard for engineering work of this type, and that they failed to make responsible provision for complying with applicable regulations, standards and codes. The respondents further admit that they failed to make reasonable provision for the safeguarding of life, health or property of persons who may be affected by the work for which they were responsible.
18. By reason of the aforesaid, the parties agree that Elgendui and Trinus are guilty of professional misconduct as follows:
- signing and sealing a PHSR report that failed to meet the standard of a reasonable and prudent practitioner in the circumstances, amounting to professional misconduct as defined by section 72(2)(a) of Regulation 941;
 - signing and sealing a PHSR report that failed to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work, amounting to professional misconduct as defined by section 72(2)(b) of Regulation 941;
 - signing and sealing a PHSR report that failed to make responsible provision for complying with applicable statutes, regulations, standards and codes, amounting to professional misconduct as defined by section 72(2)(d) of Regulation 941; and
 - performing professional engineering services in an unprofessional manner, amounting to professional misconduct as defined by section 72(2)(j) of Regulation 941.

PLEA BY MEMBER AND HOLDER

The member and holder admitted the allegations set out in paragraphs 18 a. to d. of the Revised Agreed Statement of Facts. The panel conducted a plea inquiry and was satisfied that the admissions were voluntary, informed and unequivocal.

DECISION

The panel considered the Revised Agreed Statement of Facts. It finds that the facts, as admitted, support findings of professional misconduct against the member and holder. In particular, the panel finds that the member and holder committed acts of professional misconduct as follows:

- signed and sealed a PHSR report that failed to meet the standard of a reasonable and prudent practitioner in the circumstances, amounting to professional misconduct as defined by subsection 72(2)(a) of Regulation 941 under the act;
- signed and sealed a PHSR report that failed to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work, amounting to professional misconduct as defined by subsection 72(2)(b) of Regulation 941 under the act;
- signed and sealed a PHSR report that failed to make responsible provision for complying with applicable statutes, regulations, standards and codes, amounting to professional misconduct as defined

by subsection 72(2)(d) of Regulation 941 under the act; and

- d) performing professional engineering services in an unprofessional manner, amounting to professional misconduct under subsection 72(2)(j) of Regulation 941 under the act.

REASONS FOR DECISION

Member

The panel is of the view that the conduct admitted in paragraphs 1 to 18 of the Agreed Statement of Facts constitutes professional misconduct under subsections 72(2)(a), (b), (d) and (j) of Regulation 941 under the act. That the member committed such acts is confirmed by the facts as agreed to by the parties in the Agreed Statement of Facts, admitted by the member and accepted by the panel.

Holder

With respect to Trinus, counsel for the association submitted that facts contained and admitted by the holder in the Agreed Statement of Facts concerning the conduct of Trinus were sufficient evidence of professional misconduct by Trinus. Counsel for the association noted that, at the relevant times, Trinus held a certificate of authorization issued by the association that listed the member as a responsible engineer for the purposes of section 17 of the act.

The panel accepts that the aforesaid evidence inculcating Trinus supports a finding of professional misconduct against Trinus, which employed the member and for which the member served as a responsible engineer at the relevant times. Accordingly, for reasons analogous to those outlined above with respect to the member, the panel finds the holder, Trinus, guilty of professional misconduct in the same manner.

PENALTY

The panel received a Joint Submission as to Penalty and Costs signed by the member and holder on May 19, 2021, and by the association on May 20, 2021. The Joint Submission as to Penalty included the following language that raised an issue of the jurisdiction of the Discipline Committee:

.....

- 3. PEO and the defendants make the following joint submission on penalty and costs:

.....

- b) Pursuant to s. 28(4)(d) of the *Professional Engineers Act*, it shall be a term or condition on Elgendui’s licence that he shall, within sixteen (16) months of the date of pronouncement of the decision of the Discipline Committee, successfully complete the course offered at automate.org entitled “Robot Safety and Risk Assessment Training.”
- c) Pursuant to s. 28(4)(b), (d) and (k) of the *Professional Engineers Act*, in the event that Elgendui does not successfully complete the course referred to above within the time set out in (b) above, his licence shall be suspended for a period of ten (10) months thereafter, or until he successfully completes it, whichever comes first.

.....

Counsel for the association submitted that the Joint Submission as to Penalty and Costs fell within a reasonable range of penalties imposed in previous cases and appropriately served the principles of sentencing, including the protection of the public and maintenance of the public’s confidence in the profession.

Upon being asked by the panel, ILC advised that, in his view, the panel did not have the jurisdiction under the act to issue a penalty as described in subparagraph 3(c) of the Joint Submission as to Penalty and Costs. Specifically, ILC advised that the panel does not have the jurisdiction to issue a 10-month licence suspension for failing to complete the course referred to in subparagraph 3(b) of the Joint Submission as to Penalty and Costs.

Counsel for the association objected to the advice of ILC and requested an adjournment so as to provide the parties and ILC an opportunity to submit written opinions on the issue. The panel granted the request, ordered ILC to submit a written submission detailing his advice to the panel by June 2, 2021, and ordered counsel for the association (and counsel for the member and holder if they so wish) to submit written response to the panel by June 9, 2021.

PENALTY

The panel carefully considered the written submissions of ILC, attached as Appendix “1” to this Decision and Reasons, and by counsel for the association, attached as Appendix “2” to this Decision and Reasons. Counsel for the member and holder submitted a letter dated June 9, 2021, stating that the member and holder did not intend to make any further submission in response to the advice from ILC, and that the member and holder “are in agreement with the position articulated in the written submissions filed by counsel to the PEO dated June 9, 2021.” A copy of that June 9, 2021, letter sent on behalf of the member and holder is attached as Appendix “3” to this Decision and Reasons.

This jurisdictional issue appears to have arisen in another four relatively recent decisions of this Discipline Committee: *Association of*

Professional Engineers of Ontario v. Taha and Gad Technology Inc., Discipline Committee, November 4, 2019 (*Taha*); *Association of Professional Engineers of Ontario v. Panetta*, Discipline Committee, November 12, 2019 (*Panetta*); *Association of Professional Engineers of Ontario v. Singh and Mem Engineering Inc.*, Discipline Committee, October 22, 2020 (*Singh*); and *Association of Professional Engineers of Ontario v. Torkan*, Discipline Committee, March 15, 2021 (*Torkan*). Of these four decisions, three panels determined that the Discipline Committee was without jurisdiction to impose such penalty, whereas in *Torkan* the panel determined that it did have the jurisdiction to impose a suspension of the member's licence for failure to take a course. This was also consistent with a long history of decisions, a list of which was provided to the panel, where the Discipline Committee has imposed such a penalty. See, for example, the list of cases at Schedule A to the written submissions of counsel for the association (Appendix 2 to this Decision and Reasons).

It is a well-established principle of law that a disciplinary panel should not interfere with a joint submission on penalty except where the panel is of the view that to accept the joint submission would bring the administration of the disciplinary process into disrepute or would be contrary to the public interest. A panel also cannot accept a joint submission on penalty where it does not have the necessary jurisdiction to do so under the act.

JURISDICTION

In this case, subparagraph 3(c) of the joint submission on penalty imposes a condition on the member's licence related to the course he is required to complete within a timeframe or be suspended, as follows:

Pursuant to s. 28(4)(b), (d) and (k) of the *Professional Engineers Act*, in the event that Elgendui does not successfully complete the course referred to above within the time set out in (b) above, his licence shall be suspended for a period of ten (10) months thereafter, or until he successfully completes it, whichever comes first.

Counsel for the association submits that the panel has the jurisdiction to impose such a penalty based on subsection 28(4) of the act:

- 28(4) Where the Discipline Committee finds a member...guilty of professional misconduct or to be incompetent it may, by order,
- ...
- (b) suspend the licence of the member...for a stated period, not exceeding 24 months;
- ...
- (d) impose terms, conditions or limitations on the licence... including but not limited to the successful completion of a particular course or courses of study, as are specified by the Discipline Committee;
- ...
- (k) direct that the imposition of a penalty be suspended or postponed for such period and upon such terms or for such purpose as the Discipline Committee may specify, including but not limited to,
- (i) the successful completion by the member...of a particular course or courses of study,
- ...
- or any combination of them.

In this case, the jurisdictional question turns primarily on the interpretation of subsection 28(4)(k) of the act. Counsel for the association submits, on the one hand, that the words "or any combination of them" at the conclusion of s. 28(4) gives the panel sufficient jurisdiction to impose a suspended penalty as a licence condition. ILC, on the other hand, submits that the panel has no authority under the act to impose a future licence suspension for an act that is not based on the merits of the matter. Notably, in determining the panel did have jurisdiction to impose a future licence suspension for failure to take a course in *Torkan*, the panel interpreted the proposed suspension to be a "condition" of licence pursuant to subsection 28(4)(d), whereas 28(4)(d) was not relied on in any of *Taha*, *Panetta* or *Singh*, which were all instead determined primarily on the basis of 28(4)(k) alone.

Specifically, *Taha* determined that subsection 28(4)(k) does not allow for the suspension or postponement of an imposed penalty provision pending the future completion of a course. This, it reasoned, was because the words of subsection 28(4)(k) required there to be a penalty in place that could be suspended. *Panetta* expressed a concern "that it did not have the power under section 28(4)(k) to impose a future suspension." Instead, it imposed a 10-month (suspended) suspension in the event the member did not complete the examination, upon the parties agreeing to amend the joint submission on penalty to provide for this. *Singh* concluded that a similar penalty was "beyond the Discipline Committee's jurisdiction."

In this case, ILC submits that no penalty is proposed to be suspended or postponed. Rather, it is proposed that an alternative penalty should be conditionally imposed: if the member does not successfully complete the course referred to above within the prescribed time, then

his licence shall be suspended for a period of 10 months thereafter, or until he successfully completes it, whichever comes first. If the parties had agreed, and they did not, that the misconduct merited a 10-month suspension, independent legal counsel submits that it would be lawful within the meaning of subsection 28(4)(k) to suspend or postpone the imposition of that penalty pending the successful completion of the course. But that is not what is proposed.

PENALTY DECISION

The panel accepts the submissions of ILC in that, as in *Taha*, the proposed 10-month licence suspension is not an existing penalty sought to address the panel's findings of professional misconduct. Rather, it is an *additional* penalty sought for a *future* failure to act by the member. In the panel's view, subsection 28(4) does not give it the authority to impose additional penalties based on a possible future act (or failure thereof) by the member. It is also the panel's view that imposing a condition pursuant to subsection 28(4)(d) of the act, including but not limited to the successful completion of a particular course or courses of study, is limited to immediate licence suspensions and does not extend to potential future licence suspensions.

Notwithstanding, the panel accepts that the intent of subsection 3(c) of the Joint Submission as to Penalty and Costs is to ensure that the member does in fact complete the course. The panel also accepts the association's position that without the "teeth" of a conditional licence suspension, the member may not be sufficiently motivated to complete the course, in which case the panel's statutory mandate to protect the public interest may not be met.

As such, the chair of the panel wrote to the parties on June 12, 2021, advising as follows:

"We are in receipt of an opinion from the ILC dated June 2, 2021, and written submissions from PEO and the defendants dated June 9, 2021.

After review of these submissions and deliberations by the panel on June 11, 2021, the panel finds that it is not empowered to impose a licence suspension as a condition of not completing a required course.

.....

In this instance, PEO and the defendants have not asked for the imposition of a penalty (10-month suspension) and as such the panel cannot under the act suspend a penalty that has not been imposed. The panel understands the intent of the PEO and the defendants that was submitted as part of the Joint Submission on Penalties. The panel agrees on the intended penalty but is unable to impose it under the act."

The panel accordingly invited the parties to revise and resubmit an amended Joint Submission as to Penalty and Costs by June 21, 2021, as follows:

"The panel invites PEO and the defendants to revise and resubmit the Joint Submission on Penalty (JSP) so that it is worded in a manner that is enforceable by the act. If the intent of the initial JSP remains unchanged then the new submission could impose a penalty that is then suspended for a fixed period of time or until the course is completed, pursuant to s.28(4)(k) (i)...."

The parties accordingly submitted an Amended Joint Submission as to Penalty and Costs signed by the member and on behalf of the holder on June 29, 2021, and on behalf of the association on June 30, 2021, as follows:

1. Ashraf H. H. Elgendui, P.Eng. (Elgendui), and Trinus Engineering Inc. (Trinus) are the defendants in this matter. Elgendui was at all material times a member of the Association of Professional Engineers of Ontario (PEO). Trinus was at all material times the holder of a certificate of authorization issued by PEO.
2. The defendants are the subject of a proceeding before a panel of the Discipline Committee of PEO pursuant to section 28 of the *Professional Engineers Act*.
3. PEO and the defendants make the following joint submission on penalty and costs:
 - a) Pursuant to s. 28(4)(f) of the *Professional Engineers Act*, the defendants shall be reprimanded, and the fact of the reprimand shall be recorded on the register permanently;
 - b) Pursuant to s. 28(4)(d) of the *Professional Engineers Act*, there shall be a term and condition on Elgendui's requiring him to successfully complete the course offered at automate.org entitled "Robot Safety and Risk Assessment Training" (the Course), within 16 months from the date of pronouncement of the decision of the Discipline Panel (the Date);
 - c) Pursuant to s. 28(4)(e) and (k) of the *Professional Engineers Act*, a restriction shall be imposed upon Elgendui's licence prohibiting him from practising professional engineering except under the direct

- supervision of another professional engineer who shall take professional responsibility for the work by affixing his or her signature and seal on every final drawing, report or other document prepared by Elgendui, which restriction shall be suspended for a period of 16 months from the Date. If Elgendui successfully completes the Course at any time before or after the 16-month period referred to above, this restriction shall be suspended indefinitely;
- d) Pursuant to subsection 28(4)(e)(iii) of the act, a restriction shall be placed upon Elgendui's licence and Trinus' certificate of authorization, requiring them to accept a practice inspection on the following terms:
- (i) the practice inspection will be carried out by an independent expert (to be named by the deputy registrar, regulatory compliance), who will provide a report to the deputy registrar, the chair of Discipline Panel and Trinus at the conclusion of the inspection,
 - (ii) the practice inspector shall provide written notice to the defendants at least two weeks before attending at the defendants' premises to carry out his or her inspection,
 - (iii) the practice inspection will be limited to not less than 10 and not more than 20 projects carried out in or after the year 2017, of a scope or nature similar to that which was the subject of this hearing (as identified by the independent expert named by PEO),
 - (iv) the practice inspection shall be completed, and the report submitted, within eight months from the date of pronouncement of the penalty decision,
 - (v) after review of the independent expert's inspection report, the deputy registrar, regulatory compliance, may, if he or she determines that the inspection report evidences incompetence or additional professional misconduct on the part of Elgendui and/or Trinus, after providing the defendants an opportunity to respond to this determination, request that the Discipline Panel order additional penalty action against the defendants,
 - (vi) if the independent expert concludes that one or more machines included in the inspection report are unsafe, he or she shall so advise the deputy registrar and the defendants, and the deputy registrar may take appropriate action, in accordance with section 78.1 of Regulation 941 under the act, to serve or protect the public interest,
 - (vii) the Discipline Panel shall make the determination noted in (v) no later than three months after the receipt of the request by the deputy registrar, and
 - (viii) PEO and the defendants shall each pay one-half of the costs associated with the practice inspection and the report;
- e) Pursuant to s. 28(5) of the *Professional Engineers Act*, the findings and order of the Discipline Committee shall be published, with the reasons therefor, together with the names of the defendants, in the official publication of the PEO; and
- f) There shall be no order as to costs beyond those in subparagraph (d)(vii) above.
- The defendants have had independent legal advice or have had the opportunity to obtain independent legal advice, with respect to the penalty set out above.
- The panel considered the Amended Joint Submission as to Penalty and Costs and decided it falls within a reasonable range of penalties.
- In the circumstances of this case, the panel is of the view that a reprimand, the fact of which is to be recorded permanently on the register; a requirement prohibiting the member from practising professional engineering except under the direct supervision of another professional engineer who shall take professional responsibility for the work, unless and until the member completes the Course (as defined in the Amended Joint Submission as to Penalty and Costs); a requirement for the member and holder to accept a practice inspection; and, publication of the panel's findings and order with reference to the names of the member and holder, is a reasonable outcome in this matter. A lesser penalty would fail to appropriately serve the aims of specific and general deterrence, protecting the public, and maintaining the public's confidence in the regulation of the profession.
- The panel acknowledges the member's co-operation with the association through the Agreed Statement of Facts and Amended Joint Submission as to Penalty and Costs. These considerations, combined with his lack of a prior disciplinary history, are mitigating factors in determining an appropriate penalty. It is the panel's view, however, that these mitigating factors do not completely detract from the aggravating factors, given the seriousness of the misconduct in question.

The panel has been made aware of the significant and troubling shortcomings in the member's practice in this case. The panel reiterates that the member has been found guilty of negligence and of failing to take reasonable precautions to safeguard the life and health of those who were affected by and relied on his work.

Public trust is at the core of what it means to be a professional. Members of the public must have confidence that professionals are held to high standards of conduct and that serious breaches of those standards are dealt with appropriately. Failing to take a proportionate response to protect the public in the face of professional misconduct undermines that trust and harms both the reputation of the profession and the legitimacy of professional regulation.

In the circumstances of this case, the panel is of the view that a reprimand, the fact of which is to be recorded permanently on the register, together with the requirements and licence restrictions specified above, will maintain public confidence in the regulation of the profession and adequately provide for protection of the public and general deterrence to the profession at large.

Additionally, the panel notes that the fact of a reprimand to be permanently recorded on the register and publication of the panel's findings and reasons with names serves to promote both specific and general deterrence and reinforce the public confidence in the regulation of the profession. Publication demonstrates, both to the profession and to the public, the seriousness with which the Discipline Committee regards lapses of professional standards, and the penalties for engaging in such misconduct.

Accordingly, the panel accepts the Amended Joint Submission as to Penalty and Costs for the member and Trinus and orders as follows:

- a) Pursuant to subsection 28(4)(f) of the *Professional Engineers Act*, Elgendui and Trinus shall be reprimanded, and the fact of the reprimand shall be recorded on the register permanently;
- b) Pursuant to subsection 28(4)(d) of the *Professional Engineers Act*, there shall be a term and condition on Elgendui's requiring him to successfully complete the course offered at automate.org entitled "Robot Safety and Risk Assessment Training" (the Course), within 16 months from the date of this Decision and Reasons;
- c) Pursuant to s. 28(4)(e) and (k) of the *Professional Engineers Act*, a restriction shall be imposed upon Elgendui's licence prohibiting him from practising professional engineering except under the direct supervision of another professional engineer who shall take professional responsibility for the work by affixing his or her signature and seal on every final drawing, report or other document prepared by Elgendui, which restriction shall be suspended for a period of 16 months from the date of this Decision and Reasons. If Elgendui successfully completes the Course at any time before or after the 16-month period referred to above, this restriction shall be suspended indefinitely;
- d) Pursuant to subsection 28(4)(e)(iii) of the act, a restriction shall be placed upon Elgendui's licence and Trinus' certificate of authorization, requiring them to accept a practice inspection on the following terms:
 - (i) the practice inspection will be carried out by an independent expert (to be named by the deputy registrar, regulatory compliance), who will provide a report to the deputy registrar, the chair of Discipline Panel and Trinus at the conclusion of the inspection,
 - (ii) the practice inspector shall provide written notice to the defendants at least two weeks before attending at the defendants' premises to carry out his or her inspection,
 - (iii) the practice inspection will be limited to not less than 10 and not more than 20 projects carried out in or after the year 2017, of a scope or nature similar to that which was the subject of this hearing (as identified by the independent expert named by PEO),
 - (iv) the practice inspection shall be completed, and the report submitted, within eight months from the date of pronouncement of the penalty decision,
 - (v) after review of the independent expert's inspection report, the deputy registrar, regulatory compliance, may, if he or she determines that the inspection report evidences incompetence or additional professional misconduct on the part of Elgendui and/or Trinus, after provid-

ing the defendants an opportunity to respond to this determination, request that the Discipline Panel order additional penalty action against the defendants,

- (vii) if the independent expert concludes that one or more machines included in the inspection report are unsafe, he or she shall so advise the deputy registrar and the defendants, and the deputy registrar may take appropriate action, in accordance with section 78.1 of Regulation 941 under the act, to serve or protect the public interest,
 - (vi) the Discipline Panel shall make the determination noted in (v) no later than three months after the receipt of the request by the deputy registrar, and
 - (vii) PEO and the defendants shall each pay one-half of the costs associated with the practice inspection and the report.
- e) Pursuant to s. 28(5) of the *Professional Engineers Act*, the findings and order of the Discipline Committee shall be published, with the reasons therefor, together with the names of the member and holder, in the official publication of PEO; and
- f) There shall be no order as to costs beyond those in subparagraph (d)(vii) above.

The panel will reconvene with the member and holder for the purpose of administering the reprimand, on a date to be determined on consultation with the member and holder.

Albert Sweetnam, P.Eng., signed this Decision and Reasons for the decision as chair of this Discipline Panel and on behalf of the members of the Discipline Panel: Reena Goyal, JD, and Glenn Richardson, P.Eng.

Appendix “1” (written submissions of ILC, dated June 2, 2021), Appendix “2” (written submissions by counsel for the association, dated June 9, 2021) and Appendix “3” (letter sent on behalf of the member and holder, dated June 9, 2021) can be found on PEO’s website: [https://secure.peo.on.ca/HearingDownload/90339896-877-Elgendui%20et%20al%20-%20Decision%20and%20Reasons%20\(with%20Appendices\).pdf](https://secure.peo.on.ca/HearingDownload/90339896-877-Elgendui%20et%20al%20-%20Decision%20and%20Reasons%20(with%20Appendices).pdf).

DECISION AND REASONS

In the matter of a hearing under the *Professional Engineers Act*, R.S.O. 1990, c. P.28; and in the matter of a complaint regarding the conduct of ROBERT A. PASSMORE, P.ENG., a member of the Association of Professional Engineers of Ontario, and FIELDSTONE ENGINEERING INC., a holder of a certificate of authorization.

This panel of the Discipline Committee (the panel) of the Association of Professional Engineers of Ontario (the association or PEO) convened a hearing remotely via Zoom to hear this matter on June 8, 2021.

THE ALLEGATIONS AND THE AGREED STATEMENT OF FACTS

Robert Passmore, P.Eng. (Passmore), and Fieldstone Engineering Inc. (Fieldstone) (collectively Passmore and Fieldstone or the defendants) and the association entered into an Agreed Statement of Facts dated May 26, 2021 (ASF). The relevant parts of the ASF, taken directly therefrom, are as follows:

1. “The respondent Robert A. Passmore, P.Eng., is, and was, at all material times, a professional engineer licensed in good standing pursuant to the *Professional Engineers Act*.
2. At all material times, the respondent Fieldstone Engineering Inc. held a certificate of authorization and Passmore was the individual accepting professional responsibility for engineering services provided under the certificate of authorization.
3. At all material times, the complainant Michel Richer owned the house at 1364 River Road in Manotick, Ontario (the House).
4. In December 2016, Richer retained Passmore to design and obtain a permit for the installation of a replacement sewage system for the House, with an intention to complete the installation of the replacement system in April 2017 (the Project). As part of the Project, Passmore agreed to complete the design, permit drawings, the application for a permit, project coordination and all inspections.
5. Passmore offered to and agreed to submit a permit application to the Ottawa Septic System Office (OSSO) before the end of 2016 but did not provide a draft design to Richer until on or about February 2, 2017. Passmore did not complete a full visual inspection of the existing septic system. Passmore recommended that Richer use his existing septic tank as a pre-treatment unit and install an Ecoflo treatment unit. He also recommended the use of shallow bed trenches (SBTs). Richer then approved the design and instructed Passmore to file the permit application. Passmore did not submit the permit application to the OSSO, dated February 10, 2017, until he was reminded to do so on February 22, 2017. Passmore had forgotten to submit the permit application.
6. The permit application indicated Passmore was Richer’s authorized representative and was responsible for the design of the Project. With the application, Passmore submitted a Replacement Sewage System Layout Plan, which he signed and sealed. The permit application indicated that the existing septic tank was +/-4500L and would be used as the pre-treatment unit. He indicated that the existing septic tank would be pumped and assessed for structural integrity and capacity for suitability for reuse. Passmore indicated that the treatment unit would be a Waterloo-Biofilter.
7. Before submitting the permit application, Passmore did not advise Richer that his design was conditional on the existing septic tank being a minimum size; that if the existing septic tank did not meet that minimum size, there would be impacts on the design and installation of the Project; and that he had selected the Waterloo-Biofilter (not the Ecflo [sic]) as the treatment unit.
8. On February 23, 2017, the OSSO declined to process or approve the permit application and required Passmore to make revisions to comply with the *Conservation Authorities Act*; to reflect the certification requirements of the Waterloo-Biofilter; and to include proper SBT and biomat specifications.
9. Between February 23 and April 20, 2017, Passmore did not adequately explain the OSSO’s requirements to Richer and did not adequately communicate with Richer about the status of and next steps for the permit application. Passmore did not undertake any further inspections of the House’s existing septic system.

10. On April 20, 2017, Passmore advised Richer that he had submitted revised plans, which he had not, and scheduled a meeting with Richer, which he then failed to attend. Passmore did not submit an application under the *Conservation Authorities Act* and a revised Replacement Sewage System Layout Plan to the OSSO until April 27, 2017. Passmore advised the OSSO that the existing septic tank was 4750L but no reference was made to reviewing the structural integrity and capacity of the existing tank.
11. On April 28, 2017, the OSSO advised Passmore that the revised plan did not meet Waterloo-Biofilter specifications. On or about May 13, 2017, Passmore advised Richer that he had submitted a further revised plan, which he had not. Passmore did not submit a further revised application and plan until to the OSSO until May 30, 2017. Passmore indicated that the existing septic tank was 4500L and would be inspected and reused as a pretreatment tank. Passmore also indicated that the treatment unit would be an Ecoflo model.
12. On June 1, 2017, the OSSO reviewed the further revised plan and noted biomat and contaminated material beneath the SBTs had to be removed. On June 6, 2017, the OSSO conditionally approved the application, including verification of the adequacy of the existing tank.
13. Passmore did not prepare tenders or provide information for the preparation of tenders to Richer. Richer tendered the Project and retained an installer for the Project. Richer prepared the site for installation in the summer of 2017. The installer commenced work in October 2017. In November 2017, Richer made numerous attempts to contact Passmore to inspect the installation work. Passmore came to the site on or about November 21, 2017, but did not inspect the site thoroughly.
14. On or about November 23, 2017, the OSSO visited the site for an installation inspection. The OSSO did not approve the installation, because, among other things, the existing septic tank did not meet the minimum required size. It was only 3500L where the minimum required size was 4300L. Further, the OSSO noted that all biomat and contaminated material had not been removed from the existing sewage system beneath the SBTs. Before it would approve the installation, the OSSO required the remediation of these issues, among others, and required Passmore to provide a letter verifying same.
15. To obtain regulatory approval, Passmore recommended and Richer agreed to purchase a secondary pretreatment tank with a 1100L volume, which was then installed in November 2017. The OSSO later noted that the secondary tank was under-sized. When OSSO directed Passmore to put in writing the suitability of the tanks, he advised that the 3500L tank plus the 1100L tank, met the intent of the Ontario Building Code, although not its strict wording. Passmore did not provide guidance to the installer on how much biomat to remove, resulting in the installer clearing more than was necessary. Ultimately, Passmore did not provide the letter OSSO required until December 10, 2017. By this time, the system had been exposed to the cold weather.
16. The OSSO agreed to permit Richer to cover the exposed system and agreed to approve the installation, subject to the removal of a baffle. The installer unearthed the Project and removed the baffle in May 2018. Passmore did not attend at the House to inspect the Project or the removal of the baffle. The OSSO did not provide a certification of completion for the installation of the sewage system until June 1, 2018.
17. The association and Passmore agree that, based on the preceding facts, Passmore and Fieldstone are guilty of professional misconduct under section 72(2)(j) of Regulation 941, as follows:
 - (a) Conduct or an act relevant to the practice of professional engineering that, having regard to all the circumstances, would reasonably be regarded by the engineering profession as unprofessional, when they:
 - i. failed to complete contracted services, including completing inspections and

- tenders and supervising the installer between December 2016 and June 2018;
- ii. failed to submit the permit application and plan and revisions thereto in a timely manner between December 2016 and May 2017; and
 - iii. failed to adequately explain the requirements and process of installing the replacement sewage system between December 2016 and May 2017, including:
 1. failing to advise Richer that the Project design was conditional on the existing tank being of an appropriate size,
 2. failing to advise Richer that, if the existing tank was not an appropriate size, a secondary pretreatment tank could be required, and
 3. failing to advise Richer that the February and April 2017 Plans submitted to the authority called for a Waterloo-Biofilter treatment unit, and not an Ecoflo unit; and
 - iv. advised Richer on April 20, 2017, and on May 13, 2017, that they had submitted applications or plans to the OSSO when they had not.

The defendants have had independent legal advice or have had the opportunity to obtain independent legal advice, with respect to the penalty [sic] set out above.”

PLEA BY PASSMORE AND FIELDSTONE

As noted, Passmore and Fieldstone admitted to the facts set out above in the ASF. The panel conducted a plea inquiry and was satisfied that Passmore’s and Fieldstone’s admissions were voluntary, informed and unequivocal.

DECISION

The panel considered the ASF and finds that the facts support findings of professional misconduct as set out and, in particular, finds that the defen-

dants committed acts of professional misconduct enumerated.

PENALTY

Counsel for the association advised the panel that a Joint Submission as to Penalty (JSP) had been agreed upon. The relevant parts of the JSP, taken directly therefrom, are as follows:

- (a) “Pursuant to s. 28(4)(f) of the *Professional Engineers Act*, the defendants shall be reprimanded, and the fact of the reprimand shall be recorded on the register for a period of two years;
- (b) Pursuant to s. 28(4)(d) of the *Professional Engineers Act*, it shall be a term or condition on Passmore’s licence that he shall, within fourteen (14) months of the date of pronouncement of the decision of the Discipline Committee, successfully complete the National Professional Practice Examination;
- (c) Pursuant to s. 28(4)(i) of the *Professional Engineers Act*, the findings and order of the Discipline Committee shall be published, with the reasons therefor, together with the names of the defendants, in the official publication of PEO; and
- (d) There shall be no order as to costs.

The defendants have had independent legal advice or have had the opportunity to obtain independent legal advice, with respect to the penalty set out above.”

Counsel for the association advised that the penalty should be accepted due to the importance and seriousness of this matter. Counsel for the association also read into the record comments from the affected homeowner, Michel Richer, regarding the impact that this matter has had on him. Passmore, on the other hand, noted the challenges of owning a small engineering firm. He specifically cited the challenges of adapting when changes are made to the Ontario Building Code. He also stated that he accepts responsibility for his actions and that he has tried to make amends.

In addition, independent legal counsel to the panel advised the panel that there is a high bar for a panel to meet to depart from a JSP and that

he was of the view that the penalty is within the panel's jurisdiction.

PENALTY DECISION

The panel accepts the JSP and accordingly orders:

- (a) Pursuant to s. 28(4)(f) of the *Professional Engineers Act*, the defendants shall be reprimanded, and the fact of the reprimand shall be recorded on the register for a period of two years.
- (b) Pursuant to s. 28(4)(d) of the *Professional Engineers Act*, it shall be a term or condition on Passmore's licence that he shall, within fourteen (14) months of the date of pronouncement of the decision of the Discipline Committee, successfully complete the National Professional Practice Examination.
- (c) Pursuant to s. 28(4)(i) of the *Professional Engineers Act*, the findings and order of the Discipline Committee shall be published, with the reasons therefor, together with the names of the defendants, in the official publication of PEO; and
- (d) There shall be no order as to costs.

The panel concluded that the proposed penalty is reasonable and in the public interest. Passmore and Fieldstone have co-operated with the association and, by agreeing to the facts and a proposed penalty, have accepted responsibility for their actions and have avoided unnecessary expense to the association.

REPRIMAND

Passmore and Fieldstone waived their rights to an appeal and the panel administered an oral reprimand immediately after the hearing.

Charles McDermott, P.Eng., signed this Decision and Reasons for the decision as chair of this Discipline Panel and on behalf of the members of the Discipline Panel: James Amson, P.Eng., and Alisa Chaplick, LLB.

SUMMARY OF DECISION AND REASONS

In the matter of a hearing under the *Professional Engineers Act*, R.S.O. 1990, c. P.28; and in the matter of a complaint regarding the actions and conduct of BENHAM TORKAN, P.ENG., a member of the Association of Professional Engineers of Ontario.

This Discipline Committee hearing took place by videoconference on October 19, 2020. The association was represented by Leah Price. Mr. Torkan was self-represented.

AGREED STATEMENT OF FACTS AND ALLEGATIONS

The parties submitted the following Agreed Statement of Facts:

1. At all material times, Behnam Torkan (Torkan) was a professional engineer licensed pursuant to the *Professional Engineers Act*, whose practice focused on structural engineering.
2. On August 21, 2014, Torkan signed and sealed a structural review for Fairway Building Products L.P. (FBP), an American company that supplies deck and porch railing systems (the Torkan Review). Attached as Schedule “A” is a copy of the Torkan Review.
3. FBP intended to market the railing systems in Canada. The Torkan Review stated that the railing system was “designed to comply with the structural and other requirements of Canadian standards.” The purpose of the Torkan Review was stated therein to be “to describe the loading and analyze the behaviour of the railing under given loads and recommending guidelines in the installation processes of the railing system.”
4. The calculations in the Torkan Review omitted the height of the handrails and overstated the spacing of posts, the combination of which resulted in the potential for overstress as determined in accordance with the National Building Code. As well, the Torkan Review incorrectly relied upon a combined resistance of the steel post and aluminum sleeve, when only the post was connected to the base plate.
5. PEO retained an independent expert to examine the Torkan Review. In two reports, the expert concluded that the Torkan Review contained a number of errors, including the ones identified in paragraph 4 hereof, and that Torkan fell below applicable standards in preparing the Torkan Review. Attached collectively as Schedule “B” are the two expert reports.
6. For the purposes of these proceedings, Torkan accepts as correct the findings, opinions and conclusions contained in the expert reports. Torkan admits that he failed to make reasonable provision for the safeguarding of the public, that he failed to make responsible provision for complying with applicable standards and codes, and that he failed to maintain the standards that a reasonable and prudent practitioner would maintain in the circumstances.
7. On December 6, 2018, a Hearing Panel under the *Engineering and Geoscience Professions Act* of Saskatchewan convicted Torkan of professional misconduct in connection with the same structural review (the Torkan Review), which he had signed and sealed utilizing his seal under the Saskatchewan legislation. Attached as Schedule “C” is a copy of the first page of the Saskatchewan Torkan Review (showing the seal). Attached as Schedule “D” is a copy of the decision of the Hearing Panel.
8. At the time he signed and sealed the Torkan Review, Torkan did not hold a certificate of authorization.
9. By reason of the aforesaid, the parties agree that Torkan is guilty of professional misconduct as follows:
 - a. He signed and sealed an inadequate structural review, amounting to professional misconduct as defined by sections 72(2)(a), (b), (d) and (j) of Regulation 941 under the *Professional Engineers Act*; and
 - b. He provided professional engineering services to the public while not being the holder of a certificate of authorization contrary to s.12(2) of the *Professional Engineers Act*, amounting to professional misconduct as defined by section 72(2)(g) of Regulation 941.

DECISION

The panel accepted Mr. Torkan's admission of the facts set out in the Agreed Statement of Facts, including the allegations. On that basis, the panel found Mr. Torkan guilty of professional misconduct as set out in paragraph 9 of the Agreed Statement of Facts.

PENALTY

The parties presented a Joint Submission as to Penalty and Costs, which provided as follows:

- a) Pursuant to s. 28(4)(f) of the act, Torkan shall be reprimanded, and the fact of the reprimand shall be recorded on the register permanently;
- b) Pursuant to s. 28(4)(b) of the act, Torkan's licence shall be suspended for a period of seven (7) calendar days, commencing on a date to be agreed, such date to be no later than three (3) weeks after the date of the Discipline Committee's decision;
- c) Pursuant to sections 28(4)(i) and 28(5) of the act, the findings and order of the Discipline Committee shall be published in summary form in PEO's official publication, with reference to names;
- d) Pursuant to s. 28(4)(d) of the act, it shall be a term or condition on Torkan's licence that he shall, within fourteen (14) months of the date of the Discipline Committee's decision, successfully complete PEO's Advanced Structural Analysis (16-CIV-B1) and Advanced Structural Design (16-CIV-B2) examinations;
- e) Pursuant to s. 28(4)(b) and (k) of the act, in the event Torkan does not successfully complete the examinations set out in (d), his licence shall be suspended for a period of ten (10) months, or until he successfully completes the examinations, whichever comes first; and
- f) There shall be no order as to costs.

LEGAL ISSUES

In the course of the hearing, the Discipline Committee received advice from its independent legal counsel that it did not have jurisdiction to impose a 10-month suspension on the member's licence, should he fail to successfully complete an examination, as contemplated by item (e) of the Joint Submission as to Penalty. Counsel for the association provided submissions to the contrary. The Discipline Committee found that it did have jurisdiction to impose a penalty of this nature.

SUBSTANTIVE ISSUES REGARDING PENALTY

The member's co-operation with the association and lack of prior disciplinary history were mitigating factors. However, the member was found guilty of negligence and of failing to take reasonable precautions to safeguard the life and health of those who were affected by and relied on his work. Ultimately, the panel determined that the penalty requested by the parties in the Joint Submission as to Penalty appropriately accounted for these factors, fell within a reasonable range of penalties imposed in previous cases and appropriately served the principles of sentencing, including the protection of the public and maintenance of the public's confidence in the profession.

At conclusion of the hearing, the member waived his right to appeal and the panel administered a reprimand to the member.

D. Germain, JD, chair of the Discipline Panel, signed the Decision and Reasons on March 15, 2021, on behalf of the other panel members: P. Ballantyne, P.Eng., and J. Tyrrell, P.Eng.

PEO PUBLICATIONS AND RESOURCES

Professional Engineers Ontario has a number of resources, including practice bulletins, brochures, learning modules and fact sheets, available for free on its website at peo.on.ca/knowledge-centre. The following regulatory documents and practice guidelines are available in PDF form on PEO's website.

REGULATORY DOCUMENTS

- The *Professional Engineers Act*, R.S.O. 1990, Chapter P.28
- Ontario Regulation 260/08
- Ontario Regulation 941/90
- By-Law No. 1

PRACTICE GUIDELINES

General—Engineer

- Assuming Responsibility and Supervising Engineering Work Guideline (2018)
- Conducting a Practice Review (2014)
- Guideline on Human Rights in Professional Practice (2009)
- Preparing As-Built and Record Documents Guideline (2020)
- Guideline for Providing Engineering Services Under O.Reg. 1/17 and Part II.2 of the EPA (2021)
- Professional Engineering Practice (2020)
- Professional Engineers Reviewing Work Prepared by Another Professional Engineer (2011)

Use of Seal

- Use of Professional Engineer's Seal (2008)

Legal/Discipline

- Guideline on Forensic Engineering Investigations (2016)
- Making a Complaint: A Public Information Guide (2011)
- The Professional Engineer as an Expert Witness (2011)

Communications

- Professional Engineers Providing Communication Services (1993)

Construction/Building

- Design Evaluation & Field Review of Demountable Event & Related Structures Guideline (2020)
- Professional Engineers Providing Commissioning Work in Buildings (1992)
- Professional Engineers Providing General Review of Construction as Required by the Ontario Building Code (Rev. 2008)
- Professional Engineers Providing Land Development/Redevelopment Engineering Services (1994)
- Professional Engineers Providing Mechanical and Electrical Engineering Services In Buildings (1997)
- Professional Engineers Providing Professional Services in Building Projects using Manufacturer-Designed Systems and Components (1999)
- Professional Engineers Providing Services for Demolition of Buildings and Other Structures (2011)
- Professional Engineers—Temporary Works (1993)

- Structural Condition Assessments of Existing Buildings and Designated Structures (2016)
- Structural Engineering Design Services for Buildings Guideline (2016)

Transport/Roads/Municipal

- Professional Engineers Providing Services for Municipalities (Rev. 1998)
- Professional Engineers Providing Services in Transportation and Traffic Engineering (1994)
- Professional Engineers Providing Services with Respect to Road, Bridges, and Associated Facilities (1995)

Software/Computers

- Developing Software for Safety Critical Engineering Applications (2013)
- Professional Engineers Using Software-Based Engineering Tools (2011)

Mechanical/Electrical/Industrial

- Professional Engineers Providing Reports for Pre-Start Health and Safety Reviews (2001)

Geotechnical/Environmental

- Engineering Evaluation Reports For Drinking Water Systems (2014)
- Environmental Site Assessment, Remediation and Management Guideline (2020)
- Professional Engineers Providing Acoustical Engineering Services in Land-Use Planning (Rev. 1998)
- Professional Engineers Providing Geotechnical Engineering Services (1993)
- Professional Engineers Providing Reports on Mineral Properties (2002)
- Services of the Engineer Acting Under the Drainage Act (1998)
- Solid Waste Management (2017)

National Guidelines

- Principles of Climate Change Adaptation for Engineers
- Guideline on Sustainable Development and Environmental Stewardship for Professional Engineers (2016)

STRUCTURAL DETERIORATION OF EXISTING STRUCTURES AND PRACTITIONERS' PROFESSIONAL OBLIGATIONS

By Sally Thompson, P.Eng.

The collapse of the Champlain Towers South condo in Surfside, FL, earlier this year should serve as a reminder to all practitioners involved in building evaluations and reserve fund studies of their professional responsibilities to the welfare of the public. According to media reports, several engineering reports had been provided to the condo corporation notifying it of the need to complete structural repairs to the garage and balconies, as well as other repairs such as roof work, mechanical, electrical and life safety systems. However, three years later, when the building collapsed, the recommended work had, in large part, not been completed.

We do not yet know what efforts the engineer who provided the structural report made to motivate the condo corporation to complete the required work. The building was governed by a volunteer board, and when it received the recommendations, there was not enough money in the reserve fund to cover the related costs. The board that first attempted to implement the work eventually resigned and was replaced by a new board. A couple of years later, that board initiated a special assessment to collect the required funds to cover the costs.

The story, other than the collapse itself, is not unfamiliar to those who work with condo corporations, and the pattern plays out quite frequently in Ontario. Condo boards seeking to implement special assessments to cover required work are often removed via a requisition meeting. The new board often starts fresh, firing the management, engineers, reserve fund study providers and lawyers serving the corporation. While this might seem reasonable from the perspective of the individuals seeking to avoid what they see as an unreasonable special assessment, it often introduces a delay of several years between the practitioner's first recommendation that work be completed and the start of related work. When the repairs are structurally significant, these delays represent an immediate hazard—or, if left, may become structurally significant. This delay puts practitioners in a difficult situation.

WHAT PRACTITIONERS SHOULD DO

Practitioners must regard their duty to public welfare as paramount, as per PEO's Code of Ethics in section 77 of the *Professional Engineers Act*. During a building condition evaluation or reserve fund study site visit, even though they are not complet-

ing a full structural condition assessment, a practitioner may observe conditions they believe to be structurally significant or imminently hazardous. Their first course of action should be to have a structural evaluation completed to confirm their concerns and then promptly have immediate safety risks addressed. This might mean working with the client to have a contractor visit the site within days to implement required work or arranging for the installation of temporary shoring. But often, deterioration is structurally significant and in need of repair in the next few years but not at risk of immediate failure. With time, the building may degrade further, increasing risk of failure. Here, the practitioner is put in a more difficult position. Further evaluation may be needed. Ideally, the building owner will engage them or others to complete required evaluation and design-required repairs, which can be implemented in a reasonable timeframe.

But what happens if the building owner refuses to complete further evaluation or make repairs? Or the condo board gets removed and the practitioner is not re-hired by the new board? The practitioner is no longer being engaged or paid to do work, but what obligations do they still have? Public welfare remains their obligation. The practitioner should reach out to the building owner, property manager or new condo board and notify them of their serious concerns related to the building. They should request confirmation that another professional engineer has been engaged to provide a second opinion and/or take responsibility for the deteriorated building components, and then follow up with that engineer to confirm their engagement. If they do not receive a response from the owner and a duty to warn is established due to imminent safety risk to the public, their next course of action should be to notify the jurisdiction's municipal authority of their concerns so the municipality can take appropriate action.



FORTUNATELY, MANY BUILDINGS ARE REVIEWED BY ENGINEERS, WHETHER AS PART OF THE PREPARATION OF A RESERVE FUND STUDY FOR A CONDOMINIUM, OR DURING A BUILDING CONDITION EVALUATION, OFTEN TIED TO A PURCHASE, SALE OR REFINANCING OF A BUILDING. WHILE THESE REVIEWS DO NOT TYPICALLY INCLUDE A FULL STRUCTURAL ASSESSMENT, THEY OFTEN PROVIDE ENOUGH ACCESS THAT SERIOUS STRUCTURAL DETERIORATION, OR SIGNS THEREOF, CAN BE OBSERVED.

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DOING THE RIGHT THING IN CHALLENGING CIRCUMSTANCES

Some building condition evaluations are completed on behalf of a potential purchaser of a building, not the building owner. In this case, navigating structural deterioration or hazardous conditions becomes even more challenging because the engineering contract is not with the building owner. The practitioner may advise their client not to purchase the building due to the degradation or risks but must still manage their obligation to public welfare. In the case of imminent safety risk to the public, this will mean reaching out to the building owner, if possible, or the municipality to ensure they are aware of the seriousness of the concerns.

Pursuing discussions with a building owner about required repairs or contacting municipal authorities can also have a negative business impact on the practitioner's firm because these actions may aggravate their clients by damaging the client's corporate relationships. For example, your client may not choose to buy that deteriorated building from the current owner but might not want to be shut out from other purchasing opportunities with the same owner because their engineer caused the owner a significant headache. Despite the business risk, the practitioner must persist in doing the right thing. In these cases, it may be best to work through the client to contact the building owner so they can help manage the message. But the message must get through.

Currently, in Ontario, there is no requirement for a general engineering evaluation of buildings after construction, like the 40-year recertification process in certain counties in Florida. After the Algo Centre Mall collapse in Elliot Lake, ON, the Building Safety Technical Advisory Panel recommended that the Ministry of Municipal Affairs and Housing (MMAH), which oversees the Ontario Building Code, implement mandatory risk screening of buildings with mandatory Structural Adequacy Assessments to be completed periodically every six or 12 years for high- or medium-risk buildings. These recommendations have not been implemented.

Fortunately, many buildings are reviewed by engineers, whether as part of the preparation of a reserve fund study for a condo or during a building condition evaluation, often tied to a purchase, sale or refinancing of a building. While these reviews do not typically include a full structural assessment, they often provide enough access that serious structural deterioration, or signs thereof, can be observed.

THE RISKS OF CONCEALED DETERIORATION

The above suggestions apply well to deterioration that is clearly structurally significant or visibly hazardous conditions that might reasonably be detected via the visual review completed for most building condition evaluations. Examples might include reinforced-concrete-framed parking garages with extensive concrete delamination. By their nature, these structures are exposed to view, so the deterioration may be readily evident. But in many cases, deterioration is concealed by finishes or are otherwise not immediately obvious. For example, the mall at Elliot Lake had parking on top of a steel-framed building. Practitioners reviewing the building knew of the leakage and understood the risk of salty water accessing steel connections but could not readily see the connections because they were covered by ceilings. Engineers who reviewed the building many years before its failure pointed out the related risks and recommended structural assessments that the building owner never completed.

Practitioners completing building evaluations ought to be reasonably aware of concealed structural details that might require periodic review due to their risk profile. Examples would be steel framing under parking, like at Elliot Lake, but would also include post-tensioned structures; steel-framed or wood-framed balconies with soffit finishes that prevent visual review of the connections; high-rise header-brick walls with no horizontal control joints; or buildings constructed with autoclaved, aerated concrete slabs.

The expectation here is reasonable competence, not perfection. In the author's opinion, it is also not reasonable to expect practitioners to track all conditions seen in buildings that, left unattended for decades, might eventually result in failure. The practitioner has no practical ability to force a negligent building owner to complete and pay for an assessment they choose not to do. The best solution to this conundrum is for the MMAH to make periodic structural assessments mandatory for medium- and high-risk buildings, like Quebec's mandatory in-depth verification reports for parking structures.

THE CASE OF HIGH-RISK CONDOS

Currently, the *Condominium Act* allows a wide range of individuals to prepare reserve fund studies. In PEO's new *Guideline for Engineers Conducting Performance Audits and Reserve Fund Studies*, the Professional Standards Committee takes the position that, under certain circumstances, reserve fund studies require professional engineering services. This includes studies for buildings over four storeys in height; buildings with suspended structural slabs that support parking, driveways or landscaping; buildings with balconies (other than wood balconies that are fully exposed on the soffit); and post-tensioned or other high-risk structures. Consequently, condo boards should be aware that higher-risk condos may have to be reviewed by an engineer at least once every six years. As part of those reviews, the practitioner may make recommendations for periodic in-depth structural assessments and, if the need arises, can help the building owner manage immediate and developing structural deterioration and hazardous conditions.

Our duty to public welfare sometimes puts us in the position of having to follow-up on problems, which rightfully feel like they

belong to someone else. Usually, the building owner is glad to have learned about the concerns so they can be addressed. Occasionally, however, this requirement to ensure public welfare is paramount may harm our own businesses by making our clients think we are being too detail-oriented or risk-averse or simply by costing us in unpaid labour. But the safety of the public should always come ahead of business priorities so we can do our part to help avoid catastrophes like the one that befell Champlain Towers South. **e**

Sally Thompson is a managing principal at Synergy Partners Consulting Limited, a firm specializing in capital planning and engineering related to building restoration. She has been completing building condition evaluations and reserve fund studies since 1990.



PEO Scarborough Chapter 2022 Annual General Meeting
Saturday, January 22, 2022, from 9 a.m. to 12 p.m. EST
www.eventbrite.ca/o/peo-scarborough-chapter-28802055901

ARE YOU INVOLVED IN YOUR LOCAL PEO CHAPTER?
PLEASE MAKE NOTE OF THE UPCOMING CHAPTER ANNUAL GENERAL MEETINGS.

PEO Etobicoke Chapter 2022 Annual General Meeting
Wednesday, January 26, 2022 from 7 p.m. to 9 p.m. EST
www.eventbrite.ca/o/peo-etobicoke-chapter-28909639753

PEO Grand River Chapter 2022 Annual General Meeting
Tuesday, February 8, 2022, from 7 p.m. to 9 p.m. EST
Bingemans Conference Centre, 425 Bingemans Centre Drive, Kitchener, ON
www.eventbrite.ca/o/peo-grand-river-chapter-28899318003

IN MEMORIAM

THE ASSOCIATION HAS RECEIVED WITH REGRET NOTIFICATION OF THE DEATHS OF THE FOLLOWING MEMBERS (AS OF SEPTEMBER 2021).

ABALDO, Michael Anthony
Oldcastle, ON

AUDETTE, Hector Joseph
Petrolia, ON

BALOGH, Thomas
Chatsworth, ON

BATES, James Andrew
Newmarket, ON

BECKER, Norbert Karl
Windsor, ON

BETHELL, James Robert
Ottawa, ON

BILANSKI, Walter K.
Guelph, ON

BJORNSSON, Arnold Bruce
Kanata, ON

BOUNDY, Lawrence Grant
Alliston, ON

BROOKS, John Roland
St. Marys, ON

BROWN, Warren Stewart
Peterborough, ON

BROWNING, Donald Albert
Wasaga Beach, ON

BUKATKO, Kiril
Etobicoke, ON

BUSSIERES, Pierre
Battersea, ON

CAMPBELL, Arthur James
Peterborough, ON

CARTER, Ernest Reed
Toronto, ON

CHANG, Courtney George
Toronto, ON

COFELL, John Fredrick
Thunder Bay, ON

CRAMM, David Cameron
Ancaster, ON

**CRYDERMAN, Douglas
Charles**
Ottawa, ON

CURTIS, Ralph Edward
Ottawa, ON

CZAJKOWSKI, Jerzy Krzystof
Toronto, ON

DUHA, Jan Ladislav
Kitchener, ON

ELFSTROM, Gary Macdonald
Mississauga, ON

EL-GAZZAR, Mohamed Elwy
Scarborough, ON

FERGUSON, Robert Alexander
Scarborough, ON

**FIANDER, Richard Edward
Kent**
Nepean, ON

FICHMAN, Teodor
Toronto, ON

GAZSO, Gabor Anthony
Thornhill, ON

GERDELS, John Janis
Scarborough, ON

GIBSON, Linda Louise
Ottawa, ON

GIULIANO, Matteo
Mississauga, ON

GOERZEN, Lawrence David
Kitchener, ON

GOLDING, David Wallace
Manilla, ON

GOSS, Denys William
Ottawa, ON

GROSSER, Adam Wieslaw
Victoria, BC

HAALSTRA, Martin Anthony
Belmont, ON

HAAS, Ralph Carl George
Waterloo, ON

HADLEY, Cyril Joseph
London, ON

HALINATY, Mark William
Newmarket, ON

HAMILTON, Shea Gregory
Toronto, ON

HAN, Fangru
Richmond Hill, ON

HARMSWORTH, Earl Franklin
Mississauga, ON

HIGGINS, Peter McGregor
Kanata, ON

HINK, Anthony Douglas
Oakville, ON

HOLLIDAY, James John
Oro-Medonte, ON

IGLINSKI, Wojciech Joseph
Etobicoke, ON

JACKSON, Charles Murfin
London, ON

JACKSON, Robert Michael
Kettering, United Kingdom

JAMES, Christy Kiritharan
Westborough, MA

JAMES, Michael Frederick
Nepean, ON

**JIVRAJ, Navrozali Pyarali
Abdulla**
Markham, ON

KABIR, A-K-M Nazrul
Ajax, ON

KELLY, Gerald Victor
North York, ON

KENNEDY, John Michael
Burlington, ON

KHOSLA, Yogendra Kumar

KONG, Chong Fuh
Markham, ON

KOVACS, Tibor
Toronto, ON

KOZOLE, Karl Heinz
Oshawa, ON

LAW, Earl Bonar
Toronto, ON

LESCO, Randall John
Pembroke, ON

LIE, Tjiauw Bing
Kuala Lumpur, Malaysia

LINSEMAN, Raymond Edward
Brockville, ON

MACMILLAN, Charles Peter
Essex, ON

MADRYGA, Bryan Andrew
Markham, ON

MARSHALL, Robert George
Barrie, ON

MARTINOVIC, Jozo
Mississauga, ON

**MATHEWSON, Donald
George**
Beaconsfield, QC

MCCONNELL, William George
Port Dover, ON

MCCOOMB, Carl Wilfred
London, ON

MCKNIGHT, Peter Brennen
Orleans, ON

MICHALKO, Paul David
St. Catharines, ON

MO, Lincoln Tim Kui
Richmond Hill, ON

MOORE, Victor Alan
Toronto, ON

MOTHERSILL, David Frederick
Burlington, ON

MURPHY, Thomas Joseph
London, ON

NARENJKAR, Manijeh
Conestogo, ON

NERUBENKO, Heorhiy
Scarborough, ON

NOAKES, Donald James
Nanaimo, BC

PAVLOV, Richard Michael
Southampton, ON

PEJOVIC, Stanislav
Mississauga, ON

**PERERA, Chandana Veranja
Keerti**
Burlington, ON

PFENDT, Frank Joseph
Kingston, ON

PINKUS, David
Toronto, ON

QUAN, Dick
Toronto, ON

RAZL, Ivan
Toronto, ON

REZNICEK, Wolfgang Ottokar
East Amherst, NY

SAINI, Gurdeep Singh
Sudbury, ON

SANDERSON, Paul James
Toronto, ON

SHEEHY, Michael Steven
Dundas, ON

SINE, Kenneth Ray
Grafton, ON

SMENDZIUK, Ritchie Wayne
Kanata, ON

SOMMERAUER, John
Guelph, ON

WU, Ka-Ming
Kitchener, ON

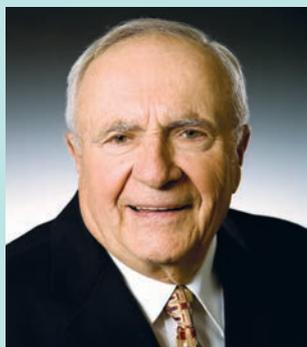
YIK, Kee
Markham, ON

YONEYAMA, Harold Y
Etobicoke, ON

YOUNG, Frederick William
Clarksburg, ON

ZUGIC, Neven
York, ON

REMEMBERING WALTER BILANSKI, PEO'S ONLY FOUR-TIME PRESIDENT



Engineering Dimensions would like to recognize the passing of former PEO president Walter Bilanski, PhD, P.Eng., FEC, who served an unprecedented four presidential terms throughout his almost 50 years of volunteerism at PEO. Bilanski passed away on September 3, 2021, in his 95th year.

Bilanski was PEO president for the 1971–1972, 1977–1978, 1998–1999 and 2007–2008 Council terms. During his time on Council, Bilanski was committed to creating a more inclusive and accessible profession, and he championed enhancements

to the education requirements for licensure. During his third term as president, he also led efforts to devolve PEO's advocacy work to the newly formed Ontario Society of Professional Engineers, obtaining the necessary approvals from the attorney general in 1998.

A well-respected agricultural engineer, Bilanski was a committed engineering professor and researcher at the University of Guelph for 37 years before retiring as professor emeritus. His research focused on improving harvesting machinery for grains, fruits and vegetables.

"PEO will be forever grateful for his invaluable guidance and his generous gifts of time and loyalty to the profession," says PEO CEO/Registrar Johnny Zuccon, P.Eng., FEC. "Walter will be fondly remembered and greatly missed."

COUNCIL REVIEWS MEMBER SUBMISSIONS FROM 2021 AGM

By Nicole Axworthy

543RD MEETING, SEPTEMBER 24, 2021

At its September meeting, Council reviewed the five member submissions that were presented and passed at PEO's 2021 Annual General Meeting in May (see AGM Minutes, p. 47). The submissions focused on issues related to the business and activities of PEO, and most of them passed with a significant margin. They were first reviewed by staff before being forwarded to Council; and the staff report to Council at this meeting was for information only and not for decision.

Though licence holders' input is important to the work of a self-regulating body, motions made at the AGM, while informative, bind neither Council nor PEO's CEO/registrar. A policy approved by Council in March 2020 requires staff to provide a report to Council following the AGM with respect to the motions that pass, to assess lawfulness and feasibility while considering Council's current work and other declared priorities.

The staff report for the five submissions from the 2021 AGM suggests that no specific action is required by Council at the present time, but in all instances Council committees—specifically the newly formed Governance and Nominating and Regulatory Policy and Legislation committees—might wish to consider the points raised in the submissions at the appropriate committee's discretion.

The first submission asked Council to commit to good governance principles, such as peer review, transparency and the removal of biases and barriers to hearing and respecting diverse views. Though the submission provided helpful advice, it did not appear to require any specific action. Therefore, staff noted that informed member and stakeholder consultation and expert input are components of effective, right-touch regulation, and this approach will be maintained and strengthened under the guidance of Council and its new governance committees. Additionally, regarding the need for transparency, PEO adheres to its bylaw obligations by conducting its meetings in public sessions, and its "Strategic Conversations" on governance matters are now being replaced by plenary sessions that are open to members and the public at large.

The second submission asked Council to immediately postpone its governance and organization changes and instead focus its agenda on the development and implementation of regulatory

policies to enable effective regulation in Ontario and in the public interest. Staff noted that, based on various decisions made in 2019, 2020 and 2021, Council has recognized that effective regulation depends not just on changes to the regulatory framework but also, more importantly, a regulatory governance structure that directs and controls those changes. These governance changes, including the new governance committees, are intended to support and improve Council's work as a regulatory board exercising vital direction and control functions.

The third motion pointed out the need for peer review and transparency in Council decision-making and hearing and respecting diverse views, similar to Motion 1. In addition to their response to the first motion, staff noted that a commitment to diversity is reflected in Council's ongoing work on anti-racism and anti-discrimination initiatives, currently stewarded by the Anti-Racism and Anti-Discrimination Exploratory Working Group.

The fourth submission positioned PEO as incapable of licensing new areas of engineering and their exclusive right to practice and requested that PEO work with the "Engineers for the Profession Incorporated" to lobby government for legislation that will create new discipline-specific regulatory bodies for modern engineering. Staff noted that PEO is charged with regulating engineering in the public interest and does not lobby or partner with advocacy organizations such as the one suggested. Council also has the power under section 7 of the *Professional Engineers Act* to create regulations in consultation with government. Currently, PEO has no plans to license on a discipline-specific basis, and any such plan would fall under the mandate of the Regulatory Policy and Legislation Committee, which is also responsible for any action to come from the report of the former Emerging Disciplines Task Force.

The fifth and last submission was also similar to Motions 1 and 3 with respect to transparency and open sessions of Council. It asked that, in the very specific circumstances that warrant a closed session, Council cite a description of the topic and the applicable section 15(4) category during the open session, and that when there is a minority debate concerning a resolution, that minutes note it along with the objection of any Council members who request that the objection be recorded. Staff noted that Council's approach to in-camera meetings, how they are recorded, as well as the content of minutes generally will continue to be informed by best practices and by the advice of PEO's governance consultants and parliamentarian. [e](#)

MINUTES OF THE 99TH ANNUAL BUSINESS MEETING

SATURDAY, MAY 15, 2021

PRESIDENT AND CHAIR: MARISA STERLING, P.ENG., FEC

The 99th Annual General Meeting of Professional Engineers Ontario was held via videoconference on Saturday May 15, 2021. President Marisa Sterling, P.Eng., FEC, welcomed PEO licence holders with a special welcome to the over 3000 new licensees joining PEO in the past year: engineering interns, students and employers; stakeholders; members of the public; colleagues in the engineering community; PEO staff; distinguished guests; and friends.

To add further meaning to her welcome, President Sterling acknowledged her positionality as a settler on Turtle Island, the name many Indigenous Peoples give to North America. She stated that her family came from Scotland, England and Italy to settle on this land that for thousands of years has been the traditional land of the Huron-Wendat, the Seneca and the Mississaugas of the Credit. She noted that she was chairing the meeting from a place that is still the home to many Indigenous Peoples and that she was grateful to have the opportunity to work on this land.

She thanked all the generations of people who have taken care of this land over thousands of years. The truth is that long before today there have been Indigenous Peoples who have been the stewards of our places and have shaped and strengthened community and our province. Acknowledging this truth is her first step towards reconciliation with Métis, Inuit and First Nations peoples, and as an engineer working in the public interest, she is working to improve the nation-to-nation relationship between engineering and Indigenous communities.

In order to promote a more inclusive gathering, President Sterling invited Indigenous engineer Jason Bazylak, P.Eng., and francophone engineer Larisse Nana Kouadjo, P.Eng., PMP, to join in the welcome. Both guests provided pre-recorded welcomes and thanked President Sterling for the opportunity to participate in PEO's annual general meeting.

President Sterling thanked Bazylak and Nana Kouadjo for their welcoming remarks. She then welcomed Ontario's attorney general, The Honourable Doug Downey, LL.M., LL.B., along with his colleagues from the attorney general's office: Patrick Schertzer, JD, senior policy and legal affairs advisor; and Candace Whitney, counsel to the justice service branch of the policy division. Sterling advised that she had the pleasure of meeting Mr. Downey and Mr. Schertzer virtually on October 27 last year, along with PEO Registrar and CEO

Johnny Zuccon, P.Eng., FEC, and Jeannette Chau, P.Eng., manager of PEO's government liaison programs, to discuss the goals of PEO Council to continue to work hard to deliver on its responsibility to protect and serve the public interest. Sterling noted that in her report later in the meeting she would be sharing the steps taken in this regard, including paving the way to implement mandatory continuing professional development on a high priority basis.

The Honourable Doug Downey congratulated President Sterling on a challenging but very successful year. He discussed the work his office and PEO have been doing together and PEO's work on the frontlines to maintain and expand services across Ontario through unprecedented and challenging times.

President Sterling thanked Mr. Downey and, on behalf of PEO and Council, expressed appreciation to Mr. Downey for taking the time to join PEO's annual general meeting to learn more about how PEO has continued to protect the public over the past year, including specific measures in response to the pandemic. President Sterling welcomed special guests from Engineers Canada and its constituent associations as well as invited organizations in Ontario's engineering community and allied professions.

CALL TO ORDER

President Sterling advised that, since proper notice for the meeting had been published in *Engineering Dimensions*, as provided for under section 20(i) of Bylaw No. 1, and a quorum was present, the meeting was officially called to order.

INTRODUCTION OF COUNCIL

President Sterling introduced the members of the 2020–2021 PEO Council: President Marisa Sterling, P.Eng., FEC; President-elect Christian Bellini, P.Eng., FEC; Past President Nancy Hill, P.Eng., LL.B., FEC, FCAE; Vice President (elected) Darla Campbell, P.Eng., CSR-P; Vice President (appointed) and East Central Region Councillor Arthur Sinclair, P.Eng.; Councillors-at-Large Sandra Ausma, PhD, P.Eng., Michael Chan, P.Eng., FEC, and Leila Notash, PhD, P.Eng., FEC; Eastern Region Councillors Randy Walker, P.Eng., FEC, and Chantal Chiddle, P.Eng., FEC; East Central Region Councillor Peter Cushman, P.Eng.; Northern Region Councillors Ramesh Subramanian, PhD, P.Eng., FEC, and Luc Roberge, P.Eng., FEC; Western Region Councillors Wayne Kershaw, P.Eng., FEC, and Peter Broad, P.Eng., FEC; West Central Region Councillors Warren Turnbull, P.Eng., FEC, and Lisa MacCumber, P.Eng., FEC; and Lieutenant Governor-in-Council Appointees Arjan Arenja, P.Eng., Robert Brunet, P.Eng., Todd Bruyere, P.Eng., Lorne Cutler, P.Eng., Andy Dryland, C.E.T., Qadira Jackson Kouakou, LL.B., Scott Schelske, P.Eng., FEC, and Sherlock Sung.

President Sterling thanked PEO's directors to Engineers Canada for 2020–2021: Christian Bellini, Danny Chui, P.Eng., FEC, Nancy Hill, Kelly Reid, P.Eng., and Changiz Sadr, P.Eng., FEC (who resigned March 26, 2021).

President Sterling also introduced PEO staff: Johnny Zuccon, CEO/registrar; Ralph Martin, manager, secretariat; Chetan Mehta, director, finance; Michelle Wehrle, director, IT; as well as Parliamentarian Lori Lukinuk.

IN MEMORIAM

President Sterling asked that all those present observe a moment of silence in remembrance of those PEO members who passed away in 2020. She also included thoughts for the family, friends and colleagues of PEO members and guests who passed away from COVID-19.

ORDER OF BUSINESS

President Sterling reviewed the order of business and housekeeping items. A test of the voting system was conducted.

ADOPTION OF MINUTES

President Sterling referred members to the minutes of the 2020 AGM. It was moved by Warren Turnbull, seconded by Arthur Sinclair, that the minutes of the 2020 AGM, as published in the November/December 2020 issue of *Engineering Dimensions* and as distributed at the meeting, be adopted as presented.

Motion carried

BUSINESS ARISING FROM THE MINUTES

President Sterling reviewed the actions taken by Council on submissions discussed at the 2020 AGM. Members made seven submissions to the meeting, three of which were passed. Council discussed these three submissions at its September 2020 meeting.

The first submission dealt with ISO 9001:2015 certification of PEO policies. The staff recommendation to Council was to leave the decision regarding certification to the CEO/registrar. Staff advised to establish a corporate policy stating PEO will eventually obtain the certification so future policies are assessed to ensure they are ISO 9001 compliant.

The second AGM submission suggested that PEO host regional town hall meetings to discuss the future of engineering. Staff reviewed the submission and recommended to Council that doing so is not appropriate at this time because PEO is currently occupied with implementing the action plan resulting from the external regulatory review and with implementing the governance roadmap and restructuring initiatives. President Sterling advised that she started "Ask Marisa" virtual sessions after Council meetings to give committee and chapter chairs the chance to learn and discuss decisions taken. Although not the intent of this member's motion, it was one way to engage with licence holders this year.

The third AGM submission suggested PEO supply digital seals for licence holders. Staff recommended that PEO join the Notarius program, giving licence holders the opportunity to subscribe to the digital certification service on a voluntary basis. Council agreed, and as of January 2021, Notarius digital seals have been available to PEO licence holders.

FINANCIAL REPORT

President Sterling invited Councillor Sherlock Sung, chair of the Audit Committee, to provide a report on PEO's audited financial statements. Sung reviewed the financial information, noting that the 2020 audited financial statements were approved by Council at the March 2021 meeting. He stated that these statements are currently on the PEO AGM webpage and would be published in the May/June issue of *Engineering Dimensions*.

Councillor Sung then provided a brief overview of some of the key highlights and encouraged members to refer to the document entitled "Questions and Answers on PEO's Operations," which is also available on the AGM webpage and includes comprehensive information on PEO's financial position.

A graph was presented that showed a five-year trend of revenues, expenses and net income. He noted that net income consistently fell from 2016 onwards until 2017, at which time there was a deficit of \$26,000. In 2018, PEO had a modest surplus of \$123,000, which was largely due to aggressive cost-cutting measures undertaken by staff, with input from the Finance Committee and Council. In 2019, there was a surplus of \$2.9 million, as the new fee structure kicked in on May 1, 2019.

There was a surplus of \$7.9 million and \$23.3 million in cash and marketable securities on PEO's balance sheet as of the 2020 year-end. Due to COVID-19 pandemic restrictions, most in-person events and meetings moved online, leading to a substantial reduction in expenditures. Despite increased P.Eng. fees, in 2020, PEO has the lowest dues in Canada while maintaining a lean organization with the highest ratio of members to staff in Canada.

A graph was presented showing the key financial highlights as of December 31, 2020, as follows:

- A surplus or net excess of revenues over expenses of \$7.9 million;
- \$23.3 million in cash and marketable securities;
- Lowest P.Eng. fees in Canada;
- Highest ratio of members to staff in Canada in comparison to other sister provincial associations; and
- Additional details on 2020 operations are available on PEO's website.

Councillor Sung advised that before formally moving on to the appointment of PEO auditor for 2021, Deloitte LLP was recommended to the membership as the 2021 auditor by the Audit Committee in February 2021 and also by Council at the March 2021 meeting. He noted that, for 2021, Deloitte will enter its fifth and final year of the current competitive tender cycle, which it won in July 2016.

The floor was opened for questions and comments from licence holders. A licence holder asked if PEO has considered a reduced fee schedule for engineers billing less than \$30,000 per year as British Columbia does. Councillor Sung responded that the purview of the Audit and Finance Com-

mittee was to look at the financial statements of the organization in 2020 and did not focus on policy questions, but he invited members of staff if they wished to comment on this matter. CEO/Registrar Zuccon noted this is something that could be brought forward to the soon-to-be-composed Audit and Finance Committee, referring to the certificate of authorization (C of A). This will be taken under advisement.

A licence holder stated that he believed there is a reduced fee policy. CEO/Registrar Zuccon confirmed that there is a fee remission policy that exists and currently is available. He asked members to refer to the PEO website or the PEO portal and, if that fails, to please reach out to the finance department.

President Sterling advised that any questions not related to clarifications about the audited financial statements, including finance matters, would be held for the questions-and-answers session later in the meeting.

APPOINTMENT OF AUDITORS

It was moved by Lorne Cutler, seconded by Michael Chan, that the firm of Deloitte LLP be appointed auditors of the association for the 2021 financial year.

Motion carried

There was a five-minute break.

President Sterling recalled the meeting to order.

CEO/REGISTRAR'S REPORT

CEO/Registrar Zuccon extended a warm welcome to everyone who was joining PEO's second virtual AGM. He thanked all those who worked tirelessly to prepare for the meeting, stating that he knew firsthand how much more time and effort is required to accomplish things while operating remotely.

CEO/Registrar Zuccon stated, "It's been an interesting year for sure, and I must confess that the novelty of our two-dimensional Zoom world is wearing on me. Who would have thought this time last year that we'd be holding our meeting like this again in 2021?"

CEO/Registrar Zuccon advised that he first introduced his "old way/new way" slide as part of the action plan presentation to Council in September 2019. He stated that it symbolizes a recognition that the status quo is no longer an option and, more importantly, it suggests a willingness to consider changing from the old way to new way in how we regulate and govern in a modern world.

CEO/Registrar Zuccon went on to say: "If there was ever an external driver to test this, well COVID certainly did, and some. So, while COVID has somewhat slowed our journey to usher in PEO's transformation, my report today will show we have been able to successfully adapt our processes to the obstacles the pandemic has presented while still advancing our enterprise-wide change process.

"And for that, I'm thankful and extremely proud of how our staff and volunteers have responded in these extraordinary times and their dedication and perseverance to maintain our functions and deliver on our operations.

Office Closure

"Since the outset of the COVID-19 pandemic, my primary concern has been the health and well-being of our staff and volunteers who would normally come to the office. On March 17, 2020, in compliance with provincial lockdown measures, PEO closed its office indefinitely and staff transitioned to working remotely.

"And while our office remains closed to visitors and most of our staff, select employees have been permitted to return at times, under controlled conditions, to complete essential work that requires access to our facilities. On average, we've had five to seven employees in our office each day and, thankfully, there has been no reported COVID cases amongst our staff to date.

"And considering the current state, staff were advised last month not to plan any in-person, face-to-face meetings for the remainder of 2021. This includes Council and committee meetings as well as in-person meetings with those seeking licensure.

"PEO will continue to follow both the letter and spirit of public health guidelines regarding the holding of in-person events, and it is expected that any group holding events under PEO's banner will fully comply with the rules in force for their areas.

Virtual Work Environment

"So, with our staff at home, securing the necessary technology last March to equip all 110 employees to continue their work virtually proved to be a globally competitive challenge.

"With many companies all seeking the same resources, laptops quickly became a scarce commodity. Just to put things into perspective, at the time of the office closure approximately 60 per cent of our staff had laptops. By the end of May, 75 per cent of our staff had them, and it was only towards the end of July before we had secured laptops for everyone.

"Concurrently, while working remotely, we had to effectively transition our operations and adjust processes to ensure we could continue to meet our regulatory obligations. Transitioning the work of the Complaints Committee didn't pose too much of a challenge, since we had previously transferred files to an electronic format. Operations of the Tribunals office emulated the courts and shifted to virtual hearings via Zoom videoconferencing, with assistance from the services of Arbitration Place Virtual, an external vendor. The Communications group was able to adapt quickly, as witnessed by the seamless transition to remotely producing *Engineering Dimensions*. Similarly, our professional standards group was also able to resume its work remotely.

“Also noteworthy is that we managed to complete the move-in for our new tenant, the Home Construction Regulatory Authority, who now occupies the fourth floor of our building.

“The most impacted of our groups was Licensing and Registration. The paper-based applications and accompanying file reviews and face-to-face interviews presented significant challenges for remote operations. In addition, some processing functions require access to the original paper file. And printing licence certificates could not be done in a virtual environment.

Licensing Updates

“Given these challenges, I’m pleased with the solutions created by our licensing team, and fellow staff went beyond expectations. While operating remotely, we developed and implemented a system to accept licence applications by email. And by mid-June 2020, we were no longer adding to our existing paper-based inventory. In fact, staff went to the office to ensure any application that arrived by mail was converted to electronic format. It’s worth pointing out that, notwithstanding the pandemic, filed applications in 2020 increased 2 per cent year-over-year.

“Similarly, we transitioned to receiving and approving new C of A applications electronically. To date, we’ve received over 600 C of A applications and over 7000 renewals have been processed directly online through PEO’s portal.

“We also launched a records conversion project to transform our inventory of paper applications into usable digital information that can be accessed remotely. Although our progress on this initiative has been curbed due to pandemic-related restrictions to accessing the office, we have the processes and staff in place to resume work as soon as possible.

“The focus on our licensing process continued with our transition to the National Professional Practice Exam (NPPE), which replaced the PEO-administered Professional Practice Exam. The NPPE is offered online and as of the January 2021 sitting, over 4200 applicants have taken it.

“To support the new electronic licensing process, we developed a new, paperless workflow for academic assessments requiring review by Academic Requirements Committee volunteers so it could be performed remotely. And Experience Requirements Committee (ERC) interviews have begun to be conducted via Zoom. Training of ERC members is ongoing so we can increase the volume and frequency of online interviews.

“Public health restrictions across the province have also impacted our technical examination

programs, which led to many cancellations last year. We have since partnered with our BC counterparts, and, later this month, we’ll be delivering online technical exams to over 1000 registrants.”

2020 Statistics

CEO/Registrar Zuccon provided a slide with some key 2020 statistics which included 84,744 P.Engs; 5820 Cs of A; 13,318 engineering interns and 3112 P.Eng. licences approved. He reminded everyone that more details are published in PEO’s 2020/2021 Annual Review, which is available on our website.

CEO/Registrar Zuccon continued by saying: “I just want to caution the engineer in all of us not to go into a deep analysis, as the numbers represent a snapshot in time and there are numerous intervening factors at play. For example, while the 84,744 P.Engs represent a 1.3 per cent overall net decrease year-over-year, I can report that the Q1 figure is trending up.

“As an aside, when we looked at the number of fee remission requests to see if the pandemic had produced a noticeable impact, the results showed that the actual monthly average was lower in 2020 than in 2019. We saw similar results with the number of resignations.

“Turning to the remaining stats: We recorded a decrease of 41 Cs of A and the number of engineering interns was 9 per cent lower than in 2019, so we will monitor these for the upcoming year. And the total licences approved were 25 per cent lower than 2019 figures, which is understandable. The Q1 figures are 27 per cent higher year-over-year for the same period, so that’s encouraging.

40 Sheppard Ave. West Update

“Now, as owners of an eight-floor building at Yonge and Sheppard in Toronto, PEO has fared well with its tenants, especially considering the extraordinary times. In fact, as mentioned earlier, we were fortunate to have the Home Construction Regulatory Authority move into our building and occupy the entire fourth floor.”

2020 Regulatory Highlights

Moving on to some additional regulatory highlights CEO/Registrar Zuccon continued: “As I stated, the Complaints Committee transition was less challenging and the throughput of 58 files is in line with past years. Similarly, the reported caseload of enforcement files opened is on par with previous years.

“Three practice guidelines have been approved since our last AGM. They include:

- *Providing Reports on Mineral Projects;*
- *Environmental Site Assessment, Remediation and Management;* and
- *Providing Engineering Services Under O.Reg. 1/17 and Part II.2 of the EPA.*

“In addition, we published a practice notice to remind practitioners of their obligations during the pandemic.

“Of the seven discipline hearings in 2020, six were held virtually. These hearings are broadcast live via YouTube. The schedules and links are published on the Discipline Committee’s webpage. Of the 10 pre-hearing conferences, seven were held virtually via Zoom.”

Three Pillars

A slide was shared showing three pillars: operational review; organization review and enhanced governance. CEO/Registrar Zuccon stated: “I included this slide to remind all of us that our transformation work is building on three pillars. Despite all the challenges presented by the pandemic, and the time and effort required to create these workaround solutions and to stabilize our key operations while working remotely, we remained vigilant on conducting and supporting the strategic work related to PEO’s multi-year, enterprise-wide transformation.

“On the regulatory operational front, we have the action plan Council approved in September 2019. It incorporates PEO’s change vision and outlines the key steps that are required to address the recommendations from the Cayton report.

“We are also taking into consideration the structural changes that will be necessary to ensure our organization has the appropriate capacity and agility to achieve our objectives. Council is taking steps to ensure it operates under sound governance practices that are founded on clearly defined roles and corresponding accountabilities.

PEO Vision

“To sum things up, the 2020–2021 term has forced all of us rethink our priorities in many ways.

“From a business perspective, we’ve had to adapt and adjust while trying to advance PEO towards achieving its change vision of becoming a professional, modern regulator that delivers on its statutory mandate and is supported by a governance culture that consistently makes decisions that serve and protect the public interest.

“Although there is much work still to be done, all things considered, I’m very pleased with the progress we’ve made. The pandemic, at least from my vantage point, has certainly reinforced the fact that, where possible, it’s preferable to drive change as opposed to have change drive you. Let’s stay the course with our transformation. I look forward to building on our success in the coming Council term.

“But before I conclude, I want to give a shout out to my longtime colleague and staff member, Bernie Ennis, who has provided exemplary service to PEO for well over 20 years. Bernie is our director of policy and professional affairs, and he has informed us he will be retiring in June. Anyone who knows Bernie or has had dealings with him will attest to his professionalism and high standard of integrity. He’s been a fountain of knowledge for PEO and for me personally. We will miss you dearly. Bernie, on behalf of everyone at PEO,

I wish you the very best for a long and healthy retirement. We toast you virtually.”

CEO/Registrar Zuccon then turned the virtual podium back to President Sterling.

PRESIDENT STERLING’S OUTGOING REPORT

President Sterling thanked CEO/Registrar Zuccon for his outstanding efforts and those of his staff over the past year. She stated that he has demonstrated a growth mindset and innovative thinking to pivot PEO’s processes with the onset of the pandemic and continue to do PEO’s core regulatory work during a very challenging time. Process matters, and when making sustained change, people, partnerships and culture are the anchors. She stated it had been a pleasure working along his team and all to reimagine PEO together. She also thanked Bernard Ennis for his contributions to PEO over his career.

President Sterling began her outgoing president’s report by stating that she wanted to share her thoughts on the business conducted by Council over the 2020–2021 term and reflections as PEO president.

“We may only be a Council for a short time, but what we do while we are here changes the course of the future. It may not at first be obvious, but with each decision, we are laying the stepping stones on a path towards a more responsive and progressive engineering regulator. While elected for three years, the role of president is for only one of those years, and it can pass very quickly, or plans can change when affected by unknown events like the global pandemic. But what made this year especially meaningful was how all councillors, staff and volunteers stepped up and didn’t just do the minimum to get by, but led substantive, positive change. I want to applaud everyone for your resiliency the public depends on as characteristics of engineers.”

President Sterling shared a picture of one of many Council Zoom meetings and went on to say: “Councillors embraced virtual meetings and ambitious goals. We tried to stay connected with virtual coffee chats, sharing favourite pastimes and cheering each other on when someone got vaccinated. Council knew it was going to have to meet much more frequently in a virtual setting to move our transformative change agenda forward. We met formally six times to make decisions; we gathered informally on a monthly basis for dialogue and education at sessions that I named “strategic conversations”; and the Executive Committee met 12 times to steward our governance roadmap.”

People, Partnerships and Culture

“I think what motivated this highly accomplished team—who were also navigating the ways they were personally and professionally impacted by the pandemic—was the vision of a better regulator, a reimagined PEO. And what we did this past year was only possible because we worked together. In the many conversations I’ve had this year, what I continue to hear is an urgent excitement to modernize PEO towards one consistent theme—to ensure PEO is primarily a regulator, for whom protecting the public interest is paramount, and acting swiftly and proactively to the changing ways of the world.

“And how much more can we contribute if we reimagine PEO together? Process matters, and people, partnerships and culture are the anchors. The succession of presidencies from my predecessor,

Nancy Hill, to incoming President Christian Bellini is one example where we have all worked collegially to add more steps towards the same future path. Also, this year Council has tried to be even more transparent, inclusive and outcomes based. Virtual Council meetings have allowed more guests to pop in; diverse thoughts and ideas have been encouraged through our governance dialogues, and Council has tried to keep committees and chapters updated on its reimagined governance at both the Volunteer Leadership and Chapter Leadership conferences. Engineers are taught to question; we look down at our iron rings to remind ourselves that what we know is that we know very little about the natural changing world, and our humility is what helps us see where we can improve and drives us to find new solutions.

Change is Our Only Constant

“Change is our only constant. Whether we are talking about climate change or self-driving cars, global engineering or crowdsourced engineering design, self-regulated or government-controlled professions, PEO needs to not just keep up with societal advances but lead the way to ensure the engineering involved is regulated in the public interest.

“The inertia of large organizations like PEO can be hard to overcome when seeking change, but with the intention to reimagine PEO together this year, along with quickly pivoting to digital operations because of the pandemic, the formula provided the catalyst for progressive and lasting change.

“PEO showed urgency this past year and had many regulatory and governance accomplishments. CEO and Registrar Johnny Zuccon has detailed many of these to you in his report today. Two that I will highlight are the online licensing application and assessment processes and the initiation of virtual discipline hearings. Both of these new approaches provide more public access to PEO’s regulatory work.

“I would like to share the most substantive foundational changes that Council made this year, which forms the groundwork for PEO’s success decades from now as a relevant and agile regulator.

New Council, Governance, Implementing Mandatory CPD and Anti-Racism Work

“The first foundation change is new Council governance. Governance renewal has been a top priority. It is a means to help Council gather sufficient information and take quicker action to protect public interest and manage organizational risks. The regulatory principles adopted are right-touch regulation, meaning regulate only as much as is needed. There are four phases of the

governance project, and two have been completed to date. Phase 1 saw new charters approved for Council, the president and chair and the CEO and registrar to better delineate Council as setting direction and control and staff holding the pen to identify, investigate, advise and execute. An updated orientation program was created to better onboard new councillors. Phase 2 saw four new governance committees of Council created. They will bring to the forefront Council’s primary responsibilities of human resources and compensation, governance and nominations, regulatory policy and legislation and audit and finance. The expectation is that these four new governance committees will be constituted by councillors and will help Council assess risks, evaluate options and set policy more quickly than previously. The final two governance project phases will occur in the upcoming year and will examine Council’s composition and the role of chapters and other external organizations in PEO’s mandate. Opportunities in Phase 3, for example, can include how Council operates to be accessible to early and mid-career professionals and those with caregiving responsibilities in its future composition, and opportunities in Phase 4 can include what mandates for chapters can link to PEO’s purpose, for example, activities such as public awareness, licensure assistance and leadership succession planning.

“The second foundational change is implementing mandatory continuing professional development (CPD) on a high priority. It will likely be implemented by 2025, when national and international mobility agreements, such as the Asia-Pacific Economic Cooperation, might exclude Ontario engineers if mandatory CPD is not in place by then. This decision by Council prioritized public interest and listened to recommendations from external reports, such as the public inquiries into deaths from the Downsview stage collapse and the Elliot Lake mall collapse. I can share with you that, personally, I stood at a microphone close to 30 years ago, fresh out of university, at a PEO AGM to voice that mandatory CPD was not required and that engineers can be trusted to keep their knowledge up to date. I still believe that likely all engineers already do professional development and that it is necessary to stay current, but today, my position has changed because, if asked, I would not be able to show to the public this happens without having a mandatory CPD program, and that is why I think this is a new and better approach and the right thing to do in the public interest. PEO’s proactive stance will focus on preventing faulty engineering practice rather than relying on a system that punishes licence holders after harm has already come to the public is the priority.

“The third foundational change is anti-racism work. This past year has been even more difficult for Black and Indigenous persons in North America, with vividly broadcast violence and media coverage of wide-reaching systemic racism. And all of this is on top of the already known marginalization of these communities as well as women and LGBTQ2+ persons in the engineering profession. Council appointed an Anti-Racism and Anti-Discrimination Exploratory Working Group last fall, and recommendations are expected later this year. The working group is expected to help PEO proactively identify, study and address any issues of systemic racism and discrimination within the organization and its processes and policies. Some simple first steps might be to start collecting race-based data on licence holders, and evaluations from licence applicants on PEO processes, with the data disaggregated by race and gender. As someone who knows how strongly an inclusive culture is in the

public interest, I am very much looking forward to helping action the recommendations of the working group.

PEO's North Star

"As much as Council accomplished this year, there is still much to do. Council cannot slow down the external pace of change and needs to be resolute to its north star—protecting public well-being in a rapidly changing world. Council's action plan, approved in September 2019, will update many existing regulatory processes such as licensing. The governance roadmap, approved in March 2020, will help Council be better structured to do its regulatory work. As PEO approaches its 100th anniversary and enters its second century of regulation, creating a new strategic plan will be critical next year to support swift completion of the action plan and governance roadmap. And a strong communications plan will be critical to bring everyone together along this journey. In fact, Council received a comprehensive communications strategy in 2019, and hopefully it will consider implementing it in the near term. But Council will need to also start charting a longer-term plan of what it means to be a modern regulator. I encourage PEO to take a more external view and engage more in citizen conversations to better define who and what PEO regulates into the next decade and beyond. What we hear in the media today are public concerns around software errors causing communication network failures and emergency service interruptions, private data like health and banking records being breached and computer vision biased against people with darker skin. Exploring how PEO can work with other organizations to be a part of the solution in the public interest might be one input into defining the modern regulator. I have full confidence in the incoming Council team and staff to continue this journey in a thoughtful and meaningful way.

"Some might ask why an engineer chooses to serve as PEO president. It's a substantial responsibility to make sure the Council of 25 has all the necessary and timely information to make informed decisions, help keep the organization focused to address the tough questions and help ensure the work stays on track and is not avoided because of the discomfort of change or indecisiveness. Most presidents of engineering regulators across Canada report spending at least 900 hours in a year, and for me it amounted closer to 1200 hours with our ambitious agenda during a pandemic. And the pay, well, it's not that good at zero dollars. So, what's my answer? What drives me is to leave the world a better place after I've passed through it? Addressing the hard questions now, while it may not be popular, I am committed to do if it will make meaningful, long-lasting change. I believe in the relevance of PEO, and I always have. I have to admit, at times I felt unwelcome, and I could have moved on. But what kept me committed was knowing that if I didn't try to make things better for others, then I might end up inadvertently hurting someone else who could have the same experiences as mine, or worse.

"If you know my story, you know I was raised with the ideals that one person can make a difference in the world and that community service is a natural part of being an active citizen. My engineering journey started with the encouragement of my parents. Without them, I would never had known that engineering was a separate field of study outside of math and science."

President Sterling shared a photo showing the day she received her P.Eng. licence in chemical engineering with her father, Gordon

Sterling, P.Eng., PEO's 82nd president. She continued by saying: "Although there is sadness in my story, as my father has since passed, I am grateful for this path that led me to serve as the 101st president and chair of Council. And I am grateful to have had the infinite support of my mother and sisters this past year. Notably, I am also the eighth woman in this role in almost a century of presidents. Why my story is important is that today there are approximately 12 per cent women engineers in Ontario. I hope that many youths, students, EITs and engineers will be inspired to follow in my footsteps and those of trailblazers before me.

"In order for PEO to protect the public, it needs to provide Ontarians with engineers who look like them and are representative of all cultures. And that means having closer to 50 per cent women engineers of all intersectional identities. PEO's 30 by 30 program aims to reach 30 per cent newly licensed engineers identifying as women by 2030. And I would suggest that this goal is good but not enough. The 30 by 30 program is working with employers and higher education, helping to remove barriers for women of all identities to get the academic and work experience needed to apply for the P.Eng. licence and is working with PEO to do its part to ensure there are no barriers in the licensing process. My story would not be possible without the active support and opportunities of my employers—my first employer, Procter & Gamble, who provided me with meaningful engineering experience applicable to PEO's licence requirements; and my current employer, the University of Toronto, who accommodated flexibility in my work schedule this year, which allowed me to take on the demands of the PEO president role while working full-time as assistant dean and director of diversity, inclusion and professionalism at the faculty of applied science and engineering. It is because of the visionary leadership of U of T engineering's dean and engineer himself, Chris Yip, and his values of professional development and professional duty, that I am here today. I hope many more employers will follow suit. By acting urgently to actively identify and remove barriers, anyone who has felt marginalized in engineering can start to feel welcomed, find pathways in, and we can become a more inclusive regulatory authority and profession. It has been an honour to serve you and the public. Thank you. Merci. Miigwech."

MEMBER SUBMISSIONS

President Sterling stated that, each year, in accordance with section 17 of By-Law No. 1, submissions from licence holders are invited as a way for them to express their views on matters relating to PEO

affairs. Submissions were due at end of day on Monday, May 3, 2021, and a guidance document to assist licence holders in making submissions was posted on PEO's website.

Five submissions were received, and the complete submissions, which in some cases contain preamble and background information, are available on the PEO website.

President Sterling noted that, given the virtual format of the AGM, members were invited to make pre-recorded introductions to their submissions. She stated that Council reserves the right to consider any submission, even if it does not receive majority support at the AGM. However, Council is not bound to adopt or vote formally on any submission. The proponent of the first submission was invited to introduce their motion.

A pre-recorded message from Roydon Fraser, PhD, P.Eng., was presented. It was stated that this past year, PEO Council rescinded the past Council promise to consult members through non-binding referendum on a mandatory CPD program. This past year, Council decided that CPD is not a matter of licensing but a matter of governance and hence unilaterally decided it did not seek peer review, despite peer review being a previous Council approved necessity for any significant motion before Council. It was stated that the intent of the motion was not to debate CPD or to debate the recent governance changes; the purpose of the motion is to inform Council that members expect members' views to be sought, to be heard, to be listened, to be considered. The purpose of the motion is to inform PEO Council that members need to be informed and need to have the opportunity to be involved in the process of decision making as a self-regulated profession.

The mover referred to transparency and the fact that Council had been conducting highly confidential strategic meetings concerning governance and that Council was making permanent major changes to self-governance without the input of members.

A licence holder noted that it would be helpful to know how many P.Engs and how many public members are participating in the AGM in order to make sense of the polls. President Sterling noted that only members may vote and that the number of how many members were in attendance would be provided later in the meeting. She noted that Council briefing notes, which are available on the PEO website, do include a peer review section.

A licence holder asked if Council will be honest with the members, e.g., stop calling their illegal secret meetings "transparency." President Sterling replied that Council was not doing anything illegal during the last year and if, need be, the senior

counsel of PEO was available to clarify that, but none of PEO's meetings this year have been illegal.

Moved by Roydon Fraser, seconded by Leila Notash

THEREFORE, BE IT SUBMITTED THAT:

Council commit fully to:

- (a) peer review;
- (b) knowledge-based decision making;
- (c) highest levels of transparency;
- (d) effective communication; and
- (e) removal of systemic biases and barriers to hearing and respecting diverse views, and that it halt all current procedures and practices that do not abide by these self-regulating governance principles.

Motion carried

The proponent of the second submission was invited to introduce their motion.

A pre-recorded message from George Comrie, P.Eng., FEC, was presented. It was stated that this motion was an urgent wake-up call and that PEO continuing on its course could lead to the demise of the self-regulating engineering profession in Ontario. While governance matters to PEO, it is not the only important thing or even the most important thing. Governance is a means to an end, not an end in itself and must be subordinate or subservient to the fundamental principles on which PEO's unique Canadian model of self-regulation is based. These fundamental principles include peer review. Council has engaged consultants to distract it and staff from its core business, which has been put on hold pending a major reorganization, and because the consultants do not understand either the nature of engineering practice or the concept of professional self-regulation, their advice cannot be expected to help PEO progress as an engineering regulator. The Cayton report revealed the author's lack of understanding of the concept of a self-regulating profession and how it was intended to work. This is not surprising, since in Cayton's home jurisdiction, the United Kingdom, engineers are not licensed and have no exclusive rights to practice. The irony is the legitimate deficiencies raised in his report were all well known to Council before his engagement. Council's governance consultants seem intent on dismantling all vestiges of the core principles of professional self-regulation. The current approach to governance reform with its concentration on regulatory policy work at the Council level and its absence of knowledge-based and peer-reviewed decision making will not solve any of PEO's problems. It's high time we abandon this misguided foray into governance reform and get back to regulatory basics before it's too late, before PEO evolves into just another government style bureaucracy.

President Sterling advised that she wished to clarify a few things. The first, as noted in her president's report and the CEO/registrar's report, is that PEO is not putting any of its regulatory priorities on hold, and that she is in fact in agreement with part of this motion, that governance work in the organizational re-organization is a means towards the end of better regulation so she feels PEO is better aligned on those points. The principles in this motion are a repeat of the first motion, which has already been passed.

President Sterling referred to a question asked earlier in the meeting regarding the number of eligible voters that were logged on. This number is 619.

Moved by George Comrie, seconded by Thomas Chong, P.Eng.

THEREFORE, BE IT SUBMITTED THAT:

Council place an immediate moratorium on governance and organization changes and instead focus its agenda on the development and implementation of regulatory policies and systems to enable the effective regulation of all professional engineering activity in Ontario in the public interest.

Motion carried

The proponent of the third submission was invited to introduce their motion.

A pre-recorded message from Patrick Quinn, P.Eng., FEC, was presented. It was stated that Council has decided that change is necessary and gone to outside experts for guidance and has essentially adopted what is known as policy governance. Policy governance is not really about policy; rather, it is about how you get policy implemented. Its proponents will agree it is not compatible with self governance, which is democratic. In policy governance you have competency tests for councillors and impositions, such as mandatory PEAK. At a Council meeting at the end of April, after very little debate but apparently after many confidential strategy meetings, it was decided to implement a total reorganization of the governance process. Again, the proponents of policy governance agree it is hugely disruptive and if you want to make that change it can involve push-back and calls for consultation. Not surprisingly, there has not been peer review, chapter involvement, town halls and other deliberative processes with which PEO has evolved over the year. Not debating the merits of the changes, although massive change without peer review is bound to be flawed. Members deserve to be treated with more respect. Engineering is a profession of integrity and ethics, accepted as trusted by the government and the public, has been self-governing for 99 years, and, if throwing the baby out with the bath water, we should at least be consulted. This is governance, not regulation, where there is true urgency. PEO can continue to govern while we consult. In the middle of a pandemic, it is so difficult to get a real sense of perspective. Pausing makes sense.

President Sterling provided some clarification on a couple of items. The first one is that the gov-

ernance experts PEO is working with are based in Canada, and the second fact is that all of Council's motions are recorded. Council has implemented a new system to record its motions and that software records each individual's motion.

Moved by Pat Quinn, seconded by Peter Cushman

THEREFORE, BE IT SUBMITTED THAT:

1. Council does not implement any significant changes to our bylaws or act without significant member and chapter consultation and that it commit to peer review, knowledge-based decision making and transparency.
2. That Council commits to effective, more robust communication and the removal of systemic biases and barriers to hearing and respecting diverse views.

Motion carried

The proponent of the fourth submission to invited to introduce their motion.

A pre-recorded message from Peter DeVita, P.Eng., FEC, was presented. It was noted that change is needed. Ten-hour Council meetings every three months is not sufficient. Council needs to meet every week. Councillors need to be in touch daily. Because this is not going to happen, what can be done? The Emerging Disciplines Task Force presented action motions to Council on March 20, 2020. It was shown that properly licensed engineers, those with exclusive rights to practise, account for only 9 per cent of the people in Ontario with engineering know-how. The task force also noted that only 40 per cent of engineering graduates joined PEO. This is called the uptake rate. For high-tech disciplines such as software engineering, the uptake rate is close to 0 per cent. This declining trend is prevalent even in civil engineering, whose uptakes dropped from about 74 per cent to less than 50 per cent. Less than 25 per cent of PEO members believe their P.Eng. is essential. The Emerging Discipline Task Force proposals were deferred and therefore denied. Many have gathered under the banner of Engineers for the Profession and include many former presidents and councillors of PEO as well as a few current councillors. PEO has had many years to act and has not. PEO began in 1922 with discipline-specific Council of five branches, each with three qualification councillors. This fundamental must be reapplied while accounting for well over 35 disciplines of today. Will creating multiple discipline regulatory bodies solve all our problems? These regulatory bodies are a necessary condition but not magic. This will empower engineers of similar disciplines to associate more effectively. It will permit them to address the street-level issues prevalent in their practices. Over 80 per cent of PEO members are in the newer fields without proper licensing that includes exclusive rights to practice. These disciplines need to create the licensing bodies and the demand legislation to produce and support rights to practise. Established practices such as civil have street-level issues. How is the public interest protected by allowing contractors to change engineering designs? There is a need to rebuild our profession based on this discipline-specific formula. Engineers for the Profession Incorporated has set on the path to make these changes happen and they want to work with PEO to reconstruct the profession.

It was moved by Peter DeVita, seconded by Roger Jones, P.Eng.

THEREFORE, BE IT SUBMITTED THAT:

- (1) This AGM recognize that PEO is no longer capable of preventing the decline of the profession with respect to the proper licensing of new engineering and their exclusive rights to practice, and
- (2) That, PEO work with "Engineers for the Profession Incorporated," to lobby the Ontario government for legislation that will create new discipline-specific regulatory bodies that will properly license and regulate all modern engineering and applied science practices whose works have a significant public interest impact.

Motion carried

The proponent of the fifth submission was invited to introduce their motion.

A pre-recorded message from Gregory Wowchuk, P.Eng., was presented. It spoke to the decline in communications with PEO's members. Communication with stakeholders, including PEO members, traditionally has been very important at PEO. In the past, there was a communications committee, which the mover chaired, as well as a tabloid called *The Link*, which kept members up to date on current affairs at PEO and *Engineering Dimensions*, which addressed all the big issues. Since then, *The Link* and the paper edition of *Dimensions* have been discontinued. Readership of the electronic version has dropped dramatically. The will to keep PEO members and other stakeholders informed and involved sadly has continued to decline. Coverage of Council deliberations in *Dimensions* is cursory at best. More importantly, more and more of Council's activity is being shielded from scrutiny by being held behind closed doors. Controversial topics are being discussed at plenaries or strategic conversations or improperly held in in-camera sessions. This is occurring while great structural change is being implemented at PEO without member approval. The submission's intent is to clarify that it is in the interest of PEO members, government, employers and the public that PEO's activity be maximally open and transparent. This submission does not restrict casual discussions or meetings between individual councillors. That is actually beneficial. What it addresses is the assembly of the whole Council and having a meeting or debate, which is not open and not minuted. That is in clear violation of our own bylaw, which states that all meetings, with very limited exceptions, be open to the public. The submission also affirms that detailed minutes are essential to all meetings, particularly to capture and record the diversity of the debate. Should the situation ever turn litigious,

written minutes are vital to establish what Council did or did not do. Engineers care about their profession and the public they serve. Future Council meetings should be open, documented and in compliance with PEO's bylaw.

President Sterling provided some clarification, noting that Council is not contravening any of its bylaws with how its meetings have been conducted over the past year.

While members voted, President Sterling addressed some of the questions about how voting is interpreted. She stated that submissions that are passed at this AGM will be considered by Council in accordance with the guidelines that were passed in March 2020, which is also on PEO's website. The motions are non-binding and help Council hear what members' thoughts are. The motions are fully researched and brought to Council at the September 2021 meeting of Council with fulsome research and information for Council to decide what it would like to do next.

Moved by Gregory Wowchuk, seconded by Alena Ravens, P.Eng.

THEREFORE, BE IT SUBMITTED THAT:

- (1) Presentations to, debate by and consensus of the assembled Council concerning Council agenda items shall occur only at a regular or special meeting of Council, convened in accordance with By-Law No. 1, sections 10 through 16. Such meetings shall have agendas and be minuted.
- (2) By-Law No. 1, paragraph 15(4) outlines few, very specific circumstances, which warrant convening in closed session. When it is deemed necessary to place an agenda item into an in-camera session, the chair shall cite a description of the topic and the applicable section 15(4) category during the open session. No other matters shall be placed on the agenda of a closed session or debated therein.
- (3) When there is significant minority debate concerning a Council resolution, which is either passed or not passed, the minutes shall note such. The minutes shall note the objection of any Council member who requests that his/her objection be recorded.

Motion carried

President Sterling thanked members for their engagement.

QUESTIONS TO COUNCIL

President Sterling invited members to submit questions to the current Council. It was noted that staff would follow up offline on those questions that could not be answered during the meeting due to time constraints.

A licence holder asked for an estimate on the average time for a new P.Eng. licence application to be approved. CEO/Registrar Zuccon advised that he could not provide specific times because, unfortunately, applications are received with some individuals just having graduated, so there is no typical average time he can report. But he would be happy to receive an email from the member so he can share some statistics that are tracked, noting it is difficult to provide an estimate of actual time. President Sterling added this was discussed at one of the Council meetings wherein the CEO/registrar provided a fulsome evaluation of the time it takes to proceed with applications through the system and is available through the minutes.

A licence holder asked how many applications were not approved in 2020. CEO/Registrar Zuccon replied he did not have this number on hand but again would review the files for this information. President Sterling clarified for those who may not be aware that a licence may take more than a year to go through and that should a licence be denied, there is a registration hearing process for anyone who wishes to appeal that decision.

A licence holder asked if Council considered that the multiple-choice National Professional Practice Exam (NPPE) ethics exam does not measure the same thing as the written Professional Practice Exam (PPE). Specifically, one measures knowledge well, but the PPE can reveal how one thinks well. He understands Council was told they measure the same thing. CEO/Registrar Zuccon replied that PEO was faced with a dilemma during the pandemic regarding the PPE, which were face-to-face but were not available. As a result, there were multiple inquiries from people wanting to move their application forward. PEO sought assistance from its sister association in Alberta. He pointed out that most of the provinces are on the NPPE. PEO is one of the few provinces that ran their own but needed a way to allow the applicants to move their application forward. PEO was looking at what could be done to pivot in the short term during COVID-19. He stated that the Alberta or the NPPE is a psychometrically balanced exam and does meet the rigor of testing.

President Sterling added that what was shared with Council is that, as CEO/Registrar Zuccon mentioned, Alberta is leading the NPPE; and by joining that, Ontario has a seat at the table in the constant evolution of that testing and so has the opportunity to provide feedback in that regard.

A licence holder asked what the related disciplines were for the 485 enforcement files that were opened. President Sterling stated that enforcement files relate to those who are unlicensed and therefore do not go to discipline. The files going to discipline are the complaints files. These statistics are included in the Q&A document in the annual report. She encouraged the member to look at that and if anything is not clear to please follow up, but enforcement files do not go to discipline.

A licence holder said she was informed there has been a 20-percent salary increase for PEO staff, including the one for the CEO. Could you please explain why this is so during a pandemic?

President Sterling replied that she could not comment on staff salaries—that is not what Council is responsible for. What she could comment on is that PEO has a Human Resources & Compensation Committee (HRCC), and that committee is

responsible for the oversight, setting objectives and reviewing the performance and compensation of the CEO/Registrar and that committee continues to do that work. CEO/Registrar Zuccon referred members to the audited financial statements where expenses are captured. He indicated that the approved budgets are followed and he was not aware of the number the member was citing regarding the salary increase.

A licence holder asked what steps PEO is taking to ensure it is becoming more and more net-zero compliant and reducing its carbon footprint year-over-year in all its operations. President Sterling indicated this was an operational question, so she would pass this on to the CEO/Registrar to answer but did note that in the virtual environment there is certainly a lot less movement of individual staff and volunteers and so PEO likely has significantly reduced its carbon footprint this year. CEO/Registrar Zuccon stated that for this year he was certain PEO was doing better than it was, but he took the point being made and it was something PEO needs to look at. Of course, even as owners of a building, PEO has an extended obligation to make sure their premises are as efficient and effective as possible.

A licence holder asked why members are not voting on mandatory CPD. When CPD was first presented, it was mentioned as optional. President Sterling replied that in place right now is the PEAK program, which is a voluntary professional development program, so this is a separate program. We have that in place right now and the CEO/Registrar can share any statistics on the uptake of that. This program has been in place for over three years at this point in time. In 2019, based on an external regulatory review by regulatory experts—who are, in fact, used across Canada by many regulators, and those regulatory experts include Harry Cayton—PEO Council adopted an action plan in 2019. This action plan stated that PEO would implement mandatory continuing professional development, so that decision was taken in 2019 as a Council to do mandatory professional development, which is different than PEAK. The implementation of that is in progress.

CEO/Registrar Zuccon stated it was his understanding that the question was why members weren't allowed to vote, and because it was not an operational matter, he could not answer. President Sterling advised that the decision to implement mandatory CPD was taken in 2019 by Council. During the implementation stage, it was noted that Council had previously adopted a motion before 2019 to go to a members' referendum on how to implement it. The motion to go to a members' referendum took place before receiving the external report that identified this significant CPD gap. This year, Council decided to rescind that motion based on the evolution of knowledge. This report, in addition to the two public reports she mentioned earlier which related to the Downsview stage collapse and the Elliot Lake mall collapse inquiries, provided Council with new information to determine it needed to move forward in the public interest and take responsibility for the implementation.

A licence holder would like to know what process was used to choose Deloitte as auditors and how they are charging PEO. President Sterling reiterated a previous answer and noted that PEO goes through an RFP process every five years to identify its auditor, and that RFP process identified Deloitte. This was last done in 2016, so the next auditor's RFP will be going out in 2021 and will likely influence the recommendations that come to the next AGM in 2022. The president encouraged members who were interested in financial reporting

to review the audited financial statements for this information.

A licence holder asked if calling a motion a “submission,” does Council consider it non-binding? President Sterling replied that, as she had indicated earlier, AGM motions are non-binding, but, at the same time Council takes them seriously. Further, staff takes time to thoroughly examine and research the motions to provide a fulsome report to Council at its September 2021 meeting.

A licence holder asked if the CEO/registrars received pushback/negative feedback with the switch to the NPPE. In other words, was there widespread dissatisfaction by those eligible to sit? Did they indicate that the PPE was preferred?

CEO/Registrar Zuccon stated that in order to provide some context, when the first PPE was cancelled last March, PEO reached out to the over 1800 who were impacted and offered them the alternatives to quickly write the June sitting of the NPPE. Over 72 per cent accepted this offer. In order to make things go smoothly, PEO also provided a final sitting of the former way that PPEs were done, and since then he has heard of very little pushback. Over 4200 applicants have accepted PEO’s offer as of the January sitting and there was another sitting that just took place, so from his vantage point it has been a well-received change. He further noted that, as the pandemic is lingering on, PEO now has no alternative but to look at the technical exam programs that have also been heavily impacted.

President Sterling advised she had received clarifications on some other questions, which she shared. The budget for the annual audit is about \$40,000, which can be found in the AGM documents.

A licence holder stated that at the 98th AGM, there was a motion (page 40 in *Engineering Dimensions*) that the 2019 audited financial statements were received as presented. Why was there no similar motion this year? Should there have been a similar motion this year?

President Sterling responded by noting that with the evolution of PEO’s governance, procedural matters have become clearer. The audited financial statements are approved by Council and are not required to be approved by the members, and, therefore, were brought forward at the AGM for information only.

PRESENTATION TO OUTGOING COUNCILLORS

President Sterling congratulated retiring members of the 2020–2021 Council, who had worked diligently to move the profession forward. President Sterling expressed her personal appreciation to all for their collaboration, support and encourage-

ment throughout the 2020–2021 year. She stated that it has been a pleasure serving as president and chair.

It was noted that certificates of appreciation would typically be presented to each retiring member at this time; however, they have received their certificates via mail. President Sterling then virtually thanked and recognized the following retiring members of Council: Nancy Hill, past president; Darla Campbell, elected vice president; Sandra Ausma, councillor-at-large; Wayne Kershaw, Western Region councillor; Arthur Sinclair, East Central Region councillor and appointed vice president; and Warren Turnbull, West Central Region councillor.

INSTALLATION OF NEW PRESIDENT

Past President Sterling administered the oath of office to Christian Bellini as 102nd president for the 2021–2022 term and presented him with the gavel of office.

PRESENTATION TO PAST PRESIDENT STERLING

President Bellini made a special presentation to acknowledge Sterling’s just-completed term of office as PEO president in an extraordinarily unique year. On behalf of Council, he thanked President Sterling and expressed sincere appreciation for all of her work and efforts to both PEO and the profession. It is recognized that this was not the year she or anyone expected and that her perseverance was appreciated. The loss of experience in events and opportunities normally attended by the president was acknowledged. The past president would normally be presented with tokens of appreciation, such as the ceremonial PEO gavel, a certificate of appreciation, a past president’s lapel pin and the outgoing president’s award at the AGM luncheon that typically follows the in-person AGM. Arrangements for the presentation will be made in person at the earliest and safest opportunity.

CLOSING REMARKS BY PRESIDENT BELLINI

President Bellini provided the following remarks: “Fellow engineers, honoured guests, it is my distinct pleasure to be virtually standing here before you today at the beginning of my term as PEO’s 102nd president.

“Thank you for entrusting me to provide leadership for the upcoming Council term. It is with a deep sense of responsibility to our self-regulated profession, to you, and most importantly, to the people of Ontario, whose interests we are committed to protect, that I take on this task on your behalf. We have a proud and enviable 99-year history of regulating engineering in Ontario. And the transformation work currently being undertaken by Council, which I will speak more about here, will ensure our ability to continue to do that into the future.

“I would like to take this opportunity to thank this year’s Council, volunteers and staff for all of the extremely hard work they put in in this challenging year. And, in particular, I would like to pass best wishes on to Bernie Ennis for his upcoming retirement. His extraordinary knowledge and insightful contributions to our regulatory work will be missed. I would also like to thank Ontario’s attorney general, the Honourable Doug Downey, for his kind and supportive words today.

“Taking the reins in the middle of a significant transformation project is challenging. But it also represents an opportunity to take stock of where we are, review our accomplishments and use them to re-energize for what comes next.

“So where are we now? First a little background. As I begin my presidential term, I find myself deeply engaged in PEO’s unprecedented change project, which we have been undertaking for a few Council terms now. As is common with evolutionary change on this scale, different people will point to different events along the way as the catalyst for this work. For me, that event was the 2018 external regulatory performance review initiated by then-President Dave Brown.

“Championed by many, but also critiqued by others, there is little doubt its unfavourable review of PEO’s regulatory structures and processes demanded a response and a commitment to change. This led to the multifaceted change project, which is still ongoing, and which has already made some significant progress. While the report’s focus was on PEO’s regulatory review, it also suggested that some of PEO’s shortcomings might be attributed to an outdated governance structure. This was not a new idea. Talk of a governance review had been around for years and was even discussed as a member submission at the 2017 AGM in Thunder Bay—back when we could actually travel and meet in person.

“During her term, President Hill responded by having Council engage a governance consultant for a year to provide advice and coaching while simultaneously benchmarking PEO’s existing governance processes. That work culminated in a proposed governance renewal roadmap, approved by Council in early 2020, aimed at modernizing PEO’s governance structure.

“Thus, at the start of President Sterling’s term, Council found itself at the beginning of a two-year governance renewal project. Despite the onset of the COVID-19 pandemic, and thanks to the extremely hard work of President Sterling, a strongly supportive Council made groundbreaking progress in renewing a governance structure, which has remained largely unchanged for decades despite many previous attempts at reform.

“Now that we’re one year into the governance renewal project, what accomplishments can we look back on? Here are some selected advances we have made towards modernization:

- A commitment to be primarily a regulator;
- A commitment to be a governance type Council as opposed to one that is more interventionist or operationally focused;
- Four new board committees to support Council in its leadership role;

- A commitment to review the size and composition of Council; and
- A commitment to formally clarify the roles, responsibilities and accountabilities for Council, committees, staff and volunteers.

“So that is where we are today. I begin my term with the primary job of maintaining the change momentum we have built so far.

“With this background in mind, many who have spoken with me over the last few years will recall that I have been a strong proponent of a full, bottom-up review of the who, what and why of how we regulate engineering in Ontario. We need a fully modernized PEO to address some of the very pressing issues that have been raised over the last decade—issues such as the role of our principal regulatory tool, the licence; the role of academics and accreditation; and the intent behind our experience requirement and how we assess experience. Add to this the broad and rapidly expanding world of emerging engineering disciplines; if and how they should be regulated and what PEO’s role might be in this; and whether our existing regulatory framework and tools are adaptable or even suitable for this work.

“I believe strongly in this critical work. I believe that our very ability to self-regulate, to be an effective protector of the public interest, is contingent on our success in addressing these issues. So why are we not tackling them right now? There is certainly enormous pressure to do so.

“The answer for me comes back to the regulatory review, which identified outdated governance as an obstacle to effective change. I have been continuously involved on the regulatory side of PEO work for over 15 years and during that time I have seen many attempts to change, update or review the regulatory work we do. They were championed by volunteers and other individuals with a depth of experience and knowledge of PEO’s role. And yet few of these attempts resulted in tangible change. Our decentralized policy structure lacks a central clarity of purpose and direction and leads to fragmented change—change, which is not holistic, and which does not gain traction.

“The first-principles review of PEO’s regulatory work is indeed critical. But it had to wait until we began progressing on our governance work. If we had tried tackling it prematurely, before we had an updated governance structure in place, then I strongly feel our fresh attempt would have met the same fate as previous ones. That is why it is so important to prioritize the governance work and see it through.

“That said, with a new Regulatory Policy & Legislation Committee coming online this year, Council will finally be in a position to kick off the work towards significant regulatory reform, culminating perhaps in changes to the regulation and even the act, as well as how we operate. I really believe this will be a turning point for the renewal of our regulatory work.

“Lastly, I would like to address the messages that have come forward at today’s meeting. We have seen at today’s meeting that our governance work is not uniformly supported by all members. Many of the member submissions presented today focused on this work and were critical of how it has been carried out this past term. I respect these opinions. It is clear our members care deeply about our profession and are committed to self-regulation. It is also clear that change is a difficult road and there will always be conflicting views on the best way forward.

“To those who have been critical of our work thus far, I have two main messages:

- I deeply believe the work we have done so far will result in not just protecting but significantly strengthening our self-regulatory model. It will demonstrate exactly why engineers need to be at the table making key decisions on how we evolve the regulation of our profession; and
- We have heard our members messages clearly and will certainly commit to considering this feedback as we move forward in the next phase of this transformation work. We are committed to stakeholder consultation as needed to ensure we do not make significant policy decisions in a vacuum.

“We have a proud 99-year history of regulating engineering to serve and protect the people of Ontario. The work of this new Council term will equip future Councils and volunteers with the essential tools necessary to be a cutting-edge engineering regulator, well respected by the public whose interest we serve and protect. On a personal note, I’d also like to take this opportunity to thank my father, engineer Vittorio Bellini, who is listening here today, for encouraging me to follow an engineering career, and for his tireless promotion of our profession.

“As we approach 100 years of regulating our profession in 2022, I look forward to working with all of you in the coming term as we continue the important and critical work of modernizing PEO. Thank you, Merci, Miigwech.”

INTRODUCTION OF INCOMING MEMBERS OF COUNCIL

President Bellini introduced the 2021–2022 members of Council: Past President Marisa Sterling; President Christian Bellini; President-elect Nick Colucci, P.Eng., FEC; Vice President Marilyn Spink, P.Eng.; Councillors-at-Large Michael Chan, Leila Notash and Pat Quinn; Eastern Region Councillors Chantal Chiddle and Randy Walker; East Central Region Councillors Christopher Chahine, P.Eng., and Peter Cushman; Northern Region Councillors Ramesh Subramanian and Luc Roberge; Western Region Councillors Peter Broad and Susan McFarlane, PhD, P.Eng.; West Central Region Councillors Jim Chisholm, P.Eng., FEC, and Lisa MacCumber; and Lieutenant Governor-in-Council Appointees Arjan Arenja, Robert Brunet, Todd Bruyere, Lorne Cutler, Andy Dryland, Qadira C. Jackson Kouakou, Scott Schelske and Sherlock Sung.

President Bellini also introduced the PEO directors on the board of Engineers Canada: Arjan Arenja, Danny Chui, Nancy Hill, Kelly Reid and

Marisa Sterling. He noted that Arjan Arenja and Marisa Sterling, newly elected PEO directors on the board of Engineers Canada, would formally assume their roles at the Engineers Canada 2021 Annual Meeting of Members later in the month. He asked for a virtual round of applause to welcome the new councillors and directors.

CONCLUSION

President Bellini then declared the 99th AGM of the Association of Professional Engineers Ontario concluded.

Johnny Zuccon, P.Eng., FEC
CEO/Registrar



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Deadline for March/April 2022 is January 28, 2022. Deadline for May/June 2022 is April 1, 2022.

**Brilliant
engineering projects**Jeff Fisher, P.Eng.,
Toronto, ON

I have been a P.Eng. since 1983. I just finished the recent issue (July/August 2021) of *Engineering Dimensions* magazine. I usually skim through in 30–60 minutes. I never was a practising engineer, opting for technical sales as a career (selling to engineers). The cover article “Engineering goes underground” is the best article I have ever seen in this magazine (“6 Ontario projects illuminate subterranean engineering,” p. 42). I read it three times...over three hours. Other than Billy Bishop airport, I had no idea these projects even existed. My god, these Ontario engineers are brilliant! Makes me proud to be a P.Eng. in Ontario. Congrats to the writer/editorial staff involved.

**Social acceptance of DGRs
is not going to happen**Bryon McConnell, P.Eng.,
Kingston, ON

Regarding deep geological repositories (DGRs), as described in the September/October 2021 issue of *Engineering Dimensions* (“Deep geological repositories: Ontario’s long-term solution for nuclear waste,” p. 29): I believe we should stop efforts to site a deep geological repository for used nuclear fuel in Canada.

Canada has been trying unsuccessfully to site a DGR for almost 50 years (see: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.667.8513&rep=rep1&type=pdf>). I conclude that such a facility will never receive a social licence. Furthermore, it would be shameful to waste the isotopes and energy in those fuel bundles. Let us spend no more money on DGRs. Let us expend no more effort on an idea that the people are not prepared to accept. Instead, spend money and effort advancing nuclear reactor designs to use those fuel bundles to exhaustion. The outcome would be a much greater production of electricity from the material, with waste that must be managed for several hundred years, rather than waste so long-lived that we need to account for the next ice age. Several vendors are currently working on such designs.

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LETTERS TO THE EDITOR are welcomed, but must be kept to no more than 500 words, and are subject to editing for length, clarity and style. Publication is at the editor’s discretion; unsigned letters will not be published. The ideas expressed do not necessarily reflect the opinions and policies of the association, nor does the association assume responsibility for the opinions expressed. Emailed letters should be sent with “Letter to the editor” in the subject line. All letters pertaining to a current PEO issue are also forwarded to the appropriate committee for information. Address letters to editor@peo.on.ca.

WE'RE SAYING GOODBYE TO PRINT!

PEO is currently undergoing a significant transformation to become a more modern and effective regulator, and with that, *Engineering Dimensions* is changing, too.



WE'LL BE MOVING TO A FULLY DIGITAL PLATFORM

starting with the March/April 2022 issue. This means you will no longer have the option to receive a hard copy of the magazine in the mail—an option we've been offering readers since we created the *Engineering Dimensions* digital edition in 2008. We'll be sending you the digital edition to the email address we have on file. If you're already receiving it, nothing will change. But if you're currently receiving a printed copy, please ensure PEO has your email address.

Go to www.peo.on.ca and click on "Log In" at the top of the homepage. You will be directed to the Member Portal, where you can log in (you'll need your licence number handy) and add or update your email address under the Profile tab.



THE PEAK PROGRAM

is for you, the public
& the profession

Your PEO licence renewal notice is your invitation to complete the Practice Evaluation and Knowledge (PEAK) program. It's available to all P.Engs and limited licence holders.

Every year, upon receipt of your licence renewal notice, log in to the PEO portal at secure.peo.on.ca to complete the PEAK program or to update your program information.

Completing the PEAK program isn't mandatory to renew your PEO licence. However, your PEAK completion status is posted online on PEO's directory of practitioners.

If you're a practising licence holder, complete the PEAK program by:

- Declaring your practising status and completing a practice evaluation questionnaire;
- Watching PEO's online module on ethics and professionalism; and
- Reporting your continuing knowledge activities to PEO during the 12-month period before your next licence renewal date.

If you're a non-practising licence holder, complete the PEAK program by:

- Declaring your non-practising status; and
- Watching PEO's online module on ethics and professionalism.

Learn more at

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