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ON THE COVER

This plant-based burger by food tech startup Impossible Foods has the potential to shape the future of our food system. Photo: Impossible Foods

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WHAT'S ON THE MENU

By Nicole Axworthy

ENGINEERING DIMENSIONS

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The global food system—to put it lightly—is a mess. Although our modern agricultural system is incredibly productive, it also has some serious downsides: mass-

scale water consumption, polluted ecosystems, over-farmed land, wasted food, mistreated animals and significant emissions of greenhouse gases. With the global population growing by well over a million each week, finding and testing new solutions around food will be essential to feed the world in an era of shrinking resources. But how can it change so more people are fed nutritiously and sustainably in the future?

In "The future of food" (p. 49), Associate Editor Marika Bigongiari delves into these complex challenges and the opportunities for engineers to get involved. Engineers play a key role in finding solutions, just like the many ways in which they contributed to the industrialization of agriculture through the first and second industrial revolutions. This area of work is once again begging for innovation. Essentially, we need to increase our food supply to keep pace with population growth—by as much as 70 per cent by 2050, according to a 2009 United Nations report—and we need to do it in a way that is safe and sustainable in the areas of land, water and energy. Take a breath before diving in because it is a large serving of food for thought.

On a similar note, Associate Editor Michael Mastromatteo covers the controversial topic of genetically-modified

foods and the role they play in the worldwide food supply (p. 54). As consumers demand greater visibility into the sources and supply chain of the food they eat, regulation and labeling of these products is becoming an increasingly important element, so what is Canada's approach?

We also know food systems are integrally related to food safety, and the scale and complexity of today's systems contribute to the likelihood and magnitude of food-borne illness. Recalls and public concern drive the push for greater vigilance in tracing and preventing food contamination. In "Keeping our food safe" (p. 45), writer Natalya Anderson speaks with professional engineers in the food industry about this critical issue and how they are using their problem-solving skills to develop effective preventative food safety control systems at all points along the food processing chain.

This issue, we also introduce you to the members of PEO Council for 2018-2019 (p. 23), including new President David Brown, P.Eng., BDS, C.E.T. As you'll read in his first President's Message, he's putting an emphasis on PEO's future relevance and believes that if we want to be a leader in self-regulation in Canada, we cannot continue to accept the status quo. Read more of his thoughts on page 6.

Finally, as you'll read on page 14, *Engineering Dimensions* is returning to the digital version of the magazine as the default delivery method starting with the next issue. If you prefer to continue getting a hard copy in the mail, head over to the member portal at www.peo.on.ca to update your subscription preference. [e](#)



THIS ISSUE Engineering's contribution to agriculture, nutrition, environmental stewardship and human health make for timely food for thought. This time, we delve into the profession's application of technology in support of food safety, the regulation of novel products, and the very future of the world's finite food supply.

THE TIMES ARE A-CHANGIN'

By David Brown, P.Eng., BDS, C.E.T., IntPE, MCSCE



As I read Scott Kelly's autobiography *Endurance*, I was intrigued to learn that his motivation to become an astronaut stemmed from his desire—perhaps need—to accept risk and the challenges that go along with it. I was impressed by his

ability to see his shortcomings at an early age and refocus them into an exciting and fulfilling career. Although there are few parallels between my life and Kelly's, I can't help but recognize that I have gravitated towards challenging myself by accepting that I am wired, like most engineers, to ask myself: What's next and how can I do my part to make it happen?

So what motivated me to stand for election as PEO president-elect, and why would any rational person consider taking on a volunteer role that is essentially a thankless job involving a significant investment of our personal time and energy for zero financial gain? As a business owner who started an engineering construction company from the ground up almost 25 years ago, taking on this role might seem irrational to most.

I believe each of my predecessors would agree we all felt our leadership skills could influence, perhaps in some small way, the future of the organization—for the better. The noble cause is what drives us; however, the reality is as president we don't have any additional power and, in fact, we don't even have a vote on Council (if the president also serves as chair of Council).

AT THE CUSP OF DISRUPTION

One might view these comments as cause for concern and perhaps negative in nature but this is not what I wish to convey at all. In fact, I consider myself a very positive person who sees the untapped potential PEO has to be a self-regulatory leader. To explore this, one must consider both the internal and external elements that form what we currently are and what factors might influence our relevance going forward. PEO is on the cusp of being disrupted. The question we need to ask ourselves is: Do we want to disrupt ourselves from within, under our control, or face being disrupted by the external forces at play around us?

It's 2018 and the world is being engulfed by what has been termed the Fourth Industrial Revolution. Technology is at the forefront of this revolution and it has already influenced the fabric

of engineering regulation in Canada. With a bureaucratic regime that is slow to react, some would argue the train has already left the station in terms of our ability to keep pace with the ever-changing landscape we are attempting to regulate. As an example, consider the disruptive forces found in the medical field and how advancements in technology have overshadowed the ability of our legal system to keep up. Consider how a company like Blockbuster was once cutting-edge only to be put to rest by Netflix.

Couple this with an organization tasked by the government to regulate a profession in which its known universe is expanding at an exponential rate whereby engineering, as defined under the *Professional Engineers Act*, is arguably uncontrollably expanding at an equal rate. We simply don't have the ability or resources to define it, let alone enforce our act, and we are losing ground at an alarming rate. So, the question I would like to pose is: What will the future hold in terms of the relevancy of our licence in light of the foregoing? This is really the answer to why I continue to find myself motivated to volunteer at PEO. It allows us to consider and formulate a big-picture problem statement that I believe needs to be addressed so we can disrupt ourselves from within and, hopefully, while we still have the opportunity to catch the train. I encourage each of you to consider our future as a regulator and recognize that complacency in an ever-changing technological landscape will, in my opinion, be our death knell and clear path to irrelevancy unless we embrace change.

THE COST OF REGULATION

Change is a scary subject for most and this is evident in our Council elections as I watch common themes unfold year after year, such as overspending and under-servicing our membership. Of late, platform issues have also focused on our Practice Evaluation and Knowledge (PEAK) program and the view by some that continuing professional development of licence holders is an unwarranted and unjustified burden. Five years ago, when I first threw my name in the hat for election, I too was concerned by the theme of the day, which focused on Council being dysfunctional. This year, some election candidates included this issue in their platforms as well. This confirms to me that nothing has changed as far as our elections are concerned.

When considering our future and our ability to remain relevant, we must address whether we are a regulator or a members' club. Being a self-

regulated profession is a privilege, not a right, and something I would argue is slipping away from our control quicker than we had imagined (and more so as we continue to succumb to the unrealistic and, in many cases, self-serving pressures of our membership). As a business owner, I find it beyond perplexing how we can freeze our P.Eng. licence fee for a decade and still suggest it's too high and that we are both under-servicing our members and wasting money with the core mandate of protecting the public interest. How can anyone with even a basic understanding of economics rationalize this position, which is touted by many each year during our elections? Freezing our fees over the past decade has essentially reduced them each year given the cost of living increases and, although owning our PEO headquarters building has enhanced our revenue stream over recent years, we are now facing our first deficit budget in years. This trend will continue unless we are willing to significantly reduce the current contingent of committees, task forces and programs or face a referendum to increase our fees to compensate.

WHAT IS OUR VALUE?

To tie these two themes together, we must consider what value you, as a licence holder, put on your licence and whether you would like to see that value increase or have it become more and more irrelevant and thus worthless over time. For those of us at the latter stages of our careers, this is perhaps of little concern; however, my focus over the next few years will be on our future and the future of our young licence holders as they try to navigate the ever-changing technology-based world we live in. What will the future bring to self-regulation and how can we ensure an engineering licence will be both relevant and necessary to the next generation?

We must come to understand that our future is at a crossroads and is about to be disrupted. My strong preference would be to engage our membership in the realization that the Fourth Industrial Revolution is upon us and we must choose our path forward carefully, but without haste. Regulation—and I'm talking about real regulation—has a heavy price and I would argue we are lacking in what I see as our two core duties: Our agreement with the government with respect to protecting the public interest is centred around licensing individuals who practise engineering and, in turn, ensuring they act in an ethical and competent manner throughout their careers.



REAL REGULATION DOES NOT SEE COSTS REDUCED EACH YEAR; AND WITH THE DISRUPTIVE FORCES AROUND US AT PLAY, WE MUST DECIDE HOW WE WANT TO MOVE FORWARD, ENSURING THAT WE PROTECT THE PUBLIC INTEREST FIRST AND FOREMOST.

Recently, Council reacted to a significant backlog in our licensing regime, which had applicants tied up in the process—in some cases, for over a year. This presented Council with some financial challenges to resolve the matter. Many would argue that our enforcement regime is marginal as well, yet in each case it boils down to a department running on a shoestring budget that is facing increasing costs as each year passes while trying to stay afloat on a fixed budget that is reduced each year by the cost of living.

In summary, if we really want to be a leader in self-regulation in this country, we simply cannot accept the status quo any longer. Real regulation does not see costs reduced each year; and with the disruptive forces around us at play, we must decide how we want to move forward, ensuring that we protect the public interest first and foremost. Taking this obligation seriously does not involve kowtowing to the self-serving interests of our members but, rather, showing strong leadership from the top down to effect change for the better. As I've noted above, I'm one man without a vote but I believe PEO can rise to the challenge and I am looking forward to working closely with Council, staff, chapters and our licence holders to consider what the future will bring and help in whatever way I can to steer it in that direction. **e**

NANCY HILL WINS 2019-2020 PRESIDENTIAL TERM

By Nicole Axworthy

On March 9, PEO received the official Council elections results revealing Nancy Hill, P.Eng., LLB, FEC, has been elected to the office of president-elect. She will begin her term as PEO president at the 2019 Annual General Meeting (AGM) in Toronto, Ontario. Hill served as vice president (elected) in 2017-2018, and will be the seventh woman to be PEO president.

In this election, 13.2 per cent of PEO membership voted. This marks a small downturn in voting from 2017, when 16.3 per cent of PEO licence holders participated.

Marisa Sterling, P.Eng., was elected vice president for the 2018-2019 Council. Sterling has been involved in PEO as a former manager of enforcement and is the elected president of the Ontario Professional Engineers Foundation for Education.

The new Council, including the following newly elected councillors, took office on April 21 at PEO's AGM in Toronto.

- Councillor-at-Large Greg Wowchuk, P.Eng.
- Northern Region Councillor Serge Robert, P.Eng.
- Eastern Region Councillor Guy Boone, P.Eng.
- East Central Region Councillor Keivan Torabi, P.Eng.
- West Central Region Councillor Lisa MacCumber, P.Eng.
- Western Region Councillor Gary Houghton, P.Eng.

Agnes Krawczyk, P.Eng., was officially elected to the position of Northern Region councillor but resigned during the election period. Current Northern Region Councillor Dan Preley, P.Eng., also resigned. At PEO Council's meeting on March 23, Council appointed Serge Robert to fill the vacancy created by Agnes Krawczyk and Ramesh Subramanian, P.Eng., to fill the vacancy created by Dan Preley. These new appointments took effect at the April 21 AGM in accordance with section 26(1) of the *Professional Engineers Act*.

At the first meeting of the new Council on April 21, Kelly Reid, P.Eng., was appointed to the position of vice president by and from the members of Council, and Michael Chan, P.Eng., and Ishwar Bhatia, P.Eng., were elected as additional members of the Executive Committee.

Find out more about the members of the 2018-2019 Council starting on page 23 of this issue.

HOW YOU VOTED

PRESIDENT-ELECT

Nancy Hill	7021
Faizul Mohee	3470

VICE PRESIDENT

Marisa Sterling	4443
Christian Bellini	2460
Peter Cushman	1920
Nick Colucci	1611

COUNCILLOR-AT-LARGE

Gregory Wowchuk	2262
Karen Chan	2158
Leila Notash	1438
Darla Campbell	1215
Fred Saghezchi	957
Barna Szabados	781
Solomon Ko	778
Nick Pfeiffer	777

EASTERN REGION COUNCILLOR

Guy Boone	880
Jovica Riznic	351
Orijit Pandit	296

EAST CENTRAL REGION COUNCILLOR

Keivan Torabi	946
Greg Merrill	921
Noubar Takessian	525
Amin Mali	421

WESTERN REGION COUNCILLOR

Gary Houghton	1300
Edgar Fernandez	427
Salman Basit	233

WEST CENTRAL REGION COUNCILLOR

Lisa MacCumber	1300
Fahad Rashid	869
Sohail Naseer	248

NORTHERN REGION COUNCILLOR

Agnes Krawczyk (resigned)	224
Serge Robert	132
Ramesh Subramanian	112

NATIONAL ENGINEERING MONTH 2018 BECOMES LARGEST CAMPAIGN TO DATE

By Rebecca White

This past March marked another exhilarating month of engineering celebrations for National Engineering Month (NEM), which kicked off in Sudbury this year with the Purple Power event lighting up the Big Nickel and the Nothin' but NEM Raptors event. With over 500 events planned across the province, #NEM2018 was the largest campaign to date.

The theme, "There's a place for you," gave engineers an opportunity to open up their world and share stories with youth and members of the public with a message that engineering and engineering technology is a place for all kinds of thinkers interested in making a difference in the world. The campaign has continued to grow since its inception thanks to the great work of its organizers, volunteers, sponsors and partners.

The partnership of the Ontario Association of Certified Engineering Technicians and Technologists, Ontario Society of Professional Engineers, Engineers Without Borders Canada and PEO works to highlight engineering and engineering technology in schools, colleges, universities, workplaces, malls and public spaces across Ontario. This year, passionate volunteers contributed their time and expertise to conduct some of the most innovative and engaging events to date. Generous sponsors also contributed financial support to make the NEM 2018 campaign possible and participated in the festivities by contributing their branded merchandise and content for the NEM blog.

Twenty-eight PEO chapters ran over 70 events across the province, continuing the association's outstanding participation in the annual campaign. Many popsicle-stick bridges were designed, built and busted this year in chapter events in Algonquin, Brampton, Kingston, Niagara, North Bay, Mississauga, Sudbury, Quinte, Scarborough and the Thousand Islands.

PEO's London Chapter supported the 20th annual "GetSet" event exploring engineering and technology with interactive hands-on activities, and the 11th annual Engineering Idol competition hosted by PEO's Etobicoke Chapter was one of the many design competitions that happened throughout the month. Other innovative events included the Engineering Book Explorers with the Hamilton-Burlington Chapter and Engineering in Hockey with the Kingsway Chapter.

continued on p. 10

PRESIDENT BROWN BEGINS PRESIDENTIAL TERM

Incoming PEO President David Brown, P.Eng., BDS, C.E.T. (right), receives the ceremonial gavel from Past President Bob Dony, PhD, P.Eng., at the April 21 annual general meeting.



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continued from p. 9



Families participate in the Grand River Chapter's K'NEX Bridge-Building Competition.



Students have fun during the Student Design Competition hosted by the Lakehead Chapter in collaboration with the OACETT Thunder Bay Chapter.

NEM was trending in numerous media newsrooms throughout the month of March. Dozens of articles appeared in local newspapers and on websites, as well as interviews featuring volunteer engineers on local TV and radio. On social media, #NEM2018 was popular across the country, with photos, videos and stories being shared throughout the network. This year, the NEM hashtag was picked up by many engineering and technology companies wanting to join the campaign. NEM was promoted on 680 NEWS AM radio, screens along The Path in downtown Toronto and in online advertising across the province. Daily blog posts featuring engineering and technology innovations, spotlights and more helped to connect the world of engineering with the general public in a unique way. Look for campaign highlights on Twitter, Instagram and Facebook @NEMOntario.

Even with NEM 2018 fresh in our memories, preparation for NEM 2019 is already underway. Chapters are reminded to include a submission in your June business plan for next year's NEM events. Applications for next March's events are due to the National Engineering Month Ontario Steering Committee in November 2018. Contact nemontario@ewb.ca with comments or questions.

Rebecca White is operations manager of Engineers of Tomorrow at Engineers Without Borders Canada.

NEW GUIDELINE ADDS CLARITY TO SECTIONS OF ENGINEERS ACT

By Michael Mastromatteo

PEO is nearing completion of a new practice guideline dealing with practitioner responsibility in supervising engineering work. The guideline *Assuming Responsibility and Supervising Engineering Work* defines best practices for engineers who assume responsibility for professional engineering work and for engineers who supervise engineering services in consideration of the *Professional Engineers Act* (PEA).

From the outset, the practice guideline was guided by the following basic questions:

- How many persons can one engineer be allowed to supervise or assume responsibility for?
- What are the limitations of supervising or assuming responsibility for engineering services?
- What extent of familiarity with the content of work is required when effectively supervising or assuming responsibility?

The new practice guideline was also aimed at providing best practices to help engineers comply with a specific exception and requirement in the PEA. The act contains an exception in section 12(3)(b) for when licences or certificates of authorization are required:

- (3) Subsections (1) and (2) do not apply to prevent a person,...
- (b) from doing an act that is within the practice of professional engineering where a professional engineer or limited licence holder assumes responsibility for the services within the practice of professional engineering to which the act is related.

As well, the PEA contains a requirement in section 17(2) for supervising engineers under a certificate of authorization:

A holder of a licence, temporary licence or limited licence who personally supervises and directs the providing of services within the practice of professional engineering by a holder of a certificate of authorization or who assumes responsibility for and supervises the practice of professional engineering related to the providing of

continued on p. 12

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continued from p. 10

services by a holder of a certificate of authorization is subject to the same standards of professional conduct and competence in respect of the services and the related practice of professional engineering as if the services were provided or the practice of professional engineering was engaged in by the holder of a licence, temporary licence or limited licence.

The project originated in November 2016 when PEO Council directed the Professional Standards Committee (PSC) to develop a guideline clarifying responsibility and supervisory issues surrounding certain engineering work situations.

PSC members developed a draft guideline in May 2017. It has since proceeded through content preparation, public and stakeholder consultation and review by PEO staff for compliance with the PEA. Consulting Engineers of Ontario and the Ontario Society of Professional Engineers were directly invited to provide feedback during the consultation phase.

A draft document was posted last summer on the PEO website for member and stakeholder review and was revised where warranted based on recommendations received during consultation.

Fanny Wong, P.Eng., FEC, chair of the PSC, says certain supervision requirements in the PEA needed clarification. "Work may or may not be supervised as stipulated per the *Professional Engineers Act*, and the act is not clear on how much supervision is required," Wong says.

The guideline was approved by PEO Council in November and it is expected to be available this summer.

INVESTIGATION CONTINUES AS NIPIGON BRIDGE INCHES BACK INTO FULL SERVICE

By Michael Mastromatteo



PEO is continuing its lengthy registrar's investigation into engineering work associated with the January 10, 2016 failure of the newly-opened Nipigon River Bridge.

Opened to traffic in late 2015, the cable-stayed bridge was forced to close after two months of service when part of the bridge deck separated from the road surface. The bridge was partially opened to traffic within days after the Ontario Ministry of Transportation (MTO) undertook emergency repairs.

PEO launched a registrar's investigation of the failure in October 2016. A registrar's investigation is based on reasonable and probable grounds that a licence holder and/or certificate of authorization holder has committed an act of professional misconduct or incompetence, and is kept confidential until further action is required.

Meanwhile, the transportation ministry continues work to bring the Nipigon bridge back into full service.

Annemarie Piscopo, spokesperson for the MTO's northwestern region, told *Engineering Dimensions* the ministry intends to open all four lanes to traffic before the end of this year. "Work is continuing on erecting the eastbound lanes, and the contractor has completed installation of a permanent retrofit to correct the structural malfunction that caused the bridge to separate from its abutment in January 2016," she said.

The reasons for the failure have been determined and two independent reports have been released to the public: www.mto.gov.on.ca/english/highway-bridges/nipigon-bridge.

"Our focus remains on working with the contractor to explore ways to advance the schedule, while completing the bridge safely and efficiently," Piscopo added.

FORUM PLOTS ENGINEERING RESPONSE TO CYBER ATTACKS

By Michael Mastromatteo

Engineers would be well advised to push for a culture of security in the face of increasing cyber attacks and the growing sophistication and boldness of hackers.

The difficulties in securing networked infrastructure was the focus of this year's Engineering Innovations Forum (EIF), held on March 21 at the Japanese Canadian Cultural Centre in Toronto, Ontario.

Organized each March with the support of PEO, the Ontario Society of Professional Engineers and the Ontario Association of Certified Engineering Technicians and Technologists, the EIF is a key part of National Engineering Month and aims to foster dialogue and raise public awareness of engineering, science and technology.

This year's forum was moderated by Marisa Sterling, P.Eng., assistant dean at the Lassonde School of Engineering at York University and an elected vice president on PEO Council.



The opening speaker was former PEO president George Comrie, P.Eng., FEC, who described the central challenges of internet security. Comrie also outlined his role as chair of the Communications Infrastructure Engineering sub-group of PEO's Emerging Disciplines Task Force.

Other guests included Joe DiAdamo, P.Eng., executive consultant with IBM Canada, who talked about efforts to defend the smart electric power grid, and Tyson Macaulay, noted network security consultant and author of four books about cyber issues, who highlighted risk elements in managing the Internet of Things (IoT). Essentially a network of physical devices, including vehicles and home appliances, to connect and exchange data, the IoT is especially vulnerable to malicious hacking.

All speakers emphasized the growing nature of the cyber security problem and said that defensive measures involve much more today than network firewalls and password protection efforts.

Comrie, for example, cited a recent study compiled by protection software developer McAfee and the Center for Strategic and International Studies showing that cyber crime now costs the world almost \$600 billion, or 0.8 per cent of global GDP.

Comrie said internet and cyber security issues arise from the origins of networked communications. Although these were ingenious in providing instant access to information, the systems were not designed with security in mind. "It's extremely difficult to retrofit security," Comrie said, adding that the global internet usage has vastly outpaced the technology that can protect it from hackers and other forms of digital warfare.

In discussing smart electricity grid security, DiAdamo said the security efforts must adapt to a rapidly changing landscape in which something as ubiquitous as electricity generation and distribution can be hijacked from a variety of sources. "Technology alone is not going to solve these problems," DiAdamo said.



Speakers at the 2018 Engineering Innovations Forum included (left to right) Joe DiAdamo, P.Eng., George Comrie, P.Eng., FEC, and Tyson Macaulay.



Rajiv Rattan, P.Eng., chair of the EIF organizing committee, thanked speakers and guests at the conclusion of this year's forum.

Cyber security is an especially thorny issue when it comes to the IoT. Third speaker Tyson Macaulay told the EIF audience that the multitude of platforms networked via the IoT make it a natural point of entry for cyber criminals. "These risks are set to grow especially as IoT device makers are made quickly and cheaply, often failing to take security into account," he said.

Ironically, all three speakers agreed that hackers have created a huge market for cyber security experts in North America and internationally. As a result, engineering associations might want to revisit policies to regulate or license cyber security specialists, and if expertise in this area might fall under the definition of professional engineering.

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YORK CHAPTER SALUTES PROGRESS ON MENTORSHIP FRONT

By Michael Mastromatteo

Volunteers with PEO's York Chapter marked the work of its mentors in steering engineering interns (EITs) onto the path of licensure with a Licensure Assistance Program (LAP) appreciation night in Richmond Hill, Ontario, just north of Toronto.

Organized by Elmer Ting, P.Eng., mentorship committee director for the York Chapter, the event featured nearly 30 guides, EITs and chapter executives for a discussion on mentoring success strategies and the importance of veteran engineers guiding recent graduates through the registration and career-hunting processes.

The LAP operates in conjunction with PEO's Student Membership Program, which aims to strengthen the links between internationally educated applicants and recent graduates, and the engineering regulator. It matches EITs to P.Eng. guides who provide advice and experience to assist them toward their goal of obtaining a P.Eng. licence. This includes insight into licensing requirements, ethical practices, leadership development and advice on obtaining and reporting acceptable engineering work experience.

PEO began the LAP as a pilot program in 2010. Starting with five chapters, the program has since branched out to nearly all PEO's 36 chapters across the province. As of this year, some 1120 EITs have taken part in the program.

At the February 28 event, guides and mentee-EITs were invited to describe their experience with the LAP. Geoff Reyes, P.Eng., a veteran EIT guide with both the Scarborough and York chapters, said the program brings significant benefit to both guide and EIT. "One overarching idea I provide all interns in our meetings is that this program is intended to help guide people towards their P.Eng. licence, but I truly believe I have a responsibility to introduce passionate engineers to the organization," Reyes said.

Reyes said the main obstacle interns face is the assessment and evaluation of international education and work experience and how

they pertain to the Canadian market. "Many interns would be provided technical exams and interviews during their application process and, for a few of them, the process was very intimidating," Reyes explained. "I had provided them with the confidence that all interviews and exams would focus on their specific discipline and are geared toward the application and information they provide PEO."

Sara Jafari, EIT, one of the York Chapter mentees attending the appreciation night, reiterated the program's benefits to all participants. Now working as a systems integration engineer at SNC Lavalin in Mississauga, Jafari was guided under the York Chapter LAP by Roger Salema, P.Eng.

"I believe the LAP is a great opportunity for recent graduates, as my guide provided his professional knowledge and expertise is assisting me to prepare my experience application to fulfill the requirement as part of P.Eng. designation process," Jafari said.

York Chapter Chair Lui Tai, P.Eng., a first-time LAP volunteer, was assigned two separate mentees in the last mentorship cycle. "It's important for PEO and the chapters to offer this assistance, to help the new EIT in the short term but to help build a strong profession in the long run," Tai said. "We need to have a good succession plan. Offering assistance to new engineers will provide reassurance that PEO cares about the profession as well as its members."

ENGINEERING DIMENSIONS GOING BACK TO DIGITAL AS DEFAULT

By Michael Mastromatteo

Engineering Dimensions is reverting to the digital edition as the default delivery method following PEO Council's decision at its February 2018 meeting.

As of the July/August 2018 issue, PEO members will receive the digital edition of the bi-monthly magazine unless they specifically request the paper edition on their online member profile in the member portal (<https://secure.peo.on.ca/ebusiness>).

In addition to saving costs of printing and mailing all 80,000 paper issues, the move to default digital is in keeping with the regulator's efforts to be more environmentally responsible in all its operations, including communications with membership.

The Council decision reverses a 2015 move to have the print edition as the default delivery option. That decision was based on reader

surveys suggesting the print or hard copy edition was slightly favoured over the digital edition.

PEO introduced its digital edition of the magazine in 2008 as an environmentally friendly option for members who didn't want to receive the paper edition. In handling the digital versus print options, PEO has had to maintain a fine balance of cost savings, environmental responsibility, the effectiveness of new communications technology and, above all, readers' preferences.

PEO members who prefer to receive a hard copy of the magazine can update their subscription preference on PEO's website at www.peo.on.ca. Simply click on the Pay Fees/Manage Accounts tab, log in to the portal and change the *Engineering Dimensions* delivery preference through the Subscriptions tab. Going forward, a subscription preference option will also be included as part of each member's annual renewal process.

May 2018

MAY 21-22

IEEE Women in Engineering International Leadership Conference, San Jose, CA
ieee-wie-ilc.org



MAY 29-JUNE 1

Engineering Mechanics Institute Conference, Cambridge, MA
umi.mit.edu/EMI2018



MAY 30-31

Data Driven Drilling & Production Conference, Houston, TX
upstreamintel.com/data

June 2018

JUNE 2-6

ASME 2018 Annual Meeting, Vancouver, BC
asme.org



JUNE 3-6

38th Annual Canadian Nuclear Society Conference, Saskatoon, SK
cns2018conference.org

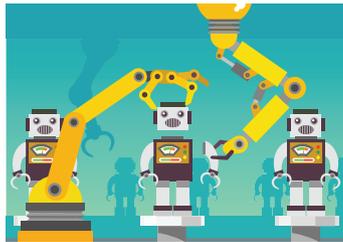
JUNE 5-7

Canada Green Building Council: Building Lasting Change 2018, Toronto, ON
cagbc.org



JUNE 10-12

IEEE Radio Frequency Integrated Circuits Symposium, Philadelphia, PA
rfic-ieee.org



JUNE 18-22

Manufacturing Science and Engineering Conference, College Station, TX
asme.org/events/msec

JUNE 13-16

Canadian Society for Civil Engineering Annual Conference, Fredericton, NB
csce2018.ca

JUNE 17-21

2018 American Nuclear Society Annual Meeting, Philadelphia, PA
ansannual.org

JUNE 17-22

ASME International Conference on Ocean, Offshore & Arctic Engineering, Madrid, Spain
asme.org/events/omae



JUNE 25-29

AIAA Aviation and Aeronautics Forum and Exposition, Atlanta, GA
aiaa.org/events

JUNE 24-26

International Conference on Sustainable Design and Manufacturing, Gold Coast, Australia
sdm-18.kesinternational.org



JUNE 24-28

Power & Energy Conference & Exhibition, Lake Buena Vista, FL
asme.org/events/power-energy

July 2018

JULY 9-11

Propulsion & Energy Forum, Cincinnati, OH
propulsionenergy.aiaa.org



JULY 15-20

5th Joint US-European Fluids Engineering Summer Conference, Montreal, QC
asme.org/events/fedsm



IS OUR PROFESSION DOING ENOUGH?

By Marilyn Spink, P.Eng.

For over 30 years, many women engineers and a few male allies have tried to resolve the chronic underrepresentation of women in the engineering profession. Sadly, female P.Engs currently represent only 11 per cent of all PEO licence holders. Is our profession doing enough?

After reading the January/February issue of *Engineering Dimensions*, I was compelled to put my thoughts together on how we might look at this problem differently because other professions, such as medicine and law, have reached gender parity. If we struggle to increase the number of women engineers, how do we hope to address deeper challenges of equity, diversity and inclusion so engineers can become truly reflective of the society we serve?

Adam Grant, a professor at the Wharton School of the University of Pennsylvania and thought leader in organizational psychology, uses the term “disagreeable givers” to describe people who are gruff, perhaps offensive or perceived as “negative Nellys” but underneath have others’ best interests at heart. According to Grant, disagreeable givers are the most undervalued people in our organizations because they are the ones who give critical feedback that no one wants to hear but everyone needs to hear. In the context of the engineering profession, many women engineers, including myself, show up as disagreeable givers.

Increasing the number of newly licensed women engineers is the goal of Engineers Canada’s 30 by 30 initiative. It is not about getting more women in engineering undergraduate programs or kids excited about science. Supply is not the issue; just get women engineering graduates, domestic and international, licensed. The 30 by 30 initiative is public recognition that the underrepresentation of women in our profession must be addressed and all engineers need to own it—both men and women.

While women meeting to share their stories provides support to continue the battle, if it is simply to rehash symptoms, this is not enough. Society would not hang the problem of poverty on the backs of the poor to resolve, so I am curious: Why, as a profession, do we constantly hang this problem on the women to resolve? “Women in ‘Whatever’” groups have not yet achieved the full parity we are aiming for despite tremendous efforts by these groups. Isn’t it the definition of insanity to do the same thing and expect different results? Men must be engaged because it is the male engineers and business leaders who are in greater positions to influence change, since women only make up 11 per cent of the profession.

If this was an easy problem to solve, it would have been, but it is a complex problem. “A ray of light in the effort to become an inclusive profession,” when there are 20 per cent female engineering students is a far cry from a truly representative profession. This is not a ray of light. As an engineering profession we are still in the dark at 11 per cent women. As an engineering undergrad at Queen’s University in the 1980s, 27 per cent female enrollment was celebrated,



ACTIONS ARE NEEDED TO MAKE TRUE AND LASTING CHANGE—PERSONAL ACTIONS AND LEADERSHIP THAT IS EMBODIED BY HELEN WOJCINSKI.

and Ryerson reached 25 per cent female enrollment a few years later. Why are we celebrating a decrease to 20 per cent female enrollment almost 30 years later?

After years of effort, many experienced women engineers are tired—exhausted, frankly. This can lead to us being perceived as “disagreeable” when, in fact, it’s our passion for our profession and our commitment to serve the public interest that causes us to show up this way. Why do we teach women to “navigate a glass obstacle course”? This places an obligation on women engineers to navigate a difficult system. Are all engineers required to navigate an obstacle course? Why would we place an additional burden on some valued minds? A more effective approach would be to change the system.

In 2000, “harassment” was added to our *Professional Engineers Act* and is now included as part of professional misconduct. This took 10 years of tremendous effort. In light of the current #MeToo movement, it’s an example of PEO Council being proactive and ahead of its time. This change was led by Nancy Hill, P.Eng., LLB, FEC, and Peter Hiscocks P.Eng., with help from Karen Webb, P.Eng., and Helen Wojcinski, P.Eng., FEC, working behind the scenes, which went largely unnoticed. These engineers deserve to be celebrated.

In September 2017, PEO officially endorsed the Engineers Canada 30 by 30 initiative due to the efforts of a group of committed engineering leaders. While late, PEO joined the other provincial regulators in their commitment to become a more equitable and inclusive profession. Actions are needed to make true and lasting change—personal actions and leadership that is embodied by Helen Wojcinski. Helen, with the support of others, will continue to take action to make 30 by 30 a reality in our profession.

I don’t have all the answers but, as an entire profession, we must start having conversations about this elephant in the room and stop skirting the issue (pardon the pun!). Engineers must demand environments free of bias. Only when we stop accepting things like the glass obstacle course can our profession be inclusive of all talent and successfully pull from society’s entire talent pool because it is in the public interest—and besides, men want it, too. **e**

Marilyn Spink, P.Eng., is a PEO and Ontario Society of Professional Engineers member, and a lieutenant governor-in-council appointee on PEO Council.

APPLICANT TAKES ROUNDABOUT ROAD TO ONTARIO P.ENG.

AFTER A FIVE-YEAR, MULTI-SITE REGISTRATION AND TRANSFER PROCESS, STRUCTURAL ENGINEER VICTOR IKE, P.ENG., BEGINS A NEW CAREER AS AN ONTARIO-LICENSED ENGINEER.

By Michael Mastromatteo



Victor Ike, P.Eng., is an international engineering graduate who recently transferred his licence to Ontario.

Structural engineer Victor Ike, P.Eng., has earned a cornucopia of frequent flyer miles since graduating in civil engineering from the University of Ilorin in Nigeria in 2000.

Ike, who just transferred his P.Eng. registration from Saskatchewan to Ontario, can be considered a fine example of the easy mobility of internationally educated engineering graduates seeking registration in Canadian jurisdictions.

In late February, Ike began a new position as a senior structural engineer with KGS Group Inc. in Mississauga. But while the job is new, the career path has been long and winding for this itinerant practitioner who has plied his engineering skills over three continents in the last 18 years.

Before deciding to pursue licensing in Canada, Ike had been working with a number of large structural and mining engineering firms in Western

Australia and in his native Nigeria. He also spent a year as a project structural engineer with Emas Chiyoda Subsea in Houston, Texas.

Ike first took up residency in Regina, Saskatchewan in search of civil engineering employment in job-rich Western Canada. It was over a six-year period, spread out among Australia, his native Nigeria, Texas and Saskatchewan when Ike satisfied the academic assessment and work experience requirements of internationally educated applicants looking to pursue engineering in Canada.

"I started my registration process with the Saskatchewan engineering regulator in 2012 while working in Australia," Ike told *Engineering Dimensions*. "I was admitted as a member-in-training by the Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS) in January 2013 and I continued to submit my experience reports until I accumulated three years of experience, approved by APEGS."

Ike's stay in Saskatchewan was very brief, however, as he had to return to a job in Australia.

He completed his APEGS professional practice exams (PPE) in 2015 in Australia after having first arrived in Regina as a landed immigrant. Finally, Ike worked in Houston under a licensed professional engineer on a major oil and gas project.

Ike was a chartered professional engineer (C.P.Eng.) with Engineers Australia. He was also a fellow of Engineers Australia, similar to a fellow of Engineers Canada.

Engineers Australia has a mutual recognition agreement with APEGS with regards to the academic review component of the licensing process at the time of Ike's application for membership of APEGS.

"I submitted my experience report on this project to APEGS, and it was approved as 'equivalent to Canadian' experience," Ike explains.

In effect, Ike completed the work and academic assessment over a five-year period while a member-in-training (also known as an engineer-in-training) with APEGS. He merely transferred his licence to PEO when he decided to settle in Ontario in 2017.

Kate MacLachlan, P.Geo., director of academic review at APEGS, says Ike's application process and his transfer to PEO was typical of many international engineering graduates. "We have a two-step process to become a P.Eng.," she explains. "First you must become an engineer-in-training. To become an engineer-in-training you must meet the academic requirement. Once you are an engineer-in-training then you can start reporting your experience and write the professional practice exam. Once four years of experience has been approved by the Experience Review Committee and the PPE exam has been written, then you can apply as a P.Eng. So, the academic review happens at the engineer-in-training stage."

With the registration process complete and the job secured, Ike will soon be re-united with his wife, Uloma, son Chimere Vincent and daughter Chinonye Margaret, who have waited out their father's application and registration process from Perth, Australia. The family was scheduled for reunification in April.

"A bit of luck, being proactive, and a lot of hard work" is how Ike describes his path to licensure with PEO. **e**

CAN ENGINEERING DESIGN PLANS BE ALTERED BY ANOTHER PRACTITIONER?

By José Vera, P.Eng., MEPP

Consider this scenario: A practitioner provides structural design plans to a fabricator. Based on the advice of another practitioner, the steel fabricator changes the method of construction outlined in the plans to save costs. A dispute arises between the practitioner and the fabricator. On one hand, the practitioner claims the fabricator infringed copyright by using and changing the design plans without permission. On the other hand, the fabricator points out the contract gave them the right to make substantial changes. In an appeal to the Supreme Court of Canada, the judge notes the alterations made by the fabricator were within acceptable limits of the contract. Consequently, the appeal is dismissed. If this case study sounds familiar it is because it is based on *Netupsky v. Dominion Bridge*, a case widely cited in disputes involving the alteration of design plans (<https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/4847/index.do>).

PEO's practice advisory team often receives questions from practitioners regarding issues involving alterations to engineering design plans. Specifically, practitioners typically can find themselves in one of the following situations:

- Practitioner A issues engineering design plans to a client. Some time later, the client engages practitioner B, who works for another firm, to modify these plans. Practitioner A would like to know his or her professional obligations in this situation, when his or her design plans may be altered by another practitioner; or
- Practitioner B receives a request from a client to alter the engineering design plans issued by practitioner A, who works for a different firm. Practitioner B would like to know his or her professional obligations in this situation, when there is a request for him or her to alter the design plans issued by another practitioner.

STATUTORY OBLIGATIONS

Practitioners have several statutory obligations under the *Professional Engineers Act* (the act) and its regulations. These obligations do not cover the specific case of an engagement to alter the engineering design plans of another practitioner. However, there are two sections in PEO's Code of Ethics that may provide insight into this situation:

- Section 77(7)(ii): A practitioner shall,... not accept an engagement to review the work of another practitioner for the same employer except with the knowledge of the other practitioner or except where the connection of the other practitioner with the work has been terminated; and
- Section 77(7)(v): A practitioner shall,... give proper credit for engineering work.

At first glance, section 77(7)(ii) does not appear to apply, since it refers to "an engagement to review the work of another practitioner," which is not the same as an engagement to alter the design plans of another practitioner. However, it could be argued that a reasonable and prudent practitioner may choose to mirror this requirement and only accept an engagement to alter the design plans of another practitioner with the knowledge of the other practitioner

or where the connection of the other practitioner with the work has terminated. In contrast, section 77(7)(v) clearly applies, since a practitioner who alters the design plans of another practitioner cannot take credit for the original practitioner's work.

While these two sections provide some basic level of guidance, it is worth noting that the core legal concepts found in *Netupsky v. Dominion Bridge* were copyright law and contract law. In his article, "Engineering Ethics: The conversation without end," American engineer and author Samuel C. Florman proposed: "when engineers discuss ethics they avoid a simplistic approach that is no longer adequate to the complexities of the current day" (<https://www.nae.edu/File.aspx?id=7378&v=f37740e0>). Taking a page from Florman, it is clear that altering design plans of another practitioner is a complex subject that goes beyond ethical obligations and involves an understanding of copyrights and contracts. Therefore, we need to look beyond the practitioner's statutory obligations under the act to fully grasp this issue.



IT IS CLEAR THAT ALTERING DESIGN PLANS OF ANOTHER PRACTITIONER IS A COMPLEX SUBJECT THAT GOES BEYOND ETHICAL OBLIGATIONS AND INVOLVES AN UNDERSTANDING OF COPYRIGHTS AND CONTRACTS. THEREFORE, WE NEED TO LOOK BEYOND THE PRACTITIONER'S STATUTORY OBLIGATIONS UNDER THE ACT TO FULLY GRASP THIS ISSUE.

COPYRIGHT OF ENGINEERING DESIGN PLANS

The PEO guideline *Use of the Professional Engineer's Seal* contains some guidance for dealing with copyright issues (www.peo.on.ca/index.php/ci_id/22148/la_id/1.htm). Below are some key points:

- In simple terms, copyright belongs to the author or authors of the work (i.e. the engineer(s) who developed the design plans);

- However, due to employment considerations, it is the employer of the engineer(s) who owns the copyright to design plans; and
- Contracts can influence copyrights.

The above indicates that contractual agreements are a key consideration to the question whether design plans can be altered by another practitioner.

WELL-WRITTEN CONTRACTS

Netupsky v. Dominion Bridge notes: "The extent to which the copyright material may be altered is not unfettered, however. The court may imply terms limiting that right, or the contract may expressly or impliedly forbid any alterations...." Consequently, rather than addressing this issue through the courts, which can be expensive, practitioners and clients should mutually agree on the acceptable limits for altering design plans.

Practitioners who issue design plans to clients should clearly limit their liability for alterations done to their work (e.g. alterations by another practitioner). Practitioners who are engaged to alter the design plans of another practitioner should ensure their proposed alterations are not at odds with reasonable and prudent practice. In that vein, well-written agreements provide clarity as well as a process for addressing these situations.

What the acceptable limits for altering design plans are is a complicated question, which depends on the particulars of a specific situation. However, written agreements between practitioners and clients can set limits for such alterations. Practitioners should seek legal advice when drafting these agreements in order to manage their risks. Finally, PEO's practice advisory team is available by email at practice-standards@peo.on.ca to answer practitioners' questions on this subject and other related issues. [e](#)

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

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IN MEMORIAM

THE ASSOCIATION HAS RECEIVED WITH REGRET NOTIFICATION OF THE DEATHS OF THE FOLLOWING MEMBERS
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North Bay, ON

BRIDGES, Roger Philip
Mississauga, ON

BRISKIN, Boris
North York, ON

BROPHY, Paul Douglas
Waterloo, ON

BUDRA, Albert Paul
Guelph, ON

BUNAMA, Ramsey M.
Riyadh, Saudi Arabia

BURN, Kenneth Nicholson
Ottawa, ON

CATELL, Leslie Bernard
Brighton, ON

CATTRAN, Douglas Bryant
Guelph, ON

CHAMBERS, Ronald Charles
Port Perry, ON

CHAN, Hoi Tok
North York, ON

CHAN, Kam-Hung
North York, ON

CHAN, Tak Hay
Arkport, NY

CLARK, Thomas Rex
Waterloo, ON

CLARK, William Slayter
Toronto, ON

CONWAY, John Robert
Thorndale, ON

COUTURE, Erik Sebastein
Timmins, ON

CROUTCH, Victor Keith
Cambridge, ON

CROZIER, Bruce David
Wheatley, ON

CRYSLER, Ralph Edward
Toronto, ON

CSIBA, Adriana
London, ON

DACOSTA, Alvaro Lawrence
Orleans, ON

DANIC, Jerry John
Sarnia, ON

DARIO, Nello Anthony
Windsor, ON

DAVIES, Brinley Moore
Niagara-on-the-Lake, ON

DAVIS, Merritt McGregor
North York, ON

DAWSON, Donald Alexander
Grimsby, ON

DEC, Eugeniusz
Toronto, ON

DE GRACE, Kevin James
Thornhill, ON

DIMITRIOU, Peter Paul
Etobicoke, ON

**DOIRON, Raymond Anthony
Claude**
Perth, ON

DOWLING, Kenneth
Mississauga, ON

DRUMMOND, James
North York, ON

DRYBURGH, George
Sarnia, ON

ELLIOTT, John David Russell
Brockville, ON

EWING, Gary John
Chatham, ON

FARROW, John Bertram
Thunder Bay, ON

FEKETE, Thomas Anthony
Scarborough, ON

FERRO, Angelo
Ottawa, ON

FINNAMORE, Roger Allen
Quincy, IL

FRANK, John Frederick
Ottawa, ON

FRENCH, Glen Elliott
London, ON

FROHMANN, Andrew
Wawa, ON

**GARVIN, William Stanley
Francis**
Toronto, ON

GERARD, Michael Philip
Ajax, ON

**GHALI GUIRGUIS, Fakhri
Younan**
Guelph, ON

GOLDEN, Jeffrey Grant
Windsor, ON

GOOCH, Edward John
Mississauga, ON

**GORMAN, Barry Edward
David**
Kingston, ON

GREBSKI, Chester Stanley
Holland Landing, ON

GRIFFITHS, Lindsay Rhys
Langley, BC

GROVES, John Kenneth
Ottawa, ON

GUIRY, James Duncan
Lindsay, ON

**HAGER, Joseph William
James**
Waterloo, ON

HAGERMAN, John Douglas
Etobicoke, ON

HALTER, John Lionel
Toronto, ON

**HASNAOUI, Chiheb Ben
Mohamed**
Montreal, QC

HAUGHTON, Ronald Gordon
Delhi, ON

HAZELTON, Trek William
Pickering, ON

HENRY, John Glynn Franklin
Unionville, ON

HEWSON, Donald Glen
Stouffville, ON

HLADKI, Robert Peter
Windsor, ON

HOLLIS, John David
Gloucester, ON

HOLMES, George Wesley
Orleans, ON

HOLT, George Barry
Sarnia, ON

HORVATH, John Anthony
Toronto, ON

HUNT, Gordon James
Georgetown, ON

JOHNSTON, Merrill Raulston
Cornwall, ON

JUNIPER, Roger
Edmonton, AB

KANE-WHITE, Anthony Salt Spring Island, BC	MCWATT, Peter North York, ON	SAVA, Michael Oakville, ON	WELCH, Donald Ernest Oakville, ON
KELLY, John Hamilton Burlington, ON	MITCHELL, Kenneth Charles Picton, ON	SEDLACEK, Josef Surrey, BC	WELLS, Robert Orval Port Elgin, ON
KIELLER, Stanley Thomas Orchard Lake, MI	MUST, Michael Toronto, ON	SHARMA, Deepak Kumar Toronto, ON	WICKS, John F. London, ON
KING, Earl Huddart Ottawa, ON	PACKHAM, James Lennox Toronto, ON	SHEFFLER, Gary Cecil Garson, ON	WIKLUND, Eric Charles Oakville, ON
KINNEAR, John David St. Catharines, ON	PAI, Siu Ting Victoria, BC	SHIRRIFF, John Henderson Sarnia, ON	WILLIAMS, Samuel Augustus Mississauga, ON
KIRKPATRICK, Robert Andrew Burlington, ON	PANAOTI, Constantine North York, ON	SHTOCK, Gregory Thornhill, ON	WILLIAMSON, Robert Navarre Whitby, ON
LANGDON, Edwin S. Scottsdale, AZ	PATTERSON, Murray N. Thunder Bay, ON	SICONOLFI, Michele St. Catharines, ON	WINGROVE, Allan Roy Alliston, ON
LANKIN, Robert Gordon St. Agatha, ON	PEETERS, Martin Frans Mississauga, ON	SMITH, Gerald Arthur Winnipeg, MB	WONG, Aston George Scarborough, ON
LEGAULT, Karen Ellen Stittsville, ON	PINCHIN, James David London, ON	SOBCZAK, Lawrence Walter Ottawa, ON	WONG, Jim Sie-Kei North York, ON
LENNOX, Murray Allan Ottawa, ON	RAE, Thomas Ewen Toronto, ON	SPINNEY, James Alexander Apple Hill, ON	YOUNG, John Keith Gravenhurst, ON
LEUNG, Matthew Chiu-Woon Mississauga, ON	RAMSAY, John South Porcupine, ON	STAIRS, Karl W. Kanata, ON	ZALZAL, Samir Jamil North York, ON
LEWIS, Kimberly Lynn Whitby, ON	RAZAUSKAS, Saulius George Etobicoke, ON	STOREY, Raymond Toronto, ON	ZANATTA, Oscar Joseph Fort Erie, ON
LING, Wen Pok Toronto, ON	REMPE, Ronald Ulrich Calgary, AB	TAHER, Rifky Georgian Bluffs, ON	
LISY, Karel Scarborough, ON	REYNOLDS, James Ashworth King City, ON	TAUBERG, Paul Brampton, ON	
MACDONALD, David Ian Thunder Bay, ON	RIBOTTO, Peter P. Green Valley, AZ	THRASHER, William James Windsor, ON	
MACDONALD, Duncan Guelph, ON	RICHARDSON, James Charles London, ON	TIPMAN, Rudolph Roy Stettler, AB	
MACK, John Peterborough, ON	RICHARDSON, Peter Alexander Picton, ON	TODERICK, Samuel Oakville, ON	
MAGAGNA, Lino Etobicoke, ON	RIDLER, Donald Alan Mississauga, ON	TRUMAN, Peter Treggerthen Peterborough, ON	
MATTA, Joseph Barrie, ON	RIEFSTAHL, Douglas Lloyd Huntsville, ON	URBANCOK, Michael Fonthill, ON	
MATUTINOVIC, Milenko North York, ON	ROBERT, Joseph Eugene Gatineau, QC	USHER, George Robert Oakville, ON	
MCCANN, James Brian Mississauga, ON	SABATA, Petr Jan Peterborough, ON	USSHER, Terence Harvey Toronto, ON	
MCDONALD, David Allen Ottawa, ON	SAUNDERS, Alan Orr East Garafraxa, ON	VISNESKI, Robert Joseph Brockville, ON	
MCGEORGE, Donald Dolsen Chatham, ON	SAUNDERS, Lloyd Ellwood Cookstown, ON	WARREN, George Clinton Toronto, ON	

TIME TO SPEAK UP FOR ENGINEERING

By Jeannette Chau, P.Eng., Howard Brown and Mike Winterburn

On June 7, Ontario voters will have elected a new government. Provincial elections are vitally important because Queen's Park is responsible for so many decisions—on topics ranging from healthcare to highways and education to energy—that impact our daily lives.

This is especially true for the engineering profession. The *Professional Engineers Act* (PEA) is a creation of the legislature and the attorney general is accountable for it to MPPs. This is the legislation that defines engineering as a profession and gives PEO responsibility for regulating it in the public interest.

The PEA is not a stagnant law but is, in fact, one that was recently updated by the legislature. It was strengthened as part of Bill 177, the *Stronger, Fairer Ontario Act (Budget Measures)*, which passed in a vote on December 14, 2017 (see *Engineering Dimensions*, March/April 2018, p. 25).

Bill 177 is a great example of how collaboration between PEO and government can benefit the public interest. As well, it shows the value in electing MPPs who understand engineering.

This year, the Ontario Society of Professional Engineers (OSPE) has launched a public campaign, #EngineeringAlly.

Engineering has long been called the silent profession—but no more. OSPE is supporting Ontario's 80,000 professional engineers to get loud, become engaged and ask more of their government. The Engineering Ally pledge asks current and future MPPs to make key, high-level commitments to support the success of our engineering community for the benefit of all Ontarians and the communities they work, live and play in. They will be asking election candidates from all parties to sign a five-point pledge to become an Engineering Ally and support Ontario's engineering community.

More information on OSPE's #EngineeringAlly

campaign and a copy of the pledge can be found at www.engineeringally.ca.

PROFESSIONAL ENGINEERS DAY

"Engineers make important contributions to the strong and innovative ecosystem we have built over the past 15 years," said Granville Anderson, MPP (Durham), in the legislature when he presented a private member's bill to make March 1 Professional Engineers Day in Ontario. "Engineers support growth and productivity in all of our province's major sectors."

The bill, a result of another great initiative by OSPE, was passed unanimously. This is the first profession to be recognized by the Legislative Assembly of Ontario for an official day and the first of its kind in Canada.

"It is very important to me that we take time to celebrate engineering professionals," Anderson said. "Madam Speaker, professional engineers are the people we trust to innovate, design, build and safeguard the world around us. They abide by a strict code of ethics under the *Professional Engineers Act* that demands fairness and loyalty, fidelity to public needs, personal honour and professional integrity, and continuous professional development."

ENGAGE IN ELECTIONS

Of course, another way to create strong links between the profession and government is to encourage more engineers to run for office. There were only two MPPs elected in the last election that were engineers: Jim McDonnell, MPP (Storont-Dundas-South Glengarry), and Jack MacLaren, MPP (Carleton-Mississippi Mills). Clearly, we need to elect more people with a P.Eng. as MPPs.

When there are no engineers on the ballot, it's still important for professionals to get involved and engage with their local candidates.

While PEO will never recommend a particular candidate or party, it is always important to support good people running in your own riding. This coming election will provide many great opportunities for PEO members to get to know local candidates and get involved. Election campaigns are a time to speak up, so let's make sure the voice of professional engineers is heard. **e**

Jeannette Chau, P.Eng., is the manager of government liaison programs for PEO. Howard Brown is president of Brown & Cohen Communications & Public Affairs Inc., and PEO's government relations consultant. Mike Winterburn is an account director at Brown & Cohen Communications & Public Affairs.



INTRODUCING PEO COUNCIL 2018-2019

Executive Committee



David W. Brown, P.Eng., BDS, C.E.T., IntPE, MCSCCE President

David Brown is both a senior managing partner and practising structural engineer with TaskForce Engineering Inc., a Belleville-based design-build firm that specializes in the ICI construction sector. He is

a founding partner of TaskForce and holds a diploma in civil engineering technology from St. Clair College of Applied Arts and Technology and a bachelor of applied science in civil engineering from Queen's University. Brown is a member of PEO, the Ontario Society of Professional Engineers, Canadian Society for Civil Engineering, and Ontario Association of Certified Engineering Technicians and Technologists (OACETT). Brown also sits as a board member for Engineers Canada and is the board representative to the Canadian Engineering Accreditation Board. He also represents PEO as a board member for the OACETT. Aside from his work at PEO, Brown has volunteered extensively within his community and, in particular, with the United Way, where he was a past chair of the Campaign Committee. He is very happily married to his wonderfully supportive wife, Liza, and they have four amazing children. dbrown@peo.on.ca



Bob Dony, PhD, P.Eng., FIEE, FEC Past President

Bob Dony holds BAsC and MASc degrees in systems design engineering from the University of Waterloo and a PhD in electrical and computer engineering from McMaster University. He is an associate professor in the School of Engineering,

University of Guelph in the biomedical engineering program. Licensed by PEO in 1989, Dony has served on numerous PEO committees before and since his election to Council as councillor-at-large in 2012. In 2016, he was elected as president-elect and served as president of PEO for the 2017-2018 Council year. In addition to his service to PEO, Dony was co-editor-in-chief, *Canadian Journal of Electrical and Computer Engineering*, Institute of Electrical and Electronics Engineers (2008-2011), past member of Engineers Canada's Canadian Engineering Qualifications Board (2001-2004), and current PEO representative on Engineers Canada's Canadian Engineering Accreditation Board since 2014. PEO has a responsibility to the people of Ontario to regulate the profession with diligence and transparency, and with a diversity of voices brought to the table, at all levels within the association, that reflects the society whose safety we are entrusted to safeguard. bdony@peo.on.ca



Nancy Hill, P.Eng., LLB, FEC, FCAE President-elect

Nancy Hill is a professional engineer, lawyer, patent agent and trademark agent. She is a founding partner of the award-winning firm Hill & Schumacher. For over 25 years, Hill has been managing intellectual property rights for clients worldwide, including

many universities across Canada. Considered an expert in her field, Hill's area of focus is in robotics, structural steel, healthcare and green energy, with many of her clients going on to win prestigious awards for their innovations. As a sought-after speaker on intellectual property rights, Hill has given talks at the Ontario Centres of Excellence, the Law Society of Upper Canada, the Certified General Accountants of Ontario, as well as many PEO chapters. She has over 20 years of experience volunteering with PEO, including as past chair of the Complaints Committee, past chair of the Awards Committee, and past chair of the Women in Engineering Advisory Committee, and was invested in 2008 as a Companion in the Order of Honour. In 2014, she was recognized for her influence on the engineering profession in Canada by being inducted as a fellow of the Canadian Academy of Engineering. In 2017, she was named one of Canada's Top 100 Most Powerful Women. Hill has worked tirelessly to promote positive change within PEO, and was instrumental in amending the *Professional Engineers Act* to include harassment as part of the definition of professional misconduct. As vice chair of the Council Term Limits Task Force, Hill was instrumental in getting Council to approve term limits for all elected councillors. nhill@peo.on.ca



Marisa Sterling, P.Eng., FEC Vice President

Marisa Sterling is assistant dean, inclusivity and diversity at York University's Lassonde School of Engineering. She leads the 50:50 Challenge to be the first engineering school in Canada to reach gender parity. Sterling is a champion of Engineers

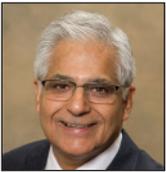
Canada's 30 by 30 goal, co-creator of Canada's first online Inclusion Lens: Event Management Tool for an engineering school, and champion of the Engineering Change Lab, a group of innovators and leaders exploring ways to transform Canada's engineering community to better steward technology to solve society's challenges. A chemical engineer from the University of Toronto and a member of the Oxford Business Alumni Network, Sterling previously worked in the consumer products industry in R&D and brand management, and for PEO as manager of enforcement. She has written about workplace safety and ethics. Sterling is the elected president of the charity Ontario Professional Engineers Foundation for Education. She created a membership category for PEO chapters and increased by 50 per cent the financial assistance given in annual student scholarships to nurture tomorrow's engineers. For EIT leadership development, Sterling helped create PEO's G. Gordon M. Sterling Engineering Intern Award and aids the annual selection. She received the University of Toronto's Arbor Award in 2015, the Engineers Canada Meritorious Service Award for Community Service in 2016, named a Woman of Distinction by the Canadian National Exhibition Association in 2016, made a fellow of Engineers Canada in 2017 and received the Canada 150 Heritage Pin in 2018. In her spare time, Sterling enjoys yoga, travelling and SCUBA diving. msterling@peo.on.ca

**Kelly Reid, P.Eng., IACCM CCMP
Vice president (appointed)**

Kelly Reid graduated first division from the University of New Brunswick, Fredericton with a bachelor of applied science in chemical engineering, nuclear and power plant option. She has over 20 years of nuclear engineering experience and has worked at Atomic Energy of Canada Limited, Nuclear Safety Solutions Limited, and Ontario Power Generation. Her primary technical focus has been thermal hydraulic safety analysis. At Pickering Nuclear Generating Station, Reid provided technical support to assess and manage nuclear safety risks. In 2004, she was recognized with a Chief Nuclear Officer award for dedication and commitment. She was responsible for a large portion of the Integrated Safety Review to support the Darlington Nuclear Generating Station Refurbishment and she managed a variety of important contracts for the Darlington refurbishment project. Reid is currently working in quality engineering with her prime role being to increase proficiency (i.e. how to perform work well) in the Darlington Refurbishment Engineering Division. In 2003, Reid represented her colleagues during the successful negotiation of the first NSS-Society collective agreement. In 2009, she attended the World Nuclear University Summer Institute at Oxford University. In 2018, she will present her abstract on engineering proficiency at the International Conference on Quality, Leadership and Management in the Nuclear Industry. She and her engineer husband Scott love to travel and take mini-adventures, such as dog sledding, gliding, hot air ballooning or whatever else takes their fancy. At home in Ajax, they dote on their cat. kreid@peo.on.ca

**Michael Kwok-Wai Chan, P.Eng., FEC**

Michael Chan is a former manager of chapters with PEO, a project manager with SHL Systemhouse and a regional director with Olivetti Canada Limited. As PEO chapter manager for eight years, Chan helped develop PEO's Government Liaison Program (GLP) and associated chapter GLP committees. He established principled administrative processes to effect the requisite changes with an emphasis on fairness and transparency. His efforts led to many significant improvements and advancements in the chapter system. After retiring from PEO, Chan began volunteering for the association. He joined the executive of the Willowdale/Thornhill Chapter where he helped improve the chapter's business plans, activity reports and operations. He also invigorated the chapter's government relations efforts while chairing its GLP Committee for two years. Chan also served on PEO's Advisory Committee on Volunteers, including three years as chair. Currently, he serves as vice chair of the Finance Committee and a member of the Discipline and Registration committees. Besides his volunteer commitments with PEO, Chan has served as a member and past president of the Federation of Chinese Canadian Professionals and a past co-chair of the Chinese Community Liaison Committee of Toronto Police Services 42 Division. He was awarded the Ontario Professional Engineers Awards Citizenship Award in 2007 and inducted as a Member in PEO's Order of Honour in 2015 to recognize his contributions to PEO and the profession. This year, he was selected as a recipient of the Canada 150 Medal for outstanding contributions and service to the community. mchan@peo.on.ca

**Ishwar Bhatia, MEng, P.Eng.**

Ishwar Bhatia completed his BEng in 1970 and his MEng (civil engineering) at Dalhousie University in 1972. After starting in consulting with McNeely and Northland Engineering, he joined the City of Ottawa in 1974 as head of sewer maintenance. For 30 years, after joining the city—eventually taking on the role of senior project leader in infrastructure—Bhatia supervised project managers, oversaw environmental assessments, hired consultants and managed multi-million-dollar complex construction projects. From 2009 to 2011, he once again joined the consulting engineering industry

with GENIVAR to start up its municipal group. He has twice volunteered as president of Ottawa's Civic Institute of Professional Personnel. Bhatia served on PEO Council from December 2008 until June 2016 as a lieutenant-governor-appointed councillor under three different attorneys general. He served on the Executive, Audit (chair), Finance (vice chair), Discipline and Government Liaison committees, and 40 Sheppard Task Force (chair) and was a vice chair of the Chapter Leaders Conference in 2017. Bhatia has served on several discipline panels and obtained certification from the Society of Arbitrators and Regulators. He has been elected as Eastern Region councillor for a two-year term and will serve from 2017-2019. ibhatia@peo.on.ca

Councillors-at-Large

**Roydon Fraser, PhD, P.Eng., FEC**

Roydon Fraser received a bachelor's degree in engineering physics at Queen's University and his master's degree and doctorate in mechanical and aerospace engineering from Princeton University. He is a professor in the mechanical and mechatronics engineering department at the University of Waterloo. He joined PEO in 1991, serving on the executive of the Grand River Chapter (formerly the Kitchener-Waterloo and Guelph-Cambridge chapters) starting in 1993, and chairing the chapter in 1996. Fraser supervises the University of Waterloo Alternative Fuels Team (UWAFT), which competes internationally in the Advanced Vehicle Technology Competitions (AVTCs), such as the current EcoCar 3 Competition, with the goal of offering unparalleled hands-on, real-world experience to engineering students. He received the 2014 National Science Foundation Outstanding

Long Term Faculty Advisor Award. Over a multi-year design and build cycle, UWAFT achieves reduced fuel consumption, greenhouse gas emissions and tailpipe emissions, all while maintaining consumer acceptability in the areas of performance, utility and safety. UWAFT is proud to have built the world's first, student-built, fuel-cell vehicle to complete successfully all of AVTC's production vehicle tests. Fraser's research interests include vehicle powertrain design, vehicle emissions health impacts, compressed air energy storage, deep geothermal energy, thermoacoustics, oilsands tailings pond elimination, and remote sensing indicators of urban, crop and ecosystem health and development. He is a member of the Society of Automotive Engineers, the American Society of Mechanical Engineers, and the Ontario Society of Professional Engineers, and is a lifetime member of the Sandford Fleming Foundation. He serves on PEO's Academic Requirements and Discipline committees, both since 1999. rafraser@uwaterloo.ca

Kelly Reid, P.Eng., IACCM CCMP
(see Executive Committee)



Gregory Wowchuk, P.Eng.

Gregory Wowchuk holds a BAsC degree from the University of Windsor and a diploma in electrical technology from the former Ryerson Polytechnical Institute (now Ryerson University), reflecting his affinity for both the theoretical and the practical.

Along with his engineering education, Wowchuk has taken courses in psychology and effective communication. He won second prize in the 1982 Ontario Engineering Design Competition. Wowchuk began his career with Spar Aerospace Limited, and is currently president of Wheatfield Instrument Corporation Ltd. and a special advisor to Dynamic Solutions Institute of Applied Knowledge Inc. in Detroit. Wowchuk was a lieutenant governor-in-council appointed PEO councillor (1997-2000) and chair of the former Communications Committee

(1997-1999). He was also a co-founder of Engineers for Engineers (1997), Ontario Engineers for Democracy on Council (2011) and Ontario Engineers for Grassroots Democracy (2017). He is an ardent supporter of the self-regulation model of our profession and speaks often against bureaucracy and waste. His commitment to grassroots democracy spans several decades. He served as a provincial returning officer (Etobicoke-Lakeshore) from 1998 to 2003 and has co-founded several citizens' advocacy groups. He was also president of the Etobicoke Historical Society (2004-2007). Wowchuk holds a black belt in Japanese karate and is an aficionado of old cars and enjoys pulling, modifying and rebuilding their engines. Wowchuk views the role of PEO Council primarily as serving the profession, consistent with protecting the public interest. He firmly believes these functions are not mutually exclusive. gwowchuk@peo.on.ca

Regional Councillors

EASTERN REGION COUNCILLORS

Ishwar Bhatia, MEng, P.Eng.
(see Executive Committee)



Guy Boone, P.Eng., FEC

Guy Boone was re-elected in February 2018 for a second term as Eastern Region councillor, after serving as PEO Ottawa Chapter (oPEO) 2015 chair, and PEO Government Liaison Program (GLP) 2013 and 2014 committee chair. Boone joined the Ottawa Chapter executive in 2008 after serving as PEO

Algonquin Chapter vice chair. As a public safety engineer for certification of products, machines and systems, Boone has had first-hand experience protecting the public and influencing safety designs and practices on a daily basis. He is an electrical engineering graduate from Memorial University of Newfoundland, and a safety advisor with SafetyGuy Consulting Inc. Previously, he worked with Alcatel, Nortel and Nemko Canada as a product safety engineer, and as a system safety engineer with Atomic Energy of Canada Ltd. and Alcatel Transportation. Boone is a strong, active advocate for the engineering profession, serving on OSPE's Chapter Liaison Committee and working within both oPEO and OSPE to initiate and develop unique programs to support the engineering profession in the greater Ottawa region. These included joint social and technical seminars, engineering employment events (OSPE E3), joint GLP/PAN meetings with MPPs, and the 2015 launch of the oPEO/OSPE Engineering Innovation Ecosystem program. Boone is a tireless advocate for services engineers need and supports co-operation among PEO, OSPE, Engineers Without Borders, learned engineering societies (IEEE, IET, CIMarE/SNAME, INCOSE, cISSS and SRE Ottawa) and the faculties of engineering at University of Ottawa and Carleton University. Councillor Boone plans to seek public office as Ottawa city councillor. gboone@peo.on.ca

EAST CENTRAL REGION COUNCILLORS



Thomas Chong, MSc, P.Eng., FEC, PMP, FCAE

Thomas Chong earned a master's degree in mechanical engineering from University of Strathclyde, Glasgow, Scotland, in 1973. He became a fellow of the Canadian Academy of Engineering in 2017; fellow of Engineers Canada in 2011; International

Project Management Professional (PMP) in 2009; senior member, American Institute of Industrial Engineers in 1977; PEO member in 1976; and Chartered Engineer (Britain) in 1974. Chong was recruited from London, England, by Nortel Canada as a corporate engineering manager in 1976. Since 2008, he has been president of the 4000-member East Asian Network in the Ontario government and currently works as system lead with the Ministry of Health and Long-term Care. Chong won a Gold Medal and Canada Cup 2016 and 2014 in dragon boating. His OPS Ride for Heart team won the Gold Wheel Award in 2015 and 2014. Chong received an Amethyst Award twice, in 2014 and 2009, won the ACE award from the Ministry of Health and Long-term Care in 2015 and 2014 and received a Queen Elizabeth II Diamond Jubilee Medal in 2013. Since 2009, he has won 15 other major awards. Chong has been a mentor, York University engineering design program since 2008; mentor, Chinese Professionals Association of Canada (CPAC) since 2008; Knight of Columbus and Lector, St. Agnes Tsao Church since 2011; founding member, Popular Music Club since 2007; and former board member, Legal Aid Ontario Clinic, 2004 to 2009. Chong was vice president (elected) 2014; vice president (appointed) 2013; East Central Region councillor 2006 to 2013; and director, York Chapter, 2000 to 2008; Human Resources Committee, 2015 to present; Audit Committee, 2006 to present; Discipline Committee, 2012 to present; and Government Liaison Program, 2006 to present. Chong has published many technical papers. thomas.chong3@gmail.com



Keivan Torabi, PhD, P.Eng.

Keivan Torabi has four chemical engineering degrees: BSc, MSc, MASc and PhD. His diverse educational background includes areas such as computer simulation, polymer characterization, and his PhD thesis was in application of artificial intelligence and machine learning technics, combined with com-

puter vision, for real-time image analysis at the University of Toronto. Torabi was also a seasonal instructor at the University of Toronto and Ryerson University between 2004 and 2007. He has more than 25 years of engineering experience in oil and gas and nuclear power generation. He has worked in the Canadian nuclear industry (CANDU) for the past 19 years with broad experience in different areas, mostly focused on nuclear safety and licensing. Torabi has worked at Ontario Power Generation (Pickering and Darlington nuclear stations) as well as Atomic Energy of Canada Limited, Candu Energy (SNC-Lavalin) and AMEC-Foster Wheeler. He is a first-generation immigrant, a talented self-taught artist (in oil painting), an avid tennis player and an executive member of Valley Tennis Club in North York for the past six years. The primary reason for Torabi's decision to run in the recent PEO elections was to encourage other engineers in the East Central Region to get involved in PEO and participate in the recent PEO policy and strategy discussions that have been happening over the past couple of years, which will have a direct impact on all of us and will affect our career and the way we practise engineering. ktorabi@peo.on.ca

NORTHERN REGION COUNCILLORS



Ramesh Subramanian, PhD, P.Eng., FEC

Ramesh Subramanian received his PhD in chemical engineering from the University of New Brunswick, Fredericton in 1994, and completed postdoctoral fellowships at the University of New Brunswick, University of Wisconsin-Madison and McMaster University before joining Laurentian University in Sudbury as assistant professor in January 2002. He

was the director of the Bharti School of Engineering at Laurentian University (2010-2016), a member of the Council of Ontario Deans of Engineering (including serving as vice chair from 2013-2015 and chair from 2015-2016) and National Council of Deans of Engineering and Applied Science (including the Deans Liaison Committee from 2013-2016). He is a fully licensed P.Eng. in Ontario since 2008 and a new fellow of Engineers Canada with volunteering experience at the Sudbury Chapter (including secretary, vice chair and chair), PEO's Academic Requirements Committee (since June 2013 and the current vice chair), and Canadian Engineering Accreditation Board visits (since January 2014). Subramanian is committed to the core principles of protecting public safety, engaging PEO membership, modernizing the governance of PEO to remain as a good self-regulator, engaging stakeholders through PEO chapters, advancing PEO's mission, and seeing increased relevance and value of a P.Eng. licence to the public, engineers and engineering graduates through improved enforcement, discipline and licensing processes. A passionate grassroots, community-oriented engineering educator and mentor, he would like to see PEO establish successful outreach programs for recruiting and retaining women in engineering and help female engineers seamlessly proceed through the licensure process.

rsubramanian@peo.on.ca



Serge Robert, P.Eng.

Serge Robert was born and raised in Timmins, a mining community located in the heart of northeastern Ontario. Having completed his civil engineering post-secondary studies in the north at Northern College in Porcupine and Lakehead University in Thunder Bay, Robert started his structural engineering career in Bradford as a truss designer for a leading building component manufacturer. Robert first began his involvement with PEO when he made the move back home to the north 11 years ago to join a local consulting firm. Starting at the chapter level, Robert has enjoyed many years of volunteering, which led to his appointment as Northern Region councillor in 2014-2016. The calling of a father and mid-career professional necessitated a step back for a few years and he is happy to return to the Council table starting in 2018. Now employed in the public utility sector, Robert is excited to bring the Northern Region's voice to Council. srobert@peo.on.ca

WESTERN REGION COUNCILLORS



Lola Mireya Hidalgo, P.Eng., PMP

Lola Mireya Hidalgo is an engineer and proud P.Eng. with the Ministry of Transportation's provincial highways management division. Hidalgo began her career with the MTO Engineering Development Program after graduating from Concordia University in civil engineering. She progressed to more senior

roles and now works in the provincial Contract Management Office in St. Catharines, Ontario. Hidalgo has gained diverse engineering experience, including working in Latin America, Asia and over five different Canadian cities in the private, public and non-profit sectors. She has recent experience in the transportation infrastructure construction, engineering, maintenance, 3P and policy areas. Hidalgo was raised in Montreal and is now a proud resident of Burlington, Ontario. She has a long history of serving her local communities and chose the engineering profession as it allowed her to pursue her commitment to contribute to improving social infrastructure. She has been actively involved with groups such as Tomorrow Ontario's Public Service, Project Management Institute, Canadian Red Cross, AIESEC, Engineers Without Borders, Transportation Association of Canada, municipal advisory committees and the Canadian Society for Civil Engineering. Recently she volunteered for Burlington's Sound of Music Festival and 2017 North American Indigenous Games. She enjoys playing piano, continuous learning, travelling with her supportive husband (who is also a P.Eng.) and meeting new people with diverse opinions. Hidalgo is passionate about giving back to those in her community and is honoured to serve on PEO Council and proud to represent the beautiful Western Region. lhidalgo@peo.on.ca



Gary Houghton, P.Eng., FEC

Gary Houghton graduated from Western University with a bachelor of engineering science. He has been a professional engineer since 1979. Houghton has spent over 30 years in consulting, working primarily on environmental projects in water and wastewater. He had the opportunity to plan and design several

significant water treatment, transmission and distribution projects in southwestern Ontario. He is currently director, engineering for Norfolk County, overseeing planning and capital projects in water, wastewater, roads, bridges and stormwater. He has been a member of the PEO Enforcement Committee since 2000, and given the designation fellow of Engineers Canada. He assisted in the founding of the London Chapter of Consulting Engineers of Ontario. He has been a member of the Ontario Water Works Association (a section of AWWA) board for several years, serving as president in 2015-2016. He is an NFPA and Ontario Fire Marshal certified firefighter with additional NFPA certification in water rescue and is an active firefighter with Central Elgin Fire Rescue. Pastimes include restoring, driving and riding old cars and motorcycles. ghoughton@peo.on.ca

WEST CENTRAL REGION COUNCILLORS



Warren Turnbull, P.Eng.

Warren Turnbull is a retired executive with over 33 years of engineering and senior sales management experience. He holds a B.A.Sc. from the University of Waterloo. Turnbull led many multi-disciplinary teams related to instrumentation, product design, maintenance, marketing and sales. Turnbull moved

from successful assignments in engineering, customer technical and product development to senior marketing and sales roles at DuPont Canada Inc., Continental Group of Canada Ltd., Fabrene Inc., Flexia Corporation and Intertape Polymer Group. Turnbull was on PEO's North Bay Chapter board and rose to become chair. For the last three years he has served as West Central Region councillor and has been on the Joint Relations Committee with OSPE for two years, vice chair and chair of the Chapter Leaders Conference committee, a member of the (CP)² Task Force, member and chair of the Volunteer Leadership Conference Planning Committee, a member of the Finance Committee and the Discipline Committee and chair of the Regional Councillors Committee and the Government Liaison Committee. For the previous five years, he held positions on the Oakville Chapter executive, including event coordinator and chair, chapter chair for two years and past chair. Turnbull led implementation of Oakville's first all-day symposium, "The Future of Energy in Ontario," which resulted in an ongoing partnership with the Oakville Chamber for future events. The chapter also partnered with local businesses and the town to encourage innovation in Oakville and Halton. Turnbull served on the Glen Abbey Residents Association board and was president for two terms. He chaired the Group Homes Advisory Committee for Oakville. wturnbull@peo.on.ca



Lisa MacCumber, P.Eng.

Lisa MacCumber currently works as a senior engineer in the business transformation branch at the Ontario Ministry of Environment and Climate Change, primarily developing technical requirements for new and amended legislation and regulations related to the environment, recom-

mending business process improvements and writing technical guidance documents. MacCumber has also worked as the team lead in the automotive unit of the advanced manufacturing branch at the Ministry of Economic Development, Training, Research and Employment. Previously, MacCumber worked in the private sector as a project engineer in the automotive industry and rubber industry. She graduated from Queen's University with a bachelor of applied science, chemical engineering degree. MacCumber is a member of PEO, the Ontario Society of Professional Engineers (OSPE) and the Water Environment Association of Ontario. She has volunteered with PEO at the chapter level in Mississauga, serving as chapter chair and past chair, Women in Engineering Committee chair and Environment Committee chair. She is currently a ministry observer on a PEO practice standard subcommittee. MacCumber was also a member of the Women in Engineering Advisory Committee of OSPE for several years. Her other volunteer interests include working with the Applewood Homeowners Association and Westies in Need dog rescue. In her spare time, she enjoys curling in the Engineer's Curling League, swimming, pilates, gardening, cooking and baking, and spoiling her West Highland terrier Grady. MacCumber is also married to a wonderfully supportive engineer husband, Chris. lmaccumber@peo.on.ca

Appointed Councillors

Michael Kwok-Wai Chan, P.Eng., FEC
(see Executive Committee)



Lorne A. Cutler, MBA, P.Eng.

Lorne Cutler graduated with a BAsC in chemical engineering from the University of Toronto in 1979. He worked for Dow Chemical for four years in Fort Saskatchewan, Alberta before returning to Ivy School of Business at Western University where he completed his MBA in 1985. Cutler joined Export Development Canada (EDC) in 1985 where he was responsible for signing loans in excess of \$1 billion in India and the countries of central and eastern Europe and the former Soviet Union. In his capacity as senior advisor, Africa, Europe and Middle East in EDC's International Business Development Group, Cutler was primarily responsible for country and sector development strategies, relationship management with Canadian banks and exporters interested in the region, and implementation of financing

facilities with international financial institutions. Upon early retirement in 2009, Cutler started a consulting firm, LAC & Associates Consulting, focused on the areas of policy analysis and development, training, personal finance, municipal finance, small business consulting, social finance and international business development. For the past several years, Cutler has delivered a Professional Practice Exam training course for internationally trained engineers for OSPE. He received a Queen Elizabeth Diamond Jubilee Medal and Ontario Volunteer Services Awards for his volunteer work with such organizations as Ottawa Community Loan Fund, a micro-finance institution, and Jewish Family Services of Ottawa. For several years, Cutler has also been president of his local community association and treasurer of the Federation of Citizens' Associations, an umbrella group of Ottawa community associations. lcutler@peo.on.ca



Qadira C. Jackson Kouakou, BA, BSW, LLB

Qadira Kouakou is the principal lawyer at Jaxon Law Professional Corporation, practising in the areas of wills, estates, corporate and real estate law. Kouakou holds a bachelor of arts degree in psychology, a bachelor of social work degree and a certificate in dispute resolution from York University, and a bachelor of laws degree from the University of Windsor. She articulated with the Canadian Union of Public Employees and was previously a social worker with experience at the Children's Aid Society, Toronto District Catholic School Board, Woman Abuse Council of Toronto and Wholistic Child and Family Services. Kouakou's community involvement includes serving as an executive board member with the Canadian Association of Urban Financial Professionals, the Canadian Association of Black Lawyers, Black Pearls Community Services and serving on the Equity Advisory Group and as a community liaison for the Law Society of Upper Canada. qjackson@peo.on.ca



Tim Kirkby, P.Eng.

Tim Kirkby is a former owner and principal with TFK Engineering, project officer of a branding project for Service Canada, executive corporate advisor with the director general of Public Works Canada, and team technical designer of the Universal Classification System with the Treasury Board of Canada. His community involvement includes serving as president of the United Way for the City of Cornwall, chair of the National Applied Science and Engineering Group of the Professional Institute of Public Service and previously as a member of the board of governors for St. Lawrence Community College, Cornwall General Hospital and vice chair of the Township of South Glengarry Economic Development Committee. Kirkby holds a bachelor of engineering degree in civil engineering from Lakehead University. He lives in Summerstown, Ontario with his wife Sue and two horses, Barney and Rainbow. Originally from Gananoque and growing up on Howe Island has influenced his appreciation of waterfront communities. Realizing a lifetime goal to join Council is celebrated and respected. Thank you to all friends and supporters! tkirkby@peo.on.ca



Lew Lederman, QC

Lew Lederman is a consultant/businessman (Knowledge E*Volutions Inc.), lawyer (Lew Lederman QC of Ottawa and Toronto) and Canada representative (and Innovation Council member) for Capital Expert Services, LLC of Washington, DC. Over the course of his career, Lederman has worked in most

major legal and business sectors, including private practice at Gowling & Henderson (now Gowling WLG) and Fraser & Beatty (now Dentons); and business and government as general counsel and corporate secretary and executive management member, first at the Canadian Payments Association (now Payments Canada) processing then some \$11 trillion p.a. (now \$50 trillion) and subsequently Canada Deposit Insurance Corporation with revenues then of \$500 million p.a. Lederman's current focus, in addition to work at PEO, includes, in law, governance, regulation and problem-solving generally, and in consulting, potentials in pharma and in artificial intelligence. Lederman's booklets and papers include *Big, Bang, Boom: Adventures in Banking, A Declaration of Independence for Boards, Shakespeare on Audit Committees, and Watch Out, He Bites: A Zoology of Dangerous Businessmen*. Lederman has also served on several boards, including the Council of the Ontario College of Pharmacists, the International Ship-Owners Alliance of Canada and the Ottawa Symphony Orchestra. lew.lederman@ledlaw.com



Iretomiwa Olukiyesi, P.Eng.

Iretomiwa Olukiyesi's 25 years of experience in mechanical/manufacturing/production/engineering cuts across various industries, such as construction, automobile and consumer goods. She started her career in manufacturing as a pioneer line manager with Procter and Gamble (Nigeria) Limited where

she successfully led technical teams through various stages/cycles from initial installation, execution/implementation to support/maintenance. She was promoted to department manager in the production operations of the company for a couple of years, after which she went to work in the supply chain organization where she consolidated eight warehouses into one central warehouse. Afterwards, she spent time in HR as a talent acquisition manager. She spent nine years with the company before she migrated to Canada. Olukiyesi had a short stint with Daimler Chrysler on a third-party contract as a throughput/efficiency engineer before joining 3M Canada, her current employer, as a senior manufacturing engineer. With 3M Canada, she has worked in various capacities as manufacturing, supply chain supervisor and currently as the lead in outsource manufacturing. Olukiyesi obtained her master's degree in advanced design, manufacturing and business from the University of Toronto. She is a licensed member of PEO and currently serves as a lieutenant-governor-appointed councillor and as the Council liaison for PEO's Education Committee. Prior to being appointed to serve on Council, she volunteered for seven years with the London Chapter of PEO as government liaison person, government liaison chair, member of the Education Committee, leader of the women in engineering and as the chapter secretary. She is actively involved as a volunteer with various charities in Canada and abroad. She mentors several people in the community and is happily married, blessed with two loving children.

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Nadine Rush, C.E.T.

Nadine Rush graduated from the environmental engineering technology program at Georgian College and is a certified engineering technologist with the Ontario Association of Certified Engineering Technicians and Technologists (OACETT). Rush's career began while working for a family-run

mechanical engineering business that specialized in fluid power. She then joined an engineering consulting firm and was involved with various infrastructure and environmental projects. Her career continues within the City of Barrie's engineering department as a development services technologist reviewing development applications and projects. Rush spent four years as chapter chair of the Georgian Bay Chapter of OACETT. As past chair she continues to be involved in organizing events, encouraging participation and promoting chapter growth. Rush is a member of the OACETT Nominating Committee responsible for candidate interviews and recommendations. She also chaired the local organizing committee for National Engineering Month comprised of members from OACETT Georgian Bay and PEO's Simcoe-Muskoka Chapter. nrush@peo.on.ca



Marilyn Spink, P.Eng.

Marilyn Spink's 30-year engineering career began in northern Ontario's mining and pulp and paper industries and then moved to steelmaking operations in both the US and Canada. After executing capital projects with Dofasco, she moved into the consulting engineering EPCM world, working on

large, complex mining and minerals projects around the world. At Hatch, SNC-Lavalin, Wardrop (now Tetra Tech) and Golder Associates, as a multi-discipline engineering manager and a process engineer at heart, she led and supported teams of professional engineers and designers. Giving back to the engineering profession is also important to Spink via her lieutenant governor appointment to PEO Council and by contributing to several PEO committees and task forces in her role as a PEO councillor. She has been a licensed professional engineer (PEO) since 1995, is a member of the Ontario Society of Professional Engineers (OSPE) since 2000, the year OSPE was created, and a long-time member of several mining industry associations and was honoured to be selected to participate in the Canadian Institute of Mining & Metallurgy's Distinguished Lecturer program. Her long-term goals are to build board/directorship experience to feed her strong interest in corporate governance and to ensure the voice of engineering is heard at the boardroom table. Spink is married to Jamie Gerson, also a professional engineer, who is extremely supportive of all her interests and a wonderful father to their three children.

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PROTOTYPING PEO's 2018-2020 STRATEGIC PLAN

By Michael Mastromatteo

Ontario's engineering regulator continues to fine-tune its latest three-year strategic plan by way of consultation, data collection and a high-level refinement effort aimed at directing the most appropriate new ideas and proposals into the final product.

The 2018-2020 Strategic Plan, developed under the guide-words "protect, engage, advance," now features nine strategic objectives in three specific focus areas (see sidebar). The plan was approved by PEO Council in November 2017 and its progress will be reviewed by Council on a quarterly basis.

As approved, the focus areas and strategic objectives set by the plan will determine the priorities for PEO programs and transformational change initiatives for the next three years. They will also provide guidance for Council, committees, task forces and staff.

The focus areas all pertain to the regulator's core objectives. They include protecting the public interest, engaging stakeholders and advancing PEO's mission.

The nine strategic objectives in the new plan are grouped together under one of the three most relevant focus areas. For example, the strategic objective to refine the Practice Evaluation and Knowledge (PEAK) program falls within the "protecting the public interest" focus area, while the goal of enlisting PEO chapters as a key regulatory resource is captured in the "engaging stakeholders" focus area.

The full version of the plan (www.peo.on.ca/index.php/ci_id/31717/la_id/1.htm) includes more detailed wording on how each strategic objective should be achieved. However, the more detailed annual actions (called strategies) still need to be determined each year. The process being used to produce these is a prototyping one, where initial ideas are proposed, fleshed out for feasibility and ultimately tested and implemented. As part of this process, PEO committees have been asked to develop and propose strategies by June 30.

PEO Manager of Policy Jordan Max is the lead staff resource directing the current strategic-planning process through its next stage. Max agrees the strategic plan is a top priority for PEO's policy team over the next several months. Since March, Max has delivered three webinars to all committee chairs and vice chairs and has made presentations to the Experience Requirements Committee, Advisory Committee on Volunteers, Licensing Committee, Academic Requirements Committee, Professional Standards Committee and Registration Committee so far, with others being scheduled. He is also available to present to other committees upon request.

In his webinars and presentations, Max outlines criteria for committee leaders and volunteers to propose new strategies. These criteria, approved by the senior management team, include how directly the proposals achieve the strategic objective, whether extra resources are required and how substantial the proposed change would be. Proposals must also be SMART (specific, measurable, attributable, realistic,

timebound) and not be part of the committee's original work plan.

Since several committees were assigned to each strategic objective, there is also an opportunity for those committees to work collaboratively to identify possible overlapping or intersecting issues, rather than work independently.

After the June 30 deadline, PEO's senior management team will review the proposals against the evaluation criteria and provide a recommended list to Council for consideration at its September 2018 meeting. Any 2019 operating or capital budget requests associated with recommendations will also be considered at that time.

PEO's major initiatives from the 2015-2017 Strategic Plan—delivery of the PEAK program, public information campaign, online licensing system and website redesign—will likely take up most of the strategic plan activity for the remainder of 2018.

Council will also monitor the plan's ongoing progress and the ideas offered to reach the plan's strategic objectives will be reviewed annually as part of PEO's budget-planning process.

"The strategic plan is not intended to be an action plan or work plan," Max says. "Rather, it is a forward-looking blueprint to provide PEO a common direction of more transformational changes. Specific strategies and action plans, with targeted completion dates, will flow from the plan on an annual basis over the three years." **e**

NEW STRATEGIC PLAN AT A GLANCE

Strategic objectives according to their focus area:

Protecting the public interest

- Refine the PEAK program; and
- Heighten delivery and awareness of PEO's enforcement efforts.

Engaging stakeholders

- Enhance PEO's public image;
- Enhance chapters as a valuable regulatory resource; and
- Increase influence in matters regarding the regulation of the profession.

Advancing PEO's mission

- Augment the applicant and licence holder experience;
- Redefine the volunteer leadership framework;
- Create seamless transition from student member to EIT to licence holder; and
- Enhance corporate culture.

PEAK TURNS ONE

By Bernard Ennis, P.Eng.



One year after PEO rolled out its Practice Evaluation and Knowledge program we look at the results of the association's efforts and what's in store for the future.

On March 31, the Practice Evaluation and Knowledge (PEAK) program completed its first year of operation. The program was implemented after two PEO volunteer task forces spent over three years researching, considering options and specifying the most appropriate path to meeting the regulatory goal of assuring the public that licence holders continue to maintain their professional engineering competence throughout their careers.

All professional regulators are responsible for quality assurance of the profession, and there are several mechanisms for doing this. First is the setting of minimum standards for entry into the profession, such as academic qualifications, experience requirements and evidence of good character. Second is the assessment of applicants to ensure they have met these qualification standards before being licensed to practice. Third is receiving and dealing with complaints against practitioners and disciplining those who do not comply with the basic standards of skilled and ethical practice. PEO currently provides all of these functions.

Rather than simply dealing retroactively with practitioners who have fallen below the standards of professionalism, most professional regulators also incorporate mechanisms for proactive quality assurance of practitioners. This generally involves assessing whether practising licence holders have maintained or enhanced their skills and knowledge beyond the minimum requirements for licensure. Almost all professional regulators in Canada do this by imposing mandatory continuing professional development (CPD). Many of these regulators also implement practice reviews in which an auditor visits the practitioner's workplace to observe the practitioner in action and to assess whether the practitioner has all the necessary resources, including policies and procedures, needed for competent practice.

A UNIQUE APPROACH

PEAK is not like typical CPD programs: It doesn't assume all licence holders have the same need for continuous maintenance and upgrading of skills and knowledge. Instead, the program recommends a specific number of hours a practitioner should commit to continuing knowledge activities based on the information collected through the practice evaluation questionnaire. This questionnaire acts like a practice review carried out by licence holders themselves. It provides an indication of whether practitioners have adopted and are using best professional practices.

The continuing knowledge activities recommendation is partially based on recognition of the efforts made by a practitioner or the firm to adopt best practices. It also relies on information about the kind of engineering work done by the licence holder. For example, practitioners moving their practice into a different area of engineering or practitioners who have a senior level of responsibility for engineer-

ing work likely require more hours of continuing knowledge activities than an engineer carrying out the same work for several years. Because the program is designed to make recommendations for continuing knowledge based on information like this, the program is more responsive to individual needs than typical CPD programs.

MORE THAN A CPD PROGRAM

PEAK is a multi-faceted program. Through the questionnaire, PEO collects much-needed data about the practice of professional engineering in Ontario—data that has never been accurately acquired before. For instance, we are learning how many licence holders practice in each of the recognized disciplines of engineering and how many practice in one or more disciplines, and we are collecting data about the distribution of practitioners by age and years of practice. This information will enable PEO to determine if the professional cadre, as a whole, is getting older, a fact that has implications for both PEO policy and the profession's future ability to provide the engineering services needed in Ontario. For instance, this information may confirm the impression that fewer young engineering graduates are being licensed. Information of this kind is crucially important to PEO Council's ability to make good decisions about PEO's future actions.

RESULTS SO FAR

As of March 31, 26,170 licence holders completed at least the first element of the PEAK program, the practice declaration. According to the declarations, 76 per cent of PEO licence holders are practising professional engineering. Approximately 90 per cent of these practitioners have completed the practice evaluation questionnaire and received a recommendation for the number of hours they should commit to continuing knowledge activities over the next 12 months.

During PEAK's first year, PEO engaged in an active and continuing communications campaign regarding the program. Eight articles about PEAK were published in *Engineering Dimensions*, PEO staff provided 51 presentations about the PEAK program to chapters, engineering firms, technical associations and other interested parties, and staff responded to over 1000 online or phone inquiries about the program.



Launched by PEO on March 31, 2017, the PEAK program is an innovative strategy to encourage and monitor continuing technical knowledge activities undertaken by Ontario licence holders.

NEXT STEPS

Work is progressing on second-year refinements to the program. During the past year, staff conducted surveys of those who had completed the various elements of the program to get users' reactions and identify impediments and concerns that might be reducing the number of program completions. The information obtained has been used to design and implement program upgrades.

A new ethics module was introduced on April 2. PEO and VocalMeet, the ethics module provider, have developed an integrated platform that will allow single-sign-on for users (previously, a separate registration was required when entering the VocalMeet site). The questionnaire for practising licence holders is not changing. However, a survey will be added for non-practising licence holders to learn why they are not practising and whether they intend to return to practice. **e**

Bernard Ennis, P.Eng., is the director of policy and professional affairs at PEO.

DECISION AND REASONS

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

This matter came on for hearing before a panel of the Discipline Committee on February 18 and 19, 2009; July 13 and 14, 2009; July 27 and 28, 2009; and May 16 and 17, 2011 at the offices of the Association of Professional Engineers of Ontario at Toronto.

The issue in the case is as to whether the design of Mr. Raouf H.M. Balbaa, P.Eng., and HITE Engineering Company Inc. for a suspended stage and associated mechanisms, including a cable crawler, met the standards of practice of the profession.

THE ISSUES IN DISPUTE

The allegations of the Association of Professional Engineers of Ontario (PEO) were that Raouf H.M. Balbaa (Ralph Balbaa) and HITE Engineering Company Inc. (HITE):

- a. Approved engineering design documentation containing insufficient and incorrect information which the respondents knew, or ought to have known, would be inadequate to meet the technical requirements of the bid to design and produce the main cable access platform for the Halifax-Dartmouth Bridge Commission;
- b. Approved engineering design documentation which did not meet the minimum standard expected of mechanical design drawings in so far as material specifications, weld specifications, assembly details, component details and tolerances were missing on several drawings;
- c. Approved engineering design documentation which failed to adhere to an intelligible revision scheme contrary to standard engineering practice and bid requirements;
- d. Approved engineering design documentation which was inadequate for the purpose of fabrication of the main cable access platform;
- e. Withdrew the HITE design of the main cable access platform on the false pretence that the welding fabrication did not meet the CSA W47.1 standard specified in the bid document; and
- f. Acted in a disgraceful, dishonourable and unprofessional manner.

Other issues relating to the performance of the design that were raised in the proceeding were the inability of the cable crawler to go all the way to the top of the bridge (a technical requirement), and that the designs caused indentations in the main bridge cable; thus, damaging property of the bridge owner.

THE ALLEGATIONS OF PROFESSIONAL MISCONDUCT

PEO alleges that Ralph Balbaa, P.Eng., is incompetent and/or guilty of breaching the Code of Ethics, and that Ralph Balbaa and HITE are guilty of professional misconduct as defined in the following subsections of section 72 of Regulation 941 made under the *Professional Engineers Act*:

Section 72(2)(a): negligence as defined at section 72(1); in this section “negligence” means an act or an omission in the carrying out of the work of a practitioner that constitutes a failure to maintain the standards that a reasonable and prudent practitioner would maintain in the circumstances;

Section 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;

Section 72(2)(c): failure to correct or report a situation that the practitioner believes may endanger the safety or the welfare of the public;

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

- Section 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 a practitioner;
- Section 72(2)(e): signing or sealing a final drawing, specification, plan, report or other document not actually prepared or checked by the practitioner;
- Section 72(2)(h): undertaking work the practitioner is not competent to perform by virtue of the practitioner's training and experience; and
- Section 72(2)(j): conduct or an act relevant to the practice of professional engineering that, having regard to all the circumstances, would reasonably be regarded by the engineering profession as disgraceful, dishonourable or unprofessional.

In written submissions, PEO withdrew the allegations of incompetence, as well as allegations relative to subsections 72(2)(c) and 72(2)(h) of the regulation.

PLEA OF THE MEMBER AND/OR HOLDER

Raouf H.M. Balbaa, P.Eng., and HITE Engineering Company Inc. denied the allegations set out in the Statement of Allegations.

DECISION

The panel finds Raouf H.M. Balbaa, P.Eng., and HITE Engineering Company Inc. not guilty of the allegations of professional misconduct.

The panel finds Raouf H.M. Balbaa, P.Eng., not guilty of the allegations of breaching the Code of Ethics.

OVERVIEW

The panel heard allegations against Ralph Balbaa and HITE which related to the design of a cable crawler device. The cable crawler device and issues encountered during the design, fabrication and installation of the device are described in the following paragraphs.

On December 20, 2002, the Halifax-Dartmouth Bridge Commission (commission) awarded a contract to Suspended Stages, a division of Yorke Hi-Lo Stages & Hoists Inc. (SSI), for the engineering design and installation of a cable crawler device for the commission. The cable crawler device was described by the commission as "the main cable access platform" or MCAP. The MCAP was intended to carry bridge maintenance staff up and down the bridge along the main support cables of the Macdonald and MacKay bridges located between Halifax and Dartmouth, Nova Scotia.

SSI retained the services of HITE Engineering Company Inc. (HITE) for the design of the MCAP, supervision of the MCAP installation on site in Nova Scotia and assistance in developing an owner's manual. Testing of the MCAP was not included in the scope of services from HITE.

Raouf H.M. Balbaa (Ralph Balbaa) was one of the professional engineers responsible for the services provided by HITE.

The design phase of the project dated from December 20, 2002 to June 25, 2003. Throughout the design process, PEO alleges that the performance of HITE was questionable due to schedule delays, missing information on the drawings, an increase of MCAP weight (which in turn required a larger winch), and a lack of a concise revision history.

On or about June 25, 2003, SSI began fabrication of the MCAP with incomplete fabrication design drawings.

On September 4, 2003, SSI shipped the MCAP to Halifax.

On September 19, 2003, the commission advised SSI that the MCAP wheels were damaging the metal wire wrapping on the main support cable of the bridge. HITE suggested a revised wheel design to address the reported problems.

On September 28, 2003, the MCAP was damaged during a hurricane and sent back to SSI for a damage assessment and repair. At this point, HITE had concerns that the welding performed on the MCAP did not meet the CSA W47.1 standard. Issues relating to the welding were dealt with, and the MCAP was shipped back to Halifax on May 13, 2004.

On June 30, 2004, the commission advised SSI that the new wheel design was not working properly and voiced their concern over the "trial and error" method of addressing design and performance issues. The commission also indicated the MCAP was incapable of fully ascending the support cable.

WITNESSES FOR THE CASE

The panel heard evidence from the following three witnesses in this case:

Mr. Keith Yorke, president of Suspended Stages (SSI). Mr. Yorke testified for PEO.

Mr. Jon Eppell, P.Eng., an employee of the MCAP Project Consultant, O'Halloran Campbell, during the time of the project. Mr. Eppell also testified for PEO.

Mr. Nino Balbaa, P.Eng., an employee of HITE. Mr. Nino Balbaa testified for HITE.

MOTION TO QUALIFY AN EXPERT WITNESS

PEO sought to qualify an expert witness to provide opinion evidence. Defence counsel for Ralph Balbaa and HITE objected and argued that he should not be qualified as an expert witness as he did not meet the legal requirements for expert witnesses.

The panel reviewed submissions by both parties and declined to qualify him as expert in the area of the quality and standards for engineering design documentation related to mechanical structures and mechanisms, including those that support people. The panel previously provided a written decision on this issue.

REASONS FOR DECISION

The panel considered the evidence and submissions before it in reaching its decision, and finds that the six allegations put forward by PEO fail to make out a case of professional misconduct for the reasons that follow.

Allegation (a):

Allegation (a) refers to engineering design documentation containing insufficient and incorrect information. The “engineering design documentation” in this case refers to drawings which were submitted to SSI by HITE. Specifically, the drawings at issue in this matter are the drawings that, in the opinion of HITE, were “95 per cent complete” and were issued on or around April 17, 2003. These drawings were not the final drawings issued for fabrication (build authorized). The panel heard testimony from Mr. Eppell (witness for PEO) and from Mr. York (witness for PEO) that these drawings were incomplete and lacking details. The panel also heard testimony from Mr. Eppell and from Mr. Nino Balbaa (witness for HITE) that these April 17, 2003 drawings did not represent drawings that were issued for fabrication. For this reason, the panel placed more weight on the testimony of the witness for HITE.

The “build authorized” drawings were issued on May 16, 2003 (Exhibit 6), however, these drawings were not at issue with this case.

The panel was also presented various email correspondence between HITE and SSI during the design period between April 17, 2003 and May 16, 2003. It is clear from these email messages that there were still

outstanding issues that would have affected the final design of the MCAP (Exhibit 8, Tab 18, 20).

While the panel can see that the project schedule appears to have fallen behind, the panel finds Raouf H.M. Balbaa, P.Eng., or HITE Engineering Company Inc. not guilty of professional misconduct as described in allegation (a).

Allegation (b):

Allegation (b) refers to engineering design documentation which did not meet the minimum standard expected of mechanical design drawings.

For the same reasons as stated for allegation (a), the panel finds Raouf H.M. Balbaa, P.Eng., or HITE Engineering Company Inc. not guilty of professional misconduct as described in allegation (b).

Allegation (c):

Allegation (c) refers to engineering design documentation which failed to adhere to an intelligible revision scheme.

These allegations stem from a change in the numbering scheme for the drawings. The panel was presented evidence, and heard testimony, on how the drawings numbers of the first six (6) drawings did not correlate to any drawings numbers of a subsequent set of drawings. Mr. Nino Balbaa testified that the final drawing count for the project was 41 drawings.

While the panel agrees a more consistent system of drawing numbers would have been less confusing to the end user, the panel also views the original six (6) initial drawings as being preliminary in the design stage and would not necessarily be part of the final drawings.

Although the panel agrees the defendant could have done a better job in adhering to a more stringent drawing numbering sequence and revision identifiers, the panel does not find these deficiencies sufficient to amount to professional misconduct. The panel finds Raouf H.M. Balbaa, P.Eng., or HITE Engineering Company Inc. not guilty of professional misconduct as described in allegation (c).

Allegation (d):

Allegation (d) refers to engineering design documentation which was inadequate for the purpose of fabrication of the main cable access platform.

The panel heard testimony from Mr. Eppell that he approved the HITE drawings for fabrication. The reasons stated by Mr. Eppell for approving the drawings were to maintain the schedule for the project. In the view of the panel, had the drawings been inadequate for the purpose of fabrication, Mr. Eppell would not have been able to approve the drawings for fabrication.

The panel finds Raouf H.M. Balbaa, P.Eng., or HITE Engineering Company Inc. not guilty of professional misconduct as described in allegation (d).

Allegation (e):

Allegation (e) refers to HITE withdrawing the design during the course of the project on the basis that HITE believed the MCAP was not being fabricated in accordance with the specifications.

The panel is unaware of the practice of an engineer withdrawing a design on the pretence that fabrication is not going in accordance with the design drawings.

The specific issue at hand was that the welding did not meet the requirements of CSA W47.1 and was shown through subsequent weld inspections and testing that the welds, in fact, did have deficiencies. The panel placed little weight on any underlying reasons for withdrawing the design as the panel found this to be an unusual practice.

In the view of the panel, an appropriate action of Mr. Balbaa should have been to inform the client that Hite would not be responsible for the design of the structure unless it has been fabricated in accordance with the drawings and specifications.

It is the view of the panel that, while Mr. Balbaa's action of "withdrawing" the design for the reasons of improper fabrication is unusual, it does not constitute disgraceful, dishonourable and unprofessional conduct, although a better approach by Mr. Balbaa could have been used. The panel finds Raouf H.M. Balbaa, P.Eng., or HITE Engineering Company Inc. not guilty of professional misconduct as described in allegation (e).

Allegation (f):

Allegation (f) is that Mr. Raouf H.M. Balbaa, P.Eng., and/or HITE Engineering Company Inc. acted in a disgraceful, dishonourable and unprofessional manner. Throughout the lengthy testimony heard by the panel, the panel found no compelling evidence which shows Mr. Ralph Balbaa or HITE acted in a disgraceful, dishonourable and unprofessional manner. The panel finds Raouf H.M. Balbaa, P.Eng., or HITE Engineering Company Inc. not guilty of professional misconduct as described in allegation (f).

Other Allegations:

Two other allegations relating to the performance of the MCAP were:

- i) The MCAP did not make it to the top of the bridge; and
- ii) The wheels of the MCAP were damaging the main bridge cable.

Mr. Nino Balbaa and Mr. Eppell testified that HITE continued to work on the issue and the MCAP did make it to the top in 2005. The testimony of Mr. Nino Balbaa was that the

issues were partially related to the tension of the slack cables. The panel found no compelling evidence the MCAP could not meet the specifications.

The issue of the wheels damaging the main cable was thought to be caused by higher than desired friction in the wheels. This issue was eventually addressed with a new roller design as well as a revised bearing configuration.

Given the limitations of the testing apparatus used, the panel finds that these performance issues could not have been detected during the testing phase, and that the respondents could not have reasonably anticipated, from test results, that such issues would arise during actual conditions of use.

Allegations of Professional Misconduct:

The above allegations [(a) though (f)] were put forward by PEO in an effort to prove professional misconduct. The panel finds no compelling evidence which would lead the panel to believe Mr. Raouf H.M. Balbaa and HITE Engineering Company Inc. are guilty of the allegations.

To the specific charges of professional misconduct, the panel finds the following:

Section 72(2)(a): In light of the above reasons, the panel finds there is insufficient evidence to support negligence as defined at section 72(1);

Section 72(2)(b): In light of the above reasons, the panel finds there is insufficient evidence to support a 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;

Section 72(2)(d): In light of the above reasons, the panel finds there is insufficient evidence to support a 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 a practitioner;

Section 72(2)(e): No evidence was put forward to support that final drawings, specifications, plans, or reports were sealed by Mr. Ralph Balbaa without having being prepared or checked by the practitioner. For this reason, the panel finds there is insufficient evidence to support that Mr. Ralph Balbaa or HITE are culpable

of signing or sealing a final drawing, specification, plan, report or other document not actually prepared or checked by the practitioner;

Section 72(2)(j): In light of the above reasons, the panel finds there is insufficient evidence to conclude the conduct or an act relevant to the practice of professional engineering that, having regard to all the circumstances, would reasonably be regarded by the engineering profession as disgraceful, dishonourable or unprofessional.

PEO provided very little submissions in its closing argument in support of the allegation that Mr. Balbaa breached the Code of Ethics. In the view of the panel, there is no merit to this allegation.

If Ralph Balbaa or HITE would like the panel's determination in this matter published in the official publication of the association, then they are directed to make this request to independent legal counsel (ILC) within two weeks of the date of this decision.

Ravi Gupta, P.Eng., signed this Decision and Reasons for the decision as chair of this discipline panel and on behalf of the members of the discipline panel: Santosh Gupta, P.Eng., Colin Cantlie, P.Eng., Daniela Iliescu, P.Eng., and David Spacek, P.Eng.

SUMMARY OF DECISION AND REASONS

In the matter of a hearing under the *Professional Engineers Act* and in the matter of a complaint regarding the conduct of a member of the Association of Professional Engineers of Ontario and a holder of a certificate of authorization. This decision and its reasons are published without names.

AGREED STATEMENT OF FACTS

The parties introduced an Agreed Statement of Facts that included the following:

1. At all material times, the member was a licensed professional engineer and held a certificate of authorization pursuant to the *Professional Engineers Act*.
2. At all material times, the member operated as an unincorporated sole proprietorship and provided structural engineering services for commercial and residential applications.
3. On or about September 1, 2014, a construction company retained the holder "to design concrete columns to support the new steel columns and reinforce the existing concrete wall" for the new waste storage building (the project).
4. On or about September 22, 2014, the member signed and sealed a drawing, without a title block, that appeared to provide wall modifications and column design details for the project.
5. On or about October 16, 2014, the municipality issued a building permit for the building relying in part on the member's September 22 drawing.
6. On or about November 24, 2014, the member signed and sealed a letter to the municipality's senior building inspector affirming that the project had been "built in substantial conformance with the approved construction drawing for their intended use."
7. On or about May 2015, the project was substantially destroyed by fire.

THE ALLEGATIONS

Counsel for the Association of Professional Engineers Ontario (the association) introduced a statement of allegations against the member and the holder that included the information in Agreed Statement of Facts above and the following:

1. The member's September 22, 2014 drawing was deficient in several ways, including without limitation:
 - a. That it proposed a design that was not compliant with applicable standards, codes and regulations;

- b. That it proposed a design that failed to properly account for the dimensions or strength of the foundation to which it would be attached;
 - c. That it failed to properly account for load requirements of various elements of the proposed structure;
 - d. That it failed to properly account for horizontal shear forces of the structure; and
 - e. That it omitted or failed to reference required notes, details, dimensions and/or applicable codes.
2. The complainant, whose engineering firm had been retained by the project's owner to design and construct a replacement structure, discovered several of the deficiencies in the member's design.
 3. Based upon these facts, it is alleged that the member is guilty of professional misconduct as follows:
 - a. Sealing and signing a drawing that fell below the expected standards of a reasonable and prudent practitioner, amounting to professional misconduct as defined by section 72(2)(a) [of Ontario Regulation 941];
 - b. Sealing and signing a drawing that proposed a design for a commercial structure that failed to make reasonable provision for the safeguarding of life, health or property of a person may be affected by the work, amounting to professional misconduct defined by section 72(2)(b);
 - c. Sealing and signing a drawing that failed to make reasonable provision for complying with applicable codes, regulations and/or standards, amounting to professional misconduct as defined by section 72(2)(d); and
 - d. Sealing and signing a drawing that, in all of the circumstances, would reasonably be regarded by the engineering profession as unprofessional, amounting to professional misconduct defined by section 72(2)(j).

PLEA BY THE MEMBER

The member denied the allegations in his personal capacity and on behalf of the holder.

THE EVIDENCE

The association called a witness who testified that she attended the site to prepare an estimate for a replacement building after the steel building burned down. She testified that three concrete columns along the west side were damaged, but that she did not see any evidence of any reinforcing. She subsequently received a copy of the member's September 22, 2014 drawing, did some quick calculations, and concluded that the columns were grossly undersized in accordance with the requirements of the Ontario Building Code. She brought her concerns to another professional engineer, who was the complainant in this matter.

The association called an expert witness. He testified that the member's design of the three concrete columns were 570 per cent overstressed, that they did not have the minimum amount of reinforcing steel, and that they did not provide enough resistance to shear forces from wind loading as required under ASTM A23.3 Concrete Design Code and the 2012 Ontario Building Code. In addition, he testified that the member's September 22 drawing did not include the elements required for final plans by the association's 1995 *Guideline on Professional Engineers Providing Structural Engineering Services in Buildings* (the guideline).

Counsel for the member called an owner of the construction company, who is a professional engineer, as a witness. The owner testified that the member's work was limited to providing a drawing to support a building permit application and that he, the owner, was responsible for the design of the columns that were built. He testified that the columns included reinforcing steel as shown in the photograph that was taken before the concrete was poured. He expressed frustration that the discipline process needed his testimony in this matter.

The member testified that the scope of his work was to provide a design for three columns along the west wall to support a building permit application. He produced the drawing after meeting with a representative of the construction company, who is also a professional engineer, and discussing what was required. The member's testimony included an explanation of the measurements for the reinforcing steel in the column. He agreed that his drawing required additional details.

Under cross-examination, the member admitted that he thought his design would be used for construction. He admitted that the design was for a footing on bedrock, though no bedrock is shown on his drawing. He confirmed that his drawing dated September 22, 2014 contained errors.

The member also admitted that there is no limitation on the scope of his work on the signed Commitment to General Reviews by Architect and Engineers that was submitted to

the municipality and includes a certification that “the construction is in general conformance with the plans and other documents that form the basis for issuances of a building permit in accordance with the performance standards of the [association]” (the certificate).

CLOSING STATEMENTS

Counsel for the association summarized that the evidence supported the allegations as follows:

1. That the member admitted his retainer was to provide a structural drawing to be submitted to the municipality,
2. That the expert witness determined that the columns fell short of the requirements under ASTM A23.3 Concrete Design and the Ontario Building Code,
3. That a professional engineer identified significant difficulties with the columns, including that she did not see any reinforcing steel in them,
4. That the member’s stamp on the certificate shows that he took responsibility for the design, including the west wall with the expanded columns,
5. That the member had an overriding standard of care that included that his drawing must comply with the guideline as set out in *Skyway Equipment Co. Limited et. al. v. Guardian Insurance Company of Canada et. al.* and that the expert witness said that the member’s work fell below that expected of a reasonable and prudent practitioner.

Counsel for the association added that the allegation under section 72(2)(j) of Regulation 941, the association was alleging that the member’s conduct would be regarded by the profession as unprofessional and that, in the association’s submission, the member’s actions would not be regarded as disgraceful or dishonourable.

Counsel summarized that the member’s work was unprofessional, not just that it lacked information, since it was not fit for purpose, and that it was unclear and contained errors.

Counsel for the member summarized that the evidence did not support a finding of guilt as follows:

1. That the complaint was not made by the professional engineer, whose observations were made after the fire and the columns were damaged,
2. That the building is unoccupied,
3. That the expert witness assumed that the member was retained to design the complete foundation,
4. That the expert witness indicated that the column loading the member’s design was appropriate for axial loading,
5. That the expert witness did not take into account that the owner was a knowledgeable client,
6. That the guideline and the same standard of care may not apply when the client is a professional engineer,
7. That the owner took responsibility for the design of the columns, and testified that they included reinforcing steel,
8. That it does not make sense that the member would take responsibility for the entire design of the foundation based only upon his signature on the certificate provided to the municipality,
9. That the member believed that he and the representative of the construction company understood that the columns were sitting on bedrock,
10. That the member confirmed that his drawing contained errors.

Counsel for the member asserted that the association had not proven all its allegations in that:

1. With regard to 72(2)(a) and (j), that the context is lacking and that his design did not include general notes etc., but that he would have provided different information for a less knowledgeable client,
2. With regard to 72(2)(b), that the expert witness found that the design was sufficient to support the axial loading, and that his calculations did not take into account the actual height of the wall and was based upon information that was unavailable to the member,
3. With regard to 72(2)(d), that the codes do not apply in this context as the on-site supervisor took responsibility for the design.

Independent legal counsel provided advice to the panel that included that the applicable standard to apply is on the balance of probabilities, considering all the evidence, whether it is more likely than not that the member committed the actions.

DECISION

The association bears the onus of proving the allegations in accordance with the standard of proof. The standard of proof applied by the panel was a balance of probabilities. The proof must be clear and convincing and based upon cogent evidence accepted by the panel.

Having considered the evidence, the onus and standard of proof, the panel finds:

1. That the member did not commit an act of professional misconduct as alleged in subparagraphs 3.a. or b. of the statement of allegations.
2. That the member did commit an act of professional misconduct as alleged in subparagraphs 3.c. and d. of the statement of allegations.

As the member was acting on behalf of the holder at all times, these findings of professional misconduct apply both to the member, in his personal capacity, and to the holder.

REASONS FOR DECISION

Negligence

The panel accepted the expert witness' testimony that the member should have applied the guideline when preparing his drawing. The panel accepted the member's testimony and concluded that the member was not trying to shirk his responsibility but instead was doing what was expected by his client, the construction company. The panel decided that the evidence showed that while the member's work was sloppy, his actions did not reach the level of negligence.

The panel found the testimony by the owner very credible. He was clear and his evidence was uncontroverted. He testified that the scope of the member's services were limited, that the

owner took responsibility for the design, and that the columns had the proper reinforcing.

Based upon these findings, the panel found that the member was not guilty of the allegation of professional misconduct as defined by section 72(2)(a) of Ontario Regulation 941.

Making reasonable provision for safeguarding property

The panel relied on the testimony by the owner, supported by the testimony by the member, that the scope of the member's work was limited to providing a drawing for the purpose of securing a building permit from the municipality. In addition, as referred to above, the panel accepted the owner's testimony that he took responsibility for the design and the construction on site. The panel accepted the owner's testimony that the only reason for the larger columns was to provide a landing for the base plate of the building. The panel also accepted the owner's and the member's testimony that the construction company is a knowledgeable client with regard to structural engineering services.

Based upon these findings, the panel found that the member was not guilty of the allegation of failing to make reasonable provision for safeguarding property as defined by section 72(2)(b).

Complying with applicable codes

The panel accepted the expert witness testimony and the member's admission that the member was required to apply the ASTM 23.3 Concrete Design, the Ontario Building Code and the guideline when preparing his drawing.

Based upon these findings, the panel found that the member was guilty of the allegation of failing to make reasonable provision for complying with the applicable codes and standards as defined by section 72(2)(d) of Ontario Regulation 941.

Unprofessional

The panel noted errors in the member's drawing dated November 22, 2014 including the different dimensions for the reinforcement and the size of the column. These errors made the drawing unclear, despite the fact that the drawing was accepted by the municipality and despite the fact that the columns did not fail during their short service life. The panel found that such a relatively simple drawing should not have contained such errors.

Based upon these findings, the panel found that the member was guilty of the allegation of failing to make reasonable provision for complying with the applicable codes and standards as defined by section 72(2)(d) of Ontario Regulation 941.

PENALTY

Counsel for the association requested the following penalty:

1. A reprimand that remains on the association's register permanently,
2. Publication of the Discipline Committee's decision with names,

3. That the member complete, within 14 months, the following exams set by the association: Advanced Structural Analysis and Advanced Structural Design,
4. That, in the event the member does not pass both exams, suspension of his licence to the maximum permitted under the *Professional Engineers Act*,
5. That costs be awarded to the association in the amount of \$10,000.

Counsel for the association submitted that the proposed penalty was fair and appropriate, and noted that no suspension was requested due to the fact that the panel found the member not guilty of professional misconduct in relation to section 72(2) (a) or (b) of Regulation 941.

She submitted that the costs requested were only to pay for out of pocket expenses, including for the expert witness, travelling expenses and summons. Counsel for the association pointed out that they were higher than the penalty sought in other matters, but that they were proportional to the nature and complexity in this matter.

Counsel for the association set out the application of the principles of penalty as follows:

1. The public interest will be protected by ensuring that by completing the two exams, the member will understand and properly apply the applicable codes,
2. Remediation will be achieved also with the exams by educating the member on how to prepare drawings with accuracy and precision,
3. The maintenance of the reputation of the profession in the eyes of the public will be achieved by publicly naming the member and by placing a reprimand on the register permanently,
4. General deterrence will be achieved by publishing the matter with names and by setting difficult examinations for the member's actions,

5. Specific deterrence will be achieved since the member will have to pass two difficult exams and therefore is unlikely to reoffend.

Counsel for the association cited two previous decisions of the Discipline Committee, *Abraham Bueckert, P.Eng., et al v. Professional Engineers Ontario*, and *George Mikhael, P.Eng., et al. v. Professional Engineers Ontario*. These matters include findings under sections 72(2) (c) and 72(2)(j) that she said demonstrated that the proposed penalty was within the range of acceptable penalties for similar actions.

Counsel for the association noted the criticism of the association in the *Report of the Elliot Lake Commission of Inquiry* dated October 15, 2015 about the length of time a members' reprimands are reflected on the association's register, and the Discipline Committee's comment in the matter of the *Association of Professional Engineers of Ontario v. Van Iterson* that the default for reprimands is that they be on the register forever. She submitted that publication without names should only occur in rare cases since it is important to maintain the reputation of the profession in the eyes of the public and to provide general deterrence.

Counsel for the association noted that the member did not plead guilty, that he did not show that he admitted his errors, and that he did not come to grips with the inadequacy of his drawings.

Counsel for the member submitted that the facts in this matter are unique and that she tried unsuccessfully to find similar cases. Counsel noted that this matter is the first offence for the member, that he learned from this experience, that he acknowledged his errors, and that he recognized the possible confusion that his action created. She pointed out the member was not responsible for the design of the complete building foundation, and that he said that he would not have done what he did for another client. Counsel pointed out that the member paid the expense of a lawyer, and that he has learned from the experience.

Counsel for the member requested the following penalty: a reprimand on the association's register for one year and publication of the matter without names. She cited two previous decisions of the Discipline Committee: the *Association of Professional Engineers of Ontario v. the member and the Certificate of Authorization holder and a complaint regarding the conduct of a member of the Association of Professional Engineers of Ontario* that include findings under sections 72(2)(c) and 72(2)(j). Counsel for the member said that the proposed penalty was proportional to the facts of this matter and that a permanent reprimand would be out of proportion.

The independent legal counsel provided advice to the panel on the application of the principles of penalty including costs. The independent legal counsel advised the panel that it has broad discretion under section 28 (4) of the *Professional Engineers Act*.

PENALTY DECISION

The panel makes the following orders as to penalty:

1. Pursuant to section 28(4)(f) of the *Professional Engineers Act*, the member shall be reprimanded verbally, and the fact of the reprimand shall be recorded on the register for a period of one year.
2. Pursuant to section 28(4)(d) of the *Professional Engineers Act*, the member shall successfully complete the Professional Practice Examination (PPE) within one year, commencing November 1, 2017.
3. Pursuant to section 28(4)(b) and (k) of the *Professional Engineers Act*, in the event that the member does not successfully complete the PPE within the time set out above, his licence shall be suspended for a period of twelve (12) months thereafter or until he successfully completes the examination, whichever comes first; and
4. The findings and order of the Discipline Committee shall be published in summary form under section 28(4)(i) of the *Professional Engineers Act*, without reference to names.

There shall be no order with respect to costs.

REASONS FOR PENALTY

The panel concluded that the proposed penalty is reasonable and in the public interest.

The penalty will:

- a) Provide protection to the public by ensuring that the member will complete the Professional Practice Exam;
- b) Maintain the reputation of the profession by publishing this decision with reasons;
- c) Provide general deterrence to others in the profession to be thorough in all of their dealings;
- d) Provide specific deterrence to the member to be thorough with all future work to ensure that his work does not lead to a complaint;

- e) Rehabilitate the member by administering an oral reprimand and by ordering him to complete the Professional Practice Exam.

The panel considered the previous decisions raised by the parties in making its decision regarding the issue of publication without names and decided that the current matter more closely resembled the facts in the ones identified by the member. In addition, the panel believed the member would have provided a more detailed work product to a client who was not a professional engineer, so there is little danger to the public posed by publishing the panel's decision without names.

In making its decision regarding costs, the panel decided that the association should pay its own costs since the member co-operated with the investigation into this relatively straightforward matter.

REPRIMAND

The member waived his right to appeal and the member was reprimanded verbally following the conclusion of the hearing.

Patrick Quinn, P.Eng., signed the decision on January 16, 2018 as chair of this discipline panel and on behalf of the members of the discipline panel: Rishi Kumar, P.Eng., Glenn Richardson, P.Eng., Nadine Rush, C.E.T., and Warren Turnbull, P.Eng.

TORONTO-AREA MAN FINED \$15,625 FOR ILLEGAL USE OF THE TITLE “PROFESSIONAL ENGINEER” AND USE OF FALSE LICENCE CERTIFICATE

On February 22, the Ontario Court of Justice fined a Toronto-area man \$15,625 (including a 25 per cent victim fine surcharge of \$3,125) after his guilty plea to four counts of breaching the *Professional Engineers Act* by misrepresenting himself as a professional engineer.

Kevin Kirk Smith used the titles “professional engineer” and “P.Eng.” in the employment application and interview for a position as a senior consultant, a position which called for credentials as a professional engineer. After being hired, Smith presented and displayed a forged licence certificate and used the title “P.Eng.” in internal correspondence and reports issued to clients.

The employer contacted Professional Engineers Ontario (PEO) and determined that Smith was not licensed as a professional engineer.

Smith subsequently used the titles “professional engineer” and “P.Eng.” in the employment application and interview for a position with a PEO certificate of authorization holder. For the duration of his employment, Smith displayed a forged licence certificate at his desk and used the title “P.Eng.” in email correspondence.

Her Worship Justice of the Peace Ruby Wong convicted Smith of one count of breaching section 41(1) of the *Professional Engineers Act*, which prohibits issuing a false licence certificate, and levied a fine of \$5,000 for this offence. Her worship further convicted Smith of three counts of breaching section 40(2)(a) of the *Professional Engineers Act*, which prohibits use of the titles “professional engineer” and “P.Eng.,” and levied fines of \$2,500 for each offence.

Nick Hambleton, associate counsel, regulatory compliance, represented PEO in this matter. PEO would like to thank both employers for their diligence and co-operation in its investigation.

COMPLAINTS COMMITTEE: VOLUNTARY UNDERTAKING UNDER SUBSECTION 24(2)(C) OF THE *PROFESSIONAL ENGINEERS ACT*

In the matter of complaints regarding the actions and conduct of CARL W. LANKINEN, P.ENG., and EDWARD M. TALSMA, P.ENG., members of the Association of Professional Engineers of Ontario, and R.J. BURNSIDE & ASSOCIATES LTD., a holder of a certificate of authorization.

BACKGROUND

1. The complaints relate to the work done by Carl W. Lankinen, P.Eng., Edward M. Talsma, P.Eng., and R.J. Burnside & Associates Ltd. for the structural design of a fabric covered pre-engineered structure 120 feet in width and 240 feet in length, located on an agricultural property in British Columbia.
2. In or about January 2007, the owners of the property contracted with a third party for the supply and construction of the structure and R.J. Burnside & Associates Limited (RJB) was retained to perform a structural review of the drawings, to make structural recommendations, to apply a professional engineer's seal to final drawings and to provide letters of assurance to the building department.
3. The structure was erected in late 2007 and a number of problems occurred, including cracks in the concrete foundation piers. The repair recommendations provided by RJB proved to be insufficient after they were implemented, and the structure was dismantled and removed.
4. Although the majority of the drawings for the project were signed and sealed by Edward M. Talsma, P.Eng. (Talsma), Carl W. Lankinen, P.Eng. (Lankinen), was the engineer involved in the review of the structure design and the construction deficiencies, and in the preparation of the remedial recommendations for the cracked foundation piers.

THE COMPLAINTS

5. The complaints raised issues concerning building code compliance, adequacy of design and drawings, the recommended remedial solutions, and the timeliness of communications concerning construction or design concerns.
6. The Complaints Committee (committee) received candid and contrite responses to the complaints from the three respondents named, which included the fact that Talsma was no longer with RJB. RJB noted that in response to the complaint in 2007, they undertook an extensive internal review of their business practices. Beginning in 2008, RJB began actions to improve their business, which included communications training for management-level employees, implementation of formal quality control policies,

which included independent peer review of drawings, reports and calculations, improvements to their electronic filing systems, introduction of standardized calculation tools and templates, and establishment of a standard details library.

THE CONSIDERATION OF THE COMPLAINTS COMMITTEE

7. The committee considered the complaints on November 29, 2016 and August 2, 2017.
8. The committee considered the responses received from the respondents, and carefully considered the issues raised in this matter. The committee considered whether a referral to the Discipline Committee was warranted in all the circumstances, and whether it was in the interest of the public and the profession to proceed with the matter. The committee decided that if its concerns were addressed through certain proactive remedial efforts on the part of the respondents, as well as publication of a summary of this matter, that the public interest issues raised by the complaint would be addressed.

VOLUNTARY UNDERTAKING

9. RJB and Carl Lankinen, P.Eng., voluntarily undertook to provide PEO with policies, documents, and other information evidencing the successful implementation of the actions already taken by RJB outlined in item 6, above. In addition, RJB and Lankinen voluntarily undertook to further implement a company policy requiring that every project that RJB had a design role in, would have a written agreement outlining the scope of work and any design assumptions.
10. Carl W. Lankinen, P.Eng., and Edward M. Talsma, P.Eng., voluntarily undertook to write and pass the Professional Practice Examination within a year.
11. RJB, Lankinen, and Talsma voluntarily agreed that this summary would be published in PEO's Gazette.
12. The voluntary undertakings described above were accepted by the committee as a dispositive measure, and pursuant to its powers under section 24(2)(c) of the act, the committee decided that these matters would not be referred to the Discipline Committee.



Every year, about four million Canadians are affected by a food-borne illness due to contamination at some point along the food processing chain. In Ontario, engineers are using their problem-solving skills to develop effective preventative food safety control systems and implement sanitary plant design as food producers try to meet the demands of a growing population.

KEEPING OUR FOOD **SAFE**

BY NATALYA ANDERSON

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edia reports of food recalls, often because of bacteria like listeria, salmonella or E. coli, or undeclared allergens, have heightened Canadians' concerns about the integrity of the products they toss into their grocery carts. For engineers working in the ever-evolving food industry, safety is the most critical issue to

address and solve. From the structure of a food manufacturing and processing building, to the mechanics of automated systems and robotics on the factory line, to temperature control in transporting produce and livestock across the country, the engineer's multidisciplinary background is more vital than ever, when the stakes—and the stakes—are life and death, and the goal is the least amount of human contact possible in processing what Canadians eat.

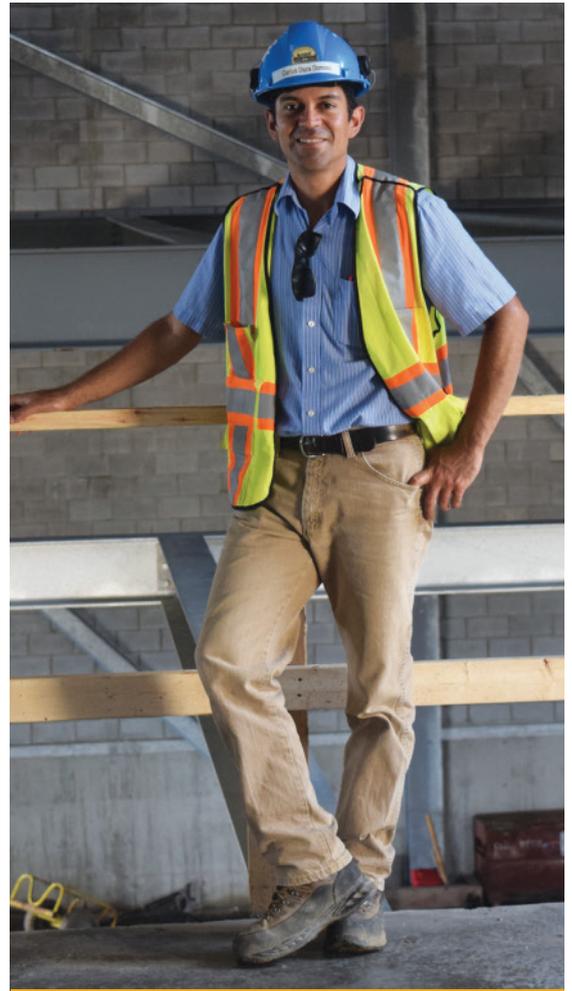
"When you are shopping at the grocery store for your favourite foods, you would not believe the amount of engineering that is required to deliver them to those shelves," says Carlos A. Daza Donoso, P.Eng., engineering manager, Conestoga Meats. "We are not only looking at the construction of the [food processing] building itself but also at the design of a proper process flow that supports a vast array of good manufacturing practices (GMPs). These GMPs support food safety, specific trade regulations and, of course, Canadian Food Inspection Agency (CFIA) regulations. It's the combination between sanitary design of the facility itself and a sound process flow that enable us to distribute our products across Canada and markets around the world. Starting from the design phase to commissioning and start-up of a food plant, there are many factors we take into consideration: air flow and balancing, lighting, temperature, cross-contamination points, sanitation and chemical resistance, and harbourage points. Each sector within the food industry—produce, dairy, fresh ready-to-eat salads, bakery, etc.—face similar food safety challenges, as well as challenges that are unique to that sector."

TRACING AND PREVENTING CONTAMINATION

Daza Donoso's experience as an engineer in food safety is exemplary. He worked with the dairy, vegetable oil, sauces and ready-to-eat meats industries before moving to fresh pork with Conestoga Meats, including six years with Maple Leaf Foods, hot on the heels of the ground-breaking listeria outbreak at the latter's Toronto plant in the summer of 2008. The event was linked to 57 cases of illness and 22 deaths. An independent investigator was appointed in January 2009 to determine the cause of the outbreak and to set up preventative recommendations for the future.

"I was with Maple Leaf Foods from 2009 until 2015," says Daza Donoso. "I was fortunate to be able to get mentorship from engineers who had not only experienced the outbreak but who had also contributed to drive the change towards a multidisciplinary, cross functional approach to food safety. When I extrapolate the impact of the engineering work we are responsible for to the thousands and thousands of consumers who rely on whatever measures we put into the design of any food processing facility, it really sets the relevance and importance of our role as professional engineers into place."

Following the 2009 investigation, Health Canada altered its risk assessment turnaround time from 24 hours to eight hours for cases known as Health 1, and new anti-listeria agents were enforced for use in plant facilities. New information and education sources were put in the public domain for consumers. Maple Leaf Foods implemented numerous improvements, including a doubling of their testing sites as well as doubling the frequency of sampling on all production lines of their ready-to-eat food plants. Engineers were



Engineers like Carlos A. Daza Donoso, P.Eng., who worked for Maple Leaf Foods after its groundbreaking listeria outbreak in 2008, are working to minimize human contact through automation in food production.

involved in the reconstruction of slicing equipment to help eliminate points of bacterial harbourage.

When it comes to the point of processing, challenges arise with traceability of contamination. Today's systems are geared toward avoiding human interaction.

"Newer food plants are becoming more streamlined than the older plants, which allows less manual handling and transportation of material," says Kim Todd, P.Eng., who worked at Maple Leaf Foods from 2006 to 2017 in continuous improvement, asset reliability and industrial engineering roles. "Less handling means less opportunities for contamination. In situations where manual touch points do exist, one needs to make sure people are wearing their protective personal gear. Another control is to have a meaningful food safety program. For example, knowing where and the frequency of when swabs are taken for checking the equipment for bacteria."

In an overnight sanitation shift, engineering also comes into effect in terms of temperature control and air flow. Todd says that, while sanitation is paramount, it can also pose obstacles.

“During sanitation, water temperature and pressure need to be high enough to kill bacteria but low enough to not damage the equipment, which can be sensitive to humidity with all the added automation features,” she explains. “Environmental control design should be a consideration in meat processing and packaging. Production rooms warm up significantly during the sanitation shift. This same room needs to be cold prior to [the next] shift start up. The transition from a hot, humid room to a cold room creates condensation that can drip onto the food from the ceiling or pipes or other overhanging sources. It’s a matter of understanding how to engineer dehumidifiers and air flow.”

EQUIPMENT AND PLANT DESIGN CHALLENGES

Observing the structural and agricultural environment of a variety of food sources has also been a driving force behind the job of Karen Conrad, P.Eng., who is an inspection supervisor at the CFIA, the country’s regulatory agency tasked with mitigating risk to food safety and enforcing health and safety standards related to food under various acts and regulations, including the *Food and Drugs Act*. With more than a decade as an inspection supervisor and food specialist with the CFIA, Conrad has focused her skills on manufacturing inspection as well as being a food specialist.

“You want to create traffic patterns that allow people to not pull contamination through the plant,” says Conrad.

The age and mechanics of an old plant can lead to difficulties in functioning safely.

“Some older plants are going to have challenges,” adds Conrad. “A lot of it is related to the fact that they built the plant of a certain size, a hundred years ago in some cases, and they expanded it over time—they’ve added rooms. What that will mean is that the flow of traffic through the plant is not ideal. There have also

“DURING SANITATION, WATER TEMPERATURE AND PRESSURE NEED TO BE HIGH ENOUGH TO KILL BACTERIA BUT LOW ENOUGH TO NOT DAMAGE THE EQUIPMENT, WHICH CAN BE SENSITIVE TO HUMIDITY WITH ALL THE ADDED AUTOMATION FEATURES.”

—Kim Todd, P.Eng.

been big advances in materials for walls and floors. When you need to replace your walls and floors, those are not easy fixes. In terms of equipment, you can adapt newer equipment into an older plant. Some engineers would be focused on the specific instrumentation or equipment improvements that could be made or adapting a new piece of equipment into an old processing line.”

Attention to the critical points of equipment design are ongoing, according to Todd: “Over time, equipment needs to be changed to accommodate product innovation, volume demand, productivity costs, or maybe the equipment is at the end of its life cycle,” she says. “Engineers may replace equipment or modify existing equipment design. We need to be diligent about learning from past experiences. For example, knowing where potential harbourage locations are, and why these locations promote bacterial growth, enables the engineer to apply effective countermeasures to equipment design or modification, including the required sanitation procedures.”

Todd is passionate about how engineers can continue to use their problem-solving expertise as food safety innovators look to the future.

“As engineers follow their respective career paths, they must keep risk management at the top of their minds,” says Todd. “Being diligent to food safety and employee safety concerns can save lives and limit injury. Engineers must understand where there is risk and build that into future design. If we want to be innovative, go above and beyond. Learn where things went wrong and build that into your new designs. Consider how you can apply early detection of contamination before it impacts product safety.”

Optimizing a food type’s environment prior to packaging is integral to the precarious paradox engineers face in this vastly challenging field—prolonging shelf life while reducing additives and preservatives to a product.

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“Shelf life and packaging technologies are driven by two opposing forces,” explains Daza Donoso. “One is the demand for longer shelf life, and the other is the demand for less and less additives and processing. Traditionally, we’ve always directed engineering interventions for food safety mainly toward food contact surfaces. Now, we know all areas of a facility have a direct impact on bacterial counts. Food safety is achieved in plants that treat it as an overall operating system that starts with proper construction materials, adequate flow of personnel, defined paths to dispose of garbage, etc. Undoubtedly, food safety represents a high capital investment to food manufacturers but when you achieve those longer shelf lives and when you guarantee wholesome and safe products to consumers, the reward is easily quantifiable.”

In learning from incidents like the Maple Leaf Foods listeria outbreak of 2008, among others, engineers are exceptionally careful to observe trends related to bacterial load. If they can reduce the initial bacterial load of a product prior to packaging, an excellent shelf life is possible. Proper handling, proper transition points, temperature and air control and even proper lighting are the main factors here, which mean minimizing human contact through automation.

“The most popular trend you’ll see in the food industry now is the adoption of six-axis robots,”



Valerie Davidson, PhD, P.Eng., an expert in food safety and risk assessment, is pointing to the role of bioengineering in the future of food safety.

adds Daza Donoso. “These articulated robots have been used in the automotive industry for decades and can perform the hardest jobs in the production line with much precision and repeatability. Operators can now be transitioned to more ergonomic and dynamic tasks, reducing human contact with the product. I’m involved in all stages of robot implementation, from the design of reinforced footings and foundations for robot bases, all the way to fine-tuning program parameters that control their performance. A robot promotes food safety because, for example, if it is programmed to sterilize its tool between each carcass to avoid cross contamination, it will indisputably do so every time.”

A FUTURE IN BIOENGINEERING

Experts like Valerie Davidson, PhD, P.Eng., university professor emerita, School of Engineering, University of Guelph, whose current research is focused on food safety and risk assessment, are pointing to the role of bioengineering in the future.

“I’m always interested in modelling systems that have biological components,” says Davidson. “In teaching biological engineering, it’s about looking at how microorganisms grow in systems. In terms of risk assessment, it’s about looking at how hazards, both biological and chemical, get into food, and then how they might change as we process the food. At the end of that process, you’re trying to figure out if there’s enough of a particular hazard in the food to make someone ill and, if so, how many people would likely get ill. So, it’s a systems model that can become fairly complex. In focussing on the future of the processing of foods, you’re processing foods to make them something that the consumer wants to eat. Things like the colour, flavour and texture are all things you want to maintain at high quality.”

Davidson applies over 30 years of experience to her work, now mainly in a consultancy capacity with organizations like the CFIA. Both Daza Donoso and Conrad are her former students. Like Davidson, Daza Donoso is continuously investigating the biological and chemical components of food—and its contaminants—when he looks to the future.

“The future, I think, is more based on bioengineering,” says Daza Donoso. “One day we will be able to grow a steak in an incubator. Biomolecular journals and food engineering journals are starting to publish this kind of research.”

While such claims may seem cinematic in their capacity, Daza Donoso is not far off. Studies referenced in multiple publications, including *The Washington Post*, *Wired* and *Vice*, suggest that lab-grown meat may be in grocery stores within the next few years. Just five years ago, the first lab-grown hamburger was created by Mark Post in his lab at Maastricht University in the Netherlands. It was sampled in London to much bemusement but Daza Donoso suggests that cultured meat is a serious antidote to environmental and health burdens that meat processing places on our world (see p. 49).

“What we see as a food plant today will remain as such in the future,” adds Daza Donoso. “It’s just the difference between a live animal unloading off a livestock truck, and a series of incubators and bioreactors, with raw materials coming in and meat being produced. This is looking many, many years in the future. What I can say is that with population growth and how we’ve seen bacteria adapt and become resistant, it’s simply not sustainable to continue doing what we’re doing now in the long term. The industry has to look at bioengineering as the alternative way to mass produce what our consumers want.” **e**

The **FUTURE** OF FOOD

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. But the challenges do not come without opportunity.

• *By Marika Bigongiari* •



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o feed an exploding population, we're going to need a food supply that is not just plentiful but sustainable. Although it's a contentious subject, most scientists agree climate change is a real issue with far-reaching consequences that will continue to have an increasing impact on food security and sustainability. We will have no choice but to learn how to provide enough food for everyone amidst diminishing natural resources like fresh water,

healthy soil and arable land, while also learning how to reduce waste and mitigate greenhouse gases (GHGs) to avoid further damaging the atmosphere in which we live.

While moving away from fossil fuels toward alternative sources of energy is expected to have a positive impact on mitigating climate change and reducing GHGs, there's another area where consumers can have an immediate and significant impact: their food choices. In the competition for land and water, agriculture has been singled out as a cause for concern and identified as an area where innovation is desperately needed.

IMPACT OF AGRICULTURE

The Canadian Academy of Engineering (CAE), in partnership with the Trottier Family Foundation and the David Suzuki Foundation, undertook a project—the Trottier Energy Futures Project—to address the serious issue of climate change. Completed in 2016, the project was a comprehensive engineering analysis of Canada's future energy systems with an eye toward achieving an 80 per cent reduction in GHGs by 2050 as compared to 1990 levels, and a goal of reducing them by a further 100 per cent by the end of the century.

While the project focused on energy, the field of study also included the impact of non-combustion sources of emissions, including agriculture, industrial processes and waste. The study confirmed agricultural emissions, due to enteric fermentation—methane from the digestive processes of animals—and manure management are responsible for a significant amount of GHG emissions. The study also pointed to soil nitrous oxide emissions due to the application of nitrogen-based fertilizers and crop residue decomposition, and waste sector emissions, including solid waste disposal on land, waste water treatment and waste incineration, with the dominant type of emission from waste products being methane from municipal landfill sites.

"I'm in agreement with the vast majority of engineers and scientists out there who think [climate change] is actually a problem, that it was actually caused by humans," says Kevin Goheen, PhD, P.Eng., executive director of the CAE and an adjunct professor of engineering at Carleton University in Ottawa. "We've missed the boat in terms of being able to stop it entirely so now we're going to have to take a two-pronged approach: reversing the GHG production and lowering GHGs in the atmosphere, so that's part one. But part two is, okay, given the fact that we've managed to change the climate, what are we going to do about it?"

Claude Laguë, PhD, P.Eng., FEC, a professor of engineering at the University of Ottawa, is an agricultural engineering expert who has made a career out of focusing on the agricultural and food sectors. He's worked on countless projects to improve agricultural technologies, including the design of field machines and equipment to increase productivity and the development of techniques for the control of weeds and insect pests to reduce the reliance on chemi-



According to the United Nations, the animal agriculture sector generates more greenhouse gas emissions than cars and is a major source of land and water degradation.

cal herbicides and insecticides. When it comes to climate change, he and Goheen are on the same page: "[Climate change] will definitely have an impact on agriculture because agriculture is highly dependent on climate," says Laguë. "If you have changes in temperature regimes and precipitation patterns, obviously you're going to have an impact on the type of crops you can grow. But I think our biggest challenge will be on the adaptation side—how we adapt agricultural production to a world where greenhouse gas concentration in the atmosphere is much higher relative to what it was before and what it is right now. I don't think we'll be able to skirt that issue; as engineers, we'll definitely need to address it head on."

DIMINISHING RESOURCES

With a world population expected to surpass 9.8 billion by 2050, and in an era where deforestation continues to exacerbate climate change and threaten biodiversity, Laguë also worries about shrinking land resources in the face of an increasing demand for agricultural and food products.

"I think the most important question is: How are we going to feed 10 billion people with a shrinking reserve of agricultural land? Each year we have less land available to grow more food, and the population is growing, and the population wants more and better food. How are we going to be able to produce more food and better food to feed more people when the main resources we need to do that, which is typically agricultural land, is continually shrinking?"

And, with agriculture consuming 70 per cent of the world's fresh water—dwarfing both industrial and municipal use, at 23 per cent and 8 per cent, respectively—conservation has never been more critical. In March, the United Nations released its

annual *World Water Development Report*, which predicts water shortages could affect five billion people by 2050—that’s about 50 per cent of the predicted world population—and called for the immediate implementation of environmental engineering strategies to, among other things, protect critical wetlands and stem the damage. The report points to agriculture as the biggest source of water consumption and pollution and identifies it as a key area for change.

Laguë says water is needed not only to irrigate crops and sustain farm animals but it is also used along the chain to, for example, wash agricultural products and to dilute, and he stresses the importance of using better irrigation technologies to conserve it.

“I think those problems are going to multiply in the near future, and as they multiply and people start asking why we don’t have enough water to meet our needs, then they’re going to be looking at areas where water is not used in the most efficient way,” Laguë says. “They’re going to be looking at agriculture because agriculture is using such a large proportion of our fresh water resources.”

We can’t escape our basic need for healthy water and soil, and due to what is, in large part, the ingenuity of engineers, we do a much better job today in terms of managing soil, increasing productivity and conserving water. Still, there’s room for improvement.

Professional agrologist, agronomist and entrepreneur Robert Saik, who has worked with The Gates Foundation on solutions geared toward food sustainability and food security, says: “I think the concerns a lot of people have when you talk about food are: Can we make it sustainable, can we make it plentiful, and can we make it affordable? And sustainability, to me, really comes down to three main metrics: 1. Soil health, and you can largely measure soil

health according to organic matter; 2. water use efficiency, because agriculture uses a great amount of fresh water resources on the planet, so how can we measure and make better use of water; and 3. greenhouse gas balance, so how can we mitigate or remove greenhouse gases, and agriculture—while it’s being vilified in a lot of press—can play a very large role in contributing to a positive GHG balance of the planet.”

Saik is a big proponent of synthetic biology, or genetic engineering, and believes it’s the answer to producing enough food for everybody in a sustainable way. “The only science I see on the horizon that would allow us to reduce the use of fertilizer and reduce the use of pesticides is genetic engineering,” says Saik. “By engineering crops that can fight their own battles, ward off insects and diseases, that enables us to reduce the utilization of fertilizers and pesticides.”

He tells a compelling story about an engineered tomato designed to resist blight—a disease that affects all tomatoes, organic or not—created at the University of Florida: “So, here’s your choice: one gene from a sweet pepper into an engineered tomato, with zero fungicide applications, or spray up to 44 times. Now you tell me which one is more sustainable? There’s not a tomato grower in North America willing to step up to the plate and bring that GMO tomato to the marketplace because they’re not prepared to deal with the backlash. These are the things that drive me insane,” says Saik. “If we’re going to feed the planet going forward, we have to embrace the technology that’s going to allow us to do so. You can’t feed the population of 2050 on yesterday’s technology. That just will not work” (see p. 54).

WASTE NOT, WANT NOT

Food waste is another piece of the puzzle when it comes to both polluting the environment in which we grow our food and not having enough. According to Laguë, food wastage can occur at multiple points—whether it’s insufficient conservation technologies, failures in packaging and transportation, or people purchasing more than what they need—all of which present opportunities for improvement.

“There are a lot of interventions that are necessary at those different points, and all of those require engineering expertise and innovation,” Laguë says. “The wastage of food, especially in the developed world, is a big issue. I think in Canada the latest estimates are somewhere between 40 and 50 per cent of the food grown or raised is wasted. It can be wasted at the farm or in the production facilities, it can be wasted along the distribution chain, it can be wasted in the grocery store and the restaurants, and a lot is wasted by consumers at home. And, given the fact that the world population is continuing to grow and people all over the world are aspiring to a higher standard of living—which translates into more and better food—I don’t think we can afford to continue to waste 50 per cent of the food we produce. It’s just not sustainable.”

Levente Diosady, PhD, P.Eng., an active food researcher and professor emeritus of food engineering at the University of Toronto, is working on a solution to the food wastage problem with a project that would see the use of a food crop in its entirety for multiple purposes. Currently, Diosady and his team are making proteins and other useful materials out of Canadian food crops, such as mustard,



Canadians waste between 40 and 50 per cent of food produced for human consumption.

“IF WE’RE GOING TO FEED THE PLANET GOING FORWARD, WE HAVE TO EMBRACE THE TECHNOLOGY THAT’S GOING TO ALLOW US TO DO SO. YOU CAN’T FEED THE POPULATION OF 2050 ON YESTERDAY’S TECHNOLOGY. THAT JUST WILL NOT WORK.”

—Robert Saik

which is being explored due to its ability to thrive in marginal areas with very little rainfall, such as Ethiopia and other parts of Africa.

"Canada has become a major exporter of vegetable oils," says Diosady. "Canola has become the third largest edible oil source in the world and the meal that is left over is going into animal feed. The meal itself contains protein of very high quality, and there have been numerous attempts to make this available as a food ingredient. We ourselves have a process we're evaluating with some companies now, in Estonia and in Canada. Canola is not great in the sense that the protein is very difficult to extract and the yields are relatively low. However, there is another Canadian crop, mustard, which is suitable



The Canadian government recently announced it will invest \$150 million in the country's plant-based food industry, with a focus on pulses, flax, hemp and oats.

for growing where there is not much else growing...and the protein in mustard is very, very high quality. What we'd like to see is mustard grown for both industrial use and for food. So, we've been looking at developing an integrated process where we would take the mustard seed and we would extract high quality edible protein out of it, and at the same time recover the oil as an industrial raw material, either for fuel or for chemicals."

BEANS VERSUS BEEF

At the same time, other experts are studying the effects of certain foods, like meat consumption, on the environment and climate. William Ripple, PhD, a distinguished professor of ecology at Oregon State University and widely published researcher, and his colleagues have studied the environmental effects of plant-based diets versus meat-based diets extensively and published their findings in a series of scholarly papers, including *Substituting beans for beef as a contribution toward US climate change targets*. In that report, Ripple and his team demonstrate how the US could meet most, if not all, of its GHG emission reduction targets by making the simple substitution of beans for beef.

The report stresses the powerful potential of simple animal to plant food shifts. According to the report, ruminant animals—cows, goats and sheep—are the biggest emitters of methane due to their unique digestion processes, and reductions in global ruminant num-

bers could make a substantial positive impact on climate change mitigation. In the study, Ripple and his team calculated a replacement of beef with beans would mean a 46 to 74 per cent reduction in GHGs, which is needed to meet 2020 US GHG targets. Additionally, they identified 42 per cent of cropland (692,918 square kilometres) would be freed up.

Ripple also authored *Global Scientists' Warning to Humanity: A second notice*, which includes the signatures of 15,364 scientists from 184 countries. Its purpose: to send a message to humanity to step up to the sustainability plate—and quickly—to prevent widespread misery and devastating biodiversity loss and environmental damage. While broader in its environmental concern, it addresses the need to mitigate food waste and shift to eating more plants. "One of the biggest things people can do to lower their greenhouse gas emissions is to eat lower on the food chain by choosing more plant-based foods over animal products," says Ripple.

Ripple and his team aren't alone in this assertion. According to a report published by the Food and Agriculture Organization of the United Nations, *Livestock's Long Shadow*, the animal agriculture sector generates more GHGs than cars and is a major source of land and water degradation. At the time the report was written in 2006, livestock accounted for 30 per cent of global land use and meat production was projected to double by the year 2050 due to an ever-increasing demand for animal protein. The report concluded urgent action is needed to remedy the situation to avoid catastrophic environmental damage.

ALTERNATIVE PROTEINS

In the face of an ever-increasing demand for protein, Canada's federal government recently announced it will invest \$150 million in the country's plant-based food industry. The funds will go toward developing foods based on pulses as well as flax, hemp and oats. Pulses are Western Canada's largest crop and, due to their high protein, fibre and health benefits, many view them as the answer to challenges of having enough protein to go around the table.

"Pulses used to be absolute staples," says David Jenkins, PhD, MD, a professor in the departments of nutritional sciences and medicine at the University of Toronto, and director of the Clinical Nutrition and Risk Factor Modification Centre at St. Michael's Hospital. "You've got dal in India, you've got Boston baked beans, black-eyed peas in the south, etc., so right away, across the board, pulses have been important. They've just gone out of style in the last half century or so. It's not a case of a rise of something new; it's simply a case of going back to our roots."

Jenkins thinks a plant-based diet is the answer to feeding the world in a sustainable way: "There's no question about the amount of soil, the amount of water, the amount of fertilizer, the amount of

crops that have to be grown to support the beef industry, the cattle industry in general, the pork industry, etc. These industries require enormous inputs of food, which could be processed through the human gut quite comfortably," he says.

Some argue the only way the demand for traditionally produced meat will decrease is if there's a viable replacement, and that's a revolution that's occurring in a petri dish. Clean meat, also known as cultured meat, lab-grown meat or in vitro meat, is on its way to becoming a reality, with several start-ups working to make it happen. Still more companies are focusing on plant-based meats that look and taste like the real thing.

"It's very interesting that there's a fairly big push to have products that totally replace meat, and this is entirely possible," says Diosady. "Once you have protein isolate, there are technologies to make it into things that look like and feel like meat. Depending on how complex you make it, that actually gets better and better—by using more complex processes, the quality of meat replacers from plant proteins gets closer to real meat."

Award-winning tissue engineer Milica Radisic, PhD, P.Eng., a professor and principal investigator at the University of Toronto's Laboratory for Functional Tissue Engineering, explains the method behind clean meat: "The idea is you would take a biopsy from an animal and then isolate muscle stem cells from this biopsy, and then grow and expand these cells in large bioreactors, and cultivate them on carriers, biomaterial carriers, to get meat that looks like meat. And people have done these experiments before...but the cost of that process is so high right now that it's not practical."

What is expensive today is moving closer to reality and mainstream commercialization, as

AT THE END OF THE DAY, IF WE CANNOT EAT, WE WON'T BE ABLE TO ENJOY ARTIFICIAL INTELLIGENCE OR TRAVEL IN OUR AUTONOMOUS VEHICLES. WE NEED TO MEET OUR BASIC NEEDS, AND FOOD IS RIGHT THERE AT THE TOP OF THE LIST."

—Claude Laguë, PhD, P.Eng., FEC



Some of the ingredients that go into the Impossible Burger, a plant-based patty with similar flavour and nutritional benefits of a meat-based burger.

more and more investors put their money behind what they believe is a key shift towards sustainability with implications for health and nutrition as well as animal welfare, food safety and food security. Even meat industry giants like Cargill, Tyson and Maple Leaf Foods are investing in these and similar start-ups or purchasing already established plant-based companies.

Start-ups like Impossible Foods, founded by biochemist CEO Patrick Brown, PhD, MD, a professor emeritus in the department of biochemistry at Stanford University, have successfully created plant-based meat, right down to the bioidentical, genetically engineered heme, an iron-containing compound found in muscle that makes meat taste like meat. The impetus for starting Impossible Foods was motivated by concerns for the environment and sustainability and the goal of making the largest positive impact possible—and the company has been backed financially by heavy-hitters like Bill Gates and Google. Their flagship product, the Impossible Burger, tastes, cooks and bleeds like real meat and is already impressing people in the mainstream restaurant market, many of whom are unable to distinguish it from beef. Impossible Foods plans to create plant-based products to replace chicken, pork, lamb, fish, eggs and cheese.

When it comes to finding solutions to the challenges of feeding a growing population in an era of diminishing resources, Laguë believes there are multiple opportunities for engineers to get involved. "I think it would be great if we could have more people think of the agricultural and food industries as great opportunities for engineering innovation in the same way we're always talking about nanotech or artificial intelligence or autonomous vehicles, and all kinds of cool stuff we hear about when we think about engineering," Laguë says. "It would be great if we could be as excited about agriculture and food as we are about those other fields that may be more glamorous. At the end of the day, if we cannot eat, we won't be able to enjoy artificial intelligence or travel in our autonomous vehicles. We need to meet our basic needs, and food is right there at the top of the list." **e**

Are GMOs safe?

Despite some uncertainty and fear about genetically modified foods, people in the know believe they will become an increasingly important element in the worldwide food supply.

These days, consumers are seeking greater visibility into the farms, ingredient sources and supply chain of the food they eat. Genetically modified organism (GMO) transparency is among the most prioritized details, and shoppers are demanding new depths of information on how they are regulated since GMOs and biotech foods have generated controversy among activists concerned about the safety of these poorly-understood products.

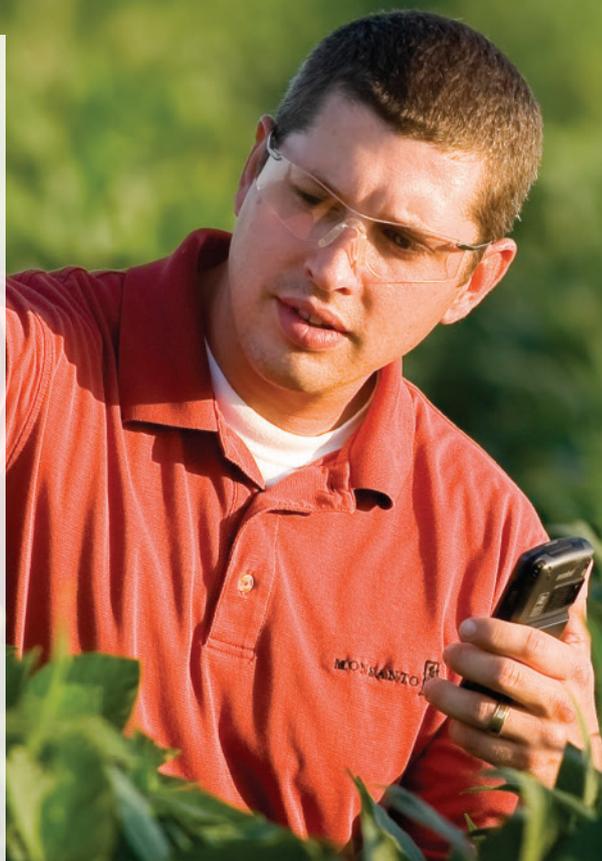
Essentially, a GM food is one derived from an organism that has had some of its heritable traits changed. This can involve traditional techniques of crossbreeding, using chemicals or radiation to change the genetic structure of an organism's cells, or introducing a gene from one species into another, as occurs with recombinant DNA activity.

No matter how they are produced, GM foods are regulated by Health Canada, which is responsible for establishing standards for the safety and nutritional quality of all foods sold in Canada under the purview of the novel foods program of Health Canada's Food Directorate. The regulatory framework put in place by the federal government ensures new and modified foods can be safely introduced into the Canadian diet. Safety assessment approaches are well established to address the potential risks associated with foods.

Since the program's inception, more than 180 novel foods, including whole foods, food products and food ingredients, and novel processes, have been approved for sale in Canada. Of these, over 120 are considered to be GM foods. They range from insect-resistant corn and herbicide-resistant canola to genetically modified yeasts that reduce levels of unwanted compounds in wine.

Canada is one of the world's top producers of a handful of GM crops, including canola, soybean, corn and sugar beets, most of which are exported to different countries around the world.

After 24 years of reviewing the safety of novel foods, Health Canada has found no published scientific evidence demonstrating novel foods are any less safe than traditional foods. It is not currently mandatory for GM foods to be labelled in Canada, so it can be difficult to know if a food product contains GM ingredients. However, as the Eat Right Ontario organization has noted, some food companies choose to label their products GMO-free.



By Michael Mastromatteo

Overall, Health Canada is responsible for food labelling policies with respect to health and safety. The department does require special labelling of all food products, including GM foods, where there are clear, scientifically established health risks or significant nutritional changes that might be mitigated through labelling, such as the presence of an allergen in food. In these situations, labelling is required to alert customers or susceptible groups in the population at large.

Should any GM food product assessed by Health Canada be determined to require labelling for health and safety reasons, the department would act immediately to ensure appropriate labelling is made. Health Canada also works with the Canadian Council of Grocery Distributors and the Canadian General Standards Board to develop a Canadian voluntary standard for labelling of GM foods.

To be sure, however, GMOs are not without their critics and opponents. For example, John Fagan, PhD, executive director of Earth Open Source Institute, and an early voice in the scientific debate on GMOs, is distressed with the relatively rapid growth of GMOs since the early 1990s.

"The introduction of GM crops and foods represents an unprecedented development in the history of agriculture," Fagan said on the Earth Open Source website. "Never before has the nature of the food supply and the manner in which crops are grown been so fundamentally altered in such a short period of time."

A similar criticism comes from the Washington, DC-based Food & Water Watch organization. In a 2016 overview of GMOs, the organization suggested GMOs have not been proven entirely safe and that existing regulatory oversight is insufficient.

LACK OF CHOICE

This lobby group alleges that GMO food relies on dangerous pesticides and increases the control of corporations like Monsanto over food sources. Food & Water Watch also claims the rules for approving GMO crops and foods need to be overhauled and that GMO products should be labeled so people have a choice in what they eat.

"The potential long-term risks from eating GMO food are unknown," it says. "The FDA (Food and Drug Administration) contends that there is not sufficient scientific evidence demonstrating that ingesting these foods leads to chronic harm. But GMO varieties became the majority of the US corn crop only in 2005 and the majority of the US soybean crop only in 2000. The potential cumulative, long-term risks have not been studied. These considerations should be critical in determining the safety of a product prior to approval, and not left to attempt to assess once the product is on the market."

Neil Strand, a senior scientific evaluator in the novel foods section of Canada's Food Directorate, suggests regulatory oversight is already robust and effective. "We are constantly looking at our approach in the assessment of all novel foods, not just GMOs," Strand says. "We are looking to improve the regulatory system for the products but we also take a case-by-case approach, so when people come in with the product, we make sure we are requesting the studies rel-

evant to that product to ensure it is safe before it gets on the market. We give ourselves some flexibility to ensure we're reviewing the product appropriately."

The Food Directorate has a time standard of 410 days from receipt of application to potential approval, so it is clearly not a rushed process.

As to charges from environmental and food industry activists that GMO regulation leaves something to be desired, Strand has a ready response. "We are certainly aware that criticism exists but our regulatory approach is based on international guidance and is the approach used not only in Canada and the US but around the world," he says. "It is based on scientific principles to ensure these products are safe before they get on the market, and we are continually reviewing our system to ensure we are both up to date on the science and we have an appropriate approach to ensure safety."

Health Canada outlines the full gamut of its regulatory oversight through its website and published material. A basic GMO assessment includes a review of how a particular food crop was developed, including the biological data underlying the genetic change. Assessors also compare GMO material with non-GMO counterparts in terms of nutrition, and the presence of possible toxins or allergens.

In Canada, regulation of GMOs also includes the principle of substantial equivalence. This approach allows the regulatory agency to review the substantial history of information related to foods that have long been safely consumed in the human diet. This comprehensive approach assists in the identification of potential safety and nutritional issues with GMOs.

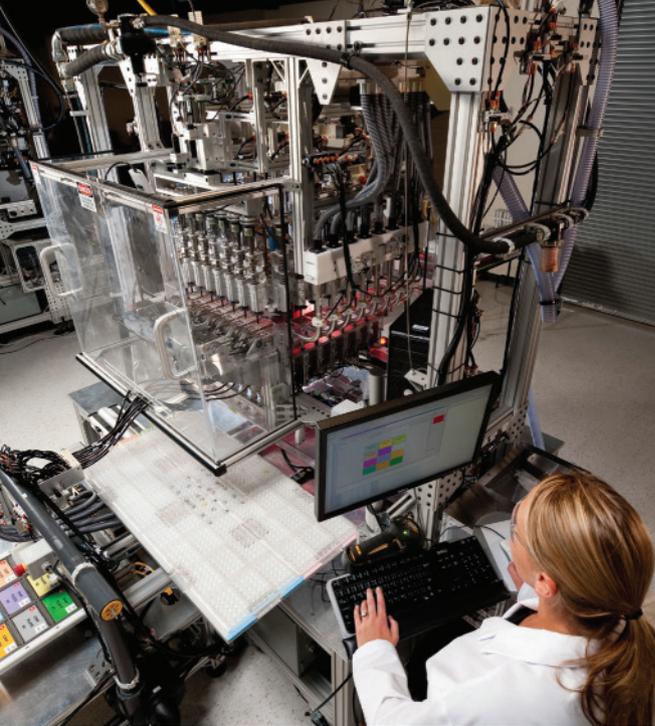
Health Canada also ensures its novel food/GMO evaluators have the necessary scientific and regulatory capacity to regulate products of biotechnology, especially as the science continues to advance and new products are proposed for commercialization.

Federal regulators say they keep pace by using the best technology available and by continually reviewing the effectiveness of its approach. Officials say assessment of the safety of biotechnology-derived foods in Canada reflects more than a decade of work by international experts working through such agencies as the World Health Organization, Food and Agriculture Organization, Codex Alimentarius Commission and Organization for Economic Co-operation and Development.

INDUSTRY GIANTS

Despite this formidable array of expertise and experience, food activists suggest regulation of GMOs has been hurried, and that food industry giants like Monsanto, Dow and BASF have too much influence within the wider food industry.

One analyst countering the claims of GMO opponents is Stuart Smyth, PhD, an assistant professor in the department of agricultural and resource economics at the University of Saskatchewan, who also operates a popular blog dealing with innovations in agriculture and food science. He has total confidence in the effectiveness of Canada's GMO regulation. "Canada's regulatory framework for GM crops was



Monsanto's research and development team has come up with a GMO-assisting device called the seed chipper, which enables workers to look inside a seed to get its DNA information, to be used as part of the selection process to determine the best seeds to keep.

carefully and deliberately developed over a period from 1988 to 1994," Smyth told *Engineering Dimensions*. "During this process, various discussion documents were prepared that assessed various potential risks about these new plant-breeding technologies, and regulations were drafted, based on scientific rational."

Smyth adds that requirements for plants with novel traits are based on the science of the product and not the process used to create the product. The first GM products approved were done in 1995 and for 23 years Canada's regulatory system has consistently approved safe crop varieties and food, he says.

Smyth also defends the US system of GMO regulation and suggests that most anti-GMO activists are indulging in the politicization of science to further their own agendas. "Those critical of innovation in agriculture are unable to ground their argument in science and rely on the general lack of knowledge the public possesses about the technology and science behind crop and food production to deliberately launch campaigns that prey on this lack of awareness to demonize the food products," Smyth says. "There are nearly 1000 journal articles that quantify some type of benefit from GM crops yet these [anti-GMO] organizations routinely say there are no benefits about GM crops. They have invested so heavily in this tactic that they have boxed themselves into a corner and are unable to admit that there are any benefits from GM crops or foods. Yield increases, fewer environ-



Through the application of genetic engineering, GMO researchers can detect and map genes, discover their functions, select for specific genes in genetic resources and breeding or transfer beneficial genes for specific traits into plants to give them additional benefits, such as the ability to ward off pests or weeds.

mental impacts and more profit for farmers are all ignored in favour of scaring the public about GM foods, as this raises money for their lobbying campaigns."

Smyth says GMO regulation remains effective and that it has evolved since the early 1990s when GMO first came onto the market. Nonetheless, he sees some room for enhancement. "Greater insights into the system of rules that underpin regulatory frameworks for agri-food and biotechnology products in genetically modified crop-adoption nations will provide value by clarifying the evidence used to commercialize these technologies," he adds.

ROLE FOR ENGINEERS

Smyth says plants with novel traits are regulated based on allergenicity, toxicity and impacts on non-target organisms. "As science evolves, such as with synthetic biology now, there could also be increased roles for engineers in these areas," he says. "Gene drives are being constructed and it is possible that engineers could be involved in this process as well."

Belinda Elysee-Collen, P.Eng., a Toronto-based engineer with more than 20 years of experience in the food industry, is deeply concerned about food safety through her involvement with the Canadian Institute of Food Science and Technology but believes the main issues surrounding GMOs include ethics, the environment and personal choice. "There is no published evidence that GMO products are not safe to eat," she says. "If a GMO-created product is not safe to eat, then they are not approved for human consumption by Health Canada or the Canadian Food Inspection Agency. There are many alternatives to GMO source foods and ingredients, so the consumer does not have any problem avoiding them if they so choose."

Debate over GMO regulation invites some thought as to the overall contribution of professional engineers to agriculture and the wider food industry. In a recent blog, Robb Fraley, the chief technology officer at Monsanto—a prime target of anti-GMO lobbyists—suggests engineers and other specialists are approaching a watershed moment in agriculture and food production. "As a result of the integration of farming, science and engineering, growers have access to meaningful insights and innovations that enable them to farm more precisely using fewer resources and produce more on each acre of land," Fraley wrote in a recent LinkedIn post. "Our global population is growing dramatically, yet the resources of our planet are not. We need to significantly increase our food supply by 2050 to keep pace with predicted population growth, and we must do so safely and environmentally sustainably in the areas of land, water and energy." **e**

TO THE MEMBERS OF THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF ONTARIO

We have audited the accompanying financial statements of the Association of Professional Engineers of Ontario, which comprise the balance sheet as at December 31, 2017, and the statements of revenue, expenses and changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's responsibility for the financial statements

Management is responsible for the preparation and fair presentation of these 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.

Auditor's responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements 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 entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of the Association of Professional Engineers of Ontario as at December 31, 2017 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.

The logo for Deloitte, featuring the word "Deloitte" in a bold, blue, sans-serif font, followed by a small green dot.

Chartered Professional Accountants
Licensed Public Accountants
2018

FINANCIAL STATEMENTS

STATEMENT OF REVENUE, EXPENSES AND CHANGES IN NET ASSETS

year ended December 31, 2017

		2017	2016
REVENUE	P.Eng. revenue	\$ 15,444,463	\$ 15,300,492
	Application, registration, examination and other fees	6,450,742	6,186,429
	Building operations (Note 4)	2,386,379	2,044,589
	Investment income	287,341	171,538
	Advertising income	269,958	437,187
		24,838,883	24,140,235
EXPENSES	Staff salaries and benefits/retiree and future benefits (Note 9)	11,742,284	11,262,243
	Building operations (Note 4)	2,401,801	2,485,858
	Purchased services	1,492,430	1,402,475
	Amortization	1,280,598	1,242,064
	Engineers Canada	960,080	977,311
	Legal (corporate, prosecution and tribunal)	913,788	614,293
	Chapters (Note 13)	887,498	765,181
	Computers and telephone	854,024	628,847
	Occupancy costs (Note 4)	817,268	857,468
	Volunteer expenses	738,032	660,736
	Postage and courier	638,415	626,926
	Transaction fees	536,201	500,306
	Consultants	459,679	410,711
	Contract staff	189,353	399,882
	Recognition, grants and awards	178,010	196,051
	Advertising	156,729	107,711
	Office supplies	132,120	132,379
	Professional development	120,985	168,011
	Insurance	116,481	111,637
	Printing	113,406	98,841
Staff expenses	100,522	83,808	
		24,829,704	23,732,739
	Excess of revenue over expenses before the undernoted	9,179	407,496
	Council discretionary reserve expenses (Note 8)	34,967	36,871
	(Deficiency) excess of revenue over expenses	(25,788)	370,625
	Remeasurement and other items	80,755	1,342,820
	Net assets, beginning of year	16,039,588	14,326,143
	Net assets, end of year	16,094,555	16,039,588

BALANCE SHEET

as at December 31, 2017

		2017	2016	
ASSETS	CURRENT	Cash in interest-bearing accounts	\$ 2,353,902	\$ 1,449,325
		Marketable securities at fair value	6,806,699	6,552,646
		Accounts receivable	426,729	499,016
		Prepaid expenses and deposits	389,089	265,014
		Other assets	401,256	401,365
		10,377,675	9,167,366	
	Capital assets (Note 3)	35,078,815	37,061,925	
TOTAL ASSETS		45,456,490	46,229,291	
LIABILITIES	CURRENT	Accounts payable and accrued liabilities (Note 15)	1,787,457	1,813,785
		Fees in advance and deposits	9,048,378	8,862,418
		Current portion of long-term debt (Note 5)	980,000	952,000
			11,815,835	11,628,203
	LONG TERM	Long-term debt (Note 5)	5,607,000	6,587,000
		Employee future benefits (Note 6)	11,939,100	11,974,500
TOTAL LIABILITIES		29,361,935	30,189,703	
Net assets (Note 7)		16,094,555	16,039,588	
Total liabilities and net assets		45,456,490	46,229,291	

Approved by Council

STATEMENT OF CASH FLOWS

year ended December 31, 2017

		2017	2016
OPERATING	(Deficiency) excess of revenue over expenses	\$ (25,788)	\$ 370,625
	Add (deduct) items not affecting cash		
	Amortization	2,232,686	2,171,172
	Amortization—other assets	68,852	63,914
	Employee future benefits expensed	1,218,555	1,445,000
	Change in unrealized (gains) losses on marketable securities	(190,013)	(23,259)
	Losses (gains) on disposal of marketable securities	71,931	10,736
		3,376,223	4,038,188
	Change in non-cash working capital items (Note 10)	107,844	(576,564)
		3,484,067	3,461,624
FINANCING	Repayment of mortgage	(952,000)	(928,000)
	Contributions to employee future benefit plans	(1,173,200)	(1,202,580)
		(2,125,200)	(2,130,580)
INVESTING	Net change in marketable securities	(135,971)	(136,356)
	Additions to capital assets	(249,576)	(1,521,795)
	Additions to other assets	(68,743)	(75,000)
		(454,290)	(1,733,151)
Increase (decrease) in cash		904,577	(402,107)
Cash, beginning of year		1,449,325	1,851,432
Cash, end of year		2,353,902	1,449,325

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2017

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 revenue, expenses 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 balance sheet. Gains and losses on such instruments are recognized in the statement of revenues, expenses 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

License 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 for funding purposes (but not one prepared using a solvency, wind-up, or similar valuation basis) 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	5%
Building improvements—common area	3.3% to 10%
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 balance sheet.

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

	2017	2016
	Cost	Accumulated amortization
	Net book value	Net book value
	\$	\$
Building	19,414,668	3,419,487
Building improvements	8,903,086	2,872,507
Building improvements—common area	9,684,007	3,028,001
Land	4,366,303	-
Computer hardware and software	4,659,375	3,154,452
Furniture, fixtures and telephone equipment	1,431,775	1,019,948
Audio visual	1,008,316	895,403
Work in progress	1,083	-
	49,468,613	14,389,798
		35,078,815
		37,061,925

FINANCIAL STATEMENTS

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:

	2017	2016
	\$	\$
Revenue		
Rental	804,236	742,060
Operating cost recoverable—tenants	1,313,369	1,052,318
Parking	139,259	124,035
Miscellaneous	129,515	126,176
	2,386,379	2,044,589
Operating cost recoverable—PEO	729,089	752,467
	3,115,468	2,797,056
Recoverable expenses		
Utilities	534,901	570,506
Amortization	563,795	540,813
Property taxes	442,424	446,086
Payroll	253,104	246,932
Janitorial	190,665	195,000
Repairs and maintenance	159,577	157,446
Property management and advisory fees	86,977	84,856
Security	4,798	35,928
Administrative	23,119	23,781
Road and ground	20,693	14,040
Insurance	18,247	18,104
	2,298,300	2,333,492
Other expenses		
Interest expense on note and loan payable	348,006	396,398
Amortization of building	388,293	388,293
Amortization of deferred costs	68,852	63,916
Other non-recoverable expenses	27,439	56,226
	832,590	904,833
	3,130,890	3,238,325
Excess of expenses over revenue	(15,422)	(441,269)

For purposes of the statement of revenue, expenses and changes in net assets, the operating costs recoverable from PEO of \$729,089 (2016—\$752,467) 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 revenue, expenses and changes in net assets.

	2017	2016
	\$	\$
Building revenue per above	3,115,468	2,797,056
Eliminated PEO portion	(729,089)	(752,467)
	2,386,379	2,044,589
Building expenses per above	3,130,890	3,238,325
Eliminated PEO portion	(729,089)	(752,467)
	2,401,801	2,485,858

5. BUILDING FINANCING

In 2009, the association financed \$14,100,000 of the cost of its building acquisition with a credit facility from the Bank of Montreal, Capital Markets Division. The facility 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 facility is repayable in monthly installments of principal plus interest maturing on March 11, 2019 and bears a floating interest rate based on variable bankers' acceptances. The balance outstanding at December 31, 2017 is \$6,587,000.

Principal repayments are due as follows:

	\$
2018	980,000
2019	5,607,000
	6,587,000

The association has entered into a swap agreement related to this loan, whereby the floating rate debt is swapped for a fixed rate debt with an interest rate of 4.95 per cent and settled on a net basis. The notional value of the swap is \$14,100,000. The start date of the swap was March 11, 2009 with a maturity date of March 11, 2019.

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 healthcare and dental benefits to active and 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 \$254,900 (2016-\$214,512) 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, 2017 was as follows:

	Basic pension plan	Supplemental pension plan	Other non-pension benefit plan	Total
	\$	\$	\$	\$
Accrued benefit obligation	(24,412,500)	(1,905,800)	(14,241,800)	(40,560,100)
Plan assets at fair value	26,726,400	1,894,600	-	28,621,000
Funded status—plan surplus (deficit)	2,313,900	(11,200)	(14,241,800)	(11,939,100)

FINANCIAL STATEMENTS

The funded status of the association's pension plans and post-retirement benefit plan using actuarial assumptions as of December 31, 2016 was as follows:

	Basic pension plan	Supplemental pension plan	Other non-pension benefit plan	Total
	\$	\$	\$	\$
Accrued benefit obligation	(23,686,100)	(1,617,100)	(13,692,400)	(38,995,600)
Plan assets at fair value	25,152,300	1,868,800	-	27,021,100
Funded status—plan surplus (deficit)	1,466,200	251,700	(13,692,400)	(11,974,500)

PEO measures its defined benefit obligations and the fair value of plan assets 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, 2017.

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 \$28,491,815 (2016—\$29,522,925).

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. Expenses from the discretionary reserve were as follows. These figures include costs of \$21,264 for salaries and benefits for staff time spent on these projects.

	2017	2016
	\$	\$
Emerging Discipline Task Force	1,376	1,790
Council Term Limits Task Force	10,506	30,276
Council Composition Task Force	23,085	4,805
	34,967	36,871

9. FULL-TIME SALARIES AND BENEFITS

During the year, the association incurred a total of \$11,763,548 (2016—\$11,286,681) for salary and benefits costs for its full-time staff of which \$21,264 (2016—\$24,438) was directly attributable to special projects approved by Council and disclosed under Note 8.

10. CHANGE IN NON-CASH WORKING CAPITAL ITEMS

	2017	2016
	\$	\$
Accounts receivable	72,287	28,298
Prepaid expenses and deposits	(124,075)	(39,236)
Accounts payable and accrued liabilities	(26,328)	(360,925)
Fees in advance and deposits	185,960	(204,701)
	107,844	(576,564)

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 \$142,264 (2016–\$138,330) is not reported on the association’s balance sheet, as it is held in trust for the Council of Ontario Deans of Engineering.

12. COMMITMENTS

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

	\$
2018	1,386,245
2019	662,752
2020	252,654
	2,301,651

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 \$887,498 (2016–\$765,181), including \$596,775 (2016–\$545,555) in chapter allotments and \$290,723 (2016–\$219,626) in other disbursements to individual chapters. During the year, the association also incurred additional costs of \$561,332 (2016–\$495,694) 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 revenue and expenses 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, 2017, 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 payables and accrued liabilities includes \$318,916 (2016–\$294,338), with respect to government remittances payable at year end.

REGISTRAR'S FINANCIAL REPORT

FOR THE YEAR ENDED DECEMBER 31, 2017

PEO ended 2017 with a \$25,788 deficit revenue over expenses. Total revenues were \$24,838,883 compared to the approved budget of \$25,989,673, and represented an increase of \$698,648 over 2016 revenues despite a \$167,229 decrease in advertising revenue. Actual expenditures of \$24,829,704 in 2017 were favourable when compared to the approved budget of \$25,824,577 but were \$1,096,965 more than the previous year.

Expenses included a year-over-year increase of \$480,041 in staffing costs (salaries and benefits). This was due to a Council approved 3 per cent increase for cost of living and merit adjustments as well as new staff positions. In addition, Council approved expenditures of \$106,814 for external hosting of the Practice Evaluation and Knowledge program's ethics module (starting in March 2017), \$42,000 to promote the 70th anniversary of the Ontario Professional Engineers Awards, and \$13,703 in aggregate for volunteer expenses relating to the work of the Council Composition Task Force, the Council Term Limits Task Force and the Emerging Disciplines Task Force. Legal costs in 2017 were higher than in 2016 due to higher costs for employment-related matters, investigations, independent legal counsel for discipline prosecution and tribunal fees for discipline hearings.

To counter the revenue shortfall, management undertook several cost-cutting initiatives that resulted in a total reduction in expenses of \$994,873. Capital projects that were deferred as part of this strategy included the online licensing project, upgrades to PEO's website and intranet, as well as upgrades to the elevators at 40 Sheppard Ave. West.

The investment in capital assets for the year was \$249,576 (\$1,521,795 in 2016). PEO incurred no additional debt for these expenditures in 2017 as these were funded from its cash reserves. At the end of the year, the closing balance in cash and investments was \$9,160,601 (\$8,001,971 in 2016) and net assets increased to \$16,094,555 (\$16,039,588 in 2016).

REVENUE

Total revenue in 2017 was \$24,838,883, which is 4 per cent below budget. This was largely due to lower than expected application, registration and exams fees as well as lower P.Eng. revenue. Approximately 62 per cent of revenue is comprised of P.Eng. licence revenue. The reduction in P.Eng. revenues was partly attributable to application processing delays brought about by

unanticipated shortage in staff resources during a medical leave period. This backlog was cleared by the end of the year. However, as P.Eng. revenues are recognized over a 12-month period for each of the 12 billing cycles, only a portion of these revenues were recognized in 2017; the remaining portion will be recognized next year.

COST MANAGEMENT

Total expenses before costs for Council special projects were \$24,829,704, which is \$994,873 or 4 per cent below budget due to various cost-saving measures implemented in 2017. Major expense variances from the budget include:

- Staff salaries and benefits/retiree and future benefits were \$488,904 lower than budgeted;
- Volunteer expenses were \$215,343 lower than planned;
- Costs for computers and telephones were \$210,746 lower than budgeted;
- Purchased services costs were \$196,332 lower than budgeted;
- Professional development costs were \$121,315 lower than planned;
- Costs for chapters were \$109,952 lower than budgeted; and
- Building operations were \$105,068 lower than budgeted.

2017 BUDGET VARIANCES BY BUSINESS UNIT

Communications

Expenditures were \$191,773 or 11 per cent below budget. The key variances include lower than budgeted purchased services largely due to lower printing costs for *Engineering Dimensions* magazine (\$55,603), lower salaries and benefits (\$50,581), and lower transaction fees for sales commissions (\$27,374) and lower postage costs for *Engineering Dimensions* (\$11,432).

Corporate Services

Expenditures were \$945,032 or 9 per cent below budget. The key variances within the department include lower than planned costs for staff salaries along with retiree and staff future benefits (\$478,334); lower professional development costs for educational courses (\$123,130); lower costs for chapters due to lower travel expenses and accommodation expenses for attending the AGM, and lower spending on the chapter certificate program (\$109,899); lower spending for 40 Sheppard expenses due to lower recoverable costs, including repairs and maintenance (\$105,068); lower occupancy costs due to lower rental recovery costs and offsite space rental (\$104,922); and lower costs for meals and catering for various events, such as the AGM, Order of Honour, etc., and lower audiovisual contracts (\$102,870). These reductions were partially offset by higher than budgeted costs for employment-related legal expenses (\$155,247) and advertising related to staff recruitment (\$56,337).

Executive

Expenditures were \$4,791 or 0.3 per cent above budget largely due to higher salaries and benefits costs (\$63,245). This was partially offset by lower legal fees for CEO litigation and related matters (\$26,452), lower volunteer expenses for representing PEO at various events (\$14,527) and lower staff business expenses for airfare and accommodation (\$10,449).

Finance

Expenditures were \$120,463 or 9 per cent above budget. This was due to higher than budgeted costs for salaries and benefits (\$69,831); for purchased services related to tax consulting (\$18,227); for postage for

administration and fees billing (\$15,867); and for office supplies (\$11,900).

Information Technology

Expenditures were \$69,562 or 3 per cent above budget in 2017. This was due to expenses for Aptify consultants (\$126,751) that were not included in the budget. These expenses were offset by lower amortization costs due to delayed spending and cancelled capital projects (\$76,285) as well as lower than budgeted costs for computers and telephone-related expenses resulting from lower costs for support and maintenance contracts, software non-capital upgrades, and computer services supplied (\$10,642).

Licensing and Registration

Expenditures were \$58,786 or 2 per cent below budget. This was largely due to lower than budgeted costs for staff salaries and benefits (\$107,597); lower volunteer expenses, including meals and mileage for attending various committee meetings (\$74,424); and lower than budgeted costs for licensing enhancement consultants (\$33,000). These reductions were offset by higher than budgeted costs for contract staff (\$88,607), higher costs for purchased services related to catering costs for various committee meetings (\$52,719), and an increase in postage costs for technical and Professional Practice Exams and issuing P.Eng. licences (\$15,897).

Regulatory Compliance

Expenditures were \$364,405 or 19 per cent above budget in 2017. Legal expenses, including costs for discipline appeals and prosecution, were higher than budgeted (\$190,562); costs for contract staff were higher due to staff being away on maternity leave (\$47,459). These costs were partially offset by lower than expected staff business costs for travel (\$6,897).

Tribunals and Regulatory Affairs

Expenditures were \$358,505 or 17 per cent below budget. The key variances include lower than budgeted spending on: computer expenses for the Practice Evaluation and Knowledge program (\$149,757); salaries and benefits due to unfilled positions (\$115,931); purchased services for a policy development survey (\$71,069); and volunteer expenses for meals, travel and accommodation for various committee meetings and events (\$29,872).

COUNCIL-DIRECTED INITIATIVES

Net expenditures for projects approved by Council were \$34,967. This includes \$23,085 for the Council Composition Task Force, \$10,506 for the Council Term Limits Task Force and \$1,376 for the Emerging Disciplines Task Force.

BUILDING OPERATIONS

The building generated \$3,115,468 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 \$2,298,300 and other expenses totalled \$832,590, thereby creating a deficiency of revenue over expenses of \$15,422 (after all

expenses, including loan interest), as compared to a budgeted surplus of \$35,391 in 2017. Total revenues were lower than budgeted by \$155,881 or 6 per cent due to a delay in the leasing of available space. Total expenses were under budget by \$105,068 or 4.2 per cent. PEO's share of expenses totalled \$729,089. These costs were reclassified from building operations to occupancy costs in the financial statements. Since 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 2017 were \$817,268, which includes security, storage and other occupancy costs. PEO's total accommodation expense (including interest) was \$1,165,274.

PEO occupied 39,100 square feet at December 31, 2017. The market rent of this space is approximately \$15 per square foot and operating costs are \$21.89 per square foot. Therefore, PEO's equivalent costs for rent and operating costs would have been \$1,442,399 for 2017, leading to a net value to PEO of \$277,125.

CAPITAL EXPENDITURES

Capital expenditures for the year totalled \$249,576 compared to \$1,521,795 in 2016.

Base building improvements totalled \$35,551, which is recoverable from tenants. Improvements included costs for a replacement heat pump (\$23,100), wall finishes (\$16,508) and window replacement (\$8,904). Non-recoverable building improvements, which are improvements made to PEO owners space, totalled \$99,721 for the year. These costs were to prepare space for a new tenant (\$88,532) and miscellaneous leasehold improvements. PEO invested \$110,537 in computer hardware and software during 2017, including a WiFi upgrade (\$34,716), virtual server hardware and software (\$32,408), PC upgrades (\$27,468) and several smaller projects. Spending on audiovisual and furniture upgrades totalled \$3,766.

All of PEO's capital expenditures in 2017 were funded from PEO's cash reserves.

CONCLUSION

Despite the challenges faced in 2017, staff and management, with the guidance and support of Council, restricted the deficit to \$25,788 by adopting several cost-cutting measures. Although there has been a steady growth in the scope and breadth of PEO's operations over the past several years, the costs for all of these initiatives have been funded without any membership fee increases for the past 10 years. In addition, PEO has the lowest membership fees in Canada in comparison to other provincial engineering associations. In light of this, it could be said that the association has managed its affairs responsibly in 2017 and, as a result, is left with a modest reserve to carry out its regulatory mandate in the public interest. **e**

COUNCIL APPROVES TERMS OF REFERENCE FOR GOVERNANCE WORKING GROUP

By Nicole Axworthy

517TH MEETING, MARCH 23, 2018

Council has approved the terms of reference for the new Phase 1 Governance Working Group. The creation of the group and a \$40,000 budget was approved at Council's November 2017 meeting and was the result of a member submission that was passed at PEO's 2017 Annual General Meeting (see *Engineering Dimensions*, January/February 2018, p. 53). Its purpose is to examine opportunities for PEO Council and committees to be more efficient, to save volunteer and staff time and resources, and to ensure PEO remains relevant as the regulator of engineering in Ontario. Phase one of the group is to evaluate if there are any risks or problems with PEO's current governance model and if it is necessary for PEO to engage an external governance expert. The group is expected to provide a progress report to Council prior to PEO's 2019 Annual General Meeting.

ONLINE LICENSING TASK FORCE

At its March meeting, Council approved the creation of an Online Licensing Portal Task Force along with a \$15,000 budget to co-operate in conjunction with PEO's online licensing portal project execution to address and improve upon customer service issues experienced by current applicants, so that the online application for licensure is conducive to a fair, timely, professional and customer-centric process.

PEO's Regional Councillors Committee (RCC) put forward this motion after issues regarding PEO's licensing process were raised by chapter delegates at various regional congresses last year and because these issues were thought to have not been adequately addressed by Council. While the online licensing portal project will likely address most of the issues experienced by current engineering interns (EITs) seeking licensure, and even covered by the improvement suggestions to the overall licensing process, the RCC felt the perceived poor customer service aspect of the licensing process required improvement and, unless addressed, could undermine the potential for success of the online licensing portal project. Next steps for the task force include drafting terms of reference and a work plan, which will be reviewed and approved by the RCC on behalf of Council.

PURPOSE OF ENGINEERS CANADA

Council has approved two of three governance improvement issues that will be part of the agenda of Engineers Canada's annual meeting of members and voted on by member-regulators on May 26, including a purpose statement of Engineers Canada that will define and constrain all activities undertaken by Engineers Canada and help align its strategic plan. The 10 purposes are as follows.

The purpose of Engineers Canada is to serve the collective interests of the regulators, to promote and maintain

the interests, honour and integrity of the Canadian engineering profession, and to do all such lawful things as are incidental to or conducive to the attainment of the foregoing, including:

Serve the regulators and strengthen the profession by:

1. Accrediting undergraduate engineering programs;
2. Facilitating and fostering working relationships between and amongst the regulators;
3. Providing services and tools that enable the assessment of engineering qualifications, foster excellence in engineering practice and regulation, and facilitate mobility of practitioners within Canada;
4. Offering national programs;
5. Advocating to the federal government;
6. Actively monitoring, researching and advising on changes and advances that impact the Canadian regulatory environment and the engineering profession;
7. Managing risks and opportunities associated with mobility of work and practitioners internationally;
8. Fostering recognition of the value and contribution of the profession to society and sparking interest in the next generation of professionals;
9. Promoting diversity and inclusivity in the profession that reflects Canadian society; and
10. Protecting and word(s), mark, design, slogan or logo, or any literary or other work, as the case may be, pertaining to the engineering profession or to its objects.

Council also approved modifying Engineers Canada's bylaw to provide for term limits for Engineers Canada directors to two, three-year terms, unless the director is elected president-elect, in which case an additional three-year term is possible. This decision will be voted on by member-regulators at Engineers Canada's annual meeting of members.

At its meeting, Engineers Canada will also propose a change in its board size but PEO only supports that the status quo be maintained. PEO President David Brown, P.Eng., BDS, C.E.T., will be representing PEO.

PEO DIRECTORS OF ENGINEERS CANADA BOARD

At its March meeting, Council appointed Christian Bellini, P.Eng., FEC, as a PEO director on the Engineers Canada board for a three-year term, effective May 26 at the Engineers Canada annual meeting of members. Bellini replaces Chris Roney, P.Eng., BDS, FEC, who has represented PEO on the board since 2009. [e](#)



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Deadline for the July/August issue is May 30, 2018. Deadline for the September/October issue is July 25, 2018.

Key role in food revolution

Claude Laguë, P.Eng.,
Ottawa, ON

Kudos to President Dony, P.Eng., FEC, for a great overview of the evolving role of our profession through the successive industrial revolutions that have marked the history of humankind since the 1700s ("Adapting to new realities," *Engineering Dimensions*, March/April 2018, p. 6). Too bad he neglected to comment on the key role engineering has played in the equally important agricultural/food revolutions that have occurred in parallel. Engineering advances in areas such as mechanization, soil and water management, and crop and livestock production, to name a few, have increased the productivity of our agri-food sector beyond the wildest dreams of the peasants and artisans of yesterday. Engineering has freed millions of workers from the drudgery of human-powered agriculture who, as a direct result, became available to contribute to the first, second, third and now fourth industrial revolutions. Advances in agri-food engineering remain as important in the age of the Fourth Industrial Revolution as they were when the first one occurred. When considering

challenges such as the global population closing in on the 10 billion mark, the wastage of almost half the food produced in developed countries, or the use of more than 80 per cent of fresh water resources by the agri-food industry, it becomes clear that innovative engineering solutions in agriculture and food production will be as, if not more, important than those in, let's say, artificial intelligence if humanity is to live long and prosper on planet Earth now, tomorrow and in the years ahead! Let us be thankful to our agri-food engineering colleagues the next time we stop at the grocery store or have a meal at a restaurant.

Gender equality or sexism?

R. Glenn Givens,
P.Eng.,
Burlington, ON

Firstly, I commend Jeannette Chau, P.Eng., on her statement that we need more engineers in politics ("Because it's 2018!" *Engineering Dimensions*, January/February 2018, p. 26). This would cause policy to be founded on logic and reason, not appearances, emotion, expediency, political gain, etc. Importantly, if the current process for candidate selection is fair (I don't claim that it is or it isn't), the onus is on engineers to enter politics. Too few do.

However, I take issue with her commending Trudeau for deliberately forming a cabinet of 50 per cent of each gender. About 25 per cent of federal MPs are female and the PM's stated objective was to have 50 per cent of cabinet ministers to be from that female 25 per cent. Any good control engineer understands that to achieve a specific outcome, the input must be changed—in this case, selecting ministers based on their gender instead of on merit, experience and qualifications. His stated purpose was to ensure gender equality. What could be more wrong than overtly practising sexism to achieve gender equality? While obviously sexism is being not just condoned, not merely recommended but indeed enforced, this single act, having great influence coming from the most powerful person in the country, will set gender equality and the fight against sexism

back a generation. Women will be the primary long-term victims as the bureaucrats who work for those ministers will question whether their minister was the best choice or was chosen merely because she had the preferred gender, and others in the working world will do the same. I do not wish that my daughter's coworkers question her qualifications or merit. PEO should not join the chorus in favour of sexism and should instead fight to break down barriers and encourage hiring based on merit, qualifications and equal opportunity. The goal must always be to create a fair hiring process rather than one where certain genders, races, etc. are preferred in order to achieve a specific outcome or quota. One cannot achieve gender or racial equality through the practice of sexism or racism.

A call to action

Nancy E. Hill, P.Eng., LLB, FEC, FCAE,
PEO president-elect,
Toronto, ON

Thank you for devoting an issue to women in engineering (*Engineering Dimensions*, January/February 2018). Such an issue is timely because of Council's recent unanimous endorsement of Engineers Canada's 30 by 30 initiative. However, when I reflect on the issue I find myself pleased, disappointed and a little angry.

I am pleased with many of the articles. In particular, I enjoyed the "25 outstanding female engineers" piece wherein you focused on a diverse group of female engineers in a wide variety of jobs and sectors (p. 36).

I was disappointed because it seems to me there was a missed opportunity. There are more elected women on Council than ever before—women make up 25 per cent of Council, and last year there were two female vice presidents for the first time in PEO history. We should celebrate these role models! It would have been wonderful to highlight experienced female engineers who have been in the trenches for decades, and to uplift the younger female change-makers who volunteer their time at PEO.

It was also a missed opportunity to publicly thank the women who created a draft 30 by 30 Joint Action Plan. The draft plan was created in record time, thanks to the tireless work of many women and the leadership of Helen Wojcinski, P.Eng., FEC. Without this work, PEO Council would likely not have been in the position to take the steps we took for 30 by 30.

Finally, I was a little angry when I read the headline, "When it comes to gender, we may have something to teach" (p. 27). Virtually every woman engineer I know has had a #MeToo moment. While I think everyone has a right to share their lived experiences, the message of the title is not the message needed in the profession now. I worry that a recent female engineering grad who has had a #MeToo experience might see that title and think engineers did not get the message and are not committed to change. There is tremendous value in sharing anecdotal experiences, positive or negative, but it is irresponsible to extrapolate an industry-wide trend from a handful of positive experiences lived by a single person. In doing so, we may find ourselves inadvertently alienating those who have had negative experiences and overlooking unacceptable professional conduct.

In my opinion, the numbers speak for themselves: fewer than 15 per cent of licensed engineers in Ontario identify as women. This is especially troubling in an environment where women are enrolling in post-secondary engineering programs at a growing rate. Why are we losing these potential young engineers? While many women in the profession have had positive workplace experiences, the statistics tell us that this is the worst possible time for us to become complacent on this issue. There are male bosses and colleagues who are exemplary role models but as a profession we still have a lot to learn. It is a time for a call to action to ensure the profession embraces the principles of equity, diversity and inclusiveness. Without a commitment to these principles and a culture shift, we will not achieve the 30 by 30 goal.

Honour the victims, not the assailant

N. Andrew Billings, P.Eng.,
Mississauga, ON

I am disappointed in the reporting of the December 6 ceremony ("PEO committee stages École Polytechnique memorial ceremony," *Engineering Dimensions* January/February 2018, p. 21). The article states WEAC "celebrated the memory of the 14 victims." Did this article also celebrate the memory of the 14 victims?

The previous paragraph detailed the horrific events on December 6, 1989. This account is required in order to provide historical perspective.

My issue is that the article included the name of the lone gunman and not the names of the 14 victims. This inclusion continues the memory of the gunman 28 years after the incident and may encourage like-minded individuals to complete their own horrific event (knowing they will be always be remembered). Is the naming of the gunman required editorially for a complete recounting of the event?

Ceremonies in 1989 at universities throughout Canada stated the names of the 14 victims and not the assailant. Can *Engineering Dimensions* not do the same 28 years later and truly honour the victims by publishing their names?

Breaking down barriers

Janice Levangie, P.Eng.,
Kitchener, ON

I appreciated the January/February issue of *Engineering Dimensions* profiling women of diverse backgrounds who are professional engineers (“25 outstanding female engineers,” p. 36). Reading the inspiring stories reminded me of experiencing barriers I hadn’t even considered until I came across them myself.

Before I became a mother, I was not conscious of some of the barriers that mothers (or parents) faced in the professional workplace. Workplace requirements for out-of-town travel, early or late meetings, changing shift work and long hours can be difficult for professional mothers, especially for those who lack access to support, such as flexible, affordable, quality childcare. While, in theory, work-

places have become more flexible—some allowing work from home, compressed work weeks, part-time work or work sharing, the actual implementation of these measures in professional workplaces seems to be low. The few employed mothers I know who are working less than full time are either self-employed or actually working more than 40 hours but being paid less than full-time salaries. I have not met a practising professional engineer who works part time. Before children, I didn’t think twice about travel or a meeting at a site at 7 a.m. Now it is only possible for me with serious advance planning.

Along with women, other groups are underrepresented in our profession. They face other barriers that we—as individuals and as members of organizations—just might not consider since we haven’t experienced them ourselves. In the Ontario Public Service, inclusive design is “designing for the full range of human diversity in ability, language, income, culture, gender, age and other characteristics.” The Ontario Human Rights Commission indicates that systemic racism is “often caused by hidden biases in policies, practices and procedures that result in unequal opportunities and outcomes for people based on race.” Perhaps the engineering profession needs to work on inclusive design to reduce the barriers that diverse individuals face in entering or remaining in the field. Eliminating barriers and uncovering hidden biases can take many shapes: anything from organizations showcasing engineers from the “full range of human diversity,” employers providing assistive technology or software, allowing an employee to work part time, and challenging subconscious biases that someone from a diverse group maybe can’t do the job as well or isn’t committed or professional.

So, consider what barriers there are out there for under-represented groups in engineering that you may not have thought of before. Reach out and start a dialogue with individuals from diverse groups. Be open to taking down the barriers together. Our profession has much to gain.

Welcome a designer designation

Arthur G. Self, P.Eng.,
White Rock, BC

The letter entitled “Redefining engineer for the future” by B. Grant Gordon, P.Eng. (*Engineering Dimensions*, January/February 2018, p. 58), certainly struck a chord with me. I have two degrees in physics and successfully became a P.Eng. a number of years ago—this designation was highly valued in both the defense and telecommunications companies for whom I worked. This was based on both the value of the designation itself to senior management in both industries (of which I was part) and the professionalism and ethics that come along with such. However, my career has spanned senior R&D positions in defense and telecommunications industries—not civil engineering—in a similar manner to Gordon, mentioned above. My research involved defense electronics, optical device development, program management and other technologies.

So, I fully support the suggestion made by Gordon. I am sure there are many of us who fully embrace the ideals and ownership that come with the P.Eng. designation but would dearly love an appropriate designation within that. “Designer” would be so appropriate.

Need to be tougher on members

David J. Baigent, P.Eng.,
Burlington, ON

"There have long been calls for reform (to self-regulation in Ontario) and they are getting louder. They include demands to scrap self-regulation."
— *Toronto Star*, March 26, 2018.

The following is my summary of the seven disciplinary matters brought to the Discipline Committee against five PEO members that resulted in panel decisions as reported in the March/April 2018 issue of *Engineering Dimensions*:

1. All five members brought before the Discipline Committee either plead guilty or were found guilty of professional misconduct.
2. Licence suspensions were: five months, two suspensions for two weeks, one week (despite the member's action resulting in the serious injury of a worker that required surgery) and no suspension (despite three incidents before the Discipline Committee in 1982, 2015 and 2017).

The perceived leniency of the Discipline Committee panels from the above-mentioned matters is clearly cause for concern. My greater concern is that the disciplinary hearing decisions published in *Engineering Dimensions* represent an exceedingly small percentage of the complaints that arrive at PEO every year. My understanding is that these complaints are reviewed by the Complaints Committee and evaluated for disposition (i.e. dismissed, further evaluated, investigated or referred to the Discipline Committee). I can only hope that the Complaints Committee is forwarding all complaints to the Discipline Committee that deserve their attention. The final decision on whether a disciplinary hearing is warranted should be the Discipline Committee's, not the Complaints Committee's, otherwise matters requiring disciplinary measures may be overlooked. This and weak penalties from Discipline Committee hearings will be sources of public criticism of the ability of our profession to self-regulate.

PEO members (and the public) deserve to know the total number of complaints received by PEO each year and the disposition of each type of complaint by both the Complaints Committee and the Discipline Committee by type of outcome. Further, both the Complaints Committee and the Discipline Committee should have half of their members from outside the profession to demonstrate independence from the influence of PEO members on both the individual committees and their panels and to ensure appropriate penalties are consistently handed down. As a self-regulated profession, we need to be seen as tough or even tougher on disciplining our members than other independent members of the public would be if we want to be proactive and remain a self-regulated profession.

So much for green science

Andrew S. Block-Bolten, P.Eng.,
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I am still impressed by the two courageous letters by Ronald Bradshaw, P.Eng. ("Questioning the cause," p. 53) and Stephen Korn, P.Eng. ("The other side," p. 54) published in the July/August 2017 issue of *Engineering Dimensions*.

I must tag on a short version of accessory thoughts.

There is much more to say about the windmills. Windmills are not only ugly—being nothing else than shoddy energy-producing constructs, their existence is a clear choice between government tax credits and the lives of thousands of wild birds, cruelly immolated by their misguided doings. Sadly, the tax write-offs and the hypocrites win. So much for the environment.

If there was no CO₂ in the atmosphere, nothing would be green. So much for green science.

Indeed, some individuals display "no hope of understanding" of this problem, as recently brought up in a high-spirited letter to the editor ("No hope of understanding," *Engineering Dimensions*, January/February 2018, p. 58).

Carbon dioxide, when in excess, dissolves in the oceans and precipitates in form of carbonate rocks, or reefs, where life is thriving.

And if I may add: nothing is more natural than coal, minerals, natural gas or oil.

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 naxworthy@peo.on.ca.

TOUGH QUESTIONS. AN AFFORDABLE ANSWER.

What if you became disabled due to a serious illness or injury and were unable to work? Treatment and recovery should be your number one focus. But treatment and recovery can have a significant price tag, which could be especially difficult to manage when you're not working.



BUT WHAT ARE THE ODDS?

The odds of suffering from a disability before age 65 are higher than you might think: **1 in 3.**¹

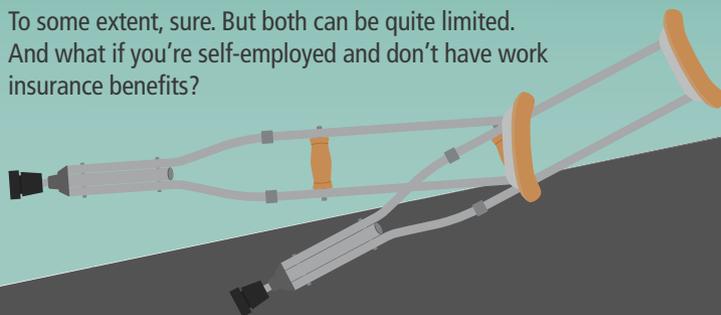
OKAY, BUT WHAT ARE THE FINANCIAL IMPLICATIONS?

Sadly, nearly 50% of mortgage foreclosures are due to disability.² And if you're self-employed, imagine the implications for your business if you're unable to work.



WHAT ABOUT DISABILITY COMPENSATION FROM WORK OR PUBLIC PLANS? THAT'S GOT TO HELP, RIGHT?

To some extent, sure. But both can be quite limited. And what if you're self-employed and don't have work insurance benefits?



SO, WHAT ARE YOUR OPTIONS?

Engineers Canada-sponsored Disability Income Replacement Insurance was created exclusively for professional engineering, geoscience and technology association members like you. With your membership, you have access to a unique combination of great benefits and low rates not available to the general public:

- **Pay no premiums** if you're totally disabled for three consecutive months. Or, if your chosen elimination period is longer,^{*} you pay no premiums during that period.
- **Monthly disability benefit payments of up to \$15,000.**³
- **Six types of disabilities** are covered under this plan.
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¹ Canada Life and Health Insurance Association, A guide to disability insurance, January 2016.

² www.disabled-world.com, "Disability Insurance: Benefits, News and claims," 2017.

³ Based on a percentage of your monthly earnings, while you are disabled and unable to perform your occupation.

* The elimination period is the number of days following your injury, after which your benefit payments will begin (7 to 365 days). The longer the elimination period, the lower your premiums.

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