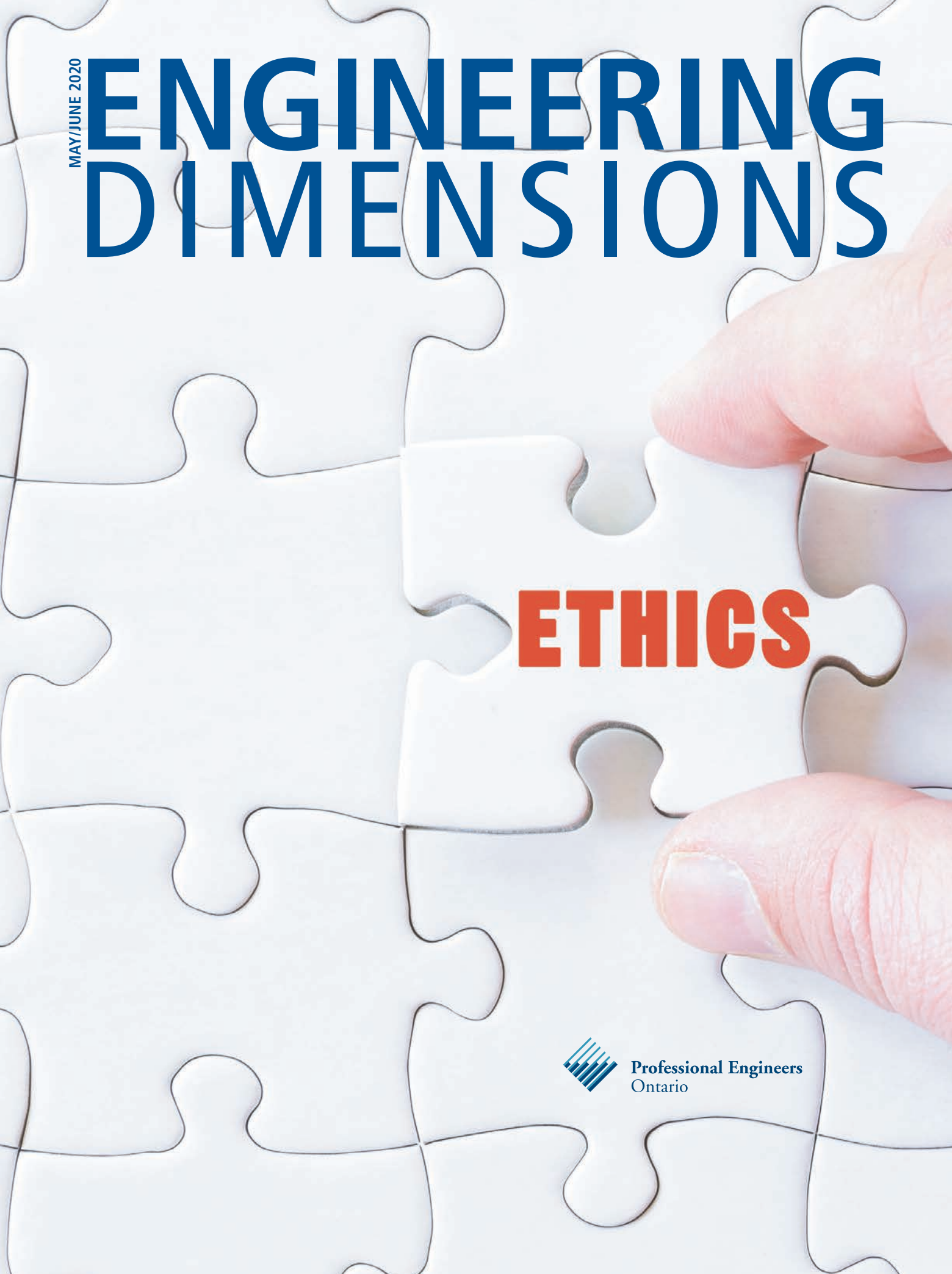
MAY/JUNE 2020

ENGINEERING DIMENSIONS



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ENGINEERING DIMENSIONS

PUBLICATIONS STAFF

Editor
Nicole Axworthy
editor@peo.on.ca

Associate editor
Marika Bigongiari

Associate editor
Adam Sidsworth

Senior graphic designer
Stephanie Katchmar

Graphic designer
Cindy Reichle

Manager, communications
Duff McCutcheon

Digital communications coordinator
Michelle Yiu

ADVERTISING SALES

Account executive
Charlene Woron
cworon@dvtail.com

Dovetail Communications
30 East Beaver Creek Road
Suite 202
Richmond Hill, ON L4B 1J2
Tel: 905-886-6640
Fax: 905-886-6615

EXECUTIVE STAFF

CEO/Registrar
Johnny Zuccon, P.Eng., FEC
registrar@peo.on.ca

Acting deputy registrar, licensing and registration
Linda Latham, P.Eng.

Deputy registrar, regulatory compliance
Linda Latham, P.Eng.

Deputy registrar, tribunals and regulatory affairs
Johnny Zuccon, P.Eng., FEC

Chief Administrative Officer
Vacant

Director, communications
David Smith

Director, finance
Chetan Mehta, MS, MBA

Director, information technology
Michelle Wehrle

Professional Engineers Ontario

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Address all communications to The Editor, *Engineering Dimensions*, PEO, 40 Sheppard Avenue West, Suite 101, Toronto, ON M2N 6K9. Tel: 800-339-3716.

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A KEY PIECE OF AN ENGINEER'S PUZZLE

By Nicole Axworthy

Although just a single feature article is devoted to our theme of ethics, this in no way should reflect its importance within an engineer's career. In fact, most professions—including medicine, teaching, law, business and engineering—have adopted codes of ethics to guide professional behaviour. PEO's Code of Ethics refers to standards of conduct that every engineer should follow; essentially, it states that a professional should always do the right thing. However, it becomes problematic when different people perceive certain behaviour as being right, when, in fact, certain concepts that guide professional conduct might be a little more complicated.

The code's guidance is integral for engineers who face moral and ethical situations in the workplace. In "Thinking like an engineer: Where the profession's Code of Ethics fits" (p. 32), Associate Editor Marika Bigongiari speaks with PEO experts about the Code of Ethics—and overlapping concepts such as an engineer's duty to report, duty to warn and whistleblowing—and how it comes into play in discipline cases. It's a must-read, in my opinion, preceded by our Professional Practice column (p. 22) in which PEO's manager of standards and practice, José Vera, P.Eng., MEPP, reviews everyday ethical principles that professionals should consider in order to reduce risks to the public and themselves.

In a very special feature this issue ("Four decades of *Engineering Dimensions*," p. 24), we celebrate the 40th year of this magazine with a decade-by-decade reflection on how it has transformed into what it is today. Associate Editor Adam Sidsworth dug deep into our archives to find the notable topics that were covered throughout each decade, and we also share a glimpse into the visual evolution of *Engineering Dimensions*. I'm proud to say I've been a part of this magazine for 16 of those years, so bringing this article to life was certainly a trip down memory lane. I hope you enjoy reading the article as much as we enjoyed putting it together.

Traditionally in this issue, we introduce you to the members of PEO Council for the upcoming Council year. However, because the COVID-19 pandemic delayed our annual general meeting—where the new Council members are officially inducted—by several weeks to a date that is after this issue's launch, we will delay the meet-and-greet until the July/August issue. In the meantime, though, you can read the first message of incoming PEO President Marisa Sterling, P.Eng., FEC, on page 6 (which—new to this magazine—includes a French version on page 7). Although her message in this issue is considered the "Incoming President's Message," we look forward to welcoming her future columns as president after she is installed at our virtual AGM later this month. Be well and stay safe. **e**

THIS ISSUE We celebrate *Engineering Dimensions*' 40th anniversary by exploring the magazine's evolution from a member-focused publication to one that follows engineers' professional, legal and ethical responsibilities. And in that vein, we also explore engineers' responsibility to adhere to PEO's Code of Ethics.

AN OPPORTUNITY TO TRANSFORM

By Marisa Sterling, P.Eng., FEC

Throughout May and June, during normal times, we may have been celebrating significant cultural and equity events in the homes of family and friends or on the streets of our communities. However, we are not in normal times. My first message comes in the midst of the COVID-19 pandemic. I am working from home, alone, to do my part. While we are working apart from one another to limit the virus's spread, I am encouraged by our deepening connectedness. Our understanding of each other is increasing as our child/elder care and personal circumstances are now visible in our virtual workplaces. While I think about how to help bring stability amidst the uncertainty, I reflect on how this disruption will change what we previously thought of as normal.

The well-being of our communities is being challenged on a global scale. Our healthcare professionals and frontline workers are selflessly carrying out their duties to protect the public, and many of you are among them. Members of the engineering community are in healthcare, emergency services, food supply, telecommunications, government services, the Canadian Armed Forces and other industries. I am profoundly grateful to all of you. We chose engineering with a shared desire to serve the public good. Right now, these are values Ontarians need from us more than ever.

STEPPING UP TO CURRENT CHALLENGES

In March, PEO shared the Canadian government's appeal to supply products and services to help combat COVID-19, and many of you responded. Whether you work on strategy, operations or in the trenches, I want to celebrate your stories of leadership, imagination and determination. Here are a few early examples: Bruce Power, General Motors, Toyota, Ford, Shell, Suncor and Home Depot donated personal protective equipment (PPE) and sanitizing supplies. Linamar, Magna and Martinrea are pivoting their manufacturing to help O-Two Medical Technologies produce ventilators. Municipal staff in Burlington, Brampton, London, Windsor and Owen Sound determined what is needed to convert buildings and temporary structures into pop-up field hospitals. Ontario distilleries are making and donating hand sanitizer. Spartan Bioscience is speeding up diagnostic testing using their DNA analyzer, The Spartan Cube.

With the race on to deliver critical equipment, global volunteer communities have emerged online and in swarm mode. There was the COVID-19 Global Hackathon to build software solutions, and the non-profit incubator Helpful Engineering is providing open-source designs for face shields, PPE and ventilators. Yet, as a regulator, how does PEO identify the responsible engineer within open-source engineering solutions? How do we safeguard the public good for engineering designs created by global teams? And how do we balance the tensions between data privacy and access as the public relies on crisis models?

I believe we must connect PEO's efforts to the urgency of the current changes in our society. Consider these critical questions now facing engineers and regulators: What must we preserve, and where are the opportunities to lean in and transform?

SHAPING OUR LONG-TERM VISION

Our 2019 external regulatory review helped identify organizational improvements, and many of these are underway. This will build a solid base from which we can forge ahead, but towards what? Our strategic plan expires this year, leaving our direction uncharted. Now is the time to shape a new, longer-term vision—a vision that includes the digital, biological and physical technologies; ensures technology is beneficial for all; and allows PEO to quickly adapt when needed to crises and changing public expectations.

We can transform while preserving what is helpful. PEO can make even greater contributions to the world that will emerge after this crisis. Council is adapting. Notably, our 2020 Annual General Meeting will be virtual this year, increasing access to more Ontarians than ever before. In response to COVID-19, PEO issued an advisory notice with guidance during the pandemic and provides regular updates on our website. I want to thank our CEO/registrar, Council, staff and volunteers for your efforts to work remotely during this disruptive time.

My commitment to you this year is to be transparent, inclusive and outcomes based. This message is being provided in English and French, for the first time, because I believe language and communication are critical for us to seek a common understanding. This pandemic has no borders. It ignores all cultures and identities. So, let's keep talking, together. Please share your thoughts and concerns using this online form: https://docs.google.com/forms/d/e/1FAIpQLSdxwYD61zd5DAVo21L_MI6WF72-p51aXLLPArBA7TOZxkES2g/viewform. I want to hear your ideas on the key engineering and regulation opportunities and issues the public faces amidst this pandemic.

Stay safe, stay motivated and stay connected. **e**

UNE OCCASION DE TRANSFORMATION

Par Marisa Sterling, P.Eng., FEC

Tout au long du mois de mai et juin, en temps normal, nous célébrerions peut-être d'importants événements culturels et d'équité avec famille et amis ou dans les rues de nos communautés. Cependant, nous ne vivons pas une situation normale. Mon premier message arrive au beau milieu de la pandémie de COVID-19. Je travaille de la maison, seule, pour participer à l'effort citoyen. Alors que nous travaillons éloignés les uns des autres pour limiter la propagation du virus, je suis encouragée par notre connectivité croissante. Notre compréhension de l'autre augmente à mesure que nos soins aux enfants et aux aînés et nos circonstances personnelles sont maintenant visibles dans nos lieux de travail virtuels. Alors que je pense à la façon d'aider à promouvoir la stabilité au milieu de l'incertitude, je réfléchis à la façon dont cette perturbation va changer ce que nous considérions auparavant comme normal.

Le bien-être de nos communautés est remis en question à l'échelle mondiale. Nos professionnels de la santé et nos travailleurs de première ligne s'acquittent de leurs fonctions de protection du public, et beaucoup d'entre vous en font partie. Les membres de la communauté d'ingénierie travaillent dans les secteurs de soins de santé, services d'urgence, approvisionnement alimentaire, télécommunications, services gouvernementaux, Forces armées canadiennes et autres industries. Je vous suis profondément reconnaissante. Nous avons choisi l'ingénierie avec un désir commun de servir le bien public. À l'heure actuelle, ce sont des valeurs dont les Ontariennes et Ontariens ont besoin de nous, plus que jamais.

RELEVER LES DÉFIS ACTUELS

En mars, PEO a partagé l'appel du gouvernement canadien à fournir des produits et des services pour aider à lutter contre la COVID-19, et bon nombre d'entre vous ont répondu. Que vous travailliez sur la stratégie, les opérations ou sur le terrain, je veux célébrer vos histoires de leadership, d'imagination et de détermination. Voici quelques premiers exemples: Bruce Power, General Motors, Toyota, Ford, Shell, Suncor et Home Depot ont fait don d'équipement de protection individuelle (EPI) et de fournitures désinfectantes. Linamar, Magna et Martinrea adaptent leur production pour aider O-Two Medical Technologies à produire des ventilateurs. Le personnel municipal de Burlington, Brampton, London, Windsor et Owen Sound a déterminé ce qui est nécessaire pour convertir bâtiments et structures temporaires en hôpitaux de campagne pop-up. Les distilleries de l'Ontario fabriquent et font don d'un désinfectant pour les mains. Spartan Bioscience accélère les tests diagnostiques à l'aide de leur analyseur d'ADN, le Spartan Cube.

Avec la course à la livraison d'équipements essentiels, les communautés mondiales de bénévoles ont émergé en ligne et en mode essaim. Il y avait la COVID-19 Global Hackathon pour construire des solutions logicielles et l'incubateur à but non lucratif Helpful Engineering fournit des conceptions à source ouverte pour les boucliers faciaux, PPE et ventilateurs. Pourtant, en tant que régulateur, comment PEO identifie l'ingénieur responsable au sein des solutions d'ingénierie à source ouverte? Comment sauvegarder le bien public pour les conceptions d'ingénierie créées par des équipes mondiales? Et comment équilibrer les tensions entre la confidentialité des données et l'accès, au fur et à mesure que le public s'appuie sur les modèles de crise?

Je crois que nous devons relier les efforts de PEO à l'urgence des changements actuels dans notre société. Considérez ces questions cruciales auxquelles les ingénieurs et régulateurs font face: Que devons-nous préserver et où sont les occasions d'avancer et de se transformer?

DONNER FORME À NOTRE VISION À LONG TERME

Notre examen réglementaire externe de 2019 a aidé à identifier les améliorations organisationnelles et beaucoup d'entre elles sont en cours. Cela permettra de construire une base solide à partir de laquelle nous pouvons aller de l'avant, mais vers quoi? Notre plan stratégique arrive à expiration cette année, laissant notre orientation inexplorée. Maintenant, il est temps de façonner une nouvelle vision à plus long terme, une vision qui inclut les technologies numériques, biologiques et physiques; qui assure que la technologie est bénéfique pour tous; et permet à PEO de s'adapter rapidement, lorsque nécessaire, aux crises et à l'évolution des attentes du public.

Nous pouvons nous transformer tout en préservant ce qui est utile. PEO peut apporter des contributions encore plus importantes au monde qui émergera après cette crise. Le Conseil s'adapte. Pour illustration, notre Assemblée générale annuelle 2020 sera virtuelle cette année, ce qui augmente l'accès à plus d'Ontariennes et d'Ontariens que jamais auparavant. En réponse à la COVID-19, PEO a publié un avis consultatif assorti d'orientations pendant la pandémie et fournit des mises à jour régulières sur notre site Web. Je tiens à remercier notre PDG/registraire, le Conseil, le personnel et les bénévoles pour vos efforts à travailler à distance pendant cette période perturbée.

Mon engagement envers vous cette année est d'être transparent, inclusif et fondé sur les résultats. Ce message est fourni en anglais et en Français, pour la première fois, parce que je crois que la langue et la communication sont essentielles pour que nous cherchions une compréhension commune. Cette pandémie n'a pas de frontière. Elle ignore toutes les cultures et identités. Alors, continuons à parler, ensemble. Veuillez partager vos pensées et préoccupations en utilisant ce formulaire en ligne: https://docs.google.com/forms/d/e/1FAIpQLSdxwYD61zd5DAVo21L_MI6WF72-p51aXLLPArBA7TOZxkES2g/viewform. J'aimerais connaître vos idées sur les principales possibilités d'ingénierie et de réglementation et les enjeux auxquels le public est confronté au milieu de cette pandémie.

Soyez prudent, restez motivé et connecté. **e**

SAILING IN UNCHARTERED WATERS

By Johnny Zuccon, P.Eng., FEC

In this issue, I intended to update you on the progress being made on the three paths of our enterprise-wide transformation, which include our operational review, our organizational review and enhancements to our governance structure. It was meant to share the advances we're making in achieving our change vision for PEO: *To become 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.*

However, since I began putting pen to paper—or strokes to keyboard—the terms "self-quarantine," "social distancing" and "flattening the curve" have dramatically forced their way into our lexicon, while more familiar words like "governance" and "regulation" don't quite seem to hold the same level of importance as they did just a few short months ago. As I write this column, our world is failing more with each passing day, and I'm not sure how things will have unfolded by the time this message reaches your eyes. If nothing else, this crisis is reminding us of what truly matters in our lives, and that family, above all, is of utmost importance. Indeed, these are very uncertain times requiring extraordinary measures. I hope you and your loved ones are comforting one another and enjoying good health.

When the fear around the COVID-19 virus first emerged, our initial priorities were to protect the safety of our staff and volunteers and to limit the spread of the COVID-19 virus. After instructing our committees and chapters to postpone or convert all in-person meetings to electronic ones, we instituted a work-from-home plan for all our employees on March 17 that would allow staff to continue to respond to questions and process payments and renewals with as little disruption as possible under the circumstances. On April 3, we reassessed our operational situation and decided that our physical office would remain closed until further notice due to the escalating situation.

EVENTS POSTPONED

Council also took decisive action by reconfiguring its March 20 meeting to a virtual one. Thanks to our dedicated information technology staff and the co-operation of the implemented technology, the meeting continued as scheduled, albeit in a new format. At that meeting, it was decided to modify our 2020 Annual General Meeting (AGM) and 533rd meeting of Council on April 25 into virtual ones on the same date or as soon thereafter as is feasible. Council also decided to indefinitely postpone or cancel our Volunteer Leadership Conference and the Order of Honour awards gala, both of which were originally scheduled for April 24. We're now investigating alternate options for these two events and our AGM will be held virtually on May 30 (see p. 17).

Further, the March 28 sitting of our Professional Practice Exam (PPE) was also cancelled due to concerns over the outbreak. Information on future exam sittings is available on our website and we will make the necessary accommodations to those for which this sitting was the last opportunity to complete the exam.

> WHEN YOU WANT TO KNOW HOW THINGS REALLY WORK, STUDY THEM WHEN THEY'RE COMING APART.

Thankfully, these words from American-Canadian science fiction author William Gibson are not indicative of our current state. I'm proud of how our team has responded and the dedication they've shown to doing as much as possible to maintain our core operations in these extreme conditions. The situation has emphasized the criticality of modernizing our operations and confirmed the need to develop a comprehensive digital strategy. Our lack of a significant digital infrastructure limits us in numerous ways, most notably in case management efficiency. Fortunately, Council recently approved an action plan to address the recommendations from our external regulatory performance review, which includes commissioning a digital strategy for the organization. Some work has already begun in this respect, such as enabling online renewal of certificates of authorization via our portal, in addition to Council's approval in March to use the National Professional Practice Examination in place of the current PEO-administered PPE. So, although we're starting to move in the right direction, there are still many significant issues to address before we can adequately transform into a fully digitalized operation. This is one important lesson we've learned from the crisis.

These are unchartered waters we're sailing in. As CEO/registrar and as a former hockey coach, I have long believed in—and relied on—well-defined structure to achieve success. Such structure is not available to us now. There is no playbook to guide us, no consistency in the world around us. This is why I'm grateful to my provincial and territorial engineering regulatory colleagues for openly sharing their ideas and strategies as we all try to navigate through this difficult situation. I appreciate the support of President Nancy Hill, P.Eng., LLB, FEC, and our councillors in trusting me to take the steps necessary to lead our operations during these continuously evolving times. Most importantly, I'd like to acknowledge and thank the tremendous staff we have at PEO for their unwavering commitment to serving all our stakeholders during this pandemic. It hasn't always been easy, but the will to do so has never wavered. e

CHRISTIAN BELLINI WINS 2021–2022 PRESIDENTIAL TERM

By Nicole Axworthy

In March, PEO received the official Council election results, revealing Christian Bellini, P.Eng., FEC, was elected to the office of president-elect. He will begin his term as PEO president at the 2021 Annual General Meeting (AGM). Bellini previously served as vice president (elected) for the 2019–2020 Council term and has participated in many of PEO's regulatory committees and task forces since he began his volunteer career with the regulator in 2005.

In this election, 10.5 per cent of PEO membership voted. This marks a downturn in voting from 2019, when 12.4 per cent of PEO licence holders participated.

Darla Campbell, P.Eng., was elected vice president for the 2020–2021 Council. She has been heavily involved in PEO's Government Liaison Committee since it was first established in 2011, including chairing the committee from 2014 to 2017. She is also a volunteer with PEO's Oakville Chapter.

The new Council, including the following newly elected councillors, will take office on May 30 at PEO's AGM, which will be hosted virtually due to the global COVID-19 pandemic (see p. 17).

- Councillor-at-Large Michael Chan, P.Eng., FEC
- Eastern Region Councillor Chantal Chiddle, P.Eng., FEC
- East Central Region Councillor Peter Cushman, P.Eng.
- Western Region Councillor Peter Broad, P.Eng., FEC
- West Central Region Councillor Lisa MacCumber, P.Eng., FEC
- Northern Region Councillor Luc Roberge, P.Eng., FEC

At the first meeting of Council, which will take place virtually on May 30, Council members will appoint individuals for the position of vice president (elected) as well as additional members of the Executive Committee. The full 2020–2021 Council will be featured in the July/August 2020 issue of *Engineering Dimensions*.

HOW YOU VOTED

PRESIDENT-ELECT

Christian Bellini	**4754**
Nick Colucci	4008

VICE PRESIDENT

Darla Campbell	**3894**
Gregory Wowchuk	3341
Tim Kirkby	1588

COUNCILLOR-AT-LARGE

Michael Chan	**acclaimed**

EASTERN REGION

Chantal Chiddle	**555**
Guy Boone	456
Arash Imani	388

EAST CENTRAL REGION

Peter Cushman	**961**
Monica Jain	686
Christopher Chahine	625

WESTERN REGION

Peter Broad	**1076**
Vivender Adunuri	780

WEST CENTRAL REGION

Lisa MacCumber	**1022**
Muktar Homam	916

NORTHERN REGION

Luc Roberge	**260**
Juan Pernia	93

PROPOSED CHANGES TO ONTARIO BUILDING CODE CAUSE INITIAL CONFUSION

By Adam Sidsworth

A proposal to have professional engineers and architects work as building inspectors employed by contractors has been dropped from a bill introduced at Queen's Park in March. Bill 184, *An Act to amend the Building Code Act, 1992, the Housing Services Act, 2011 and the Residential Tenancies Act, 2006 and to enact the Ontario Mortgage and Housing Corporation Repeal Act, 2020* was introduced for first reading in the Ontario legislature on March 12. The bill amends several already-existing bills, in part, to increase access to rental housing while making the rental market a more lucrative venture for property developers. Notably, Bill 184, if passed, will amend *The Building Code Act* to allow for the creation of an arms-length provincial agency to administer the application of the Ontario Building Code in unincorporated parts of Ontario, which consist of areas of the province that lie outside of municipal boundaries. Currently, the majority of unincorporated areas in Ontario lie in the sparsely populated areas of northern Ontario.

Because the Ministry of Municipal Affairs and Housing (MMAH) recognizes that unincorporated areas are not subject to permitting and inspection requirements and that the Ontario Building Code has become increasingly complex, the administrative authority is proposed to deliver the same permitting and inspections as municipalities. Municipalities are currently required to administer the Ontario Building Code, with their own plan examiners and building inspectors, and will continue to do so should the bill become law under its present shape. Responsibility for the development of business-related policy, such as the Ontario Building Code, will remain with the ministry, with the proposed amendments divesting the ministry of only the operational processes.

Additionally, if Bill 184 is passed in its current proposed form, the administrative authority will carry out the administration of the building code identification number (BCIN)—the government registration program that has oversight over non-licensed designers who carry out the design of certain buildings. Architects and engineers are exempt from requiring a BCIN, so the new agency will have no authority over them.

EFFECT ON ENGINEERS

Should Bill 184 be approved by the Ontario legislature in its present form, little will change for engineers working in the construction industry, notes Bernard Ennis, P.Eng., PEO's director, policy and professional affairs. "Essentially, the ministry is looking to transfer many of its operational functions to an independent, non-profit corporation, just as past governments transferred similar functions to the Technical Standards and Safety Authority and the Electrical Safety Authority," Ennis says. "Nothing changes in terms of regulatory requirements or professional responsibilities for professional engineers."

One proposal initially considered by the MMAH in its 2019 discussion paper that caused some initial confusion among Ontario's engineers was to allow developers to hire architects or professional engineers on a contract basis to conduct the initial approvals and ongoing inspections throughout the building process. However, that proposal was dropped from Bill 184 due to widespread opposition, notably from the Ontario Association of Architects, which cited increased costs due to increased liability insurance for architects; and some municipal chief building officials, notably from the City of Toronto, who feared a lack of independent oversight—although, under the proposal, municipal building inspectors would still have had final inspection and approval. However, the Ontario Home Builders' Association applauded the proposal, noting that architects and professional engineers have both the expertise to approve more complex developments and adhere to strict professional codes of ethics through their respective regulatory bodies.

PROMOTING A CONSISTENT APPROACH

The proposed changes to devolve the MMAH of some of its direct role in overseeing approvals and ongoing inspections of new developments come as the province actively explores new channels to increase access to more affordable housing in the province. Throughout the fall of 2019, the MMAH circulated its discussion paper *Transforming and Modernizing the Delivery of Ontario's Building Code Services* throughout the province's construction industry. Notably, it stated that "building sector stakeholders have been asking for better, more modern and timely services and resources to support their ability to understand and apply the highly technical and complex building code requirements" in light of the MMAH's inability to keep "pace with the needs of the sector, making [the current] model unsustainable. The ministry needs to implement a model that will enable the delivery of improved services to promote consistency and better support the sector." The goal of the administrative authority is "to promote a consistent approach to building code interpretation and application, while still protecting public health and safety."

Some larger municipalities in Ontario reported an inability to keep pace with increased demand for building inspections from their municipal staff, noting an upswing in development and changes to the Ontario Building Code in 2014. Ottawa's chief building official in 2018 recommended that the city hire 12 full-time inspector positions to keep up with the city's 25 per cent increase in building permit applications between 2015 and 2017, with one city councillor at the time stating that many subdivisions witnessed the erection of buildings that failed to meet the provincial building code.

ENGINEERS CANADA REPORTS ON NEXT DECADE OF ENGINEERING INDUSTRY TRENDS

By Adam Sidsworth

Canada's umbrella organization of provincial and territorial engineering regulators predicts that engineers will have to be more multidisciplinary and increasingly flexible with the emergence of artificial intelligence, automation and other new engineering disciplines.

Engineers Canada analyzed recent articles and blog posts of leading engineering thinkers to predict the coming trends in engineering throughout the 2020s, predicting "a mixture of trepidation and optimism as to how the next 10 years might look."

Engineers Canada cited a presentation by James Plummer, the Ontario-born former dean of engineering at Stanford University, who told an IEEE Vision, Innovation and Challenges Summit in San Francisco, California, in 2017 that engineers in the future "will be a different breed of people than the engineers we educated in the 20th century." These engineers, competing for fewer jobs in a more highly automated world, will undergo an engineering education that includes more exposure to the liberal arts and life skills, "with the aim of preparing future engineers for unpredictable careers. Engineers will need communication skills, the ability to work in teams, global knowledge and an entrepreneurial outlook as much as they will need technical depth."

GROWTH IN SPECIFIC SECTORS

Emerging and newly emergent engineering disciplines, according to Engineers Canada, "will continue to fill gaps as the technology landscape rapidly changes alongside the problems engineering needs to most urgently address." Engineers Canada cites University of California, Riverside (UCR), noting that engineering in environmental sectors will outpace the growth rate of many other engineering disciplines "as demand increases for green energy systems, including windmills, hydropower deployments and solar infrastructures." Among other engineering trends, UCR says that robotics engineering will become crucially important, noting that in 2018, an estimated 1.3 million will have entered service in factories; as will data science and computational engineering, which combine classical elements of mechanical and electrical engineering with principles from computer programming and data analytics. More traditional engineering streams, such as electrical engineering, will change due to the evolving needs of manufacturing, while biomedical engineering will experience a surge due to the aging global population and increasingly sophisticated medical devices. But, like Plummer, they echo the need for engineers to be able to work across engineering disciplines, with the integration of mechanics, electronics and software accelerating.

TECHNOLOGICAL TRENDS

Engineers Canada also notes that as engineering becomes increasingly more globalized, there will be an "increasingly complex interplay between international markets and regulatory environments." Engineers Canada cites Carsten Bock, senior partner at global consultancy firm Roland Berger, stating that "differing product demands in different markets and regulatory environments will pose major challenges to companies' resources, and this will leave them facing tough decisions." Bock suggests that firms become capable of developing both standard products and tailor-made solutions.

Interesting technological trends for the 2020s—digital twins, artificial intelligence, generative design, robotics and 3D printing—will likely, as a whole, "allow for a transformed engineering landscape characterized by faster, cheaper prototyping; more efficient product design; reduced product risk; and new ways for engineers to work with and leverage technology.

Citing a Bernard Marr article in *Forbes* magazine, Engineers Canada notes that one result will likely be the twinning of already-existing objects and perfect digital models, with "the increasing existence of numerous side-by-side technologies (think Blue-ray vs. HD DVD or gasoline vs. electric cars), where one may win out, but all still require considerable investment and ongoing support." As the new technology develops, Engineers Canada, quoting SmithGroup, says that "visualization tools will become more realistic and immersive, leading to a future where collaboration between the owner, contractor and designers will be far more integrated," predicting a possibility that engineers and engineering firms will leverage emerging technology like virtual and augmented reality, which by some predictions will boom into a $33.9 billion industry by 2022, up from $1 billion in 2015. Interestingly, SmithGroup predicts that "advancements in technology and climate changes will also have a significant impact on the shape of cities in the decade ahead" and that "cities, institutions and communities will turn their attention away from building-scale sustainability to focus on adaptation and implementation of more equitable support structures within communities."

SIX ENGINEERING REGULATORS CELEBRATE CENTENARIES IN 2020

By Adam Sidsworth

The Canadian engineering profession marks a major milestone this year as six provincial and territorial engineering regulators celebrate their 100th anniversaries. Engineering regulators in British Columbia, Alberta, Manitoba, Quebec, New Brunswick and Nova Scotia were all formed within months of each other in 1920. (They were joined by Ontario two years later, in 1922, when the province's legislature passed its first professional engineering law, which created what would eventually be called Professional Engineers Ontario.)

For their 100th anniversaries, many of the centenary regulators have planned special events across their respective provinces.

BRITISH COLUMBIA

Engineers and Geoscientists British Columbia (EGBC) held a series of 3D chalk art installations earlier this year in Vancouver, Kelowna, Prince George and Victoria, and on March 5, it held a centennial celebration in Vancouver, where they celebrated 100 years of ethics, excellence and progress in engineering. Additionally, on its website, EGBC has created a webpage, 100years.egbc.ca, devoted to the history of its first 100 years. It is complete with a timeline of significant events in EGBC history; an "Invest in Our Future" program, in which it outlines a series it hosted at schools across the province throughout the 2019–2020 school year to encourage school-age kids to become interested in engineering and geoscience; and a social media campaign with the hashtags #100yearsofpossibility and #thisisourprofession, to encourage people to share their thoughts about the evolution of engineering and geoscience in BC over the next century and to honour innovative engineering and geoscience leaders.

ALBERTA

For the Association of Professional Engineers and Geoscientists of Alberta (APEGA), the regulator created a webpage, discoverapega.ca, to honour significant events in the timeline of Alberta engineering and geoscience and regulation.

MANITOBA

Engineers Geoscientists Manitoba formed a Centennial Task Group to celebrate this important milestone and highlight how 100 years of engineering and geoscience regulation has improved the province. The regulator had planned to celebrate its centenary on March 27, but due to the COVID-19 pandemic, it had to celebrate virtually over the internet. Celebratory events included a YouTube message from CEO/Registrar Grant Koropatnick, P.Eng. (Manitoba), FEC, a virtual birthday party on Facebook, Instagram and Twitter with the hashtag #EngGeoMBCentennial2020 and a centennial gala currently scheduled for September 2020. The regulator also added the webpage mystory.enggeomb.ca, which features videos of Manitoba engineers talking about their careers.

QUEBEC

L'Ordre des ingénieurs du Québec (OIQ) in part kicked off its centenary celebrations last year with a makeover of its visual image, which included a new logo (see "Quebec engineering regulator introduces new advertising campaign and visual identity," *Engineering Dimensions*, January/February 2020, p. 18). The campaign, which ran from September to November 2019 and January and February 2020, overlapped with OIQ's 100th birthday on February 14 and ran on television, outdoor advertising and online. OIQ's 100th anniversary gala, originally scheduled for May 27, will take place on November 25, 2020.

NEW BRUNSWICK

Engineers and Geoscientists New Brunswick (EGNB) had planned a centenary gala banquet to take place on April 25, but because of the COVID-19 pandemic, it postponed the gala until October 23, 2020. In the meantime, EGNB received over 100 submissions from students from kindergarten to Grade 12 from across the province for a science, technology, engineering and mathematics contest. Additionally, EGNB has an open call for artists to submit proposals for an art installation in front of EGNB's office that will reflect both engineering and geoscience and has prepared videos to be shared at its Gala of Past Presidents and another to promote excellence in engineering and geoscience.

NOVA SCOTIA

Engineers Nova Scotia is looking to celebrate its centenary with a special publication of its member magazine, *The Engineer*, to be released this fall. Participants wishing to be a part of *The Engineer*'s celebration will be able to place congratulatory advertisements ranging in size from small banner ads to double-page spreads. The issue will highlight a century of work by engineers and engineering firms in Nova Scotia.

ONTARIO P.ENG. RUNS FOR CONSERVATIVE PARTY LEADERSHIP

By Adam Sidsworth

Marilyn Gladu, P.Eng., MP for Sarnia-Lambton, is running for leadership of the Conservative Party of Canada.

A southwestern Ontario minister of parliament (MP) who made history in 2015 by becoming Canada's first woman engineer elected to the House of Commons is running for leadership of the Conservative Party of Canada at its leadership convention, set to take place later this year in Toronto, Ontario.

Marilyn Gladu, P.Eng., MP for Sarnia-Lambton, announced her leadership bid after paying the initial $25,000 fee and submitting 1000 nominations from fellow Conservative Party members. However, Gladu had to pay an additional $275,000 and be nominated by an additional 2000 party members by May 15 in order to ensure her spot on the first ballot at the convention. That convention, originally scheduled to take place on June 27, has been delayed to a yet-to-be-determined date due to the COVID-19 pandemic. The Conservative Party's Leadership Election Organizing Committee may announce a new convention date by mid-May, along with a temporary suspension in campaigning.

The Conservative Party declared its leadership convention following the December 12, 2019, announcement by current party leader Andrew Scheer that he would resign his post amid perceptions that he misused party funds to pay for his children's school tuitions. (The Conservative Party has maintained the payments were standard party practice.) The revelations surfaced just weeks after the Conservative Party won only the second-highest number of seats in the House of Commons, despite winning the popular vote. However, the Conservative Party's increased seat count was partly responsible for Prime Minster Justin Trudeau's minority-government status.

A FAMILIAR FACE

Gladu may not have the name recognition on the national level of the early frontrunner, former MP Peter MacKay, who subsequently held various senior cabinet positions in the government of former prime minister Stephen Harper after holding the leadership of the former federal Progressive Conservative Party. However, Gladu, who is currently serving her second term as MP after being first elected in 2015, has had increasing recognition among her fellow PEO members and Ontario's wider engineering community.

In 2016, Gladu addressed the Engineering Student Societies' Council of Ontario's annual PEO Student Conference in Ottawa, ON (see "Power of the P.Eng. shines at ESSCO conference," *Engineering Dimensions*, January/February 2017, p. 19), and in 2018, Gladu was named a fellow of the Canadian Academy of Engineering.

"I'm incredibly proud," Gladu told *Engineering Dimensions* in reference to her status as Canada's first woman engineering MP. "Not only am I the first engineer out of 320 in the entire country who has been elected to the House of Commons, but I think it means that I have to do that well so that they want more of us."

AN ENGINEERING BACKGROUND

Gladu earned her undergraduate degree in chemical engineering from Queen's University in 1984 and pursued a 32-year engineering career in the petroleum industry, including 21 years at Dow Chemical in a variety of roles in Canada and abroad. She subsequently became engineering manager and then director of engineering at Suncor, and at WorleyParsons, where Gladu managed large teams working on construction- and engineering-related projects. She subsequently joined Shell, serving as its North American business director for petrochemicals and refining.

Asked about engineers' contribution to government, Gladu noted that they have a "set of skills to solve complex problems, and we have many complex problems in the country…Engineers, by being fact based, are able to provide concrete solutions and execute jobs."

Since being elected to the House of Commons, Gladu has played increasingly more prominent roles, serving, at various times, as the official opposition science critic and the shadow minister of health, during which times she noted that she received awards for her healthcare advocacy. She served prominently on several House of Commons committees, including a stint as the chair for the status of women committee and vice chair on the standing committee on health. "When I was the critic for science," Gladu recalls, "I worked with the minister of science at the time, [Liberal] Kirsty Duncan, and I said, 'Why don't we get a plan that we can both agree on, then regardless of what government is in place, the plan is there to do the right thing for science.' I worked with her to create a vision." Gladu noted that she has been voted as the most collegial MP by members of all parties in the House of Commons.

"In order to win [the next election], we need to grow our base as a party," Gladu told *Engineering Dimensions*. "We need fiscal responsibility and social compassion. And that's what I'll be bringing to the race."

IRON RING CEREMONY ORGANIZERS CREATE GUIDELINES FOR INCLUSIVENESS FOLLOWING SEXIST JOKES AT BC INFORMATION SESSION

By Adam Sidsworth

The national organization that oversees the iron ring ceremonies across the country responded with strong measures after a February iron ring information session in Vancouver, British Columbia, was riddled with discriminatory comments and inappropriate conduct by the presiding wardens.

The University of British Columbia Engineering Undergraduate Society (UBCEUS) announced on February 26 that the organizers of Camp 5, the Vancouver affiliate of the Corporation of the Seven Wardens Inc., would not be overseeing this year's Ritual of the Calling of an Engineer in that city after students complained about sexist language targeting women at the February 12 information session, which was held in preparation of the actual ceremony.

The University of British Columbia's (UBC's) student newspaper, *The Ubyssey*, reported that many graduating students at the session were left feeling uncomfortable, with graduating mechanical engineering student Juliana Lee stating that she was "shocked" to hear numerous inappropriate jokes, including "the most blatant one, [in which] they talked about replacing a ring for a shiny ring because [they implied that] young women like shiny jewellery." She added that organizers also "shared a story about a woman wearing an iron ring, and 'somebody asked her if her boyfriend was an engineer.'" According to Lee, the punchline was, "'No, but my boyfriend has a girlfriend who's an engineer.'" Lee added: "There was an inaudible shock…it was baffling…I needed confirmation in the moment that I wasn't overreacting or thinking about these things in a negative way…but the remarks were equally shocking for my guy friends."

UBCEUS Interim President and Vice President of Finance Katherine Westerlund, a fifth-year geological engineering student who was scheduled to attend this year's ceremony, confirmed to *The Ubyssey* that after concerns were raised with the Corporation of the Seven Wardens, the Camp 5 ceremony would be hosted by Leonard Shara, MBA, ing., chief warden of the Corporation of the Seven Wardens, which oversees all camps in Canada. The rescheduled date of Camp 5's iron ring ceremony had yet to be determined at the time of this article's writing.

ENSURING INCLUSIVENESS

In a statement to *Engineering Dimensions*, Shara stated that "the concerns raised by Camp 5 events have accelerated the workings of a corporate task force on camp governance and succession. Within a couple of months, specific guidelines will be sent out to all camps to follow, ensuring that inclusiveness, renewal and accountability are enshrined as the prime directives." However, Shara wants to emphasize that "this is already the case in most camps, but there is a desire for everyone with any connection to the corporation to sign off and agree to these directives."

Westerlund told *Engineering Dimensions*: "Our concern was with their overall conduct—the shutting down of student questions and our concerns about conducts at previous ceremonies. [The wardens] seemed incapable or unwilling to recognize and apologize for the harm they have caused in the past, which is a serious concern for us. Previous remarks at the ceremony itself have been much more hurtful and inappropriate than these jokes, from telling women in the room that they should have caught up by now to rants against political correctness and remarks about how indigenous people have been given enough. These statements are inappropriate for a professional ceremony welcoming our graduates into the engineering community, and we do not believe this represents the profession well."

Westerlund adds: "The Iron Ring ceremony is seen as being synonymous with being an engineer in Canada, so it's very important for our graduates to attend this ceremony. This is something people look forward to more than their actual graduation." However, Westerlund says that it does not reflect her experience at UBC, asserting that the university makes an active effort to be inclusive of all students who would like to become engineers, citing the university's Women in Engineering club, EngiQueers and the Canadian Region of American Indian Science and Engineering Society.

UPDATING THE LANGUAGE

The Ritual of the Calling of an Engineer, the ceremony of the Obligation of Canadian Engineers, was founded in 1922 in Montreal, Quebec, at a meeting of the Engineering Institute of Canada. One past president, H.E.T. Haultain, an engineer-

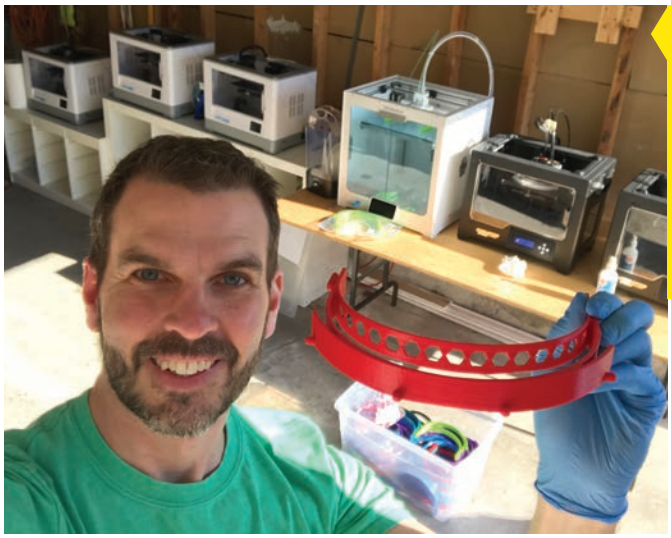
ing professor at the University of Toronto, asked English poet Rudyard Kipling, author of *The Jungle Book*, to compose the ritual, which contained specifically male-centric language and references to Christianity, leaving some participants feeling uncomfortable.

John Allen Stewart, PhD, P.Eng., chief warden for Camp 3 in Kingston, Ontario, and PEO Academic Review Committee member, told *Engineering Dimensions* that Camp 3 has updated its ceremony to be more inclusive of all genders and religious beliefs. Stewart, who is professor emeritus at the Royal Military College as well as its former vice principal, academic and dean of engineering, notes that they removed gender-specific language and overtly Christian references from the ceremony five years ago—with the exception of the reading of Kipling's "Hymn of the Breaking Strain," which wasn't changed to respect Kipling's original poetry. Stewart emphasizes that Camp 3 has not had complaints since the ceremony has been updated, agreeing with Westerlund that engineering students look forward to participating in an engineering ritual rich in history.

The iron ring is granted to students who meet the academic requirements to be called an engineering graduate, not an engineer. PEO does not have any affiliation with the iron ring or the Ritual of the Calling of an Engineer.

ENGINEERS STEP UP TO THE PLATE IN THE FIGHT AGAINST COVID-19

By Marika Bigongiari



Chris Daniel, P.Eng., in his garage, holds up a 3D-printed headband portion of a protective face shield designed for healthcare workers on the frontline of COVID-19.

Global pandemic COVID-19 has caused a worldwide shortage of personal protective equipment (PPE)—critical tools for frontline healthcare workers who are in direct contact with infected patients—and professional engineers are moving swiftly to fill the PPE gap.

Chris Daniel, P.Eng., a mechanical engineering technology professor and faculty advisor with the FastStart entrepreneurship team at Durham College in Oshawa, Ontario, is working to help make protective face masks for those working on the frontline. Daniel, who previously worked as a senior mechanical design engineer in Husky Injection Molding Systems' robotics division, became involved in the charitable initiative after discovering that Kitchener, ON–based manufacturing company InkSmith was working to produce PPE using a 3D-printed headband design by Czech company Prusa Research.

InkSmith launched their Community Shield program to crowdsource 3D printing with an aim of creating PPE face shields for hospitals and healthcare providers in need. With InkSmith looking for volunteers to 3D print the headband component so they could focus on laser cutting the face sheets and assembling the pieces, Daniel sprang into action. "Since we had six 3D printers at the college, I pitched the idea of using them to help produce frames (the headband component) for InkSmith, and it got the green light," Daniel explains. "We're shipping our printed headband donations to their warehouses, [and] they take care of manufacturing the clear front shield, assembling the two pieces along with elastics and sanitizing the final assembly."

Daniel reached out to current and past Durham College students to see who had machines at home and might be interested in helping. The response was immediate, with volunteers ranging from students to alumni to members of the community with no college affiliation. Approximately 52 people using 70 3D printers are currently working on the project from their home garages, basements and bedrooms. "About 40 per cent are current students or alumni of the college, and the rest are community members," Daniel explains. "It's incredible how quickly these machines have become more accessible and commonplace."

In addition to InkSmith, Daniel has also partnered with CAD MicroSolutions, Ontario Tech University and Trillium Health Partners to see the project to fruition. The team has already distributed face shields to organizations and groups in need. "So far, face shields built using our 3D-printed frames have been donated to Sick Kids Hospital in Toronto and Northumberland Hills Hospital in Cobourg," Daniel notes. Depending on the head-

band style (four variations are being printed), it can take anywhere from 40 minutes to two-and-a-half hours to print. "I have the six machines at my home running 24 hours a day, as do most of our team members," Daniel notes. "Collectively, we're currently printing 320 headbands a day."

When the team first started out, they used all of Durham College's available polylactic acid to start printing the headbands. In order to facilitate the printing of as many pieces as possible—and given that the headbands cost just over $1 each in raw material, and their production rate was increasing steadily—Daniel started a GoFundMe page for the project. "Although I only asked for $1,000, people were so generous that nearly $8,000 was raised in one day, and $12,000 after nine days," Daniel says. "Considering the size and production rate of our group, this will supply us with approximately 1.5 months of plastic and result in 9,000 headbands."

UNIVERSITY OF WINDSOR ENGINEERING TEAM JOINS THE FIGHT

Jill Urbanic, PhD, P.Eng., a mechanical, automotive and materials engineering professor at the University of Windsor, has been working long hours with engineering students on several key projects for everyday items that people can use to slow the spread of COVID-19. Urbanic was first approached by master's student Alireza Pasha and doctoral candidate Morteza Alebooyeh with ideas for hands-free attachments for door handles—which they came up with after they approached the door of a lab and didn't want to touch the handle. "We are being told repeatedly about avoiding hand-to-face contact, but there are several activities that we engage in every day, like opening doors, that could facilitate disease transmission," Urbanic explains. "We reviewed solutions that were out there, and I gave their ideas two thumbs up to build and test because their designs are simple, natural to use and, quite frankly, good ideas."

The device is a simple J-hook design that allows a person to use their elbow or forearm to open a door, instead of putting their hand directly on the handle. The team built and tested variants of the designs, which work with different types of door handles. Facilitating manufacturability is the challenge, Urbanic explains, especially with materials in short supply around the globe and demand for volume high.

PPE shortages have driven parallel development activities for the team, which is also designing and making parts for ventilators and working on face shields—the latter of which doctoral candidate Hamed Kalami is working on with Urbanic. "We have been working on face shield designs that are comfortable yet provide a good fit while addressing the limitations of 3D printing," Urbanic explains. In addition to avoiding irritation that might come from long-term use, proper fit is important to ensure pathogens don't slip through gaps. Her team has been getting feedback from medical personnel and are improving the designs as they go, addressing issues such as comfort and durability. Urbanic and her team have been getting crucial support from medical professionals and partners, which include Valiant TMS, CAMufacturing Solutions, Inc., University of Windsor, Western University and Western University's Schulich School of Medicine and Dentistry.

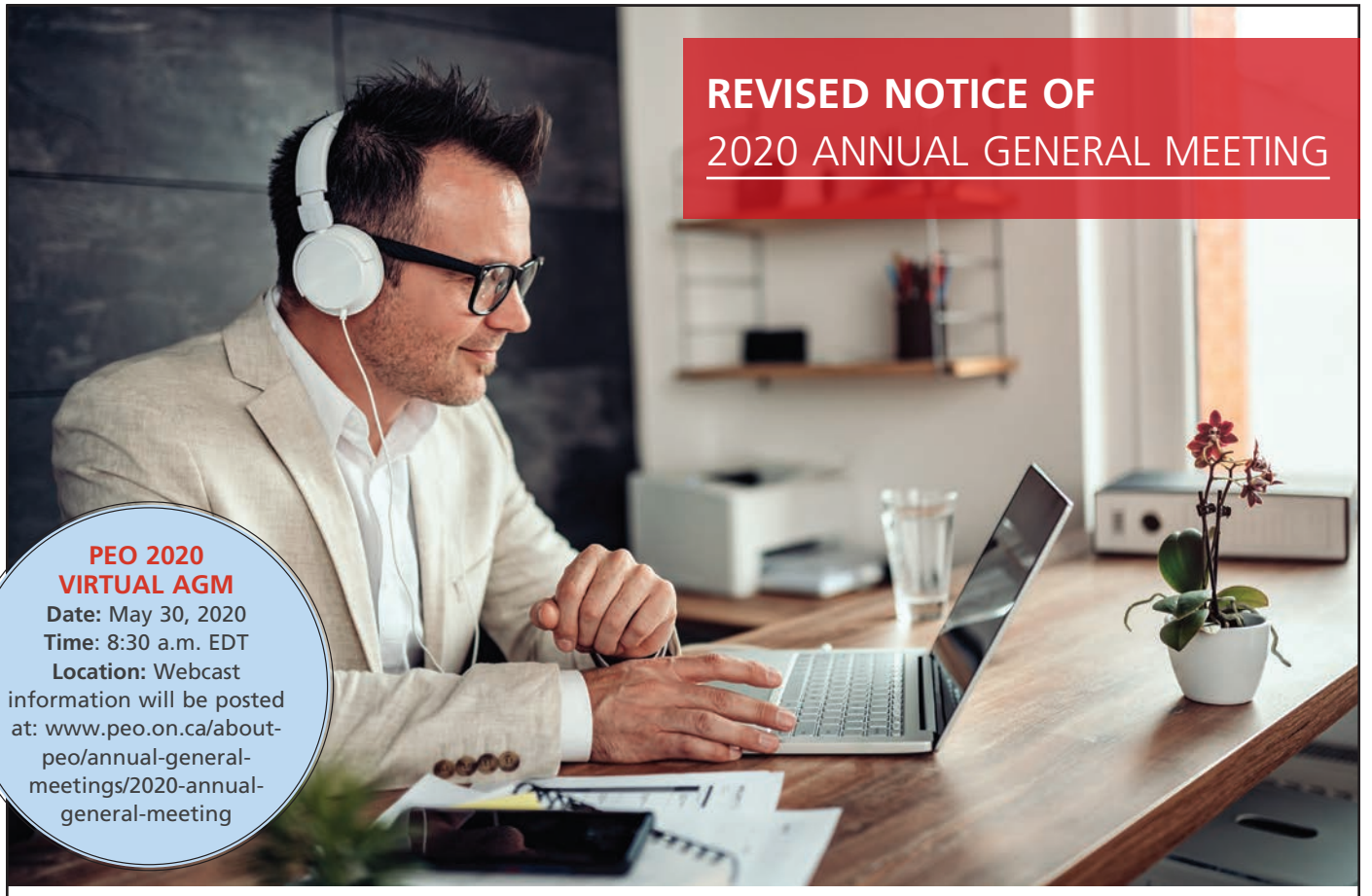
The Government of Canada is working closely with local, provincial, territorial and international partners to minimize the health, economic and social impacts of COVID-19. To assist their efforts, PEO has reached out to its members on social media and via eblast to invite them to contribute critical supplies and services to support Canada's response to the pandemic. News and operational updates related to COVID-19 can be found on PEO's website: peo.on.ca/latest-news/peo-covid-19

BITS & PIECES

Modular construction involves building parts of a structure, often an entire building, off-site in a controlled environment and then transporting the modular components to the building site to be integrated into a larger build. This construction method is quicker while maintaining design intent and specifications. Photo: Alex Jesús Cabello Leiva

Biomedical engineers are working on using biomaterials to 3D print human organs. Using computer-aided design software, engineers design digital models and utilize complex materials such as bioink, a material that combines synthetics with human cells. It is hoped research will result in fully functional organs to help meet increasing demand for transplants. Photo: Creative Tools

REVISED NOTICE OF 2020 ANNUAL GENERAL MEETING



PEO 2020 VIRTUAL AGM
Date: May 30, 2020
Time: 8:30 a.m. EDT
Location: Webcast information will be posted at: www.peo.on.ca/about-peo/annual-general-meetings/2020-annual-general-meeting

In accordance with section 20 of By-Law No. 1, which relates to the administrative affairs of PEO, the 2020 Annual General Meeting (AGM) of the Association of Professional Engineers of Ontario will be held on Saturday, May 30, 2020, at 8:30 a.m.

As noted in section 17 of By-Law No. 1, the AGM of PEO is held for the following purposes:

- To lay before members the reports of the Council and committees of the association;
- To inform members of matters relating to the affairs of the association; and
- To ascertain the views of the members present at the meeting on matters relating to the affairs of the association.

IMPORTANT: PEO will not hold an in-person meeting as previously communicated to licence holders in the Notice of Annual General Meeting published in the March/April issue of *Engineering Dimensions* as well as in the eblast on March 12, 2020. Instead, as per the motion of PEO's Council passed on March 20, 2020, and in compliance with the order of the provincial government prohibiting organized public events and social gatherings amid concerns surrounding the COVID-19 pandemic, PEO's AGM will be using a virtual meeting format. This means that proceedings will be conducted solely via live webcast. The meeting will be in listen-only mode. Members will have the opportunity to submit questions online during the meeting and to provide submissions in advance.

Members interested in participating in the meeting, including voting on business properly brought before the meeting, will need access to an internet-connected device for the full duration of the meeting.

VOTING

Prior to the meeting, eligible members will be sent unique and secure log-in credentials by email from FMAV, our official AGM agent. The email will include a link, user name and password. If you have not provided an email address to PEO, please ensure you do so by May 8, 2020, through our online portal at: https://secure.peo.on.ca/ebusiness.

SUBMISSIONS

Members of PEO can make submissions on matters of importance to the work of PEO. Submissions must be emailed to agmsubmissions@peo.on.ca at least 10 business days before the date of the meeting (May 14) using the template available on PEO's website at: www.peo.on.ca/sites/default/files/2020-03/2020-AGM-SubmissionGuidelines.pdf. Submissions received after this time will not be considered at the AGM. Once received, submissions will be posted on the PEO website.

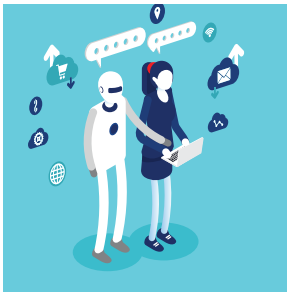
Since the AGM will be conducted in listen-only mode, members making submissions are being given the opportunity to pre-record a brief introduction to their submission. The recording will be played during the meeting. Those interested in scheduling such a recording should indicate their interest when emailing their submission. Members will be contacted to schedule the recording.

PEO President Nancy Hill, P.Eng., LLB, FEC, FCAE, will preside and present her report to the AGM. President-elect Marisa Sterling, P.Eng., FEC, and CEO/Registrar Johnny Zuccon, P.Eng., FEC, will also provide remarks. The president-elect, officers and councillors for the 2020–2021 term will officially take office at the conclusion of the meeting.

Attend Virtually

The following events can be attended via videoconferencing (see individual websites for details).

May 2020



MAY 27
International Conference on Human Factors in Computing Systems, Toronto, ON
arsss.org/Conference2020/5/Canada/ICHFCS

MAY 27
International Conference on Mechanical, Civil, Industrial and Production Engineering, Toronto, ON
arsss.org/Conference2020/5/Canada/ICMCIPE

MAY 27–28
International Conference on Science, Technology, Engineering and Management, Ottawa, ON
academicsera.com/Conference2020/Canada/2/ICSTEM

MAY 27–28
International Conference on Civil and Environmental Engineering, Ottawa, ON
academicsera.com/Conference2020/Canada/2/ICCEE

MAY 28–29
International Conference on Innovative Engineering Technologies, Toronto, ON
theires.org/Conference2020/Canada/2/ICIET

MAY 30
PEO Annual General Meeting (online only)
peo.on.ca/about-peo/annual-general-meetings/2020-annual-general-meeting

June 2020

JUNE 27
International Conference on Recent Advances in Engineering, Technology and Science, Toronto, ON
arsss.org/Conference/7414/ICRAETS

JUNE 27
International Conference on Mechanical, Civil, Industrial and Production Engineering, Toronto, ON
arsss.org/Conference/7412/ICMCIPE

Listen

Flash Forward
Half science, half fiction—each week, host Rose Eveleth picks a fictional future and has experts explain how it might work.
flashforwardpod.com

The Weirdest Thing I Learned This Week
Popular Science has a podcast, and it's about all things that are unusual
soundcloud.com/weirdest-thing-podcast

Science Friday
Brain fun for curious people and enthusiasm for all things science
podcasts.apple.com/us/podcast/science-friday/id73329284

Read

Ethics for Engineers, by Martin Peterson, 2019: In-depth coverage of major ethical theories, professional codes of ethics and case studies with practical examples covering whistleblowing, conflicts of interest, engineering and environmental ethics, privacy and computer ethics and more

Engineering Ethics: Concepts and Cases, by Charles Harris Jr., Michael Pritchard, Michael J. Rabins, Ray James and Elaine Englehardt, 2018: Packed with examples of engineering achievements, failures and modern-day ethical dilemmas that illustrate how actions can affect the health, safety and welfare of the public and environment

Canadian Professional Engineering and Geoscience: Practice and Ethics, by Gordon Andrews, Patricia Shaw and John McPhee, 2018: Provides practice and ethics topics, case studies and advice on becoming effective professionals

Watch

Transistors—The Invention That Changed the World
The simple device that is the foundation of all computers and our modern world
youtube.com/watch?v=OwS9aTE2Go4

How Are Underwater Structures Built?
A quick overview of how we build underwater structures
youtube.com/watch?v=URC125wpMS4

How Do Spillways Work?
The role spillways play in hydropower generation
youtube.com/watch?v=fjapgTd-QUg

CYCLING ACCIDENT DRIVES TRANSPORTATION ENGINEER TO ADVOCATE FOR SAFER, ACCESSIBLE ROADS

By Natalya Anderson

Once a favourite part of her daily commute, Toronto-based professional engineer Meredith Wilkinson's cycle to work one morning in September 2017 profoundly changed her personal life, her job and her very existence. While on her bike that day, Wilkinson was pulled under the front wheel of a garbage truck when its driver made a right turn across her on-street bike lane. She was pinned under the truck and dragged several metres; and as a result of the incident, she lost the lower half of her right leg. Wilkinson spent five days in the intensive care unit, five weeks in hospital care and six weeks in rehabilitation.

"There is a life-long impact," says Wilkinson, who is a senior transportation engineer with BA Group. "I'm still learning how to adapt to the constant physical demands of living with a prosthetic leg. It's a continual challenge to accommodate both the physical requirements of a recovery and my professional career."

Wilkinson says her recovery is an ever-evolving process that she does not force beyond her determination to live in each moment, and she works through it as it presents itself in the many facets of her personal and work life. She feels grateful to have had the support of her colleagues at BA Group, a private consulting firm in Toronto that focuses purely on urban transportation issues, where she's been part of the team since 2005. "I am fortunate to have a very supportive employer—this has been very beneficial in regard to my recovery," Wilkinson says. "Advocating for myself and being able to communicate about my new physical limitations is crucial, and I'm still learning how to do this effectively. However, it can be difficult to request special accommodation (even if warranted), as it can feel like an imposition, particularly in a professional environment."

Wilkinson describes her work projects as involving functional, preliminary and detailed design work, with an emphasis on promoting active transportation. Throughout her years at BA Group, she has been an avid cyclist and supporter of alternative transportation programs, presenting best practices for providing bicycle parking for commercial facilities at the International Parking Institute and Canadian Parking Association conferences. She has campaigned for the provision of secure bicycle parking for her colleagues and participated in an annual bike-to-work month event. She adds that cycling infrastructure has become a major work component, and she enjoys the "puzzle" of finding solutions that support all the transportation elements of a project, particularly as Toronto's urban development sites are becoming increasingly compact and complicated.

The collision in 2017 hasn't dampened her spirits so much as illuminated them from a different angle. "With respect to my work, I'm now even more determined to be part of projects that encourage safer, more attractive and accessible options for active transportation," Wilkinson says. "Despite my collision, I still encourage cycling and am keen on any solution that helps reduce single-occupancy vehicle trips."

Meredith Wilkinson, P.Eng., a transportation engineer with BA Group, lost a portion of her right leg in a cycling accident and is now advocating for safer roads.

FINDING NEW STRENGTH

As her physical abilities have shifted, Wilkinson says she has found strength and resilience in new places within herself and within industry. Although there are some aspects to her job that she can no longer physically participate in at this stage in her recovery, she continues to tap into the natural curiosity and creativity that transportation engineering has cultivated in her since she discovered her love for the field in a co-op placement during university. "I enjoy the mix of logic and creativity required to do the job," Wilkinson adds. "My interest in transportation continued to grow as I came to appreciate how relatable the field is—literally everyone has an opinion about transportation as it directly impacts our everyday lives in a very personal way."

Looking forward from an honest place, Wilkinson says she finds it essential to live and work in each day as it produces new obstacles, be they daunting or exciting. "I'm still adjusting to returning to work—it's difficult to plan for the future when I'm still figuring out the present," she explains. "Due to my recent experience, I'm drawn to issues concerning road safety, and I'm particularly interested in how the physical design of our streets usually determines how they're used. Toronto currently appears to be experiencing a road safety crisis, and as a transportation engineer, I'm fortunate to be in a position to be part of the solution. I'm encouraged to see the focus in our industry shifting from the singular goal of keeping vehicular traffic moving to also improving the experience for pedestrians and cyclists, and pushing active transportation as a viable, accessible alternative." e

THE ASSOCIATION HAS RECEIVED WITH REGRET NOTIFICATION OF THE DEATHS OF THE FOLLOWING MEMBERS (AS OF FEBRUARY 2020).

ABDELHALIM, Abdelhalim Omar
Manotick, ON

ALDWORTH, George Albert
North York, ON

ANDERSON, William David
Huntsville, ON

ANJA, Kaljo
North York, ON

ARNOLD, Alison Elizabeth
The Woodlands, TX

ATACK, Daniel Ross
Kingston, ON

AUSTIN, Douglas Charles John
Tucson, AZ

BACON, William Gordon
Kamloops, BC

BALSON, Peter John
Caledon, ON

BANKS, Peter Morris
Brights Grove, ON

BEAMISH, David John
Brockville, ON

BEESLEY, Timothy John
Toronto, ON

BENNETT, Paul Robertson
Orillia, ON

BERNATCHEZ, Joseph Albert Raymond
Owen Sound, ON

BHATTACHARYYA, Sris Chandra
Scarborough, ON

BHOGAL, Balwant Singh
Cardiff, United Kingdom

BLACKIE, John
Oakville, ON

BODNAR, Ernest
Georgetown, ON

BOWES, Emer Beryl
Kingston, ON

BOZOZUK, Michael
Ottawa, ON

BRADSHAW, Thomas John
Niagara Falls, ON

BRANCO, Paulo Junior
Burlington, ON

BRASG, Colin
Thornhill, ON

BRISSON, Harold Joseph Guy
Quebec, QC

BUCKHAM, John Reginald
New Liskeard, ON

BULMER, Harold Douglas
Kingston, ON

BURRY, Charles James
Toronto, ON

CALLAGHAN, David Livingstone
Burlington, ON

CERA, Robin Paul
Burlington, ON

CHAN, Vicente Ting
Toronto, ON

CHASE, Derek Brian Alan
Ottawa, ON

CHIK, Harris Hoi-Fun
Toronto, ON

COLLINS, Robert Alexander
Toronto, ON

COOPER, Neil Anthony
Etobicoke, ON

CUMMING, Kenneth Henry
Bracebridge, ON

CZUCZMAN, Paul Joseph
Port Elgin, ON

DAS, Samir Kumar
Hamilton, ON

DAVIES, Kenneth Peter
Kingston, ON

DICKSON, Gerald William
Kingston, ON

DIONNE, Antoine
Candiac, QC

D'IPPOLITO, Romualdo
Mississauga, ON

D'SOUZA, John Joseph
Brampton, ON

DURHAM, Harry Albert
Acton, ON

ELOP, Gordon Harry
Ancaster, ON

ERHARD, Eric Michael
Camlachie, ON

FOOTE, William Robert
Mississauga, ON

FRIC, David Marks
Jordan Station, ON

FRIESEN, Bruce Ronald
Bath, ON

GELLNER, Mark John
Ilderton, ON

GENEST, Bernard Andre
Laval, QC

GHARGHOURY, Emmanuel
Toronto, ON

GORDON, Howard Keith
Cammeray, NSW Australia

GOYETTE, Pierre Jules
Ottawa, ON

GRANT, Alan McNabb
Kingston, ON

HAGER, David Grant
Calgary, AB

HANNESON, David Arthur
Almonte, ON

HANSON, Bradley Everon
Ottawa, ON

HARIRI, Abbass
Toronto, ON

HASLETT, Robert Fielding
Thornhill, ON

HATFIELD, Wilsie Hilton
Brockville, ON

HIBBERT, George Soloman
Kanata, ON

HILEY, John Robert
Richmond, ON

HILL, John Edward
Ottawa, ON

HULST, Robert Daniel
Greenville, KY

JOHNSON, Trevor Smith
Mississauga, ON

JOHNSTON, David Robert
St. Thomas, ON

KAY, Kenneth Robert
Barrie, ON

KEATS, Kevin
Brantford, ON

KITCHEN, Midford Joseph
Parry Sound, ON

KRETZSCHMANN, Manfred Horst
Sudbury, ON

LEE, Joseph Chiman
Mississauga, ON

LEGROW, Wilfred Chesley
Burlington, ON

MACDONALD, Kerry Robert
Barrie, ON

MACDONALD, Peter Douglas
London, ON

MAKEEV, Evgeny
Downingtown, PA

MARGARITIS, Argyrios
London, ON

MARKANEN, Murray Earl
Kirkland, QC

MCCREA, William Lawrence
Deep River, ON

MCFARLAND, John
Pickering, ON

MCINTYRE, Georges
Laval, QC

MCKERLIE, Brian Richard
Sugar Land, TX

MERBER, Joseph Laszlo
East York, ON

METCALFE, James Arthur
Toronto, ON

MILOS, Frank Mathew
London, ON

MITCHELL, John Hugh
Hamilton, ON

MONTGOMERY, William Leo
Etobicoke, ON

MOORE, Frederic Withers Lloyd
Toronto, ON

MORI, Kenneth Nobuyoshi
Vernon, BC

NELSON, John Brookes
Toronto, ON

NG, Matthew King Heam
Richmond Hill, ON

PATEL, Bharatbhai Ranchhodbhai
Clarksburg, MD

PRATT, Victor W.
Oshawa, ON

PRIDE, Peter John
Kingston, ON

PRINGLE, Daniel
Guelph, ON

QUICKFALL, Phillip Arthur
Waterloo, ON

READ, Gordon Armstrong
Calgary, AB

REID, Gerald McLean
Wasaga Beach, ON

ROBERTS, Edward David
Uxbridge, ON

ROBERTS, Louis Douglas
Sidney, BC

ROESSLER, Steven Robert
George Town, Cayman Islands

ROZWADOWSKI, Dariusz
Burlington, ON

SCEVIOUR, William Frank
North York, ON

SEARLE, John Fleming
Mahone Bay, NS

SEETON, John Ernest
Oakville, ON

SHOPOFF, Angel Blogoeu
Richmond Hill, ON

SIDHOM, Sami Samaan
Burlington, ON

SIMPSON, Bruce Paton
Meaford, ON

SMOLEC, Slawomir
Richmond Hill, ON

STASIUK, James
Thunder Bay, ON

STODDART, Norman Lindsay
Sidney, BC

SUKSI, Ronald Edwin
Mississauga, ON

SUMAR, Razahussein Nazerali
Markham, ON

TAYLOR, Harold John
Hamilton, ON

TOEG, Jamal
Gloucester, ON

TOMLINSON, Jack Murray
Collingwood, ON

TRITTER, David Bowen
Toronto, ON

TROSS, Ralph Gunther
Ottawa, ON

TUFTS, Albert Norman
East Garafraxa, ON

TWITCHEN, Derek Anthony
Burlington, ON

VAN GERWEN, Christopher Joseph
Conestogo, ON

VERVOORN, Alexander Bernardus Hendrikus
North York, ON

WALLER, James Ralph
Ottawa, ON

WARNOCK, James Murray
Richmond Hill, ON

WATTS, Gordon Daniel
Toronto, ON

WEBSTER, Gary Douglas
Nepean, ON

WEEKS, Robert Benjamin
North York, ON

WEINSTEIN, Frederick
Toronto, ON

WHITE, David Brian
St Catharines, ON

WHITTAKER, James Arthur
Nepean, ON

WILLARD, Beverly Keith
Pointe Claire, QC

WRIGHT, Gordon Roger
Vineland, ON

YELLS, Edward Arthur
Comox, BC

ZHANG, Haixia
North York, ON

EVERYDAY ETHICAL PRINCIPLES HELP PROTECT THE PUBLIC AND PRACTITIONERS

By José Vera, P.Eng., MEPP

The *Practice Guideline on the Code of Ethics* from Engineers Canada notes that "a code of professional ethics is more than a minimum standard of conduct; rather, it is a set of principles which should guide engineers in their daily work." Even though we may see high-profile engineering ethics cases in the news, such as those involving Boeing and Volkswagen, the typical ethical questions faced by most engineers daily are far more practical, according to North Carolina State University ethics and technology professor Joseph R. Herckert. Furthermore, engineering law expert Jeffrey H. Matsuura asserts that while the central objective of an engineering Code of Ethics is to safeguard the public, it also provides legal protection to practitioners. Let's review some key ethical principles that practitioners should consider every day in order to reduce risks to the public—which is the main objective of the Code of Ethics—and in so doing also help them reduce their own legal risks.

TRANSPARENCY AND DISCLOSURE

Practitioners have an ethical and professional obligation to disclose to their clients any potential conflicts of interest that may be perceived as prejudicial to their engineering judgment. Similarly, employee engineers considering part-time engineering entrepreneurship must disclose in writing their employment status to their prospective clients and satisfy their current employer that their work will not present a conflict to them. Furthermore, practitioners who review the work of other fellow practitioners for the same employer have an ethical obligation to ensure their peers are notified that their work is being reviewed. Finally, the PEO practice guideline *Structural Condition Assessments of Existing Buildings and Designated Structures* recommends that practitioners disclose relevant work experience, among other information, to their prospective clients.

One purpose of engineers' obligation to disclose information is to be transparent about their intention. Although practitioners may have perfectly good intentions when engaging in such activities as part-time entrepreneurship or peer reviews, transparency with their employer, client and colleagues helps ensure that potential conflicts are managed appropriately. Furthermore, disclosing relevant work experience to prospective clients ensures that the competency of practitioners is being assessed by others, such as clients, and not just by practitioners themselves.

It is worth noting that actual and serious conflicts of interest result not only in allegations of professional misconduct but also, in some cases, termination of employment (see *Cavanagh v. Canada Revenue Agency*, 2015 PSLREB 7 (CanLII), canlii.ca/t/ggbs1). Transparency and disclosure help minimize these risks. Although the Code of Ethics has specific requirements for disclosure, it is fair to conclude that a reasonable and prudent practitioner consistently aims to be transparent in their day-to-day work life, since transparency helps safeguard the public interest and helps practitioners avoid unnecessary liability.

INTEGRITY AND HONESTY

As per the Code of Ethics, practitioners must not publicly express opinions on professional engineering matters that are not founded on adequate knowledge and honest conviction. Furthermore, practitioners have an ethical obligation to maintain the honour and integrity of the profession and—without fear or favour—expose before the proper tribunals unprofessional, dishonest or unethical conduct by any other practitioner.

These ethical obligations help protect the public by ensuring that professional engineering advice and opinions included in reports and studies are presented in an honest manner, noting that the public places reasonable reliance on engineering recommendations. Conversely, an engineering report containing dishonest, false or misleading information likely presents a risk not only to clients but to the public, who may be affected by the consequences of such a report. For example, a situation that results in a clear risk to the public can involve a practitioner who conducts an environmental property audit and informs the Ontario environment ministry that no contaminants were detected in all samples analyzed but an inspector subsequently finds out during a lab visit that the practitioner withheld results showing polychlorinated biphenyls (PCBs) (see Decisions and Reasons, *Engineering Dimensions*, November/December 2009, p. 33).

It is critical to note that these obligations relating to honest behaviour are not exclusively ethical, since several laws make it an offence to provide false information to regulatory bodies and, further, these laws apply to engineering documents, such as reports (see "Honesty, integrity and engineering reports," *Engineering Dimensions*, September/October 2015, p. 36). Consequently, when practitioners act with devotion to high ideals of professional integrity, they protect themselves from unwarranted legal liability while helping protect the public.

KNOWLEDGE AND COMPETENCE

Practitioners have an ethical duty to always act with knowledge of developments in the area of professional engineering relevant to any services undertaken, and with competence in the performance of any professional engineering services undertaken. From this duty it logically follows that practitioners must only undertake work in areas in which they are knowledgeable and where they can perform competently.

Well-known engineer and writer Samuel Florman points out that several studies demonstrate that engineering disasters are usually not caused by malicious intent but rather are the result of negligence. Thus, Florman concludes that competence is a key ethical principle, more important than professional courtesy, since incompetent engineering can lead to catastrophe with loss of life and injuries. Current events teach us that practitioners can even face allegations of criminal negligence in the most extreme cases (see *R. v Wood*, 2017 ONSC 3239 (CanLII), canlii.ca/t/h422f). But even in day-to-day situations, incompetence can have serious consequences to the public and to practitioners. For example, a roof collapse of an empty arena due to an engineering design error may cost no lives, and that is good news, but it can result in allegations of professional misconduct and liability to practitioners. Undertaking work only that the practitioner can perform competently and with knowledge protects the public—and this is the main objective of the Code of Ethics. And by protecting the public, the practitioner avoids legal risks for both themselves and their employer.

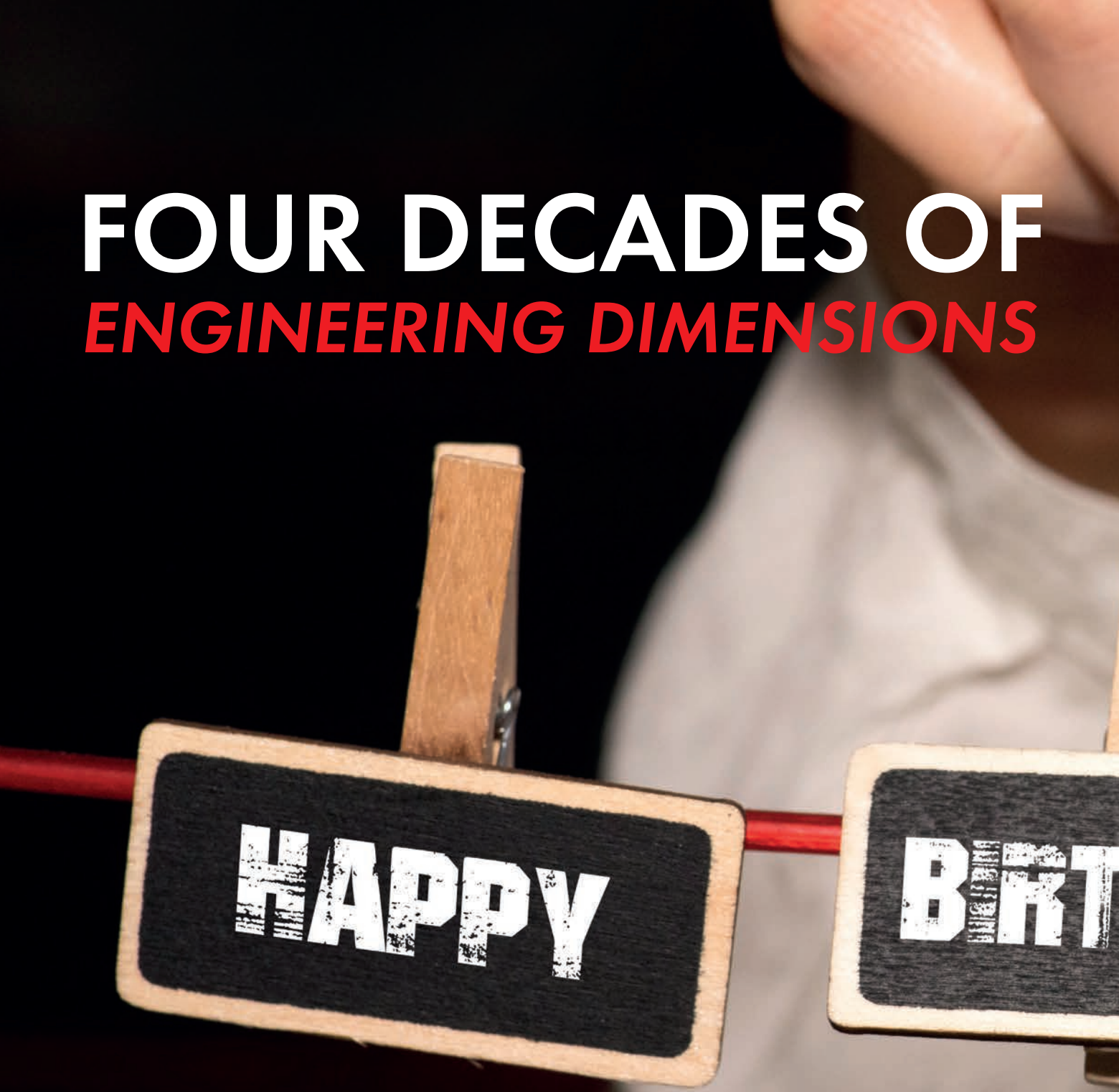
ETHICAL BEHAVIOUR AND NON-ENGINEERS

Policymakers have long been aware that solely having ethical practitioners is not enough to protect the public. That is why there are laws that hold organizations and non-engineers responsible for environmental contamination, worker safety and even public safety. Furthermore, insurance requirements provide a level of protection to the public. Government inspections also play a key role in public protection. Although ethical behaviour of practitioners is nonetheless very important, practitioners must be aware that they do not operate in a vacuum, and they often need to collaborate with other entities, such as clients, employers, regulatory bodies, municipalities, ministries and standards organizations to help protect the public.

PEO's practice advisory team is available by email at practice-standards@peo.on.ca for practitioners looking for general information on their professional obligations. However, practitioners looking for assistance on resolving legal problems occurring in specific, concrete situations should always contact their lawyer. e

José Vera, P.Eng., MEPP, is PEO's manager of standards and practice.

FOUR DECADES OF *ENGINEERING DIMENSIONS*



When Council approved the creation of a stand-alone bimonthly magazine for PEO members in 1980, it unwittingly created a communications tool that has played an increasingly important role for the regulator. In this issue, *Engineering Dimensions* celebrates with a decade-by-decade reflection on how it has informed, enlightened and entertained PEO's members for 40 years. BY ADAM SIDSWORTH

May 1980. Pierre Trudeau is prime minister. Quebec referendum voters choose to remain in Canada. *The Empire Strikes Back* opens in movie theatres. The New York Islanders win the first of four-straight Stanley Cups. And, direly, Canadian banks' prime rates hover around 20 per cent, hinting at an approaching recession. Yet in this chaos, PEO (then called the Association of Professional Engineers of Ontario, or APEO) publishes the first edition of a magazine designed to keep its licensed members updated on PEO news, professional ethics and advocacy.

The May/June 1980 *Dimensions* (the September/October 1981 issue would be the first to use the now-current title *Engineering Dimensions*) began a 40-year tradition of informing, enlightening and entertaining Ontario's engineering community. Previously, *Engineering Digest*, a magazine with a focus on engineering across Canada, with cross-country engineering news stories and features often written in a highly technical nature, was geared towards a wider engineering

In the early to mid-1980s, *Engineering Dimensions* had a less colourful visual style than in future decades. The magazine's content was also more broad ranging than today, reflecting PEO's then dual role as an engineering regulator and advocacy body.

audience, while its accompanying insert, *Ontario Digest*, printed on yellow paper, focused on engineering stories of interest to an Ontario engineering audience.

Yet the new magazine's success was not a certainty. Indeed, in the first issue's President's Message, then called "For the Record," then-PEO President Richard M. Dillon, P.Eng., had his doubts: "When I first learned of the Editorial Board's plan for APEO to produce its own journal, I reacted negatively. Like many of us, I suspect, I had grown used to the Yellow Pages in the Digest and saw no reason to change—to 'spend more money,' or to 'branch out on our own.'" But Ontario's engineers soon came around. By the July/August 1980 issue, engineers wrote in to commend the magazine. "Congratulations to the whole staff of **our** new magazine," then-member Stanley Murray wrote. "It is an excellent publication and fitting for our association. I will be keeping this first issue—it will be a collectors' item…."

We can't speak to how many of PEO's now-senior members have kept that first *Engineering Dimensions*, but 40 years later, Pierre Trudeau's son is prime minister, Quebec is still in Canada and *Star Wars* movies and television shows are still being made. Over the next few pages, we have highlighted some notable *Engineering Dimensions* articles by decade, along with a visual evolution of *Engineering Dimensions*' look.

THE 1980s

Engineering Dimensions had many of the familiar features we have today: engineering news, letters to the editor, features, profiles of incoming PEO presidents, recaps of PEO's annual general meetings and Council introductions. Issues were more broad ranging, reflecting PEO's then-dual nature as a regulator and engineering advocacy body. (The advocacy role would later be devested to the Ontario Society of Professional Engineers in 2000.) Consequently, issues featured sections and columns no longer seen: "It's Your Business" offered engineers tax and RRSP advice; "Professional Services" featured ads from real estate agents, engineering consultants and other professionals; and "Professional Opportunities" included engineering job advertisements.

A change in editors in late 1987 seems to have marked a shift in writing styles and visual look of the magazine, with features becoming more focused on then-current events, such as the acid rain concern and the 1988 debate on free trade, and a crisper-looking front cover and more clearly defined magazine sections. Most features throughout the decade were written by guest writers, principally engineers, but also lawyers, provincial cabinet ministers and other professional experts. But now for the real dirt: Discipline cases were printed in *Engineering Dimensions* from the beginning, but they weren't on blue paper and called Gazette until the March/April 1982 issue. Early discipline cases also contained the name of the complainant in the title of the case but failed to mention who that person was, prompting letters to the editor. (The complainant's name would soon be dropped from the Gazette.)

The first discipline case

In the first reported discipline case (May/June 1980, p. 58), an engineer was found guilty in 1979 of professional misconduct and violating PEO's Code of Ethics after pleading guilty in court of bribing officials in relation to the construction of an Ontario hospital. The engineer's licence was suspended for five years.

Ethics is a prominent topic

Whistleblowing appeared to be a big issue for PEO and its members throughout the 1980s, with *Engineering Dimensions* covering it in several ways, including in a news story entitled "*The Truesteel Affair:* A 'must see' film" (March/April 1983, p. 25). The story introduced a training video developed by PEO to be distributed to its chapters. The video details the fictional story of Robert Williams, a design engineer at Truesteel Ltd. Williams is caught in a dilemma between his boss and family situation and must choose to come forward. "As a professional engineer," the article reports, "you owe it

to yourself to see *The Truesteel Affair*. You'll see for yourself what it's like being caught between a rock and a hard place, and ultimately the inevitable question will have to be answered: 'What would you have done?'"

A focus on PEO's regulatory role

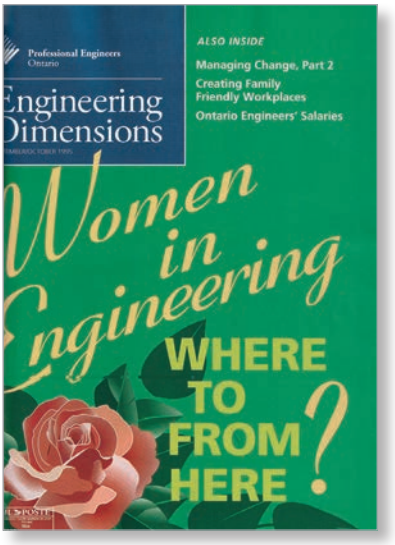
Even in the 1980s, there was a question about how much PEO should invest in non-regulatory affairs, and chapters were at the top of the list.

- The September/October 1982 issue details the history of chapters, which were formed in 1960 with a mission to improve communication between PEO and its then 18,000 membership. "Initially, membership participation in chapter affairs was high," the article reports, "but, with some exceptions, has dwindled, despite growth of membership to 48,000 in 1981. The role(s) of the chapters have evolved in different ways, although the system retains its original purpose."
- By the January/February 1987 issue, *Engineering Dimensions* reported news stories that the regulatory debate had shifted towards the devolution of PEO's advocacy role, with then-Attorney General Ian Scott telling the Canadian Society for Professional Engineers in November 1986 that "the public is raising serious questions as to the continued plausibility of the longstanding faith in self-regulatory bodies" that serve their members and prohibit others from practising the profession.

Where are all the women?

Women have long been underrepresented in engineering, and it was recognized in the 1980s. Interesting, though, is how *Engineering Dimensions* handled it.

- The January/February 1983 issue published a letter to the editor from Pamela Mitchell, a non-engineer who received the magazine by mistake. "Despite an honours standing in math and physics in high school, I was discouraged from pursuing engineering because I am female," Mitchell wrote. "While I admit that women and visible minorities do not form a large percentage of your membership, I believe such a magazine should reflect their presence…little has changed in the 20 years since I was discouraged by professional engineers from using my skills in the 'male' fields of applied science and technology."
- The November/December 1985 issue had a letter to the editor complaining of the outmoded role of the Engineers' Wives Association, with the thoughtful question of why there is no engineers' husbands association. The same issue had photographs of Council members' wives on a shopping trip in Michigan as Council met in Sarnia, ON.
- But the May/June 1986 issue marked a milestone for PEO—and for *Engineering Dimensions*. The issue profiles Claudette Lassonde-Mackay, P.Eng., as PEO's first woman president. Her photo graces the cover of the issue.



THE 1990s

By the May/June 1993 issue, PEO had rebranded itself and adapted its now-current corporate signature. *Engineering Dimensions* used PEO's image rebranding as an excuse to revamp its cover title, with white letters in front of a blue background. "The Association of Professional Engineers of Ontario has a new corporate signature. Just a cosmetic change? Far from it…our printing implementation plan alone lists 213 items scheduled for conversion during 1993," wrote then-pub-

By the 1990s, *Engineering Dimensions* reported not only on the engineering profession but the people who make up Ontario's engineering community, from profiling engineers, complete with colourful spreads, to covering tragedy.

lisher Margaret McCaffery in the issue's "Last Word," in which she explained the new image. "The essence of good communication is that what you have to say should be enhanced by how you say it. Our new visual system helps us do just that."

The 1990s also became the first full decade that each magazine issue was given its own theme, a tradition that started with the July/August 1989 issue. And with dedicated themes, *Engineering Dimensions* began exploring important issues within which engineers can bring their expertise to the public good, from the environment to transportation to women in engineering.

The environment comes to the forefront

From the start of the decade, *Engineering Dimensions* senses that environmental catastrophes and climate change are at the forefront for Ontario's engineers.

- A feature article in the July/August 1992 issue called "Alternative fuels: Improving the odds for cleaner air" reported on how automobile manufacturers were testing the North American market for new alternative-fuelled and electric fuels within the context of Canada's Green Plan.
- The January/February 1993 issue, published just six months after the United Nations' 1992 Rio Earth Summit, interviews five leaders in the energy and environmental sectors about those who are in a position to set Ontario's environment and energy policies, including engineers David Anderson, P.Eng., then-chair of the Canadian Nuclear Association; then-member Terry Matthews, then-president of Pollution Control Association of Ontario; and David Robinson, P.Eng., then-president of the Municipal Engineers Association.
- Aside from the increased environmental awareness in the 1990s, not all PEO members agreed that anthropogenic climate change was serious, as was evident in numerous letters to the editor. Notably, Nolan Piper, P.Eng., wrote in the May/June 1999 issue that "human activity is responsible for only a small percentage of greenhouse gases…Professional engineers must be careful about endorsing unproven software models, especially models used to justify decisions that may restrict freedom, increase unemployment and add extra costs to manufacturing and energy use generally."

The women's struggle continues

As the 1990s progressed, women continued to become more visible in the engineering profession. Unfortunately, *Engineering Dimensions* was obligated to start off the decade with tragic news that came out of Montreal. However, the debate of sexism in engineering—and *Engineering Dimensions'* perceived complicity in it—remained a hotly debated topic.

- In December 1989, 14 women, mostly engineering students, were murdered at a Montreal engineering school. The event was widely covered in *Engineering Dimensions*: The March/April 1990 issue had the caption "Plus jamais Never again" on its cover. Pages 14 and 15 had a two-page spread on the event with headlines that read: "Students, profession want attitudes to change" and "Students vow never again, distribute poster denouncing violence."
- The September/October 1995 issue's theme was "Women in engineering: Where to from here?" complete with a colourful cover that included calligraphic script and a pink rose. One of the issue's features was a roundtable discussion with women and men members of Ontario's engineering community, with Rosalind Cairncross, P.Eng., then-vice president of the Ontario Advisory Council on Women's Issues, stating: "We have to guard against just accepting 'just give it time.' The engineering profession has had exactly as much time as medicine and law to change, and somehow the others have gone much further."
- Letters to the editor proved that engineers still had vast and opposing opinions on women in engineering, with then-member Robert Wimperis writing in the July/August 1991 issue against quotas for women in engineering, stating, "I have never met a young female who had either a passion or strong aptitude for the field, although they no doubt exist… few are destined to become mainstream engineers," and PEO's incoming president, Marisa Sterling, P.Eng., FEC, writing in the March/April 1999 issue in response to two *Engineering Dimensions* stories about up-and-coming engineers: "Why did the female engineers' photos show them with family, outdoors in a pensive state, under soft lighting or in a non-descriptive way, while the male engineers' photos showed them in an office environment, in front of computers or wearing a hard hat with machinery in the background? Have we not progressed beyond these blatant stereotypes of the roles of men and women in the profession?"

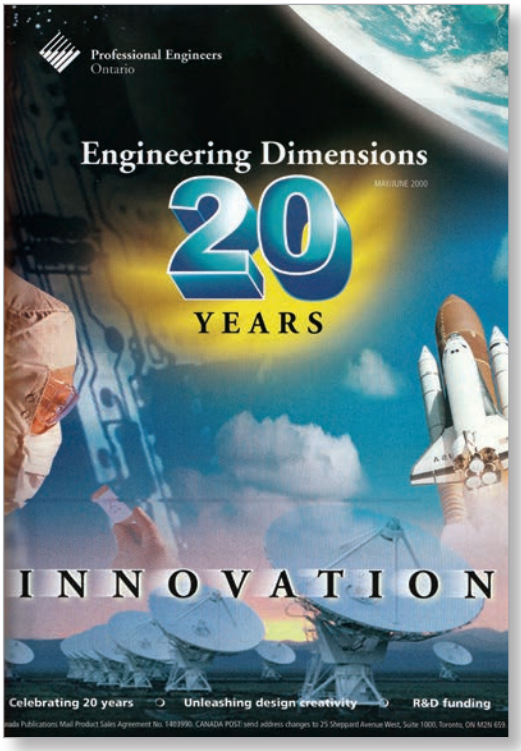
Profiling everyday engineers

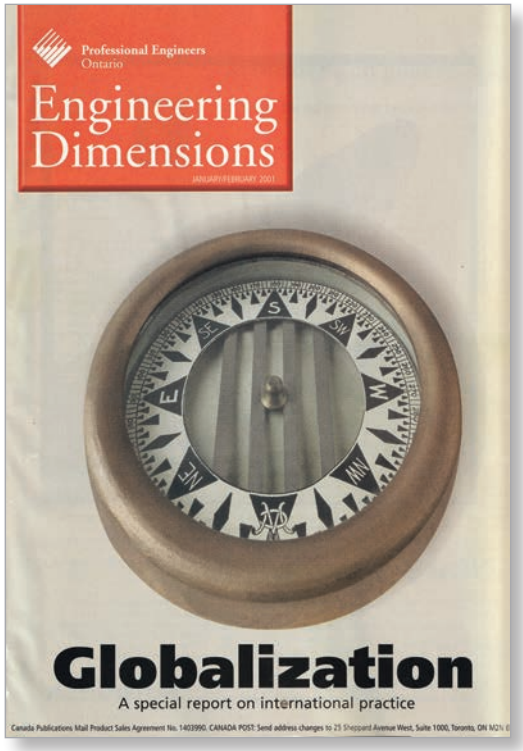
By the early 1990s, the magazine began a separate Profile section that highlighted, among other things, engineers' entry into the profession, the development of their careers and their engineering expertise.

- The January/February 1991 issue was the first to feature a profile relating a PEO member's career to their fellow engineers. This article, on then-member Douglas Wright, PhD, then-president and vice chancellor of the University of Waterloo, proved the section was still a work in progress, as Wright was delegated a small black and white photo on the bottom of the page, which was also cluttered with advertisements.
- By decade's end, the Profile section's layout became more prominent, with the profiled engineer getting a large colour photo and prominent pull quotes. The November/December 1999 issue featured Ross Gillett, P.Eng., a PEO member then with the National Research Council of Canada and employed by MD Robotics.

THE 2000s

The May/June 2000 issue of *Engineering Dimensions* marked not only the magazine's 20th anniversary but also the birth of the Ontario Society of Professional Engineers (OSPE), the engineering advocacy





By the 2000s, engineering had undeniably gone global, and *Engineering Dimensions* was there to capture it, with articles that included the comparison of engineering regulation in Canada to other countries and the difficulty of internationally trained engineering graduates seeking entry into Ontario's profession.

body that took over non-regulatory matters from PEO. PEO Council approved OSPE's formation at its April 2000 meeting. By the January/February 2001 issue, the separation of advocacy from PEO's operations had a more measurable effect on *Engineering Dimensions*, as evidenced in that issue's Editor's Note, in which then-Managing Editor Alison Piper noted that "the magazine this year will concentrate mainly on the legal, regulatory and ethical aspects of the profession. We'll still cover a broad range of topics and offer diverse opinions to ensure balance, but the content will need to relate more closely than in the past to PEO's mandate—rather than to PEO members' self interests."

The 2000s also brought in a new visual and content style to the magazine: Editor's Notes began to regularly appear at the beginning of the magazine in 2001; this was precipitated in 1999 by a clearer crediting of the magazine's articles to its staff. (Previously, sections such as news articles lacked a byline.) And by 2004, the majority of feature articles began to be written in-house, as opposed to guest expert writers, and tended to focus on the expertise of engineers working in broad-ranging fields from transportation to energy and the environment, with the aim of educating other engineers about the role that engineers can play.

Engineering goes international

By the 2000s, there was growing awareness that the Ontario engineering profession was not an island unto itself. The focus shifted to the role of international engineering graduates and their difficulties becoming licensed and employed in their field in Ontario.

- The January/February 2001 issue's theme was globalization, with features highlighting how engineering education differs in a number of countries; a movement to establish registers of engineers considered competent to practise across jurisdictions; and how engineering is regulated in Canada compared to the United States, Mexico, the United Kingdom and Europe.
- By the November/December 2001 issue, which had the theme "Access to the profession," five internationally trained engineers were profiled, including Jasmina Vucetic, P.Eng., who came to Canada from war-torn Bosnia in the 1990s and had worked across Europe, Asia and Africa in infrastructure engineering but found it difficult to become licensed and employed in Ontario.
- A September/October 2006 article called "What can diversity bring to engineering?" focused on how PEO committees have explored increasing diversity in Ontario's engineering profession. *Engineering Dimensions* quoted then-member Cynthia Dunning, then of Western University, who said: "By encouraging diversity in our profession, we are encouraging looking at problems from different viewpoints. That should ultimately lead to an improved solution."
- The January/February 2007 issue reported on the provincial government's creation of the fairness commissioner, who is charged, in part, with ensuring that internationally trained professionals have access to regulated professions in Ontario.

Engineers embrace the internet

PEO launched its website in 1995, and by 2000, more and more engineers were embracing the ability to use the instant communication of the internet to grow their businesses, and *Engineering Dimensions* recognized this.

- In a March/April 2000 feature called "Marketing engineering services: The 'virtual engineers' model," guest writer R. Anthony Warner, P.Eng., advised on "how you can use internet-based technologies to better market and deliver your services," introducing the "virtual engineers model," developed to help engineers market and deliver cost-effective engineering services. "As internet-based technologies become the basis of our community," Warner wrote, "engineers have to reengineer their business models, marketing skills and media in order to sell their services effectively."
- Warner's advice followed the January/February 2000 article called "Working the net," which advised engineers on website tips and email etiquette, noting that website content should "be concise and packed with vital information of interest" to readers and include hyperlinks, and that email was becoming more prominent.
- By 2000, the Canadian engineering profession began to recognize that software engineering was an engineering discipline that needed to be regulated, as noted in a July/August 2000 article entitled "Shifting the tide: Regulation of software engineering practice," which noted that "for years, 'software engineering' was not seen as a hard and fast engineering discipline. That started to change when software practitioners were being asked to do everything from coding to designing safety systems for nuclear power plants."

Discipline cases continue

From the beginning, PEO's discipline department has been busy, with the Gazette still actively publishing members' woes.

- Take the case of a PEO member whose firm was retained by the Ministry of Transportation of Ontario, as was reported in the May/June 2002 Gazette. The member was to perform on-site and laboratory quality control testing in support for a bridge's rehabilitation. The member falsely said that the bridge needed recompaction; his employer reported him.
- The January/February 2009 Gazette reported the actions of a member, a university engineering professor at an Ontario university, who borrowed thousands of dollars from several of his students, beginning in 2002, repaying some of them and not repaying others. The students described his behaviour as very aggressive, and when the member's department found out about his behaviour, they reported him to PEO.
- Surprisingly, although many PEO members love to read the Gazette, in a letter to the editor in the July/August 2007 issue, William Este, P.Eng., criticized the minutiae that are reported, stating that "each hearing's material goes on, ad infinitum, with minute detail. I ask: What is the purpose of printing each whole episode, and who benefits? Surely, for each case, a summary can be printed showing complaint, plea and penalty."

THE 2010s

The 2010s marked a thematic shift in direction for *Engineering Dimensions*, as it reflected PEO's move toward improving its regulatory performance and public accountability. At the beginning of the decade, PEO worked with the attorney general to close a *Professional Engineers Act* (PEA) loophole, informally called the industrial exception, which allows non-PEO-licensed employees of factories and manufacturers to operate machines that perform engineering work. The government passed legislation to close this gap in 2010, then delayed its proclamation over several years and, ultimately, permanently cancelled it. And in 2012, two major fatal engineering-related disasters—the collapses of the Algo Centre Mall roof in Elliot Lake, ON, and temporary stage at Toronto, ON's Downsview Park prior to a concert by rock band Radiohead—signalled both what can happen when engineers don't adhere to proper engineering procedures and PEO's Code of Ethics and PEO's deficiencies in its discipline and enforcement actions.

Both incidents witnessed members (and in one case, a suspended member) having charges before the courts and, ultimately, appearances before PEO's Discipline Committee. *Engineering Dimensions* was quick to follow each event's subsequent commission of inquiry or coroner's inquest and PEO's adoption of their recommendations. Ultimately, PEO ended the decade by having an external expert conduct a review of PEO's regulatory performance, and *Engineering Dimensions* was there to assure that PEO was transparent with the expert's findings, which didn't always show PEO in a positive light. But, importantly from a content standpoint, the last third of the decade witnessed a significant shift in *Engineering Dimensions*' feature articles, which now focus on engineers' expertise and ethical and professional responsibility to protect the public interest in, among other things, the economy, safety and the environment.

A stronger focus on accountability

The early 2010s witnessed two high-profile engineering-related incidents that not only caused death but attracted media attention across the province and beyond. And *Engineering Dimensions* was there to cover it.

- *Engineering Dimensions* announced in its November/December 2010 issue that the provincial government passed the *Open for Business Act*, an omnibus bill that, among other things, introduced 66 amendments to the PEA, taking out the requirement for Canadian citizenship for licensure, and updating the definition of engineering to match that of Engineers Canada and, importantly, the elimination of the industrial exception. The subsequent years-long struggle by PEO to eliminate the exception was covered by *Engineering Dimensions*, including the January/February 2016 issue articulating PEO's disappointment at the province's November 2015 decision to not close the industrial exception, with then-President Thomas Chong, P.Eng., FEC, writing in his President's Message, "It was like a betrayal."
- "Yesterday, as I write this, a roof collapse in Elliot Lake would seem to merit some engineering investigation," wrote then-President

Denis Dixon, P.Eng., FEC, in his July/August 2012 President's Message. *Engineering Dimensions* kept its members up to date on the engineering disaster right up to the release of the report of the commission of inquiry. Indeed, the November/December 2014 issue was filled with information, with then-Editor Jennifer Coombes writing: "The great news for the association is that most of the recommendations PEO made to Commissioner Bélanger were included in his report."

- One recommendation from the Elliot Lake inquiry to PEO was the implementation of a continuing professional development (CPD) program, which was discussed by PEO and *Engineering Dimensions* as early as the 1980s. In fact, *Engineering Dimensions* featured CPD as its theme for the March/April 2010 issue. Seven years later, when CPD was implemented, albeit on a voluntary basis, the March/April 2017 issue stated that the Practice Evaluation and Knowledge (PEAK) program would "help ensure the association has sufficient information on each licence holder's practice to effectively carry out its role as the regulator of the profession," with articles answering members' possible questions and articulating the importance of PEAK.
- *Engineering Dimensions* was also focusing on the Downsview Park stage collapse in hopes of seeing how PEO would partake in its regulatory responsibility. By the March/April 2019 issue, it reported that PEO would most likely "give expert opinion on PEO standards… [and] practice standards for engineers in such situations" at the inquest. By the January/February 2020 issue, *Engineering Dimensions* was reporting on Council's decisions on the coroner's report recommendations to PEO, including asking the government to amend the PEA to allow PEO to have engineers declare the engineering disciplines in which they practise and to have engineers confirm with clients that only sealed documents, which cannot be changed by the client, should be worked from.

Spotlighting public protection

By the last three years of the 2010s, *Engineering Dimensions* began including feature articles and profiles on engineers that recognized the important role they play in protecting the public good.

- The May/June 2017 article "Environmental concerns: Coaxing new levels of input from P.Engs" acknowledged the 2010 change in the definition of engineering in the PEA introduced by the *Open for Business Act*: "One of the least heralded changes at the time was adding the word 'environment' to the list of things to be safeguarded by the engineering profession," while stating that "environmental practitioners are poised for even more contributions to the public good."
- The May/June 2018 issue, with the theme "Reinventing what we eat," explored how engineers can have an impact on safe foods. The article "The future of food" stated that "when it comes to feeding the world with a growing population in an era of shrinking resources, engineers play a more critical role than ever before," further exploring engineers' roles in reducing food waste and developing plant-based meats to improve the food supply cycle and increase people's access to food.
- In the November/December 2018 article "Pikangikum: A northern Ontario First Nations community in transition," *Engineering Dimensions* featured the efforts of three engineers who used their time, effort and fundraising skills to bring much-needed infrastructure to an isolated First Nations community. The article explores ways in which engineers can donate their expertise to improve any community, regardless of circumstances.

The 2010s marked a thematic shift for *Engineering Dimensions*, reflecting PEO's move toward improving its regulatory performance and public accountability. Within its feature articles, the magazine also acknowledged engineers' expertise in areas from food management to the development of First Nation communities' infrastructure.

Engineering Dimensions has changed a lot in 40 years, evolving its style and content with PEO as it evolved from a member-focused association to a regulatory-focused organization. Engineering has expanded in exponential and unforeseen ways since 1980, and with those changes, *Engineering Dimensions* has been there to assure both members and Ontario's public that PEO is indeed here to protect the public interest. **e**

THINKING LIKE AN ENGINEER:

Where the profession's CODE OF ETHICS fits

DESPITE ITS PROMINENCE IN THE *PROFESSIONAL ENGINEERS ACT*, THE CODE OF ETHICS IS SOMETIMES THOUGHT OF AS A GUIDE OF SUGGESTED CONDUCT AND, AS SUCH, UNENFORCEABLE—BUT IT SHOULD VERY MUCH BE CONSIDERED A BINDING PART OF THE ENGINEER'S RULE BOOK. WE SPEAK WITH PEO EXPERTS ABOUT WHAT IT IS, WHY IT'S IMPORTANT AND HOW IT COMES INTO PLAY IN DISCIPLINE CASES.

BY MARIKA BIGONGIARI

To new and existing professional engineers, PEO's Code of Ethics is best understood as a higher code of conduct under which practitioners are expected to act at all times. The code—which is included in section 77 of the *Professional Engineers Act* (PEA)—uses broad concepts such as fairness, loyalty and fidelity to public needs, but at their root an engineer's duty to the public welfare is top priority.

The Code of Ethics should not be confused with the concept of ethics in the philosophical sense. Although its concepts relate to duty and moral obligation, the code, at its heart, is more directive. In "Code of Ethics—A misnomer?" (*Engineering Dimensions*, May/June 2003, p. 22), PEO Manager, Tribunals Sal Guerriero, P.Eng., LLM, writes: "PEO's Code of Ethics should not be confused with ethics per se. A code is primarily a collection of laws, regulations or rules. A code of ethics cannot prescribe ethical conduct when, by definition, ethics imply moral deliberation and freedom of choice."

OVERLAPPING CONCEPTS

José Vera, P.Eng., MEPP, PEO's manager, standards and practice, explains that confusion over the Code of Ethics occurs when other factors such as duty to report, duty to warn and whistleblowing are thought of as ethical obligations when they apply to areas largely outside of the code—although there can be overlap. Duty to report falls under professional misconduct in the PEA; duty to warn is an element of Canadian common law; and there is no whistleblowing duty, Vera says. He explains that ethics

sometimes gets confused with newsworthy items, such as the 1986 Challenger space shuttle disaster, where some engineers foresaw that the seals on the shuttle's solid rocket boosters might fail in the sub-zero temperatures of that January morning launch. The engineers reported it, but NASA went ahead with the launch and the shuttle broke up 73 seconds after takeoff, killing its seven-astronaut crew. In cases like these, Vera says, ethical concepts can be treated as something extreme, where one might look at the concept of duty to report, which is obviously interpreted as whistleblowing in a case like this. "But what happens in extreme cases is not what we see everyday," Vera says. "The reason there are misconceptions is if you grab a non-engineer, to them ethics is how they behave but not necessarily in relation to a profession. There's a link to the profession, but it's also linked to history. And there's some distortion, because newsworthy items like whistleblowing often get confused with ethics when, once you report it, you don't have to go to the press, which is essentially whistleblowing."

The Code of Ethics outlines conduct that is tied to professional ethics rather than the ethical behavior that a person might aspire to philosophically. And the concept of professional ethics has foundations in historic key studies in engineering. Vera notes the example of the Quebec Bridge disaster, in which a bridge spanning the St. Lawrence River in Quebec City, Quebec, collapsed twice during construction, first in 1907 and again in 1916, killing 88 workers between the two accidents (see "After the fall—What the Quebec Bridge means today," *Engineering Dimensions*, September/October 2007, p. 50). Vera points out that the language the Code of Ethics uses to describe what being a professional means paints a picture that is in opposition to the mistakes that were made on the Quebec Bridge. "There's language there that infers you can't be overconfident," Vera explains. "It doesn't use the word 'humble,' but you'll notice a lot of language like a practitioner 'shall act towards other practitioners with courtesy and good faith,' and so on, and it's based on those types of incidents."

Duty to report, outlined under professional misconduct in the PEA, is limited to situations where an engineer must apply judgment based on their professional training, experience and competence, where they are expected to report issues that may come to their attention in the course of their practice. "Duty to report simply says if there's a safety issue, you report it," says Vera, who adds that the duty-to-report mechanism isn't limited to professional engineers. He offers the example of the *Occupational Health and Safety Act*, in which workers are directed to report to their employer or supervisor anything they see that's unsafe, explaining that some engineers might sometimes think they're the only ones who must report. "Whistleblowing has been mistaken with something that's called a duty to warn," Vera notes. "Duty to warn is not part of the Code of Ethics but is part of Canadian common law. The Code of Ethics talks about a higher duty to public safety, and you could almost say that it's going in that direction. If someone thinks that the prime duty is public safety, it then argues that loyalty to the employer is not the higher duty. If you use a converse argument—if my highest duty was to the employer and not to the public—then I wouldn't report. But if my duty to the public is the higher one, and if my supervisor doesn't act and someone's life is in danger, then I could go to the municipality, and it would still be ethical. And it's perfectly legal."

At this point, we're in duty-to-warn territory. However, Vera says you could argue you're still in the Code of Ethics, and you can argue professional misconduct, where it says you have a duty to report. "Same situation: Once you report it to your superior, you can argue you're no longer in misconduct; you're in good professional conduct," Vera explains. "No one's going to file a complaint against you, or it won't go anywhere if they do. Discipline cases almost always fall under professional misconduct—but there is some overlap in the Code of Ethics, especially under the conflict-of-interest provisions."

ENFORCING ETHICS AND AIMING HIGHER

In a 2009 discipline case (*Engineering Dimensions*, July/August 2009, p. 29), an engineer had his licence revoked after being found guilty of professional misconduct on the heels of being convicted of multiple counts of wire fraud in the United States. "Fraud is a crime, but it's also a conflict of interest," Vera notes. "That's why it's good to be ethical, because if you're ethical, you avoid perceived conflicts of interest—or at least you disclose them and avoid the next stage, the higher one, which is the accusation of fraud."

If someone has a conflict of interest, there are many different possible outcomes: their company could fire them, for example, or someone could file a complaint. "The moment there's a conflict of interest, there's also an argument that the person is acting unethically," Vera says. Because the Code of Ethics is not prescriptive, there's an argument that it's unenforceable. But since it talks about honesty and fidelity to the public need, it's implying that an engineer must have integrity and act in an honest manner.

In each of his examples, Vera maintains the individuals in question were acting unethically from the get-go because there's so much warning about trust and fidelity to the public need that acting with honesty is seemingly built into the Code of Ethics. "You could argue all [their legal issues] started when they began to behave without integrity," Vera says. Where professional misconduct as a standard is a minimum, the Code of Ethics is about aiming higher, he explains, and generally speaking, dishonest behaviour is already built into many other provisions. "The Code of Ethics is more about guiding principles," he notes. "The guiding principles will help you get out of legal problems outside of PEO, but it will also help you avoid professional misconduct. They overlap. The moment someone is unethical, there are so many problems that could arise: legal problems, like a civil lawsuit, the government could press charges, there could be trouble with the police, and PEO could start an investigation." And because the code is very broad and there's overlap with other areas, there are grey areas, too. That overlap—the vagueness of which may lead some to be confused—serves another purpose: fairness. Someone may have been unethical but didn't break any rules under professional misconduct. "The Code of Ethics leaves it in such a way that there are grey areas," Vera explains. "The code is general, but then misconduct narrows it down—because at the end of the day, there's fairness. You can't take someone's licence away for something that's grey. So, you must narrow it down. You have to ask, 'What is the minimum before we take someone's licence away or suspend them?'—that's when you look at misconduct. The Code of Ethics is aiming higher."

"THE MOMENT SOMEONE IS UNETHICAL, THERE ARE SO MANY PROBLEMS THAT COULD ARISE: LEGAL PROBLEMS, LIKE A CIVIL LAWSUIT, THE GOVERNMENT COULD PRESS CHARGES, THERE COULD BE TROUBLE WITH THE POLICE, AND PEO COULD START AN INVESTIGATION."—José Vera P.Eng., MEPP

A BINDING CODE OF CONDUCT

"PEO's Code of Ethics is unusual, in that it is not directly enforceable through the complaints and discipline process," says Leah Price, LLB, PEO's counsel, regulatory compliance. In other words, there is nothing in the PEA or in Regulation 941 that prescribes consequences for action that is a breach of the code alone. As such, professional misconduct, outlined in section 72(2)(g) of O. Reg. 941 of the PEA, states that a breach that is solely a breach of the Code of Ethics is not in itself professional misconduct. In his article, Guerriero states that in the PEA, what the Code of Ethics in section 77 of Regulation 941 states as duties and standards of care, section 72 defines a failure to meet prescribed standards as professional misconduct. When considering the two sections of the PEA in tandem, it makes sense to view the Code of Ethics as a binding code of conduct. Sherin Khalil, P.Eng., PMP, PEO's standards and guidelines development coordinator, provides examples from sections 72 and 77 of the PEA to illustrate how the Code of Ethics supports professional misconduct in discipline cases:

- 72(2)(a) negligence, used in conjunction with:
  - 77.1.iv "knowledge of developments in the area of professional engineering relevant to any services that are undertaken," and
  - 77.1.v "competence in the performance of any professional engineering services that are undertaken";
- 72(2)(d) "failure to make responsible provision for complying with applicable statutes, regulations, standards, codes, bylaws and rules in connection with work being undertaken by or under the responsibility of the practitioner," used in conjunction with:
  - 77.1.iv "knowledge of developments in the area of professional engineering relevant to any services that are undertaken"; or
- 72(2)(b) "failure to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work for which the practitioner is responsible," used in conjunction with:
  - 77.1.ii "It is the duty of a practitioner to the public, to the practitioner's employer, to the practitioner's clients, to other members of the practitioner's profession, and to the practitioner to act at all times with fidelity to public needs."

Price confirms that to bolster arguments for discipline in some cases, the Code of Ethics is sometimes referred to. She reiterates Vera's point that the definition of professional misconduct in section 72 of Regulation 941 does include items that either overlap with, or are encompassed within, some of the provisions of the code: "For example, the code provides (in section 77.2.i) that a practitioner must 'regard the practitioner's duty to public welfare as paramount.' Subsection 72(2)(b) includes as professional misconduct, 'failure to make reasonable provision for the safeguarding of life, health or property of a person….' Similarly, subsection 72(2)(c) makes it professional misconduct to fail to act to correct or report a situation the practitioner believes may endanger the safety or welfare of the public." Price also notes that, even though some of the more general elements of the code are not directly encompassed by specific subsections in section 72 of the regulation, it is arguable that an egregious violation of the code would be considered to be conduct that "would reasonably be regarded by the engineering profession as disgraceful, dishonourable or unprofessional," contrary to subsection 72(2)(j) of Regulation 941. An examination of a number of cases that have found professional misconduct under subsection 72(2)(j) would show that the impugned conduct contravenes the Code of Ethics, and although the code is not directly enforceable, it is indirectly enforceable through the complaints and discipline process.

Although ethics is sometimes thought of as a higher duty or moral obligation that is optional, the governing principles outlined in the Code of Ethics should be regarded as a binding code of conduct—one that is designed to steer engineers towards higher ground and away from trouble, and, in so doing, protects the public, themselves and the engineering profession. **e**

ENGINEERS, EITs AND ENGINEERING FIRMS TAKE HOME AWARDS

By Marika Bigongiari

RJC Engineers won the Ontario Wood *WORKS!* Mass Timber Wood Design Award for its 80 Atlantic project in Toronto, ON—the province's first mid-rise mass timber commercial building.
Photo: Doublespace Photography

Stephenson Engineering Ltd. took home the Ontario Wood *WORKS!* Institutional Wood Design Award for the King Township Municipal Administration Centre in King City, ON, a project that reflects the provincially protected green belt and natural preserve in which it is situated.
Photo: A-Frame Inc.

The Canadian Wood Council's Ontario Wood *WORKS!* program, hosted in partnership with the Ontario Forest Industries Association (OFIA), recognized six winning projects as part of the Ontario Wood Design Awards program. The awards were presented as part of OFIA's annual meeting and convention, showcasing excellence in wood architecture throughout the province. "The winning projects reflect the sophistication of an evolving wood culture that is gaining momentum in Ontario," Marianne Berube, executive director for the Ontario Wood *WORKS!* program, said. "We're happy to partner with OFIA this year to recognize the design and construction teams that are pushing the boundaries of innovation for wood construction." The winning projects reflect advancements in wood research and technology and were recognized for diversifying the application of wood in construction. They include **RJC Engineers**, which won the Mass Timber Wood Design Award for its 80 Atlantic project in Toronto, Ontario; **Stephenson Engineering Ltd.**, which took the Institutional Wood Design Award for the King Township Municipal Administration Centre in King City, ON; **Blackwell**, which won the Innovation Wood Design Award for the Shopper's Drug Mart Flagship in Toronto, ON; **WSP Canada Ltd.**, which was honoured with the Low-Rise Commercial Wood Design Award for the Kenora Terminal Building in Kenora, ON; **Gamaley and Associates Engineering**, which took the Mid-Rise Residential Wood Design Award for the Deerhurst Lakeside Lodge Resort Homes in Huntsville, ON; and **A2S Consulting Engineers**, which was honoured with the Northern Ontario Wood Design Award for the Temagami First Nation Multi-Use Facility in Bear Island, ON. The CWC also recognized recipients of its 2019 Catherine Lalonde Memorial Scholarships at the event, including **Gabriella Vojtila, EIT,** a second-year master's degree candidate in applied science and civil engineering at Queens University. Vojtila's thesis investigates the performance of fully concealed beam-column connectors

Blackwell won the Ontario Wood *WORKS!* Innovation Wood Design Award for the Toronto, ON, Shopper's Drug Mart Flagship, which marks the first significant mid-rise mass timber building in Toronto's downtown core. Photo: Scott Norsworthy

Gamaley and Associates Engineering won the Ontario Wood *WORKS!* Mid-Rise Residential Wood Design Award for the Deerhurst Lakeside Lodge Resort Homes in Huntsville, ON. It's the first waterfront hotel to open in Muskoka in over a decade. Photo: Deerhurst Resort

WSP Canada Ltd. took home the Ontario Wood *WORKS!* Low-Rise Commercial Wood Design Award for the Kenora Terminal Building in Kenora, ON. The building employs the use of local wood as a key structural element. Photo: Ryan T. Fisher Photography

Gabriella Vojtila, EIT, a second-year master's degree candidate in applied science and civil engineering at Queens University (left), is presented a 2019 Catherine Lalonde Memorial Scholarship by Canadian Wood Council President and CEO Kevin McKinley. Photo: Canadian Wood Council

under seismic loading, including displacements due to interstorey drifts, for a 10-storey all-wood structure.

Changiz Sadr, P.Eng., FEC, a PEO director on the board of Engineers Canada and former PEO councillor, received the Sovereign's Medal for Volunteers at the Engineers Canada Scholarship Awards gala in Gatineau, Quebec. The medal, which is bestowed by the office of the Governor General of Canada, recognizes the exceptional volunteer achievements of Canadians from across the country and celebrates their voluntary contributions at home and abroad. It is considered the highest honour for volunteers in the country.

University of Guelph engineering professor **Andrea Bradford, PhD, P.Eng.,** has been honoured at this year's YMCA-YWCA of Guelph annual Women of Distinction Awards. Bradford, whose work is centred on water management for wetlands and rivers, is known for her water resource engineering expertise. Her research focuses on urban water systems, low-impact development and stream and wetland restoration. The Women of Distinction Awards celebrate women role models, pioneers and those with exceptional achievements in Guelph and Wellington County, ON.

Herb Saravanamuttoo, PhD, P.Eng., professor emeritus of mechanical and aerospace engineering at Carleton University and author of *Gas Turbine Theory,* received the International Society for Air Breathing Engines (ISABE) Lifetime Achievement Award at a conference in Canberra, Australia, in recognition for his outstanding contribution to air-breathing engine technology. Saravanamuttoo, a past president of the Canadian Aeronautics and Space Institute, began his career working on the development of the Iroquois engine for the Avro Arrow and later worked on the propulsion system of the Concorde. The ISABE is dedicated to furthering the free international exchange of knowledge in the field of air-breathing propulsion for flight vehicles.

Christina Amon, ScD, P.Eng., dean emerita of the University of Toronto (U of T) faculty of applied science and engineering, has been honoured with a Vivek Goel Faculty Citizenship Award, which recognizes a faculty member as an exemplary university citizen. Amon was recognized for establishing U of T as a world leader in

Changiz Sadr, P.Eng., FEC, a PEO director on the board of Engineers Canada and former PEO councillor (right), seen with David Lynch, P.Eng. (Alberta), FEC, president of Engineers Canada, received the Sovereign's Medal for Volunteers at the Engineers Canada Scholarship Awards Gala in Gatineau, Quebec. The medal recognizes his exceptional long-time volunteerism.

Herb Saravanamuttoo, PhD, P.Eng., professor emeritus of mechanical and aerospace engineering at Carleton University and author of *Gas Turbine Theory* (left), seen with Pericles Pilidis, PhD, professor at Cranfield University in the United Kingdom and UK national representative for the International Society for Air Breathing Engines (ISABE), received the ISABE Lifetime Achievement Award in recognition of his outstanding contribution to air-breathing engine technology.

multidisciplinary engineering research and education, as well as for her work to advance gender equity, diversity and inclusion. Under Amon's deanship, the percentage of women in the university's first-year engineering cohort grew from 20 per cent to 42 per cent, the number of women faculty members increased from 19 to 57, and 13 significant leadership roles have been held by women.

U of T computer engineering professor **Vaughn Betz, PhD, P.Eng.,** has received a prestigious Google Faculty Research Award. The award program celebrates world-class research in computer science, engineering and related fields and facilitates partnerships between Google researchers and universities. Betz, who was awarded in the systems category, will receive funding that will go toward making computer-aided design tools. Betz aims to speed up the programming and manufacturing of field-programmable gate arrays, a widely used type of computer chip. This will alleviate potential delays for engineers doing design work in this arena, increase productivity and lead to better electronic systems.

U of T engineering professor and Officer of the Order of Canada **Michael Sefton, ScD, P.Eng.,** has been elected as an international member of the National Academy of Engineering (NAE). The NAE provides engineering leadership in both the United States and around the world. Sefton is a leading expert in biomaterials, biomedical engineering and regenerative medicine. Through his work at the Donnelly Centre for Cellular and Biomolecular Research, Sefton has created biomaterials that actively promote the growth of blood vessels. This has positive implications for wound healing and the development of lab-grown tissues. Sefton is

University of Guelph engineering professor Andrea Bradford, PhD, P.Eng., has been honoured at this year's YMCA-YWCA of Guelph annual Women of Distinction Awards. Bradford is known for her water resource engineering expertise. Photo: University of Guelph

University of Toronto professor Timothy Bender, PhD, LEL, principal investigator at Bender Lab for Organic Electronic Materials and Devices, has won a Connaught Innovation Award. He is working to commercialize a new and unique set of OLED materials for brighter, more flexible displays. Photo: Branden Wesseling

University of Toronto associate professor Benjamin Hatton, PhD, EIT, whose inventions include robotic grippers with smart finger pads inspired by octopi suckers, has won a Connaught Innovation Award. Photo: U of T Engineering

University of Toronto professor Hoi-Kwong Lo, PhD, LEL, a Canada research chair in quantum information, whose work centres on data privacy, cybersecurity, cryptography and future-proofing data breaches for the age of supercomputers, has won a Connaught Innovation Award. Photo: U of T Engineering

University of Toronto professor Molly Shoichet, PhD, LEL, a Canada research chair in tissue engineering, whose team invented a biodegradable substance that mimics vitreous to better treat retinal detachment, has won a Connaught Innovation Award. Photo: Roberta Baker

Michelle Liu, EIT, a civil engineering graduate student at the University of Waterloo, has been awarded a prestigious Manuel Fine Scholarship worth US $2500. The scholarships recognize high achievers and honour the memory of Manuel Fine, P.Eng.

executive director of Medicine by Design, a U of T initiative aimed at accelerating discoveries in regenerative medicine to improve treatments for serious conditions such as heart failure, diabetes and stroke.

Ten U of T researchers of note have received prestigious Connaught Innovation Awards and will share up to $500,000 to support their work. Among the recipients are professor **Timothy Bender, PhD, LEL,** principal investigator at Bender Lab for Organic Electronic Materials and Devices, who is working to commercialize a new and unique set of OLED materials for brighter, more flexible displays; associate professor **Benjamin Hatton, PhD, EIT,** whose inventions include robotic grippers with smart finger pads inspired by octopus suckers; professor **Glenn Hibbard, PhD, P.Eng.,** a Canada research chair in comparative multi-scale dynamics who invented FLYCORE, a fully recyclable, sustainable structural material for the circular economy that makes sustainability a part of structural design from day one; professor **Hoi-Kwong Lo, PhD, LEL,** a Canada research chair in quantum information whose work centres on data privacy, cybersecurity, cryptography and future-proofing data breaches for the age of supercomputers; professor **Molly Shoichet, PhD, LEL,** a Canada research chair in tissue engineering, whose team invented a biodegradable substance that mimics vitreous, the gel-like substance that makes up 75 per cent of the human eye, with an aim toward better treating retinal detachment; and mechanical engineering professor **Yu Sun, PhD, P.Eng.,** a Canada research chair in micro and nano engineering systems and director of the Robotics Institute, whose research is aimed at facilitating an increase in the viability of available hearts for transplant.

Canadian engineers were honoured at the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) winter conference, an event where ASHRAE recognized the outstanding achievements and contributions of its members to both the society and the built environment industry. **Nicolas Lemire, P.Eng.,** president of Montreal-based Pageau Morel and Associates, was inducted as a fellow; and **Kurt Monteiro, P.Eng.,** and **Kevin K. Sharples, P.Eng.,** both principals at Smith + Andersen, were first-place recipients of an ASHRAE Technology Award in the new healthcare facilities category for their work on the Peel Memorial Centre in Brampton, ON.

Two Ontario engineering students have been awarded Manuel Fine Scholarships, each worth US $2500 (C$3500): **Michelle Liu, EIT,** a civil engineering graduate student at the University of Waterloo; and **Patrick Wilkon,** an undergraduate at McMaster University who is studying civil engineering and management. The scholarships are bestowed by the Deep Foundations Institute (DFI) to honour the memory of Manuel Fine, P.Eng., who served DFI for more than two decades in roles that included president, executive director and managing editor of *Deep Foundations*. **e**

TO THE MEMBERS OF THE ASSOCATION OF PROFESSIONAL ENGINEERS OF ONTARIO

Opinion

We have audited the accompanying financial statements of the Association of Professional Engineers of Ontario, which comprise the statement of financial position at December 31, 2019, and the statements of operations and changes in net assets and cash flows for the year then ended and notes to the financial statements, including a summary of significant accounting policies (collectively referred to as the financial statements).

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Association of Professional Engineers of Ontario as at December 31, 2019, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Basis for opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards (Canadian GAAS). Our responsibilities under those standards are further described in the "Auditor's Responsibilities for the Audit of the Financial Statements" section of our report. We are independent of the Association of Professional Engineers of Ontario in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of management and those charged with governance for the financial statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian accounting standards for not-for-profit organizations and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Association of Professional Engineers of Ontario's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Association of Professional Engineers of Ontario or to cease operations, or has no realistic alternative but to do so. The Audit Committee is responsible for overseeing the Association of Professional Engineers of Ontario's financial reporting process.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with Canadian GAAS will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian GAAS, we exercise professional judgement and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations or the override of internal control;
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Association of Professional Engineers of Ontario's internal control;
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management;
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Association of Professional Engineers of Ontario's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements, or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Association of Professional Engineers of Ontario to cease to continue as a going concern; and
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Deloitte.

Chartered Professional Accountants, Licensed Public Accountants March 20, 2020

STATEMENT OF OPERATIONS AND CHANGES IN NET ASSETS, YEAR ENDED DECEMBER 31, 2019	2019 $	2018 $
REVENUE		
P.Eng. revenue	16,617,881	15,731,903
Application, registration, examination and other fees	8,507,693	6,966,526
Building operations (**Note 4**)	2,063,933	2,058,844
Investment income	572,499	64,460
Advertising income	214,087	270,005
	27,976,093	25,091,738
EXPENSES		
Staff salaries and benefits/retiree future benefits (**Note 9**)	11,948,676	11,778,442
Building operations (**Note 4**)	2,497,508	2,494,427
Purchased services	1,295,698	1,620,259
Amortization	1,182,780	1,210,440
Engineers Canada	1,009,422	982,774
Computers and telephone	1,001,350	968,239
Chapters (**Note 13**)	942,292	817,850
Occupancy costs (**Note 4**)	845,733	885,083
Legal (corporate, prosecution and tribunal)	720,790	1,072,994
Transaction fees	650,829	544,817
Volunteer expenses	614,032	726,230
Contract staff	551,099	305,197
Postage and courier	417,773	529,756
Consultants	255,675	235,196
Recognition, grants and awards	152,623	141,498
Professional development	143,358	86,057
Office supplies	129,224	134,263
Insurance	128,505	127,030
Printing	97,200	102,310
Staff expenses	89,783	88,055
Advertising	74,808	99,268
	24,749,158	24,950,185
Excess of revenue over expenses before the undernoted	3,226,935	141,553
Council discretionary reserve expenses (**Note 8**)	298,827	18,472
Excess (deficiency) of revenue over expenses	2,928,108	123,081
Remeasurement and other items (**Note 6**)	4,647,153	934,800
Net assets, beginning of year	17,152,436	16,094,555
NET ASSETS, END OF YEAR	24,727,697	17,152,436

The accompanying notes are an integral part of the financial statements.

	2019	2018
	$	$
STATEMENT OF FINANCIAL POSITION AS AT DECEMBER 31, 2019		
ASSETS		
Current assets		
Cash in interest-bearing accounts	**3,031,510**	2,773,438
Accounts receivable	**767,025**	433,467
Prepaid expenses and deposits	**363,272**	404,162
Other assets	**328,077**	456,308
	4,489,884	4,067,375
Marketable securities, at fair value	**11,303,103**	6,819,008
Capital assets (**Note 3**)	**33,301,183**	34,615,613
	49,094,170	45,501,996
LIABILITIES		
Current liabilities	**2,024,830**	2,215,435
Accounts payable and accrued liabilities (**Note 15**)	**11,048,555**	9,250,525
Fees in advance and deposits	**1,088,796**	5,607,000
Current portion of long-term debt (**Note 5**)	**14,162,181**	17,072,960
LONG-TERM		
Long-term debt (**Note 5**)	**3,629,292**	—
Employee future benefits (**Note 6**)	**6,575,000**	11,276,600
	24,366,473	28,349,560
Net assets (**Note 7**)	**24,727,697**	17,152,436
TOTAL LIABILITIES AND NET ASSETS	**49,094,170**	45,501,996
Contingencies (**Note 16**)		
Approved by Council		

STATEMENT OF CASH FLOWS, YEAR ENDED DECEMBER 31, 2019		
OPERATING ACTIVITIES		
Excess of revenue over expenses	**2,928,108**	123,081
Add (deduct) items not affecting cash		
Amortization	**2,243,632**	2,208,919
Amortization - other assets	**178,563**	77,339
Employee future benefits expensed	**1,017,653**	1,222,000
Change in unrealized losses (gains) on marketable securities	**(337,636)**	181,017
Losses (Gains) on disposal of marketable securities	**25,596**	(24,005)
	6,055,916	3,788,351
Change in non-cash working capital items (**Note 10**)	**1,314,757**	608,314
	7,370,673	4,396,665
FINANCING ACTIVITIES		
Payout of previous mortgage (**Note 5**)	**(5,441,000)**	—
Proceeds from refinancing of mortgage (**Note 5**)	**5,443,952**	—
Repayment of mortgage (**Note 5**)	**(891,864)**	(980,000)
Contributions to employee future benefit plans	**(1,072,100)**	(949,700)
	(1,961,012)	(1,929,700)
INVESTING ACTIVITIES		
Net change in marketable securities	**(4,172,055)**	(169,321)
Additions to capital assets	**(929,202)**	(1,745,717)
Additions to other assets	**(50,332)**	(132,391)
	(5,151,589)	(2,047,429)
Increase in cash	**258,072**	419,536
Cash, beginning of year	**2,773,438**	2,353,902
CASH, END OF YEAR	**3,031,510**	2,773,438

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2019

1. NATURE OF OPERATIONS

The Association of Professional Engineers of Ontario (PEO) was incorporated by an act of the legislature of the Province of Ontario. Its principal activities include regulating the practice of professional engineering and establishing and maintaining standards of knowledge, skill and ethics among its members in order to protect the public interest. As a not-for-profit professional membership organization, it is exempt from tax under section 149(1) of the *Income Tax Act*.

2. SIGNIFICANT ACCOUNTING POLICIES

These financial statements have been prepared in accordance with Canadian accounting standards for not-for-profit organizations and reflect the following accounting policies:

a) Financial instruments

PEO initially recognizes financial instruments at fair value and subsequently measures them at each reporting date, as follows:

Asset/liability	Measurement
Cash and marketable securities	Fair value
Accounts receivable	Amortized cost
Accounts payable and accrued liabilities	Amortized cost
Long-term debt	Amortized cost

Financial assets measured at amortized cost are assessed at each reporting date for indications of impairment. If such impairment exists, the financial asset shall be written down and the resulting impairment loss shall be recognized in the statement of operations and changes in net assets for the period.
Transaction costs are expensed as incurred.

b) Hedge accounting

PEO entered into an interest rate swap in order to reduce the impact of fluctuating interest rates on its long-term debt. The policy of PEO is not to enter into interest rate swap agreements for trading or speculative purposes.

The interest rate swap held by PEO is eligible for hedge accounting. To be eligible for hedge accounting, an instrument must meet certain criteria with respect to identification, designation and documentation. In addition, the critical terms of the derivative financial instrument must match the specific terms and conditions of the hedged item. The fair value of derivative instruments eligible and qualifying for hedge accounting is generally not recognized on the statement of financial position. Gains and losses on such instruments are recognized in the statement of operations and changes in net assets in the same period as those of the hedged item.

Interest on the hedged item is recognized using the instrument's stated interest rate plus or minus amortization of any initial premium or discount and any financing fees and transaction costs. Net amounts receivable or payable on the interest rate swap are recorded on the accrual basis of accounting and are recognized as an adjustment to interest on the hedged item in the period in which they accrue.

PEO may only discontinue hedge accounting when one of the following situations arises:

(i) The hedged item or the hedging item ceases to exist other than as designated and documented;
(ii) The critical terms of the hedging item cease to match those of the hedged item, including, but not limited to, when it becomes probable that an interest-bearing asset or liability hedged with an interest rate swap will be prepaid.

When a hedging item ceases to exist, any gain or loss incurred on the termination of the hedging item is recognized as an adjustment of the carrying amount of the hedged item. When a hedged item ceases to exist, the critical terms of the hedging item cease to match those of the hedged item, or it is no longer probable that an anticipated transaction will occur in the amount designated or within 30 days of the maturity date of the hedging item, any gain or loss is recognized in net income.

c) Revenue recognition

Licence fee revenue, excluding the portion related to the building fund, is recognized as revenue on a monthly basis over the licence period. Building fund revenue is recognized as revenue at the commencement of the licence period. Other revenues are recognized when the related services are provided.

d) Donated services

The association receives substantial donated services from its membership through participation on Council and committees and as chapter executives. Donations of services are not recorded in the accounts of the association.

e) Employee future benefits

Pension plans

The cost of PEO's defined benefit pension plans is determined periodically by independent actuaries using the projected benefit method prorated on service. PEO uses the most recently completed actuarial valuation prepared on the going concern basis for funding purposes for measuring its defined benefit pension plan obligations. A funding valuation is prepared in accordance with pension legislation and regulations, generally to determine required cash contributions to the plan.

Other non-pension plan benefits
The cost of PEO's non-pension defined benefit plan is determined periodically by independent actuaries. PEO uses an accounting actuarial valuation performed once every year for measuring its non-pension defined benefit plan obligations. The valuation is based on the projected benefit method prorated on service.

For all defined benefit plans PEO recognizes:
(i) The defined benefit obligation, net of the fair value of any plan assets, adjusted for any valuation in the statement of changes in net assets;
(ii) The cost of the plan for the year.

f) Capital assets
Capital assets are recorded at cost. Amortization is calculated on the straight-line basis at the following annual rates.

Building	2%
Building improvements—PEO	5%
Building improvements—common area	3.3% to 10%
Building improvements—non-recoverable	10% to 20%
Computer hardware and software	33%
Furniture, fixtures and telephone equipment	10%
Audio visual	20%

The association's investment in capital assets is included as part of net assets on the statement of financial position.

g) Use of estimates
The preparation of financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates. Accounts requiring significant estimates and assumptions include capital assets, accrued liabilities and employee future benefits.

3. CAPITAL ASSETS

			2019	2018
	Cost	**Accumulated amortization**	**Net book value**	Net book value
	$	**$**	**$**	$
Building	**19,414,668**	**4,196,073**	**15,218,595**	15,606,888
Building improvements—PEO	**8,961,068**	**3,792,724**	**5,168,344**	5,596,606
Building improvements—common area	**11,188,719**	**4,229,963**	**6,958,756**	6,940,977
Building improvements—nonrecoverable	**534,292**	**80,782**	**453,510**	336,906
Land	**4,366,303**	**-**	**4,366,303**	4,366,303
Computer hardware and software	**5,191,125**	**4,307,847**	**883,278**	1,051,484
Furniture, fixtures and telephone equipment	**1,460,916**	**1,259,236**	**201,680**	299,174
Audio visual	**1,008,315**	**975,723**	**32,592**	72,725
Work in progress	**18,125**	**-**	**18,125**	344,550
	52,143,531	**18,842,348**	**33,301,183**	34,615,613

4. BUILDING OPERATIONS

PEO maintains accounting records for the property located at 40 Sheppard Avenue West, Toronto, ON, as a stand-alone operation for internal purposes. The results of the operation of the building, prior to the elimination of recoveries and expenses related to PEO, are as follows:

	2019	2018
	$	$
Revenue		
Rental	**728,919**	727,943
Operating cost recoverable—tenants	**1,048,012**	1,047,173
Parking	**145,200**	143,700
Miscellaneous	**141,802**	140,028
	2,063,933	2,058,844
Operating cost recoverable—PEO	**754,538**	812,793
	2,818,471	2,871,637
Recoverable expenses		
Utilities	**449,632**	574,521
Amortization	**614,546**	587,416
Property taxes	**442,420**	445,156
Payroll	**258,166**	253,104
Janitorial	**202,931**	214,395
Repairs and maintenance	**119,385**	193,615
Property management and advisory fees	**50,000**	59,244
Security	**19,166**	37,372
Administrative	**23,180**	25,034
Road and ground	**27,112**	24,227
Insurance	**19,728**	18,711
	2,226,266	2,432,795
Other expenses		
Interest expense on note and loan payable	**211,545**	301,269
Amortization of building	**388,293**	388,293
Amortization of deferred costs	**178,563**	77,339
Amortization of tenant inducements	**58,012**	22,770
Other non-recoverable expenses	**189,367**	84,754
	1,025,780	874,425
	3,252,046	3,307,220
(Deficiency) of revenue over expenses	**(433,575)**	(435,583)

For purposes of the statement of operations and changes in net assets, the operating costs recoverable from PEO of $754,538 ($812,793 in 2018) have been eliminated. The portion of costs allocated to PEO is reallocated from building operations and is included in occupancy costs on the statement of operations and changes in net assets.

	2019	2018
	$	$
Building revenue per above	**2,818,471**	2,871,637
Eliminated PEO portion	**(754,538)**	(812,793)
	2,063,933	2,058,844
Building expenses per above	**3,252,046**	3,307,220
Eliminated PEO portion	**(754,538)**	(812,793)
	2,497,508	2,494,427

5. BUILDING FINANCING

In 2009, the association financed the cost of its building acquisition with a credit facility of $14,100,000 from the Bank of Montreal, Capital Markets Division at a floating interest rate based on variable bankers' acceptances. This floating rate debt was swapped for a fixed rate debt at an interest rate of 4.95 per cent with a maturity date of March 11, 2019. On March 11, 2019, upon maturity, the facility was converted to a floating rate loan at prime plus 1 per cent until April 5, 2019, when the association refinanced its outstanding loan of $5,443,952 with the Bank of Nova Scotia. The refinanced loan is secured by a first mortgage on the property located at 40 Sheppard Avenue West, a general security agreement, and a general assignment of tenant leases. The loan is repayable in monthly installments of principal plus interest and bears a floating interest rate based on variable bankers' acceptances. The association entered into a swap agreement related to this loan, where the floating rate debt is swapped for a fixed rate debt at an interest rate of 3.47 per cent and settled on a net basis. The notional value of the swap is $5,443,952. The start date of the swap was April 5, 2019, with a maturity date of April 5, 2024, on which date the loan will be fully paid.

6. EMPLOYEE FUTURE BENEFITS

The association's pension plans and post-retirement benefits plan covering participating employees (full-time and retirees) are defined benefit plans as defined in section 3462 of the *CPA Canada Handbook* and accounted for as per section 3463. The pension plans provide pension benefits based on length of service and final average earnings. The post-retirement benefits plan provides hospitalization, extended health care and dental benefits to retired employees. Participation in the pension plans and benefits plan (for post-retirement benefits) has been closed to all new employees as of May 1, 2006. All employees joining after this date have the option of participating in a self-directed RRSP (registered retirement savings plan). During the year, the association recorded $275,065 ($261,634 in 2018) in employer contributions to the self-directed RRSP.

The funded status of the association's pension plans and post-retirement benefit plan using actuarial assumptions as of December 31, 2019, was as follows:

	Basic pension plan	**Supplemental pension plan**	**Other non-pension benefit plan**	**Total**
	$	**$**	**$**	**$**
Accrued benefit obligation	**(25,268,500)**	**(2,198,300)**	**(10,606,800)**	**(38,073,600)**
Plan assets at fair value	**29,527,500**	**1,971,100**	**-**	**31,498,600**
Funded status—plan surplus (deficit)	**4,259,000**	**(227,200)**	**(10,606,800)**	**(6,575,000)**

The funded status of the association's pension plans and post-retirement benefit plan using actuarial assumptions as of December 31, 2018, was as follows:

	Basic pension plan	**Supplemental pension plan**	**Other non-pension benefit plan**	**Total**
	$	$	$	$
Accrued benefit obligation	(24,698,000)	(1,828,800)	(12,956,000)	(39,482,800)
Plan assets at fair value	26,335,600	1,870,600	-	28,206,200
Funded status—plan surplus (deficit)	1,637,600	41,800	(12,956,000)	(11,276,600)

PEO measures its defined benefit obligations and the fair value of plan assets related to the basic and supplemental pension plans for accounting purposes as at December 31 each year based on the most recently completed actuarial valuation for funding purposes. The most recently completed actuarial valuation of the pension plans for funding purposes was as of January 1, 2019. PEO measures its obligations related to its other non-pension benefit plan using an actuarial valuation prepared for accounting purposes. The most recent actuarial valuation for accounting purposes was as of December 31, 2019.

Remeasurements and other items resulting from these valuations are reported directly in net assets in the statement of financial position and are reported separately as a change in net assets in the statement of operations and changes in net assets.

7. NET ASSETS

The net assets of the association are restricted to be used at the discretion of Council and includes the association's investment in capital assets of $28,583,095 ($29,008,613 in 2018).

8. COUNCIL DISCRETIONARY RESERVE

The Council discretionary reserve is an internal allocation from the operating reserve used at the discretion of Council to fund expenses related to special projects approved by Council. These figures include $71,262 for salaries and benefits costs of full-time staff and $21,000 for contract staff for time spent on these projects. Expenses from the discretionary reserve were incurred on the following projects:

	2019	2018
	$	$
Emerging Discipline Task Force	**39**	1,110
Governance Working Group Phase 1	**-**	452
30 by 30 Task Force	**22,819**	16,910
Regulatory Functions Review	**241,597**	-
Governance Advisor	**34,372**	-
	298,827	18,472

9. FULL-TIME SALARIES AND BENEFITS

During the year, the association incurred a total of $12,019,938 ($11,790,887 in 2018) for salary and benefits costs for its full-time staff, of which $71,262 ($12,445 in 2018) was directly attributable to special projects approved by Council and disclosed in Note 8.

10. CHANGE IN NON-CASH WORKING CAPITAL ITEMS

	2019	2018
	$	$
Accounts receivable	**(333,558)**	(6,378)
Prepaid expenses and deposits	**40,890**	(15,073)
Accounts payable and accrued liabilities	**(190,605)**	427,978
Fees in advance and deposits	**1,798,030**	202,147
	1,314,757	608,314

11. CUSTODIAL ACCOUNT

The association maintains a separate bank account for the Council of Ontario Deans of Engineering. Cash held in the bank account totaling $162,089 ($156,437 in 2018) is not reported on the association's statement of financial position, as it is held in trust for the Council of Ontario Deans of Engineering.

12. COMMITMENTS

The association has obligations under non-cancellable operating leases and agreements for various service agreements. The payments to the expiry of the leases and agreements are as follows:

	$
2020	1,098,547
2021	305,042
2022	103,454
2023	26,027
	1,533,070

13. CHAPTERS OF THE ASSOCIATION

The financial information of the 36 chapters of the association are individually not material and, therefore, have not been consolidated in these financial statements. Furthermore, management believes that the effort and cost required to prepare financial statements for each chapter for consolidation purposes far exceed the benefits of doing so.

During the year, the association paid chapter expenses totaling $942,292 ($817,850 in 2018) including $639,000 ($524,000 in 2018) in chapter allotments and $303,292 ($293,850 in 2018) in other disbursements to individual chapters. During the year, the association also incurred additional costs of $533,458 ($485,698 in 2018) related to chapter operations, including staff salaries and benefits and for various support activities. These amounts have been included in the various operating expenses reported on the statement of operations and changes in net assets.

14. FINANCIAL INSTRUMENTS AND RISK MANAGEMENT

Interest rate risk

PEO is exposed to interest rate risk, which is the risk that the fair values or future cash flows associated with its investments will fluctuate as a result of changes in market interest rates. Management addresses this risk through use of an investment manager to monitor and manage investments.

Liquidity risk

PEO's objective is to have sufficient liquidity to meet its liabilities when due. PEO monitors its cash balances and cash flows generated from operations to meet its requirements. As at December 31, 2019, the most significant financial liabilities are accounts payable and accrued liabilities and long-term debt.

Currency risk

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate due to changes in foreign exchange rates. PEO's international and US equity pooled fund investments are denominated in foreign currencies, the value of which could fluctuate in part due to changes in foreign exchange rates.

15. GOVERNMENT REMITTANCES

Accounts payable and accrued liabilities include $410,275 ($307,724 in 2018), with respect to government remittances payable at year end.

16. CONTINGENCIES

PEO has been named in litigation matters, the outcome of which is undeterminable and accordingly, no provision has been provided for any potential liability in these financial statements. Should any loss result from these claims, which is not covered by insurance, such loss would be charged to operations in the year of resolution or earlier if the loss is likely and determinable.

17. COMPARITIVE FIGURES

Certain of prior year figures have been reclassified to conform to current year's presentation.

CEO/REGISTRAR'S FINANCIAL REPORT

FOR THE YEAR ENDED DECEMBER 31, 2019

PEO generated an excess of revenue over expenses of $2,928,108 for the 2019 fiscal year as compared to a budgeted loss of $856,602. This was due to a reduction in expenses of $2,723,855, or 10 per cent, lower than budget as discussed below in the cost management section. In addition, there was an increase in revenues of $1,216,682, or 5 per cent, versus budget, attributable to a fee increase in May 2019.

The excess of revenue over expenses was offset by Council discretionary reserve expenses of $298,827, resulting in a net excess of revenue over expenses of $2,928,108 as indicated above.

The investment in capital assets for the year was $929,202 ($1,745,687 in 2018), and PEO incurred no additional debt for these expenditures in 2019, as these were funded from its cash reserves. At the end of the year, the closing balance in cash and investments was $14,334,613 ($9,592,446 in 2018) and net assets increased to $24,727,697 ($17,152,436 in 2018).

REVENUE

Total revenue in 2019 was $27,976,093, which is 5 per cent above budget. This was higher due to the May 2019 fee increase mentioned above, which impacted P.Eng. revenue, as well as application, registration, exam and other fees revenue. In addition, investment income was higher by $360,499, or 170 per cent, due to favourable market conditions, which included increased unrealized investment gains and higher bank interest. These were offset by building revenue, which was lower than budget by $46,583 due to tenant vacancies; and advertising revenue, which was lower than budget by $5,913 due to fewer ads in the digital version of *Engineering Dimensions*.

COST MANAGEMENT

Total expenses before costs for Council special projects were $24,749,158, which is $2,723,855, or 10 per cent, below budget due to various cost-saving measures in 2019. Major expense variances from the budget include:

- Staff salaries and benefits/retiree and future benefits were $1,641,520 lower than budgeted;
- Legal expenses (corporate, prosecution and tribunal) were $348,815 lower than planned;
- Computers and telephone costs were $260,179 lower than budgeted;
- Amortization was $219,894 lower than budgeted;
- Spend on consultants was $164,570 lower than planned; and
- Volunteer expenses were $136,933 lower than budgeted.

2019 BUDGET VARIANCES BY BUSINESS UNIT

Communications

Expenditures were $121,259, or 9 per cent, below budget. The key variances include lower-than-budgeted purchased services ($43,280), including printing costs for the *Engineering Dimensions* magazine and other corporate communications printing; lower postage costs for mailing the *Dimensions* magazine due to the transition to the digital version ($41,294); and lower advertising costs, including newspaper and magazine advertising costs ($33,432).

Corporate Services

Expenditures were $934,663, or 9 per cent, below budget. Variances within the department include lower-than-budgeted costs for staff salaries and benefits along with retiree future benefits ($986,627); lower costs for amortization due to delayed building improvement projects ($88,110); lower-than-budgeted occupancy costs, including lower PEO rental recovery costs and outside space rental ($68,956); lower-than-planned costs for volunteer expenses, including lower registration fees for Ontario Professional Engineers Awards and Government Liaison Program events ($61,782); lower-than-budgeted costs for professional development related to staff and volunteer educational courses ($39,237); and lower-than-budgeted spending for computers and telephone costs for teleconferencing and technical allowance ($35,370). These reductions were partially offset by higher-than-budgeted costs for contract staff to cover vacant positions ($189,363); higher legal costs related to HR matters ($137,945); and higher 40 Sheppard Avenue West expenses, which included non-recoverable legal and leasing expenses ($60,789).

Executive

Expenditures were $66,772, or 4 per cent, below budget. Key variances include lower-than-budgeted costs for a strategic consultant ($123,500); lower volunteer expenses, including accommodation and mileage for representing PEO at various events ($34,962); and lower legal expenses on corporate matters ($33,897).

Finance

Expenditures were $259,259, or 18 per cent, above budget. This was due to higher-than-budgeted costs for transaction fees for credit card commission payments resulting from the 2019 fee increase ($262,764), and higher spending on office supplies ($14,299). This was offset by lower insurance costs, including travel insurance and lower directors and officers liability coverage ($10,517); and lower postage and courier costs for mailing member correspondence ($7,694).

Information Technology

Expenditures were $585,612, or 19 per cent, below budget in 2019. This was due to lower amortization for computer software projects that had been delayed and carried over ($129,112); lower costs for support contracts to maintain networks ($122,908); lower-than-planned consulting costs for application update projects ($111,411); less-than-budgeted

contract staff for various projects ($94,180); lower-than-budgeted staff salary and benefit costs ($40,094); lower internet connection costs ($24,565); and less-than-budgeted data security support ($22,500). These expenses were somewhat offset by higher rental costs for telephone equipment ($23,295).

Licensing and Registration
Expenditures were $409,259, or 8 per cent, below budget. This was due to lower-than-planned costs for staff salaries and benefits ($312,489); lower postage and courier for Professional Practice Exams and issuing P.Eng. licences ($41,684); lower volunteer expenses, including air/train fare and meals for attending various committee meetings ($29,826); lower costs for offsite record storage, as well as rental space for testing locations ($14,564); and lower staff business expenses for mileage and accommodation ($11,670). These were partially offset by higher consulting costs for a psychometric review ($15,000).

Regulatory Compliance
Expenditures were $287,956, or 11 per cent, below budget in 2019. A key variance was lower-than-budgeted legal costs for a discipline prosecution case ($369,993). There were also lower-than-expected costs for discipline investigations ($25,000); lower human rights challenges legal costs ($24,655); lower enforcement survey spending ($12,000); and lower staff business expenses for air/train fare and accommodation ($10,022). These were partially offset by higher complaints investigation costs ($66,650) and higher discipline appeals in 2019 ($19,545).

Tribunals and Regulatory Affairs
Expenditures were $743,591, or 32 per cent, below budget. A key variance was lower-than-budgeted spending on salaries and benefits due to unfilled positions ($434,139). Other variances include lower independent legal counsel expenses for discipline and registration related activities ($61,908); lower professional standards administrative law counsel ($45,000); lower consultants for the Practice Evaluation and Knowledge (PEAK) program ($40,000); lower computer support costs for the PEAK program ($35,653); lower volunteer expenses for mileage and air/train fare to attend various meetings and events ($33,277); and lower court reporter costs for discipline hearings ($17,341).

COUNCIL-DIRECTED INITIATIVES

For 2019, the net expenditures for projects approved by Council amounted to $298,827. This includes $241,597 for the regulatory functions review, $34,372 for the governance advisor, $22,819 for the 30 by 30 Task Force, and $39 for the Emerging Discipline Task Force.

BUILDING OPERATIONS

The building generated $2,818,471 in revenue, including PEO's share of recoverable expenses but excluding the base rent that would have been paid if PEO had paid market rent for its space. Total recoverable expenses were $2,226,266 and other expenses totaled $1,025,780, thereby creating a deficiency of revenue over expenses of $433,575 (after all expenses, including loan interest), as compared to a budgeted loss of $326,205. Total PEO building operations revenue was lower than budgeted by $46,583, or 2.2 per cent, due to a delay in the leasing of available space. Total building operations expenses were over budget by $60,787, or 2.5 per cent. PEO's share of expenses totalled $754,538. These costs were reclassified from building operations to occupancy costs in the financial statements. Because PEO is a not-for-profit organization, it received a preferred property tax rate (residential rate instead of commercial rate), thereby reducing PEO's overall occupancy costs. Total occupancy costs for 2019 were $845,733, which includes security, storage and other occupancy costs. PEO's total accommodation expense (including interest) was $1,057,278.

PEO occupied 39,100 square feet at December 31, 2019. The market rent of this space is approximately $15 per square foot and operating costs are $20.86 per square foot. Therefore, PEO's equivalent costs for rent and operating costs would have been $1,402,126 for 2019, leading to a net value to PEO of $344,848.

CAPITAL EXPENDITURES

Capital expenditures for the year totalled $929,202, compared to $1,745,687 in 2018.

Base building improvements totalled $632,326, which are recoverable from tenants. Improvements included costs for a generator replacement ($404,273), additional fourth-floor corridor fit-up spending ($110,145), exterior windows ($52,448) and mechanical elevator costs ($44,851). Non-recoverable building improvements, which are improvements made to PEO owners' space and other non-recoverable costs, totalled $174,616 for the year. These costs were to prepare space for new tenants ($148,161) and miscellaneous leasehold improvements, including the PEO portion of fourth-floor corridor improvements ($26,455). PEO invested $99,393 in computer hardware and software during 2019, including an Aptify upgrade ($49,491), additional website project spending ($31,777) and $18,125 on another software upgrade project. Spending on audiovisual and furniture upgrades totalled $22,858.

All of PEO's capital expenditures in 2019 were funded from PEO's cash reserves.

CONCLUSION

In 2019, PEO adopted cost-cutting measures and approved fee increases to address the challenges we faced. The association has managed its affairs responsibly, producing a surplus for the year and increasing reserve to carry out its regulatory mandate in the public interest. **e**

PEO's ANNUAL GENERAL MEETING GOES ONLINE

By Nicole Axworthy

532ND MEETING, MARCH 20, 2020

At its March meeting, Council passed a motion to convert PEO's 2020 Annual General Meeting (AGM)—which was originally scheduled to take place in Ottawa, Ontario, on April 25—to an electronic meeting and to schedule it on the same date or soon after, and to postpone or cancel the other events associated with the AGM weekend, specifically the Volunteer Leadership Conference and the Order of Honour Awards gala. As part of the motion, Council directed the CEO/registrar to take all necessary steps to reduce the possibility of the COVID-19 virus transmission until public authorities confirm that the risk of virus spread has sufficiently abated.

Since then, it has been decided that the AGM would be held virtually on May 30. A formal notice of the revised arrangements has been sent to members as required by By-Law No. 1, together with instructions for how to participate online. (See page 17 for the revised AGM notice.)

PEO ADOPTS NATIONAL PROFESSIONAL PRACTICE EXAM

Council passed a motion to discontinue the PEO-administered, paper-based, closed-book Professional Practice Exam and join the National Professional Practice Exam (NPPE) program, which is administered by the Association of Professional Engineers and Geoscientists of Alberta and offers a computer-based, multiple-choice exam. PEO staff recommended to Council that the regulator join the NPPE program, currently used by nine professional engineering regulators and two geoscience regulators. The program is overseen by the Professional Practice Examination Committee comprised of volunteer subject-matter experts from across Canada, and the committee reports to the NPPE Advisory Committee, which is comprised of representatives from each of the participating regulators. There are five exam sittings offered per year in many exam centres (compared to PEO's current three annual sittings). By using the NPPE, PEO will ensure conformity of admissions assessment criteria with other engineering regulators in Canada. PEO already accepts this exam as meeting the requirements for licensure specified in Regulation 941, paragraph 33(1)5, as licence holders transferring from another province to Ontario who have already written the exam are not required to write it again in Ontario.

Adopting this option serves PEO's strategic objective of moving towards a fully digital licensing process. It also complies with recommendations made by the Ontario Fairness Commissioner, the recent external review of PEO's regulatory performance and several internal PEO reports to make the licensing process more objective, fair and transparent. As part of the motion, Council directed the CEO/registrar to implement the necessary operational changes needed to join the NPPE and communicate to candidates regarding the adoption of the new exam. The new exam is expected to be implemented later this year.

GOVERNANCE ROADMAP APPROVED

At its March meeting, Council approved in principle a Governance Roadmap, which will be used by the regulator as a path toward governance reform. Council delegated to the Executive Committee the responsibility of overseeing the roadmap's implementation over a two-year period. The approved motion also calls for the CEO/registrar to recruit a consultant to support the work of implementing the roadmap and provide governance advisory and training services to Council for a two-year period, at a maximum cost not to exceed $200,000.

In 2019, Council approved the hiring of Governance Solutions Inc. (GSI) to provide governance advisory services to Council. GSI provided guidance regarding agenda management and meeting procedures and also identified various areas for improvement in how Council functions as a governing board. At the February 2020 Council plenary session, GSI presented a Governance Roadmap, which incorporates what GSI has learned from working with PEO over the past several months.

The Executive Committee is tasked with developing a work plan that corresponds to the Governance Roadmap. The committee will bring this work plan back for Council's ratification as soon as is practicable. The work plan will also incorporate the need to study and integrate related recommendations on governance issues emanating from the report of the Succession Planning Task Force (see below). Recommendations that emerge from the work plan and that require policy changes or legislative amendments will be brought back to Council, as needed.

SUCCESSION PLANNING TASK FORCE PRESENTS FINAL REPORT

Council received the Succession Planning Task Force (SPTF) final report and recommendations as presented to Council at its March meeting. At the meeting, Council stood down the task force and directed the Executive Committee to develop an action plan to implement the report's recommendations. A portion of the motion also asked Council to receive the draft terms of reference for a new Succession Planning Committee, which would establish and maintain Council succession planning in the future, but it was voted on separately and ultimately withdrawn from the main motion.

The SPTF was established in principle in 2017 as the successor task force to the Council Term Limits Task Force. The SPTF's key responsibilities were to determine best practices, with the help of governance consultant Laridae Management Consultants, and to develop an implementation plan for Council succession planning

based on recommendations of the Council Term Limits Task Force. The implementation plan in the final report includes key recommendations—including undertaking a full governance review and implementing interim succession planning practices—a schedule, a maintenance and oversight process and potential operating expenses.

NEW PEO DIRECTORS OF ENGINEERS CANADA BOARD

Council appointed two PEO representatives to the board of Engineers Canada. Nancy Hill, P.Eng., LLB, FEC, and Danny Chui, P.Eng., FEC, will begin serving on the board for a three-year term effective as of the 2020 Engineers Canada Annual Meeting of Members on May 22–23. Hill took the place of Annette Bergeron, P.Eng., FEC, and Chui was reappointed for a second term.

COUNCIL CONSIDERS EMERGING DISCIPLINES TASK FORCE REPORT

At its March meeting, Council was asked to receive the final report of the Emerging Disciplines Task Force (EDTF) and make a policy decision to "enlarge PEO's tent to include emerging and non-traditional disciplines, subdisciplines and scopes of practice" by creating a new standing committee known as the Emerging Engineering Disciplines Committee that would replace the existing EDTF. In a presentation, EDTF Chair Peter Devita, P.Eng., FEC, and Communications Infrastructure Engineering Subgroup Chair George Comrie, P.Eng., FEC, asked Council to consider the urgency of regulating emerging disciplines, such as cyber systems security engineering, and expanding the tent of engineering regulation rather than just focusing on regulating traditional disciplines.

Past President David Brown, P.Eng., FEC, BDS, C.E.T., moved to strike several portions of the main motion that related to creating a new committee and add to the motion that "1) Council tasks the Executive Committee to consider the EDTF report in conjunction with their work on the governance roadmap and the SPTF recommendations; and 2) That Council stand down the Emerging Disciplines Task Force." After considerable discussion, Council voted to carry the motion as amended.

COUNCIL RESTORES FUNDING TO GOVERNMENT LIAISON PROGRAM

Council passed a motion to receive a report from the Government Liaison Committee (GLC) and restore the Government Liaison Program (GLP) budget to enable the GLC to meet its mandate—which is to provide oversight and guidance to the GLP. When Council made cuts to PEO's 2019 budget in an effort to make up for an expected deficit, a temporary one-year reduction of $35,000 in the GLP budget was implemented. With the passing and implementation of PEO fee increases in 2019, PEO is expected to have a surplus in 2020. During discussion of the motion, some councillors suggested that the GLP overlaps with the responsibilities of the province's engineering advocacy body, the Ontario Society of Professional Engineers, and is therefore unnecessary, while other councillors believe its work is important for communicating with the government. Council ultimately voted to restore the GLP's budget so the program and committee can move forward with its 2020 work plan. **e**

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Deadline for July/August 2020 is May 27, 2020. Deadline for September/October 2020 is July 27, 2020.

Promoting gender parity

Vince Janzen, P.Eng.,
Welland, ON

The idea of promoting engineering to women with such programs as Go ENG Girl and others are good ways to encourage women to consider engineering. I took my daughter and two of her friends to Go ENG Girl, and they really enjoyed the event. My daughter has decided to study to be a nurse, and I encourage her to pursue her chosen occupation.

Many professions do not have gender parity, such as construction, computer science, nursing, elementary teachers and early childhood education. The fact is that men and women are equal but not the same, and some professions are male dominated, some are female dominated and some are equal.

When we put hard targets on professions to achieve gender parity, we promote unjust discrimination. The gross oversimplification by President Nancy Hill, P.Eng., LLB, FEC, who [by saying], "Given that we make up more than half the population, this simply isn't good enough" (*Engineering Dimensions*, January/February 2020, p. 6) is pandering to political correctness, identity politics and virtue signaling. The issue is much more complex than that and should be dealt with carefully and professionally to treat everyone involved with equal respect and positive messages. I fully support encouraging women to be engineers, but I do not support the 30 by 30 initiative and the way it is being promoted and justified.

Reduced fees for retired members

Roger Jones, P.Eng., FEC,
Thornhill, ON

Permit me to recommend to PEO what the Institute of Electrical and Electronics Engineers (IEEE) does regarding membership fees for older members. Once a member reaches the age of 65, if the sum of years of paid membership and the member's age reaches 100, no further membership fees are required, and they are designated life members. The life member is grandfathered for all IEEE benefits, and a yearly request is made for a voluntary contribution to one of many IEEE benevolent funds. PEO could do the same, with any voluntary contribution going to the Ontario Professional Engineers Foundation for Education.

Some engineering history on St. Elias Church

Richard de Faria, P.Eng.,
Mulmur, ON

With some interest I read the profile of Mary Alexander, P.Eng. (*Engineering Dimensions*, January/February 2020, p. 20), and, specifically, the story about the St. Elias Church.

I had heard that the church burned down some years ago, which was very disappointing, and I'm glad it has been rebuilt. The article comes across as if the domes being constructed with glulam was something new.

This project was originally undertaken by F.J. Reinders and Associates Limited from the Brampton office in the early 1990s. The overall project was led by Glen Reinders, and I was the structural engineer on that project. The client was originally told that the centre section of the church with the main dome had to be made with structural steel columns and then clad in wood. We had an artist rendering of the building concept—that was about it—and the mandate to make it all wood and make it as economical as possible. It was to be illuminated with candles. We decided to take on the challenge. We convinced the client the main frame could be made from heavy glulam, and that with a wire brushed finish we could hide most of the glulam lamination glue lines from being visible to make the main columns look like solid timber.

We employed heavy timber throughout, including glulam frames for the main domes. In fact, the main domes were fabricated on the ground and then lifted as one piece onto the supporting structure. The tolerances were tight, so when the camera crew from the local Toronto news station came to film the final dome placement, I was really hoping it would all fit, as it would be live on camera. It did fit and was shown on the news that night.

During the fabrication stage, further refinements were made as we closely collaborated with Gary Williams of Timber Systems and [his] staff, who were responsible for the glulam fabrication. Glulam rivets with moment connected frames were employed. So yes, there were other innovative materials used in the project, such as early adaptation of insulated forms for foundation walls beyond normal residential wall heights and so on.

A bit more history on the project, and the engineering that had gone on previously, would have made the story more complete. I'm glad to see it's been rebuilt and that wood as a material continues to be used in fascinating ways.

The elephant in the room is nuclear power

Paul Thompson P.Eng.,
Pinawa, MB

Regarding the editorial "The greatest challenge of all" about sustainable options for future generation of electricity in Ontario on page 5 and the article on renewable energy on page 24 of the March/April 2020 issue, I couldn't help but notice the elephant in the room. The editorial and article focused on the future of renewable energy sources, including hydroelectricity. The latter article stated incorrectly that "In Ontario, hydropower is the biggest producer of electricity. (Nuclear is a close second)." Ontario's Independent Electricity System Operator (IESO), responsible for operating the electricity market and directing the operation of the bulk electrical system in Ontario, states on their website that in 2019, nuclear power produced 61 per cent and hydropower produced 25 per cent of Ontario's electricity. These percentages have been much the same over the past decade, which means that nuclear power is by far the largest source of Ontario's electricity and the information in the article is incorrect.

As reliable and environmentally friendly as hydropower is, the elephant in the room is nuclear power. As Ontario's prime source of electricity, one would expect that nuclear would get more attention in *Engineering Dimensions*, including some informative articles on new developments and plans to replace aging plants, such as Pickering. Instead, nuclear is not even mentioned in an editorial on electricity generation. CANDU reactors, designed and built in Ontario, have supplied the bulk of Ontario's electricity for decades and have done so safely, reliably and without emitting greenhouse gases or pollution. In contrast, in spite of huge investments and subsidies, according to the IESO, wind and solar power produced only 7 per cent of Ontario's electricity in 2019.

The reality is that wind and solar power (as green as they are) will only ever be bit players in electricity generation, as they are intermittent sources with low capacity factors and cannot be used for baseload generation, meaning that their capacity must be matched by reliable baseload generation sources. The only current greenhouse gas–free options for baseload electricity generation are hydroelectric and nuclear. There is little remaining hydroelectric capacity in Ontario, leaving nuclear as the only feasible option for greenhouse gas–free additional baseload power generation. I respectfully suggest that we should be investing in new nuclear power generation to protect our environment and our way of life, rather than tilting at windmills (pun intended). This is even more important as we transition to electric vehicles, which will require increased generation capacity. More articles on the future of nuclear power generation in Ontario would be appreciated by the many professional engineers who work (or have worked) in the nuclear power sector.

CORRECTION NOTICE In the March/April 2020 *Engineering Dimensions* article "Engineers weigh in on the shift to renewable energy" (p. 24), we inaccurately represented, on page 27, the leading sources of Ontario's energy. In fact, according to Ontario Power Generation, nuclear power accounts for approximately 60 per cent of the province's power, while hydroelectric power accounts for one third.

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.

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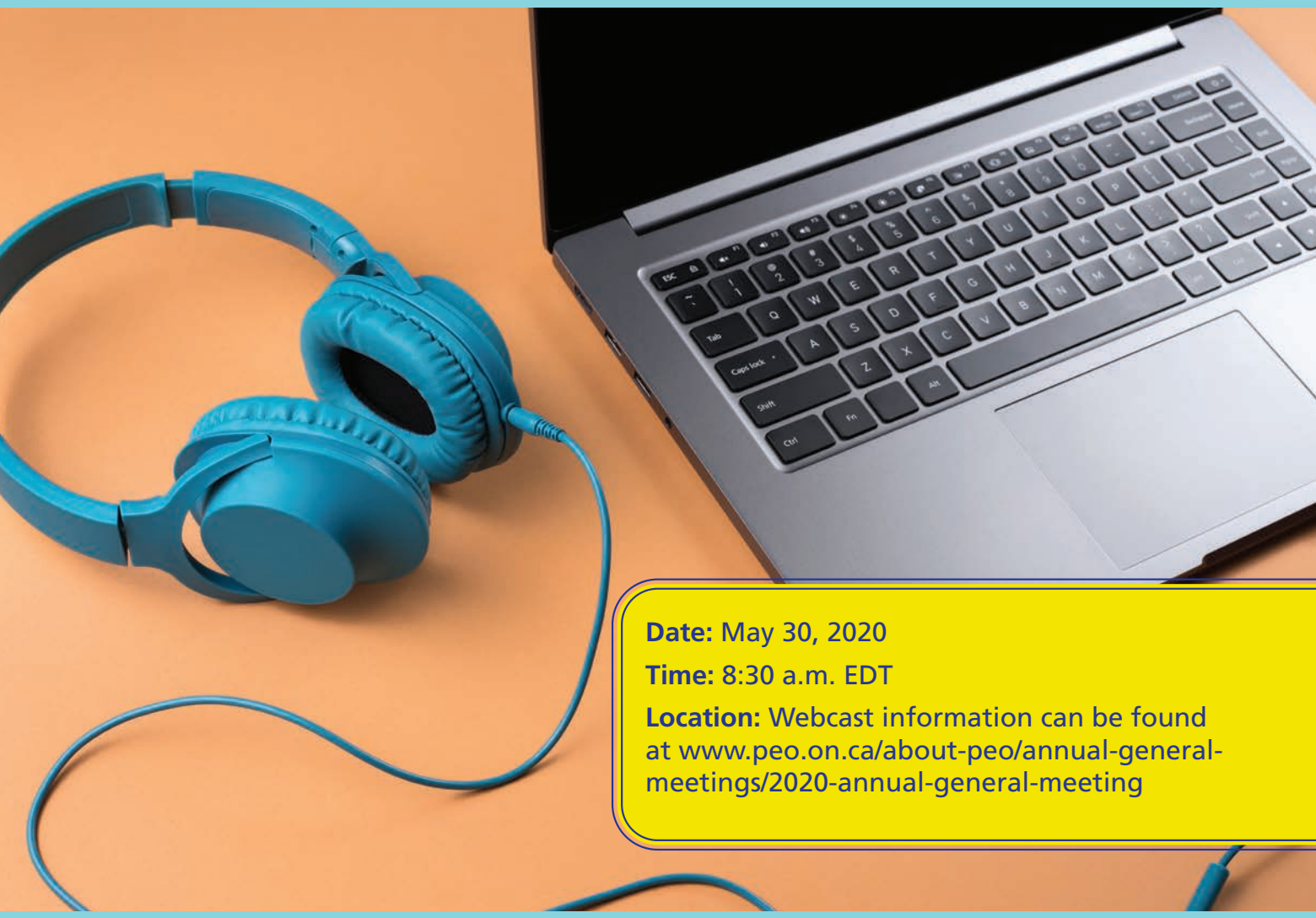

Date: May 30, 2020

Time: 8:30 a.m. EDT

Location: Webcast information can be found at www.peo.on.ca/about-peo/annual-general-meetings/2020-annual-general-meeting

As per a Council motion, and in compliance with the order of the provincial government prohibiting organized public events and social gatherings amid concerns surrounding the COVID-19 pandemic, PEO's AGM will now be held on May 30 using a virtual meeting format. Proceedings will be conducted solely via live webcast and will be in listen-only mode.

PEO will not hold an in-person meeting as previously communicated to licence holders in the Notice of Meeting published in the March/April issue of *Engineering Dimensions*. See the Revised Notice of 2020 Annual General Meeting on page 17 of this issue for more information.

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