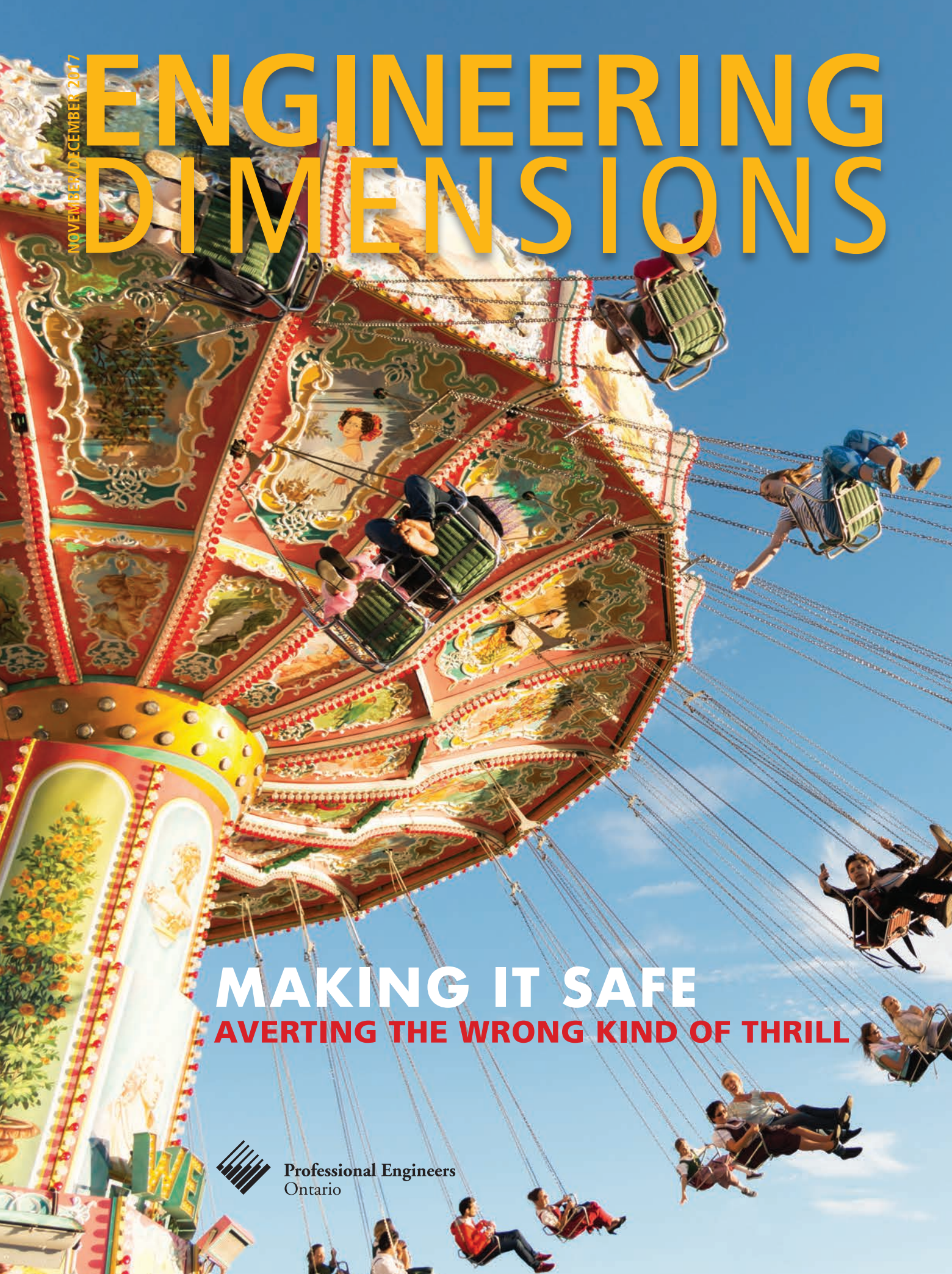
NOVEMBER/DECEMBER 2017

ENGINEERING DIMENSIONS



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ENTER AT YOUR OWN RISK

By Nicole Axworthy

ENGINEERING DIMENSIONS

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"Failure to imagine the possibility of failure is the most profound mistake engineers can make."

Those were the wise words PEO Registrar Gerard McDonald, P.Eng., shared with an audience of safety professionals in 2016 (p. 28).

It's true. Nothing in life is 100 per cent safe or risk-free, and yet engineering—a profession that is synonymous with safety and risk reduction—continues to assume greater responsibility and influence in developing more sophisticated safety networks across all industries, and even more so as technology advances. In fact, one of the fundamental reasons the engineering profession is regulated is to protect public safety. When professional engineers design a bridge, building or any other structure, process or solution that requires the use of engineering principles, the public should be assured it is safe.

In our feature article this issue, "How safe can you really make it?" (p. 26), we explore the challenges engineers face in improving safety standards, risk assessment systems and workplace health and safety programs—the key, as Registrar McDonald explained, is to overcome complacency and reliance on past success when creating a culture of safety. The article also highlights champions of safety in industries that require special attention to safety issues, including risk management leaders within the mining and chemical industries, and human factors engineers within the seemingly carefree world of amusement park rides.

On a similar note, our profile this issue, "Deconstructing—and recycling—a building, brick by brick," features a challenging demolition project with a 90 per cent waste diversion target that occurred earlier this year along one of Toronto's busiest downtown intersections. PEO Communications Manager Duff McCutcheon spoke to George Thomas, P.Eng., of DST Consulting Engineers about how the former Ontario government office complex was safely and methodically disassembled using various innovative techniques to minimize impacts to the busy traffic and pedestrian corridor. Find out how successful they were on page 24.

Finally, I'd like to direct your attention to the 2018 Ontario Professional Engineers Awards call for nominations on page 18. These prestigious awards showcase Ontario professional engineers who have contributed to their profession and community. The award categories include engineering excellence, management, research and development, entrepreneurship, young engineer, citizenship, and engineering project or achievement. If you know someone whom you think is deserving of such a recognition, you can find the nomination forms at www.peo.on.ca. e

2018 EDITORIAL CALENDAR

Below are the themes we'll be featuring in upcoming issues of *Engineering Dimensions*. If you can lend your expertise or opinions on these topics, don't hesitate to get in touch.

January/February: Women in Engineering
March/April: The Engineered Hospital
May/June: The Food Issue
July/August: The Discipline Process
September/October: Education
November/December: Northern Ontario

THIS ISSUE Safety has come to mean much more than checks, inspections and operator training. While these remain important, today's engineers are being encouraged to be more proactive in understanding all forms of risk and how they might tighten up even well-functioning process safety and health systems.

THE BUSINESS OF TRADE RESTRICTION

By Bob Dony, PhD, P.Eng., FIEE, FEC

On November 17, 1983, Ontario Attorney General Roy McMurtry rose in the legislature to introduce the first reading of the new *Professional Engineers Act*. In his remarks, he noted:

"It is by now axiomatic that self-governing licensing bodies exist only to serve the public interest. The financial or other interests of their members should not be a concern. The economic benefits that may inure to the possessors of a licence are a possible by-product of licensing, but they are not a reason for the legislature to confer the licensing power on a self-governing organization. A licence is an exclusive right to practise an occupation.

"As a general principle, every person should be free to utilize his or her abilities, education, training and experience in earning a livelihood. Therefore, it is wrong to create a restriction on this general principle by establishing licences unless this legislature is satisfied that licensing is necessary to protect the public."

We are rightly proud of our exclusive right-to-practise licence. As former PEO president Peter DeVita, P.Eng., FEC, notes in his book, *A Search for Advocacy: Creating the Canadian engineering profession*, we, along with our sister regulators across Canada, are one of the few jurisdictions in the world with such an exclusive right-to-practise licence for engineering, on par with such other professions as medicine and law. Other engineering organizations may have an exclusive right to title—you cannot call yourself a chartered engineer in the UK without joining the appropriate engineering institution and fulfilling the necessary requirements—but there are not general restrictions on who can do engineering work. Here, you may claim to be a fully-qualified bridge designer, but without a valid licence issued by PEO, you cannot independently practise.

We are granted this privilege, as Hon. McMurtry stated, "only to serve the public interest." Yes, we may make a living as "a possible by-product" of the licence, but he was clear that this is not a concern of the regulator. As our Code of Ethics states, "A practitioner shall regard the practitioner's duty to public welfare as paramount." It is also interesting to note how our profession differs in this regard with others. For example, in law or medicine, the practitioner's duty of care is to protect the welfare and interests of the client or patient. For engineers, it is the welfare of the public as a whole that requires our top-most dedication.

THE REGULATOR'S ROLE

This exclusive right-to-practise licence means PEO is, in effect, in the business of restriction of trade. We enforce not just on title but on practice—we issue a licence to practise to only those qualified, and we may revoke that licence as a disciplinary penalty. In a free society, anyone should be able to earn a living using their talents and ingenuity. Society does not abide by arbitrary impediments that stand in the way of people earning an honest living. However, when public safety is at stake, restriction of trade is acceptable.

Society generally understands the rationale behind granting PEO such powers. It understands the safety risks of having unqualified people doing engineering work. Buildings and bridges shouldn't collapse, vehicles shouldn't pose a danger to drivers or those around them, the electrical power infrastructure should be safe and secure, and chemical plants should not fail and cause environmental damage. Society has been willing to restrict trade in these areas because the danger to the public of having unqualified work is obvious.

As we go about our business of regulating the profession, the significance of our exclusive right-to-practise licence must be top of mind. Without restriction of trade, our role fundamentally changes. We would become a membership-driven organization, like most other engineering bodies, who simply lobby for regulations, standards and other demand-side legislation, as well as our own self-interest. And without the clear link to public safety and welfare, this exclusivity is simply unjustifiable.

PUBLIC SAFETY IS PARAMOUNT

Despite our long history of public protection, we must tread carefully. Our stance on the repeal of the industrial exception had been based solely on safety arguments. We even presented research that made a clear link between the industrial exception and workplace injury—and even death. Yet the government decided the danger to the public was not a sufficient imperative to override the reluctance to impose further restrictions of trade by repealing that exception. The imperative was logical to us, but obviously, it was not to others.

The lesson of the non-repeal of the industrial exception must be heeded as we move forward in our profession. Engineering is evolving as it moves beyond such classical disciplines as civil, mechanical, electrical and chemical. But as we adapt to the world of an ever-expanding scope of professional engineering and the diversity in scopes of practice, we cannot lose sight of that necessary link between our right-to-practise licence and the protection of the public.

When we make claim to a new area of practice as being professional engineering, we are effectively saying that no one is now allowed to do that work without being appropriately licensed by PEO. And to justify this restriction of trade, the danger to the public's safety and welfare must be made clear. For software engineering, for example, it's clear that a nuclear station's software-based control systems have such a safety argument. However, what about internet billing and transactions software?

It is society who ultimately decides where the line is drawn. e

ULTIMATE RESPONSIBILITY FOR MALL COLLAPSE STILL AN OPEN QUESTION, INVESTIGATOR SAYS

By Michael Mastromatteo

The lead engineering investigator into the June 2012 fatal Algo Centre Mall collapse in Elliot Lake, Ontario, believes there is no single line of liability among all players involved in assessing the doomed building's condition.

Hassan Saffarini, PhD, P.Eng., manager of structural engineering at NORR Limited, was guest speaker at a September 21 presentation organized by PEO's West Toronto and East Toronto chapters.

Nearly 150 engineers and guests attended the presentation, which included tours of the TRI iDAPT Research Facility on the site of the Toronto Rehabilitation Institute.

Saffarini's address was preceded by a brief update on PEO's Practice Evaluation and Knowledge (PEAK) program from Bernard Ennis, P.Eng., PEO's director of policy and professional affairs.

Ennis pointed out that while the Algo Centre Mall collapse and subsequent inquiry were assumed to be the impetus for development of the PEAK program, PEO had been pursuing continuing professional development initiatives well before the Algo mall incident.

On June 23, 2012, a partial collapse of the roof of the Algo Centre Mall resulted in the death of two Elliot Lake residents. The Ontario Provincial Police commissioned NORR Limited, led by Saffarini, to carry out a forensic investigation into the cause of collapse and factors contributing to it.

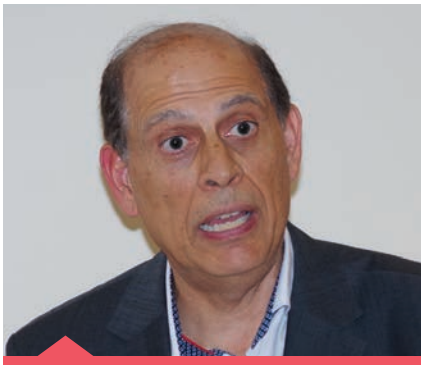
The NORR team's findings influenced the Report of the Elliot Lake Commission of Inquiry, which recommended, among other things, that PEO institute a system of mandatory professional development for its members.

Saffarini also testified at the trial of a former engineer who had inspected the Algo Centre Mall just two months prior to its collapse and declared it to be structurally sound. That engineer was later acquitted on charges of criminal negligence causing death in a June 1, 2017 ruling by Ontario Superior Court Justice Edward Gareau.

In a rare public appearance since the trial, Saffarini outlined to PEO members the extensive forensic investigation into the causes of the Algo Centre Mall's fatal collapse. The NORR team ultimately determined a loss of connection due to corrosion to be the ultimate cause of the failure, although investigating other possible causes was required.

The mall experienced leaks and water infiltration from the day of its completion in 1980. Several investigations and repair efforts were made over the years but no significant remedies were achieved over its 32-year lifespan. The NORR report described the corrosive impact of the roof leakage as similar to that of a marine environment.

Saffarini offered four possible explanations for why the impact of corrosion was overlooked in earlier structural assessments of the mall. He said most of the investigations focused on the concrete used on the roof deck parking lot rather than the



Hassan Saffarini, PhD, P.Eng., manager of structural engineering at NORR Limited in Toronto, reviewed the engineering investigation into the June 2012 Algo Centre Mall collapse September 21 at a joint presentation by PEO's West Toronto and East Toronto chapters.

supporting steel connections. As well, failures in steel buildings are uncommon as steel is normally protected from corrosion by the building envelope. In the case of the Algo Centre Mall, the corroded steel was hidden behind ceilings, thereby making it easier to overlook upon cursory inspection.

The investigator concluded that the mall incident was catastrophic for the local community and a "shocking" reminder to engineers of their ethical obligations to public safety and protection.

He suggested that while the former engineer who conducted the building's final structure assessment probably used bad judgement, there was no clear indication that he alone was guilty of criminal negligence.

"Without assigning liability or culpability, it is worth reflecting on what went wrong and what could have been done differently that would have averted the incident," Saffarini said. "I will leave this question with every one of you to reflect on while acknowledging that there is no simple and unique answer."

PEAK PROGRAM TEAM RESPONDING TO FIRST WAVE OF USER INPUT

By Michael Mastromatteo

PEAK
REACHING NEW HEIGHTS

Ontario's engineering regulator continues to fine-tune its Practice Evaluation and Knowledge (PEAK) program since its inception at the end of March 2017.

Despite a generally positive response from the more than 10,000 licence holders who have completed the questionnaire and received a recommendation for knowledge activity hours to pursue, PEO is still gathering feedback from users to improve the recording system.

In addition, PEO hired a PEAK program coordinator, Arden Heerah, P.Eng., in late July to manage ongoing operations of the program.

Heerah, who is also responsible for the future development and overall improvement of the program, has spent his first few months gathering feedback from users and answering questions as to how they can best file their professional development and knowledge activities with PEO.

Only licence holders who self-identify as practising engineers received recommended numbers of continuing knowledge activity hours to complete before their next licence renewal date.

As well as fielding users' questions about PEAK, Heerah is also helping update and expand the PEAK website's Frequently Asked Questions (FAQ) section, which offers extensive background information about the program and anticipates many of the inputting issues members might experience in filing their knowledge activities.

Now more than three months into his position, Heerah shared some insights into the PEAK program.

"Most queries seem to be based on a fear of completing parts of the PEAK program incorrectly and then having to deal with licensing ramifications," Heerah says. "And because members are typically busy at their day job, they are hesitant to commit to the PEAK program if it imposes undue demands on them, especially if the program is still voluntary."

Heerah also says the program's participation incentive—publicly posting one's completion status on the practitioner directory of PEO's website—seems to be working: Even PEAK-resistant licence holders want to participate, if only so their statuses are shown as "complete" on their online profile.

"We have been reviewing member feedback judiciously, implementing what can be done now and banking other suggestions for future program upgrades," he adds. "Some PEAK-related tweaks have been made to the FAQs and to the online directory, but we are still working on revising the PEAK portions of the FAQs and the member portal."

As of the end of October 2017, more than 43,000 PEO licence holders have become eligible to participate and 33 per cent (15,000) are actually participating. Of this group, 76 per cent, or 11,000, are self-declared practising engineers, 92 per cent (10,000) of whom have completed the questionnaire and received a recommendation for knowledge activity hours to pursue. Of those, 18 percent, or 1800, have begun reporting activities to PEO.

"I have also learned that other provincial engineering regulators are looking at PEO's take on continuing professional development and the ethics component as fresh, new and engaging," Heerah says.

Common questions from members include:

- Is the PEAK program mandatory for my licence renewal?
- When are my PEAK due dates? And when should I participate?
- What are the differences between practising and non-practising engineers?
- What are the implications of declaring as a non-practising engineer?
- What activities count towards the PEAK recommendations for continuing knowledge activities?

See page 32 of this issue for a PEAK refresher and answers to more FAQs.

CELEBRATION APLENTY AS PEO BRINGS MESSAGE TO QUEEN'S PARK

By Michael Mastromatteo

PEO combined its 95th anniversary with celebrations of Canada and Ontario's sesquicentennial on October 4 at the 11th annual engineering reception at Queen's Park.

More than 40 MPPs, seven cabinet ministers, and Ontario Premier Kathleen Wynne attended the annual reception, which is organized to celebrate the engineering regulator's Government Liaison Program (GLP) and the growing relationship between legislators and the Ontario engineering community.

"Along with the Ontario Society of Professional Engineers and Consulting Engineers of Ontario, our partners in the engineering community, our goal is to ensure the public and government continue to recognize PEO's regulatory mandate and our voices, priorities and issues are heard and considered," said PEO President Bob Dony, PhD, P.Eng., FEC, in his welcoming remarks.

"While we celebrate our milestones, we also gather this evening to recognize the work of PEO's Government Liaison Program, or GLP, and engage with you—Ontario's elected officials—here in this room," Dony added.

Although Premier Wynne did not address the gathering, she spent at least 30 minutes greeting PEO officials, chapter volunteers and other stakeholders in the engineering community, prior to the start of the official program.

Ontario Attorney General Yasir Naqvi, who oversees regulated professions for the province, offered his congratulations to PEO towards the end of the evening.

"I am very privileged as the attorney general to be responsible for regulating the [engineering] profession, and as such, one of the great parts of my job is to have a close working relationship with PEO," Naqvi said. "It's important for me as the AG, as somebody who is responsible for the legislation that is directed to professions, to have that close relationship, and I'm very proud to say that we have exactly that. You have worked very hard. We are almost on a daily contact basis on important issues—making sure we are consulting with each other and making sure your voice is heard."

As in previous Queen's Park receptions, the evening included an engineering games event that saw an MPP, a professional engineer and an engineering student form teams to build durable bridge structures using only spaghetti and tape. The winning bridge team this year consisted of Liberal MPP Han Dong (Trinity-Spadina), Ved Proag, EIT, of the Ottawa Chapter and student Elaine Cook of Western University.

The engineering reception is also the occasion to present the GLP Awards to the most politically engaged PEO chapter, and to Ontario MPPs most supportive of PEO events. This year's GLP Chapter Award went to the York Chapter for its many and varied GLP events. MPP Award winners for 2017 are Soo Wong (Scarborough-Agincourt) of the Liberal party, Gila Martow (Thornhill) of the Progressive Conservatives, and Catherine Fife (Kitchener-Waterloo) of the New Democrats.

Offering greetings from the engineering advocacy group, OSPE President Jonathan Hack, P.Eng., said it's especially important for engineers to enhance their relationship with elected officials as the profession looks towards more active policy development.

"It is critical that engineers move toward this policy of leadership because policy development in areas such as climate change, sustainability and infrastructure is becoming increasingly complex in nature," Hack said. "As governments hire more engineers in policy development, they will be better positioned to proactively manage and understand the whole system dynamics associated with these types of issues."

Hack also outlined recent OSPE interaction with the provincial government and called for continuing avenues to celebrate engineering achievement and influence in Ontario.

While Attorney General Naqvi spoke on behalf of the governing Liberal party, MPPs for the two opposition parties also welcomed engineers and special guests.

continued on p. 10

continued from p. 9

Gila Martow said engineers play an important role in advocating for STEM (science, technology, engineering, mathematics) in schools.

"We always have to look to the future," Martow said. "You are either growing or you're failing. I think the engineers really understand that. We are either doing something and having success and innovating, or we're falling behind as a profession—and engineers never fall behind. We thank you for everything you do, not just here in Ontario, but worldwide."

In a similar vein, MPP Gilles Bisson (Timmins-James Bay), NDP natural resources and forestry critic, said engineers provide inspiration for past achievements and future potential. "On behalf of Ontario New Democrats, we understand that some of the work you do is challenging, but you're a resilient bunch in the sense of understanding that, in the end, you have to rise up to the challenge, and you've got to think outside the box and invent the things that have not been invented before," Bisson said.

Other special guests attending the reception included PEO Registrar Gerard McDonald, P.Eng., former presidents George Comrie, P.Eng., FEC, and Thomas Chong, P.Eng., FEC, PEO President-elect David Brown, P.Eng., BDS, C.E.T., OSPE CEO Sandro Perruzza, Rex Meadley, P.Eng., head of Consulting Engineers of Ontario, Emily Rowan of Engineers Canada, and Andrew Cook, president of the Engineering Student Societies' Council of Ontario (ESSCO).

Darla Campbell, P.Eng., chair of the Government Liaison Committee, was emcee for the evening. She was assisted throughout by engineering student Angel Serah of the Queen's Park Subcommittee, and by Jeannette Chau, P.Eng., manager, government liaison programs for PEO.

LONG LIST OF MPPs ATTEND 2017 RECEPTION

Premier Kathleen Wynne, MPP (Don Valley West); Citizenship and Immigration Minister Laura Albanese, MPP (York South-Weston); Environment and Climate Change Minister Chris Ballard, MPP (Newmarket-Aurora); Community and Social Services Minister Helena Jaczek, MPP (Oak Ridges-Markham); Agriculture, Food, Rural Affairs and Small Business Minister Jeff Leal, MPP (Peterborough); Speaker Dave Levac, MPP (Brant); Research, Innovation and Science Minister Reza Moridi, MPP (Richmond Hill); Status of Women, Early Years and Child Care Minister Indira Naidoo-Harris, MPP (Halton); Attorney General and Government House Leader Yasir Naqvi, MPP (Ottawa Centre); Durham MPP Granville Anderson; Etobicoke Centre MPP Yvan Baker; St. Catharines MPP James Bradley; Eglinton-Lawrence MPP Mike Colle; Ajax-Pickering MPP Joe Dickson; Trinity-Spadina MPP Han Dong; Ottawa South MPP John Fraser; Barrie MPP Ann Hoggarth; Kingston and the Islands MPP Sophie Kiwala; Mississauga-Brampton South MPP Amrit Mangat; Davenport MPP Cristina Martins; Scarborough-Agincourt MPP Soo Wong; Wellington-Halton Hill MPP Ted Arnott; Sarnia-Lambton MPP Robert Bailey; Scarborough-Rouge River MPP Raymond Cho; Leeds-Grenville MPP Steve Clark; Whitby-Oshawa MPP Lorne Coe; Oxford MPP Ernie Hardeman; Kitchener-Conestoga MPP Michael Harris; Thornhill MPP Gila Martow; Stormont-Dundas-South Glengarry MPP Jim McDonell, P.Eng.; Chatham-Kent-Essex MPP Rick Nicholls; Sault Ste. Marie MPP Ross Romano; Prince Edward-Hastings MPP Todd Smith; Bruce-Grey-Owen Sound MPP Bill Walker; London-Fanshawe MPP Teresa Armstrong; Timmins-James Bay MPP Gilles Bisson; Parkdale-High Park MPP Cheri DiNovo; Kitchener-Waterloo MPP Catherine Fife; Welland MPP Cindy Forster; Windsor-Tecumseh MPP Percy Hatfield; Hamilton East-Stoney Creek MPP Paul Miller; Timiskaming-Cochrane MPP John Vanthof; Carleton-Mississippi Mills MPP Jack MacLaren, P.Eng.

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QUEEN'S PARK RECEPTION 2017

Daniel Liao, P.Eng., PEO Government Liaison Committee member, with Ontario Premier Kathleen Wynne

PEO President Bob Dony, PhD, P.Eng. (left), with Lakehead Chapter Chair Zack White, P.Eng.

Len D'Elia, P.Eng. (left), with Jeffrey Lee, P.Eng., representing the Oakville Chapter

Bridge-building competition participants Jeffrey Lee, VP communications, Engineering Student Societies' Council of Ontario (left), and Ernie Hardeman, MPP, Oxford

Ontario Premier Kathleen Wynne chats with Howard Brown, president of Brown & Cohen Communications & Public Affairs and PEO's government relations consultant

From front left: Elaine Cook, Western engineering student, Ved Proag, EIT, PEO Ottawa Chapter member, and Han Dong, MPP, Trinity-Spadina, complete their winning bridge-building entry while Mehwish Obaid, P.Eng., PEO Sudbury Chapter member, and Gabriel Pizarro of UOIT Engineering Students' Society work in the background.

Nadia Aftab, EIT, PEO East Toronto Chapter member, Sadiq Pirani, P.Eng., PEO Windsor-Essex Chapter member, and Christian Bellini, P.Eng., PEO councillor-at-large, enjoying the festivities

From left: GLP Award winners Daniel Liao, P.Eng., PEO Government Liaison Committee member, Gila Martow, MPP, Thornhill, and Antony Niro, P.Eng.

PEO Registrar Gerard McDonald, P.Eng. (left), with Jim McDonell, P.Eng., MPP, Stormont-Dundas-South Glengarry

Helping PEO celebrate 95 years (front row, left to right): Catherine Fife, MPP, Kitchener-Waterloo; Jeannette Chau, P.Eng., PEO manager, government liaison programs; Sadiq Pirani, P.Eng., PEO Windsor-Essex Chapter member; Marilyn Spink, P.Eng., PEO vice president (appointed); Attorney General Yasir Naqvi, MPP, Ottawa Centre; Minister of Natural Resources and Forestry Kathryn McGarry, MPP, Cambridge; Ishwar Bhatia, P.Eng., PEO Eastern Region councillor; Rakesh Shreewastav, P.Eng., PEO Engineers Canada director; Nancy Hill, P.Eng., PEO vice president (elected); and Christian Bellini, P.Eng., PEO councillor-at-large

P.ENG. TO LEAD TORONTO COMMUNITY HOUSING CORPORATION

By Michael Mastromatteo

A PEO licence holder with extensive experience heading community safety and public infrastructure management organizations is the new leader of the Toronto Community Housing Corporation (TCHC).

Kathy Milsom, P.Eng., was named CEO of the TCHC on August 17. The recipient of a 2004 Ontario Professional Engineers Award in the management category, she is also a 2017 inductee into the University of Toronto's (U of T) Engineering Hall of Distinction and won the university's Meritorious Service Medal for Mid-Career Achievement in 2008.

Milsom, who graduated from U of T's civil engineering program in 1983 and was licensed by PEO in August 1989, takes over an organization facing a number of challenges, including a $2.6 billion repair backlog and concerns over the state of repair of many of its housing units.

She plans to bring an engineering mindset in revitalizing the corporation. The largest such organization in Canada, the TCHC manages nearly 60,000 units for about 110,000 Toronto-area residents.

"Throughout my career, I have led organizational transformations, but every organization is unique. There is no one-size-fits-all solution," Milsom told *Engineering Dimensions*. "I look forward to working with the team to transform Toronto Community Housing into a service-oriented and responsive landlord for our tenants, and an organization the entire city can be proud of. I believe my engineering background and training provide me with a structured way of thinking and a logical, pragmatic approach to analyzing problems, prioritizing necessary actions and finding solutions based on evidence."

Milsom says her engineering training has been key in leading organizations responsible for developing and delivering the highest possible standards for public infrastructure and safety. "Basic project management skills, developed in my earliest roles, have also been valuable throughout my career in helping me deliver projects and other undertakings successfully in accordance with defined parameters," she adds.

Kathy Milsom, P.Eng., is the new chief executive officer of the Toronto Community Housing Corporation.

In an August 17 statement, Toronto Mayor John Tory welcomed the appointment of Milsom: "Kathy Milsom is a great fit to lead Toronto Community Housing during this period of organizational change and renewed focus on tenants," Tory said. "As an experienced leader in both the public and private sectors, I know she will work to improve the lives of tenants while delivering better financial and operational performance, ultimately making the corporation sustainable."

Milsom's previous roles include president and CEO of both the Technical Standards and Safety Authority and Canada Lands Company Ltd. She also serves as a member of the board of directors of the Greater Toronto Airports Authority and the chair of its Risk Oversight Committee, and as a director and former chair of the Standards Council of Canada.

BITS & PIECES

Montreal is home to the tallest manmade leaning tower in the world—standing at 165 metres, the Montreal Olympic Stadium Tower leans at a dizzying 45-degree angle.

Engineers at The Institute for Quantum Computing, University of Waterloo, Ontario, created the smallest national flag at 0.697 square micrometers—less than the width of a human hair—viewable only by electron microscope.

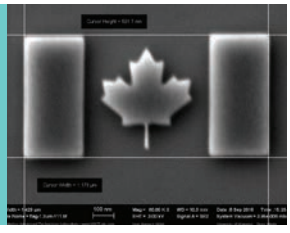


Photo: The Institute for Quantum Computing

CHARGES STAYED IN FATAL STAGE TOWER COLLAPSE TRIAL

By Michael Mastromatteo

A professional engineer along with a concert promoter and a stage building contractor have avoided penalties for their involvement in a June 2012 stage collapse at a Radiohead rock concert that resulted in the death of a member of the band's set-up team.

In early September, Ontario Court Judge Ann Nelson stayed charges against the defendants on grounds that the five-year-old case had taken too much time to come to trial, violating the rights of those charged to a timely trial.

The case suffered a major blow in June 2017 when the original presiding judge withdrew from the case following his recent appointment to a higher court position.

Charges under the *Occupational Health and Safety Act* were originally laid in June 2013, nearly a year after the Radiohead concert was set to begin at Toronto's Downsview Park. Just hours before the concert part of the massive stage structure crashed down, killing British drum technician Scott Johnson and injuring three others.

PEO offered to assist the Ministry of Labour in investigating the stage collapse and to help determine if any engineering work involved in the stage and tower construction had been performed by appropriately licensed personnel.

NATIONAL ENGINEERING MONTH 2018 IS ON THE WAY

By Carrie Boyce

Students dab their excitement about the Student Design Challenge during NEM 2017, hosted jointly by PEO Lakehead and OACETT Thunder Bay chapters

Next March sees the return of National Engineering Month (NEM), a special occasion in the hearts of engineers across the nation. It's an opportunity for volunteers to bring engineering to life and showcase its relevance to youth and the public through a variety of outreach events and online campaigns. It's also an opportunity for engineers to reconnect with a subject they've devoted their careers to, reigniting their passion for creation, collaboration and problem solving.

NEM 2017's theme "There's a place for you!" expands into 2018 as NEM continues to promote diversity and inclusion in engineering. Showcasing this theme is a priority for every event, with students and professionals demonstrating that anyone can be an engineer with passion and dedication. With the challenges of the 21st century emerging as more urgent and complex than ever before, our profession must diversify to match the rapidly broadening fields, industries and tools. It is our responsibility to prepare today's youth for a world our generation could never have imagined.

The strength of NEM celebrations in Ontario is in no small part thanks to the partnership of organizations working together to bring engineering to life in meaningful ways. Through collaboration, the Ontario Association of Certified Engineering Technicians and Technologists (OACETT), Ontario Society of Professional Engineers (OSPE), Engineers Without Borders Canada (EWB) and PEO have helped the initiative grow.

In 2017, NEM swelled to over 350 in-person events engaging over 58,000 children, teens and adults with engineering activities. Further, our messages reached over 10 million Ontarians via print, radio, online and other visual media. PEO chapters contributed 60 events, complemented by many of PEO's Engineers-in-Residence volunteers hosting NEM events in their local classrooms.

But there's still work to do! We're keen to harness this spirit of learning and building—and see 2018's campaign reach further than ever before. That's where you come in.

GET INVOLVED

Taking part in NEM is simple. If you have an idea for an outreach event that engages youth and the public with engineering, we want to hear from you. If you're keen to be involved but are struggling with ideas, there are plenty of suggestions to be found on the NEM website (nemontario.ca). Two funding streams are available to support your NEM activities: PEO chapters can receive up to $700 each to organize events, and additional funding for creative or experimental activities is available through the Innovation Fund.

For more information, visit nemontario.ca/propose-an-event. The deadline to submit applications for NEM funding is November 17, 2017.

Don't forget to follow us on Facebook, Twitter and Instagram @NEMOntario and visit the website (nemontario.ca) for regular updates. We look forward to working with you to make #NEM2018 bigger than ever before.

Carrie Boyce is a program development officer for Engineers of Tomorrow, an initiative of Engineers Without Borders Canada.

BC REGULATOR GOES PUBLIC WITH COMPLAINT INVESTIGATION

By Michael Mastromatteo

The British Columbia engineering regulator's handling of a recent complaint investigation could have lessons for the entire engineering community.

In August 2017, Engineers and Geoscientists BC (EGBC)—the new business name of the Association of Professional Engineers and Geoscientists of British Columbia—completed an investigation into complaints of unprofessional conduct and conflict of interest involving five consulting engineers associated with Active Earth Engineering, a BC-based environmental and hydrogeological consulting group.

The investigation concluded that there were no grounds to charge the EGBC members with professional misconduct or contravention of the regulator's code of ethics.

The investigation began more than two years ago due to a number of public complaints asserting the Active Earth Engineering employees were involved in "undisclosed conflict of interest" in providing professional technical services to a client, while also taking an ownership interest in the project.

EGBC's extensive investigation focused on reclamation of a contaminated soil facility near Shawnigan Lake on Vancouver Island. The investigation included analyzing the role Active Earth engineers performed in the permitting process and the nature of the financial relationship between Active Earth and its client, Cobble Hill Holdings/South Island Aggregates, a Vancouver-Island-based quarry operation.

Over and above the details of the complaint investigation, the case was significant to engineering regulators because of its high public profile and the fact that EGBC obtained permission from the complained against organization that it be identified in discussing the results of its investigation.

"This case has been challenging to discuss because we are still bound by confidentiality provisions under our engineering act and freedom of information and privacy provisions," says Megan Archibald, a spokesperson for EGBC. "But because of the high level of public interest, we took the unusual step of asking for permission to discuss some of the particulars."

As with other provincial and territorial regulators, including PEO, EGBC is not permitted to identify individuals or organizations subject to complaints or enforcement matters.

OPEA CALL FOR NOMINATIONS

Nominations are being accepted for the 2018 Ontario Professional Engineers Awards (OPEA).

Now in their 71st year, the OPEAs showcase Ontario professional engineers who have made outstanding contributions to their profession and community. Nominate an exceptional engineer or a team of engineers who have led a successful engineering project. OPEA recipients are honoured annually in November at a black-tie gala hosted jointly by the Ontario Society of Professional Engineers and Professional Engineers Ontario.

PROFESSIONAL ENGINEERS AWARDS

THE AWARDS

GOLD MEDAL

The premier award, the Gold Medal recognizes commitment to public service, technical excellence and outstanding professional leadership.

ENGINEERING PROJECT OR ACHIEVEMENT AWARD

This award recognizes a team of engineers who have conceived of, designed and executed an outstanding project or achievement that has had a significant, positive impact on society, industry or engineering.

CITIZENSHIP AWARD

Those who earn this award have given freely of their time, professional experience and engineering expertise—to the benefit of humanity.

ENGINEERING MEDAL

The Engineering Medal recognizes professional engineers who have improved our quality of life through the ingenious application of their engineering skills, and whose achievements rise significantly above the normally high standards of the profession. It can be awarded in the categories of:

Engineering Excellence
Recognizes overall excellence in the practice of engineering, where the innovative application of engineering knowledge and principles has solved a unique problem, led to advanced products, or produced exceptional results

Management
Awarded for managing and directing engineering projects or enterprises, where innovative management practice has contributed significantly to the overall excellence of the engineering achievement

Research and Development
Awarded for using new knowledge in developing useful, novel applications or advancing engineering knowledge or applied science, or discovering or extending any of the engineering or natural sciences

Entrepreneurship
Awarded for applying new technologies or innovative approaches that have enabled new companies to get started, and/or assisted established companies to grow in new directions

Young Engineer
Awarded to outstanding young Ontario engineers who have made exceptional achievements in their chosen fields. Candidates must be no older than 35 as of December 31 in the year the nomination is submitted and have demonstrated excellence in their careers as well as in community and professional participation

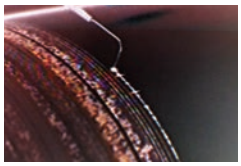
ELIGIBILITY

More information about the awards, including selection criteria and nomination forms, is available at www.peo.on.ca, or by email at awards@peo.on.ca.

THE DEADLINE

Nominations are due by 4 p.m. EST on **Wednesday, February 28, 2018,** but they may be submitted at any time during the year.

November 2017



NOVEMBER 6–8
SEG/SPE Workshop: Injection Induced Seismicity, Dallas, TX
seg.org/events/SPE17

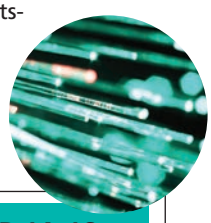
NOVEMBER 6–8
Gender Summit 11 North America 2017, Montreal, QC
www.gender-summit.com

NOVEMBER 7–8
12th Annual API Cybersecurity Conference & Expo, The Woodlands, TX
www.api.org/products-and-services/events/calendar/2017/cyber

NOVEMBER 6–8
Ocean & Earth Big Data Congress 2017, Halifax, NS
www.bigdatacongress.net

NOVEMBER 7–8
International Conference on Emerging Technologies for a Smarter World, Stony Brook, NY
www.cewit.org/conference2017

NOVEMBER 9
Space Summit: A New Space Age, Seattle, WA
events.economist.com/events-conferences/americas/the-new-space-age



NOVEMBER 13–14
Biostatistics and Bioinformatics, Atlanta, GA
biostatistics-bioinformatics.conferenceseries.com

NOVEMBER 12–15
Canadian Technical Asphalt Association Annual Conference, Halifax, NS
www.ctaa.ca/conference

NOVEMBER 14–16
Mirror Technology SBIR/STTR Workshop, Redondo Beach, CA
www.spie.org/conferences-and-exhibitions/mirror-technology-sbir/sttr-workshop

NOVEMBER 29–DECEMBER 1
29th Annual Construct Canada, Toronto, ON
www.constructcanada.com

NOVEMBER 18
Ontario Professional Engineers Awards Gala, Toronto, ON
www.opeawards.ca

December 2017

DECEMBER 6–7
Energy From Waste Conference, London, UK
www.smi-online.co.uk/energy/uk/energy-from-waste

DECEMBER 7–8
Virtual Reality and Immersive Tech Business Conference & Expo, San Francisco, CA
vr-intelligence.com/vrx

DECEMBER 7–8
Mining Investment North America, Toronto, ON
www.mininginvestmentnorthamerica.com

P.ENGs HONOURED WITH NATIONAL AWARDS

By Marika Bigongiari

The University of Ontario Institute of Technology's faculties of energy systems and nuclear science, and engineering and applied science, recently honoured esteemed and distinguished engineering leader **Jeanette Southwood, P.Eng., FEC, LLD,** conferring upon her the honorary degree of Doctor of Laws. Southwood, vice president, strategy and partnerships, Engineers Canada, has a long history of being recognized for exceptional achievement, setting the pace early in her career by winning an Ontario Professional Engineers Award in the Young Engineer category in 1997 and then again in 2015 in the Engineering Excellence category. Further exemplifying her service to the community, she worked as a PEO volunteer, serving as a committee chair and chapter director from 1993 to 2014. Southwood is a recipient of the Province of Ontario's Leading Women Building Communities Award and the Ontario Volunteer Service Award. She was honoured as one of Canada's Clean50 for her work as a sustainability influencer, and named one of the Women's Executive Network (WXN) Canada's Top 100 Most Powerful Women. In August, Southwood was recognized by the Metallurgy and Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum as part of their Women of Innovation initiative, highlighting her contribution as a driving force for positive change and role model for women in engineering. Southwood's reputation as a well-respected leader, visionary and mentor makes her a powerful force in the engineering community and a natural choice to receive this honour.

Bert Wasmund, PhD, P.Eng., executive director at Hatch Ltd., has been named as a Member of the Order of Canada. Wasmund was chosen for this honour, one of the most prestigious appointments in Canada, in recognition of his role as a leader in engineering and a distinguished career that includes the receipt of several noted awards, like the Ontario Professional Engineers Awards' Gold Medal in 2012 and the Engineering Medal for Engineering Excellence in 2005. In 2011, Wasmund was inducted into the Canadian Mining Hall of Fame in recognition of his exceptional work in the mining and metallurgical industry, and he received the Metallurgy and Materials Society's Airey Award, the most prestigious award for Canadian metallurgy, in 1998. Well-known as a philanthropist, he has put noteworthy endowment scholarships in place at both Queen's University and the University of Toronto. A pioneer in the industry, Wasmund has developed patents that have revolutionized the industry. His forward-thinking contributions to the environmental progress of Canada's mining and metals industry are renowned. Wasmund's dedication as a philanthropist and mentor, continued flair for innovation, and track record of exceptional achievement has earned him a well-deserved reputation for excellence in his field, aptly culminating in receiving this, the highest honour our nation can bestow on a civilian.

Doctor of Laws recipient Jeanette Southwood, P.Eng., FEC, LLD. Named as a Member of the Order of Canada is Bert Wasmund, PhD, P.Eng.

In August, the 2017 Schulich Leaders were announced. Fifty exceptional students were chosen to receive the award—of those, 25 were awarded $100,000 each for engineering. The Schulich Leader Scholarships, the largest of their kind available to science, technology, engineering and math (STEM) students, are awarded annually to top students across Canada. The following 11 Ontario engineering students were among those honoured: **Aidan Aird,** University of Toronto, engineering; **Sam Crawford,** McMaster University, engineering; **Mickey Dang,** University of Waterloo, systems design engineering, co-op; **Joshua Guinness,** McMaster University, engineering; **Laure Halabi,** Queen's University, engineering; **Andres Lombo,** University of Toronto, engineering science; **Emma Lozhkin,** University of Waterloo, computer engineering, co-op; **Susie O'Brien,** University of Ottawa, chemical engineering; **Johann Sapim,** Queen's University, engineering; **Joy Shah,** Western University, software engineering; and **Nathan Stachow,** York University, geomatics engineering. Additional information is available at www.schulichleaders.com.

CALL FOR ENTRIES

The Canadian Academy of Engineering (CAE) is set to offer a new annual award and scholarships, in partnership with SAE Foundation Canada, to top engineering students across Canada. The CAE Bruce Aubin SAE Aerospace Design Award is valued at $800, while the CAE William G. Belfry Memorial SAE Scholarships are worth $2,000. The award and scholarships coincide with Canada's 150th birthday celebrations, recognizing the crucial role aerospace, automotive and transportation design engineering play in building Canada's future. The deadline for submission of applications is March 20, 2018, with the winners announced on May 15, 2018. Additional information is available at www.cae-acg.ca/projects/scholarships. e

THE STORY BEHIND COUNCIL SUCCESSION PLANNING AND TERM LIMITS

By Rob Willson, P.Eng.

At its meeting on June 23, 2017, PEO Council adopted the revised recommendations of the Council Term Limits Task Force (CTLTF) and took a significant step towards improved election governance at its most senior level.

This decision has set in motion actions that will enshrine term limits in Regulation 941, which governs how our elections are held, and establish a successor task force to implement succession planning for all Council positions. In doing so, Council has departed from almost 20 years of an election process wherein candidates essentially self-nominated and campaigned for positions with a minimum of regulation. Implementation of the task force recommendations could have significant impact on the composition of future Councils, as well as on the recruitment of volunteers looking to serve in an executive capacity.

In late 2015, Council approved term limits and succession planning in principle, and established the CTLTF in February 2016. This followed a recommendation from PEO's 2015 Annual General Meeting, at which members expressed strong support for term limits following the elections earlier that year. That election saw many councillors elected by acclamation, and two former presidents elected to president-elect and vice president positions. It was perceived the unregulated system was in fact limiting access of new voices to Council and leading to a recycling of former councillors.

The CTLTF was tasked with recommending how best to implement term limits and succession planning. These changes were not without controversy and were opposed by some members of Council. It is important for PEO members to understand how these changes came about and why—in the end—they were approved.

JUSTIFICATION NEEDED

At the outset, the CTLTF recognized improved succession planning would be readily accepted, but term limits were potentially controversial. Term limits would have to be justified based on an analysis of how the current election system was affecting Council composition, and on general principles of what is the best practice for elections to not-for-profit boards.

The analysis of PEO elections established that in most—but not all—cases there has been reasonable turnover at the regular councillor level. However, for senior officers, such as elected vice president and president, there has been substantial recycling.

The conclusion from this analysis was that term limits for regional councillors and councillors-at-large would affect few individuals and provide greater consistency in terms of office. Term limits for president and elected vice president would ensure turnover and widen the spectrum of members in these high-profile positions.

Governance literature in general favours turnover on boards to encourage board members to fulfill their mandates with enthusiasm and then move on to make room for new people with new ideas. There is a tendency for long-term incumbents to lose their passion after several years on a board, and some stay on for reasons that have more to do with themselves than with serving the organization.

In various studies, the recommended maximum is six to 10 years. An alternative to fixed term limits is a robust evaluation system, where board members are asked to step aside once it is perceived they are not effective. However, this system is challenging to implement and requires careful management to avoid abuses. A fixed-term-based system is both easier to manage and less impactful on board members.

With the justification for term limits established, the task force was able to set limits for all Council positions. Its report recommended that these be permanent—in other words, that all members of the association have a fixed allocation of years on Council available to them. Six years was recommended for general members of Council, with a maximum of 10 years if a councillor was subsequently elected to a president or vice president position.

SIX-YEAR HIATUS

In March 2017, Council rejected permanent term limits in favour of a hiatus approach, where those reaching their limit would be allowed to return after a minimum time off Council. In response to this, the CTLTF recommended the hiatus be set at 10 years, but Council chose to reduce this to six years and approved term limits on this basis.

Succession planning was, as expected, more readily accepted by Council. However, it is also much more complicated and challenging to implement. There are many possible ways to get the best people on Council and not all approaches will be effective at PEO, especially given our election-based system. For this reason, the task force concluded that an independent successor task force is essential and provided preliminary recommendations to start the process.

Once this task force is in place, it is expected the process will be iterative in nature and various programs will be tried as the best practice for PEO is developed. This approach was accepted by Council and approval of the new task force terms of reference are expected in November 2017.

Approved term limit recommendations, along with policy direction outlined in the CTLTF report and recommendations (www.peo.on.ca/index.php/ci_id/31193/la_id/1.htm), has been sent to the Legislation Committee for development of any necessary act, regulation and/or bylaw changes, and will be advertised and put into practice for the 2019 Council elections. **e**

Rob Willson, P.Eng., was chair of the Council Term Limits Task Force, and also served two terms on PEO Council as a West Central Region councillor.

THE ASSOCIATION HAS RECEIVED WITH REGRET NOTIFICATION OF THE DEATHS OF THE FOLLOWING MEMBERS (AS OF SEPTEMBER 2017).

AHMAD, Israr
Ajax, ON

BAILEY, David Bertram
Airdrie, AB

BEAULIEU, Alain Joseph Guy
Kingston, ON

BECK, Earl Douglas
Etobicoke, ON

BIRRELL, Andrew Bruce
Minden, ON

BLOKKER, Anthony
London, ON

BRUTESCO, Flavio
Ottawa, ON

CALDWELL, Bruce Douglas
Orillia, ON

COOKE, John Dening Ellis
Simcoe, ON

CROMPTON, Michael Elias
Toronto, ON

DEA, Frank Yu-Kit
Nepean, ON

DELVECCHIO, Glen Wayne
Burlington, ON

DESBIENS, Richard
Quebec, QC

DIOSKALI, Erika Laura
Laterriere, QC

DODGE, Arthur George
Carleton Place, ON

DURRANI, Noor Ahmed Khan
Mississauga, ON

EDER, Wolfgang Ernst
Kingston, ON

ELLIS, John Elliott
Kingston, ON

EVANS, Walter Anderson
Milford, ON

FEDORAK, Humphrey
Ft. Myers, FL

FELL, Walter John
Sudbury, ON

FRANCIS, Alymer Edward
Grand Bend, ON

FURMAN, Tedeusz Henryk
Oakville, ON

GABRIEL, Bernard Stephane
Gatineau, QC

GARDINER, Harry Mander
Ottawa, ON

GIBSON, William
Hamilton, ON

GIBSON, William John Murray
Nauvoo, IL

GOLDBERG, Daniel
Toronto, ON

GOTHE, Gunther Ulrich Hermann
Georgetown, ON

GOWANS, Ronald Basel
Burlington, ON

GRAY, Donald Noel
Bainbridge Island, WA

GRAY, Neil Ferquharson
London, ON

HARRIS, Frederick Thomas
Manotick, ON

HART, Ralph Stewart
Cambridge, ON

HESSE, Christian August
Hollywood, CA

HEYS, Donald Mauriece
Brampton, ON

HODDER, Robert William
London, ON

HOOKINGS, Robert Samuel
Bracebridge, ON

HOOLBOOM, Gerard Johan
Burlington, ON

HOPKINS, Kevin Michael
Burlington, ON

HORN, Myron
Thornhill, ON

JEFFERIES, Charles Cornelius
Kingston, ON

JONES, Lawrence Raymond
Kirkland Lake, ON

KENNEDY, Thomas
Arnprior, ON

KHAN, Najir Ally
Oakville, ON

KILEEG, Gerald
Toronto, ON

KNOPP, John Guenther
Mississauga, ON

KOMEILI, Mohammad Hadi
Toronto, ON

KOSCEVIC, Slavko
Elliot Lake, ON

KOZMA, Paul
Toronto, ON

KYLE, John Murray
Toronto, ON

LAAKSO, Robert Williams
Holland Landing, ON

LAFONTAINE, Jean
Saint-Julie, QC

LANE, Edward George
Port Carling, ON

LAPENSEE, Jacques Francois
Gloucester, ON

LEIPERT, Gerald Frederick
Fonthill, ON

LINTON, Dennis Malcolm
Madoc, ON

MACDONALD, Ronald Thomas
Scarborough, ON

MACEACHERN, Bruce William
Richmond, ON

MACKELVIE, John Stewart
Peterborough, ON

MAIN, James Arthur
Scarborough, ON

MALKIN, Arthur Ward
Mono, ON

MARCOLIN, John Peter
Burlington, ON

MARSLAND, David Duddon
King City, ON

MARTIN, Gordon Kenneth
Mississauga, ON

MARTIN, Keith Aden
New Dundee, ON

MATTHEWS, John Dudley Howard
Pickering, ON

MCCAFFREY, George Thomas
Ottawa, ON

MCCOWATT, James Whyte
Gibsons, BC

MCDIARMID, Donald Peter
Mississauga, ON

MCGILLICUDDY, Cornelius Wm
Oakville, ON

MCKESSOCK, Keith Alexander
Stouffville, ON

MCLEAN, Keith Gordon
Kanata, ON

MCLUSKIE, William Peter Gordon
Etobicoke, ON

MCNABB, Allan Douglas
Mississauga, ON

MEHRA, Sudarshan Kumar
Scarborough, ON

MELOCHE, Lloyd Joseph Thomas
Windsor, ON

MILLER, Stanley
London, ON

MIRANDA, Luis Hector
Bolton, ON

MITCHELL, William Jackson
Sidney, BC

MITTERMAIER, Arthur Heinz George
Rexdale, ON

MLADJEN, Boris
Etobicoke, ON

MOFFAT, John
Thornhill, ON

MONETTE, Joseph Jean-Guy Luc
Kanata, ON

MONTGOMERY, William Gordon
Toronto, ON

MORGAN, Thorold Stephen Garth
London, ON

MORIN, Joseph Patrick Andre
Sarnia, ON

MORIN, Rene Arthur
Ottawa, ON

NAUGHTON, Donald George Peter
Newcastle, ON

NEGREA, Tudor
Toronto, ON

NEMETH, Ernest James
Brampton, ON

ODDSON, Robert William
Thornhill, ON

OGILVIE, Alan Frederick
Blue Mountains, ON

O'NEILL, John Gerald
Toronto, ON

OPRISAN, Morel
Ottawa, ON

PAGOTTO, Jack
Nepean, ON

PARENT, Robert Joseph
Saint-Sauveur-Des-Monts, QC

PAWLUK, Robert Russel
Toronto, ON

PEARSON, John Bryan
Belleville, ON

PEDERSEN, Roy Stanley
Hudson, QC

PIDCOCK, Paul Mortimer
Timmins, ON

PIKAART, Jacob
Bloomfield Hills, MI

POLEWSKI, Edward Bernard
Windsor, ON

PUGSLEY, John Derek
Orangeville, ON

RAMIA, Naim Tanios
Kitchener, ON

REEKIE, Keith Irwin
Hamilton, ON

REICHL, Frederick Edward
Etobicoke, ON

ROOTHAM, Lewis John
Aurora, ON

ROY, Orest Zenon
Nepean, ON

RUDNER, Alexandru
North York, ON

SAKAGUCHI, Roy Leonard
Toronto, ON

SEEDHOUSE, Stuart Athol
Cameron, ON

SEROPIAN, Gaston
Ottawa, ON

SHEEDY, Michael Anthony
Uxbridge, ON

SHOREY, Roger Arnaud
Oakville, ON

SINGH, Narandra
Edmonton, AB

SLAVINSKY, Leonid
Richmond Hill, ON

SMITH, John MacConnell
Stratford, ON

SMITH, Robert George
Markham, ON

SOLOMON, Clyde William
Prescott, ON

STEELE, John David
Peterborough, ON

STIBRANY, Norbert
Mississauga, ON

ST LOUIS, John Michael
Nepean, ON

STURTON, Hamish Macleod
Ottawa, ON

SUCHER, Iacov Shlomo
Toronto, ON

SUGIMOTO, Mamoru
Waterloo, ON

SUTHERNS, John Stanley
Mississauga, ON

SYLVESTER, Richard Karl
Unionville, ON

SZEP, Stephen Desiderius
Mississauga, ON

THOMSON, John D
Naples, FL

TINDALE, John Laverne
Toronto, ON

TSE HING YUEN, Tse Kwet Sin
Kirkland, QC

TYRRELL, Donald Henry
Oakville, ON

UZUMERI, Sukru Muvaffak
Etobicoke, ON

VALLEE, George Douglas
Simcoe, ON

VANDUSEN, Harold Allan
Ajax, ON

VRIESINGA, Ludwig Wilhelm
Windsor, ON

WALKER, Bruce Carrington
Shuniah, ON

WAN, Hon-Keung
North York, ON

WANLESS, Gerald Austin
Georgetown, ON

WEINSTEIN, William
North York, ON

WELSH, Charles Edmund
Blue Mountains, ON

WHALEN, Richard Paul
Ottawa, ON

WONG, Bai Ren
Oakville, ON

WONG, Yui-Ting Norman
Markham, ON

WYPORSKI, Jaroslaw Stefan
Kanata, ON

YATES, Shawn Edward
Lasalle, ON

YORKE, Lowell Chester
Perth, ON

DECONSTRUCTING—AND RECYCLING—A BUILDING, BRICK BY BRICK

How DST Consulting Engineers cleanly and safely demolished a building along one of Toronto's busiest downtown intersections

By Duff McCutcheon

All the concrete recovered from the demolition was crushed onsite and used to backfill the basement cavity.

How do you safely demolish a seven-storey government building in downtown Toronto with minimal impacts to a busy traffic and pedestrian corridor, while recycling 95 per cent of the construction materials?

As DST Consulting Engineers has figured out, it's less a demolition than a deconstruction—dismantling the building piece by piece, floor by floor—and recycling the materials into something new. And, it involved the improvisation of some very novel (and effective) health and safety techniques and equipment to keep everyone safe.

Engineering Dimensions talks with George Thomas, P.Eng., DST Consulting Engineers' director of infrastructure client group, on how the firm safely demolished the 70-year-old building at 880 Bay Street.

Engineering Dimensions: Can you provide a brief overview of the project?
George Thomas: DST Consulting Engineers was the prime demolition consultant responsible for demolition planning, design and abatement of all designated substances for the retired Ontario government building located at 880 Bay Street, in downtown Toronto. The seven-storey structure was constructed in 1947 and had a basement totaling approximately 170,000 square feet.

Due to the multi-disciplinary nature of the project and the number of sub-consultants involved, highly effective contract management, stakeholder management and sub-consultant management was required. The project involved a high level of health and safety oversight given the very busy urban location of the building. There were also major environmental considerations, with a 90 per cent waste diversion target for the project.

ED: How did this project differ from other building demolition projects?
GT: This was the largest demolition project ever completed by the client—Infrastructure Ontario (IO).

Given the proximity to public sidewalks and a very busy intersection at Bay and Grosvenor streets, IO considered this to be a high-risk project and public safety was paramount. However, requesting to shut down a sidewalk or lane of traffic on Bay Street was completely out of the question and we were basically told not to think about it. We had to complete the demolition within the confines of the site, which was right at the edge of the sidewalk.

Public safety was given added urgency because of an incident a year earlier during a building demolition at Bathurst Street and Eglinton Avenue in Toronto. The facade of the building collapsed and crushed the hoarding, or safety structures, that had been erected to protect the public around the site. Fortunately no one was killed, but two parents and their child were trapped inside the hoarding after the collapse and had to be rescued. That incident definitely heightened everyone's awareness around public safety for the 880 Bay Street project.

In demolition, you can knock down a building and not worry about debris falling if you're in an open area—the risk is much less. But in this circumstance, we were deconstructing a seven-storey building, plus penthouse, with a brick veneer facade, at an extremely busy downtown intersection. Even one brick dropped in the middle of Bay Street could cause disaster.

Before we started the actual deconstruction, we did some test trial runs on the wall facing the parking lot. We tested our dismantling procedure on the non-public area first to determine what the risks were and then modified the procedures accordingly for work on the public side.

ED: Many of DST's engineering innovations for this project related to the extreme public safety concerns involved in demolishing a building in such a high-traffic area. Can you describe the safety innovations you devised for this project?
GT: There were a couple of safety innovations that were unique to this job: shipping container hoarding and outrigger safety nets. Firstly, the

The Ontario government's 880 Bay Street building in Toronto was built in 1947.

hoarding (the safety structures shielding the public around the perimeter of the site) was made of shipping containers—the rectangular steel boxes used to transport goods on ocean-going container ships.

We basically took standard shipping containers and modified them to create steel rectangular boxes that could be laid seamlessly, end-to-end, around the public-facing perimeters of the building. We had them all manufactured offsite: removing both ends, reinforcing them, and installing LED lighting inside. We also cut windows on the street-facing side so people could see out as they passed through.

It was the first time this type of hoarding had ever been used in Ontario. There are many advantages to this type of system: it's easy to install, it's solid steel and there are no openings. If you walk through a standard hoarding made of scaffolding and plywood, you'll see openings. All it takes is something small to come through to hurt someone. But shipping containers are 100 per cent enclosed between the public and the site.

The second safety innovation was an outrigger-design safety net to capture any debris that might fall outside the building footprint and hit the public area. The outrigger was a steel structure that fitted two to three metres beyond the building facade and captured any debris that might fall from the upper levels. Basically, it's a heavy duty, structural steel net angled at 45 degrees toward the building so falling debris would hit the outrigger and slide back to the building at the level below the one we were working on.

ED: Considering the very limited space with which to work, including little staging or storage areas to remove materials and debris, how did DST work around these constraints?
GT: Yes, because the building site was right in downtown Toronto, there was very little room to work with—especially considering we weren't allowed to use the adjacent parking to store deconstructed building materials like concrete and brick. If you look at the building, the only extra real estate we had was an alley at the back of the building where you could barely drive a truck through. There was very little for a staging area.

To get around this, we created vertical shafts within the building—all the way up from level eight down to the basement—and dropped the deconstructed materials down the chute to the basement. We then filled up the basement cavity with the materials. The shafts had to be reinforced to handle major chunks of concrete and rebar being dropped down through it.

In the basement area, we had machinery in place to move the deconstructed materials around because as the space got filled, the chute would get blocked up.

ED: Part of the project requirements was a 90 per cent waste diversion target. How did you go about recycling a seven-storey building?
GT: To allow for optimal dismantling and segregation of materials on this project, DST utilized the 3R (reduce, reuse, recycle) approach and implemented stringent waste management reporting and monitoring to ensure the waste diversion goal of 90 per cent was not simply met, but exceeded. In the end, we achieved 95 per cent waste diversion.

We brought in a mobile crusher and placed it in the basement to minimize dust and noise. All the concrete from the building was processed through the crusher, removing the steel rebar and crushing the concrete to create a granular material—granular B aggregate—that we used to backfill the basement cavity. And before we started work on the deconstruction, we scraped off all the adhesives from the concrete and removed any foreign materials so in the end we were crushing pure, clean concrete. We also recycled all the steel and copper piping and crushed all the glass for reuse in other purposes.

The remaining five per cent was mostly painted wood finishes. You can recycle wood into chips, but if it's painted or treated you can't.

Finally, we recovered all the Queenston limestone slab that covered the ground-level facade. It's all limestone from the Queenston formation from Niagara Region, and you see a lot of it in old buildings around Queen's Park. We recovered all those pieces and restored them onsite for future reuse.

IO was proud enough to create a video of the process, which you can view here: www.youtube.com/watch?v=8eJtudDXStk. e

HOW SAFE CAN YOU REALLY MAKE IT?

Guarding against complacency and an overreliance on past success is a new imperative for engineers looking to advance a culture of safety across all industries.

BY MICHAEL MASTROMATTEO

TSSA inspectors Craig Durnan and Denis Lapierre (in background) at the height of safety.

At a Minerva Safety Institute workshop in the summer of 2016, PEO Registrar Gerard McDonald, P.Eng., was invited to reflect on some safety lessons engineers could draw from the Lac-Mégantic train derailment and fire that claimed the lives of 47 Quebec residents in July 2013.

McDonald, who was assistant deputy minister of safety and security with Transport Canada at the time of the Lac-Mégantic incident, had more than passing interest in the chain of events leading to the disaster and, in turn, what professional engineers, ethically committed to public safety and protection, might bear in mind as a result of the incident.

Among McDonald's key observations in the wake of Lac-Mégantic is that an overreliance on past success in any safety system is a sure blueprint for future failure. He also suggested that while regulatory frameworks are set up inherently to promote safety, they will never completely overcome the possibility of failure. "Failure to imagine the possibility of failure is the most profound mistake engineers can make," McDonald told his audience of safety professionals.

As a profession synonymous with safety and risk reduction, engineering, ironically, is often targeted for censure when accidents, disasters and catastrophes occur.

The mining industry is often cited as the birthplace of Ontario's modern occupational health and safety legislation—safety thinking developed by the late engineer James Ham, PhD, P.Eng. Ham is the former president of the University of Toronto and author of *The Ham Commission on Mine Safety*, the forward-looking provincial review of mine safety in Ontario. His work, on which Ontario's *Occupational Health and Safety Act* (OHSA) is largely based, marks a milestone in the advancement of health and safety legislation in the workplace.

Back in 2009, *Engineering Dimensions* reported on the influence of professional engineers in expanding the reach and effectiveness of Ontario's occupational health and safety legislation. The occasion was the 30th anniversary of the passage of the OHSA and its institution of the internal responsibility system allowing workers greater involvement in workplace safety campaigns.

Given the near symbiotic relationship between engineering and safety, *Engineering Dimensions* thought it timely to re-examine the latest developments of safety work in various industries and manufacturing settings in Ontario today.

CHAMPIONS OF SAFETY

Rob Bianchin, P.Eng., holds the title of risk management integration leader at Sudbury Integrated Nickel Operations (Glencore Group), a company that has been mining nickel-copper ores in the Sudbury area since 1928. He previously worked in reliability, productivity and operational integrity at the company, but in 2010 he asked for and received the responsibility of overseeing risk management operations.

"In this role, my focus has been on integrating risk management in the health and safety program of our operations," Bianchin says. "My team and I support operations and engineering projects by facilitating risk assessment exercises as required to support change management and identify and control risks at each phase of a project. Ideally, risk management and elements of process safety management could be further integrated into the project engineering process to assure catastrophic hazards and fatal hazards are addressed and managed using engineering controls at the onset of their introduction to the operation."

Engineers are essential to safety and risk reduction activities, Bianchin says, because of their input into the evaluation and development of processes that avoid use of hazardous materials or processes by substituting other, less hazardous materials and approaches where possible.

"Where hazardous installations are implemented, engineers are key to designing and establishing controls and systems that prevent catastrophic, fatal or severe hazards from materializing," Bianchin says, adding that input into development of sustainable hazard management plans to monitor effectiveness of controls is also an important part

of their role: "These decisions rely heavily on the engineer's knowledge of process, confidence in achieving and sustaining control effectiveness, requirement and openness to engage with affected stakeholders for input to define requirements, and strict adherence to their professional obligations."

The influence of engineers on safety is also felt in the seemingly carefree world of amusement park rides. Kathryn Woodcock, PhD, P.Eng., a professor of human factors engineering at Ryerson University in Toronto and a world authority on amusement park ride safety, participates in advisory councils for the Technical Standards and Safety Authority (TSSA) and helps develop amusement ride standards for other safety organizations.

TSSA is responsible for safety in amusement park rides, fuels, elevating devices, boilers and pressure vessels and upholstered/stuffed articles and regulates approximately 2240 permitted amusement devices in Ontario by ensuring all rides conform to the act and applicable regulations, codes and standards. The TSSA reviews and registers rides, issues permits for each ride in the current operating season, licenses operators, conducts inspections and incident investigations, and delivers public awareness campaigns throughout the province.

As a human factors specialist, Woodcock is especially concerned with safety in ride design and professional engineers' influence in the wider safety field.

"Many portable rides were designed in a different era, when mastering the correct use of technology was the hallmark of proficiency," explains Woodcock. "One thing that interests me is considering how classic rides could be modified to cater to the contemporary audience and make it less tempting to deviate from the rules. Newly designed theme park rides often already incorporate these principles. As awareness of human engineering grows, the analysis step of ride design may be better able to anticipate human response to different ride experiences in the same way human engineering has benefited pilot performance, medical safety, driver behaviour and other safety-critical activities."

One of Woodcock's former students is Joelle Javier, P.Eng., an elevating and amusement devices safety engineer at TSSA. In her role, she and her colleagues meet with engineers and designers from manufacturers, along with contractors, owners and operators and other stakeholders, in Canada and the US, to discuss code and stay abreast of new developments. In these meetings, regulators often discuss improvements that can be made to the standards. Unsurprisingly, amusement ride safety standards evolve with technology. "Sometimes, when there are incidents that occur, we look back in the standards and see if there were enough guidelines that could have prevented the incident," Javier says. "If there are none, we discuss and try to create new requirements. If there are, we try to find better ways of enforcing them."

Like other professionals in her field, Javier has a special appreciation for the role of engineers in designing and developing safer technology.

"I find that engineers are trained to look at things more holistically," Javier told *Engineering Dimensions*. "A good engineer who is also trained in human factors can go further and see how things interact and affect humans. This makes engineers best situated to attend to matters of safety. They understand how things can go wrong and how to safeguard against hazards that may not be 100 per cent eliminated. Above all, engineers also vow to hold paramount the health, safety and welfare of the public. Just like doctors, we have the responsibility to attend to the protection of the public, including the day-to-day things we enjoy like elevating and amusement devices."

Another innovator with insights on the growing influence of practitioners in the safety area is engineer Marcello Oliverio, P.Eng., process safety program manager at Enbridge Gas Distribution. Oliverio got involved in process safety after his experience with the Canadian Society for Chemical Engineering's process safety management division. He believes process safety engineering is poised for new inroads in promoting a stronger safety culture across all industries and work sites—operating in concert with the Ontario Ministry of Labour's workplace health and safety initiatives.

"Process safety management is becoming better understood but it still needs to be promoted," Oliverio says. "There is also, I think, a shortage right now of good safety engineers in Ontario."

He believes safety engineers, whatever their situation, should be more proactive in recognizing potential risks and hazards rather than focussing on dealing with the consequences of failures and accidents.

"THESE DECISIONS RELY HEAVILY ON THE ENGINEER'S KNOWLEDGE OF PROCESS, CONFIDENCE IN ACHIEVING AND SUSTAINING CONTROL EFFECTIVENESS, REQUIREMENT AND OPENNESS TO ENGAGE WITH AFFECTED STAKEHOLDERS FOR INPUT TO DEFINE REQUIREMENTS, AND STRICT ADHERENCE TO THEIR PROFESSIONAL OBLIGATIONS."
Rob Bianchin, P.Eng.

"It's all about preventing catastrophic failure and continually improving," Oliverio says. "Facilities must be designed and operated with an acceptable level of risk but also be affordable and practical."

HEALTH AND SAFETY UPGRADES

Closing the gaps in existing risk assessment systems could be the next big challenge for safety engineers. Though present at its beginnings, over the last nearly 40 years engineers have retained key roles in the rollout of enhanced health and safety programs.

One example is the engineering presence on the Ontario Ministry of Labour's (MOL) Prevention Council, established in December 2012 to advise the ministry and its chief prevention officer on a wide range of occupational health and safety issues, including: prevention of workplace injuries and illnesses, development of the provincial occupational health and safety strategy and any significant proposed changes to funding and delivery of services under the *Occupational Health and Safety Act*.

NONETHELESS, SISTILLI AND OTHER SAFETY ENGINEERS IN GENERAL SUGGEST THERE IS A LONG WAY TO GO IN IMPROVING ACCOUNTABILITY AND GAINING THE PUBLIC'S TRUST. FOR MANY, THE CHALLENGE COMES IN EXPLAINING SAFETY AND RISK REDUCTION PRINCIPLES TO THOSE WHO LACK A TECHNICAL BACKGROUND.

Graeme Norval, PhD, P.Eng., one of two professional engineers now on the prevention council, is professor of chemical engineering at the University of Toronto and a leading advocate of process safety management. He maintains engineers have long taken a more proactive stand on workplace safety issues.

His engineer colleague on the council, Dawn Tattle, P.Eng., concurred with that assessment, adding: "The abilities to analyze data and identify trends are engineering skills I believe help lay the groundwork for the development of prevention strategies in health and safety. I have found my engineering background combined with my construction experience to be important in my work as a member of the [labour ministry's] vulnerable workers task group and, more recently, the prevention council."

Norval and Tattle are not alone in their encouragement of the changing perception of safety in the workplace: Sujoy Dey, corporate risk officer with the MOL, leads a team of experts in the assessment, monitoring and mitigation of risk across the occupational health and safety system in the province.

Dey sees the creation of a corporate risk officer position and other recent initiatives as an indication the ministry is moving towards a risk-based organization. He cites an evolving "Swiss cheese" risk assessment model currently in use by safety professionals.

As the name implies, the Swiss cheese model of risk assessment highlights holes or gaps in any of the existing layers of process safety. If the holes align in a certain way, an incident, accident—or even catastrophic event—could get through.

Safety layers in most risk prevention programs usually involve the original design, regulatory controls and training of users and operators. These layers could still allow "latent failures" to result in an accident or injury. At the end of the model, an unsafe act by an operator or user by itself can undermine existing safety features and lead to similar negative consequences. Although unsafe acts on the part of individuals would be considered "active failure," they still must be considered by safety engineers looking to improve any risk management process.

Dey believes professional engineers can help improve the risk assessment system by identifying and overcoming latent failures.

"The Ontario labour ministry has initiated the risk management journey to inform enforcement and prevention strategies," Dey says. "This was based on the principles of risk management and operations science and influenced by the work of Professor Malcolm Sparrow of Harvard University, who visited the ministry in 2013 to talk about how regulators can use information about particular risks to 'sabotage the risk' and thereby prevent harm to workers. The Mining Health and Safety Review embraced the risk approach and a demonstration project to conduct a risk assessment of the underground mining industry was launched."

Dey adds the results were well received by stakeholders in the mining industry and inside the labour ministry. The success of the first risk assessment provided a foundation for continuing efforts to assess the risks to health and safety in a diverse set of sectors: construction (low-rise residential, roofing), health care (hospitals), agriculture (greenhouses), mining (underground and surface) and, most recently, forestry (sawmills and logging).

"More significantly," Dey adds, "the underground mining risk assessment and its aftermath offered glimpses of the exciting potential of risk-based approaches to improve the ministry's results in measurable ways. Improved results mean fewer workplace injuries and illnesses. And strong stakeholder buy-in means a stronger internal responsibility system for workplaces actively involved in managing their risks to worker health and safety."

Dey says the occupational health system leadership is now committed to shifting the system to a more comprehensive risk-based approach to regulation and prevention, consistent with the move to integrated risk management across the Ontario government.

In 2013, the deputy ministers of all the regulatory ministries agreed to an overarching risk-management framework within which each ministry was required to develop a business-specific model. The Treasury Board recently released a new Ontario Public Service enterprise risk management framework that provides guidance to ministries on the risk journey.

The MOL further signaled its intent to be a risk-based ministry by appointing Dey as its first corporate risk officer dedicated to the application, implementation and execution of risk thinking across the health and safety system in Ontario.

Dey suggests this transformation includes safety and process engineering ideation for the management of occupational health and safety risk. "The intent is to integrate risk thinking within the health and safety system in Ontario, and the labour ministry has started on this path with its system partners and industry stakeholders. An important aspect of this journey will also be to identify and recognize any gaps in risk maturity across the entire system and not just MOL," he says.

Dey also suggests the engineering profession should take note of this innovative approach in the interest of public safety and protection. "In this age of lightening-speed technological advances, engineers are looking to reduce waste and enhance quality and sustainability while continuously seeking ways to improve safety," he says. "I would say that any engineer can easily appreciate the risk-based approach to safety and it is important there be a greater emphasis on the risk-based approach in any engineering curriculum."

SETTING STANDARDS

Mary Cianchetti, P.Eng., president of standards for the CSA Group, believes adherence to professional ethics and industry standards are key bulwarks in enhancing safety across the board.

Cianchetti asserts the primary goal of developing a standard is public safety—something that is clearly aligned with the aims of a professional

engineer—stating in *Canadian Manufacturing* magazine: "As an engineer, the number one goal is to ensure you are carrying out your work, not only to the best of your abilities but, more importantly, in a responsible way—always bearing in mind how your work affects the safety and well-being of others."

Cianchetti and fellow engineers at the standards association are animated by the recent release of CAN/CSA-Z767-17, a new CSA standard on process safety management (PSM). This new standard describes PSM as the application of management principles and systems for the identification, understanding, avoidance and control of process hazards to prevent, mitigate, prepare for, respond to, and recover from process-related incidents.

These principles and techniques may be applied across industry sectors, with the standard written to be broadly applicable across industry sectors and organization sizes. Companies or organizations using these principles can be found in the chemical, food, mining, nuclear, petroleum, pulp and paper, transportation and utilities sectors—the standard applying to large, integrated manufacturing sites as well as small businesses or retail sites. However, the standard is not intended to define prescriptive solutions that will meet the needs of every organization. Each facility or worksite within an organization is unique and the user of this standard will find that a policy, practice or procedure effective at one site might need to be modified or rewritten for another site.

Amanda Sistilli, P.Eng., a process safety engineer at ERCO Worldwide, a company with a long history of producing chemicals, attended the process safety management division (PSMd) of the Canadian Society for Chemical Engineering to learn more about process safety and to study process safety developments in Canadian industry. She studied chemical engineering at the University of Toronto and graduated in 2011.

"My job entails acting as a process safety representative for three ERCO manufacturing sites (two in Canada, one in the US)," Sistilli said in a recent interview. "I facilitate process hazard analysis studies for these sites, and I also offer guidance and assistance in meeting the process safety requirements that ERCO has committed to. Recently, I have been involved in a project assessing major hazards at each manufacturing site and how to reduce offsite impact."

Sistilli developed an interest in the safety side of engineering during her first rotation as an engineering intern at a manufacturing site. "I was able to see how safety culture and robust safety practices played an important role in ensuring that everyone went home safely at the end of the day," she says. "As I learned more about the process safety systems that ERCO followed, I found myself becoming more engaged and soon became an advocate for these systems."

Sistilli commented that some people view safety as an expensive investment that slows things down. "My job gives me the chance to challenge that perception," she adds. "I enjoy the process of getting people on board with a strong safety culture and finding ways to implement process safety systems that are practical for the application."

Sistilli says there is still misinformation circulating about the level of safety in various industries, "Unfortunately, mostly due to past events, the chemical industry has developed a reputation of having unsafe practices that put the public and environment at risk in favour of profits," she says. "The process safety field within the chemical industry has made great strides since then along with legislative changes. As a result, the industry has become much more accountable and proactive in assessing and addressing hazards that affect people and the environment."

Nonetheless, she and other safety engineers in general suggest there is a long way to go in improving accountability and gaining the public's trust. For many, the challenge comes in explaining safety and risk reduction principles to those who lack a technical background. Since engineering projects inevitably affect society for better or worse, public engagement is still important.

"I am a big advocate for collaboration between multidisciplinary groups, including the public, to develop plans that reduce the potential impact on the community," Sistilli says. "To better facilitate that discussion, I think the engineering profession could do more to educate and showcase the processes we go through to keep people safe."

While engineering has been instrumental in the evolution of occupational or workplace health and safety—due largely to the profession's early involvement with such foundational industries as mining, railway building, bridge construction and other high-profile civil projects—as new industries and manufacturing develop, the profession, as the traditional custodian of technology, must continue to assume greater responsibility and influence in developing more sophisticated health and safety frameworks. **e**

A PEAK REFRESHER

By Arden Heerah, P.Eng.

Eight months have passed since PEO launched its Practice Evaluation and Knowledge (PEAK) program. Since then, we've fielded hundreds of queries and received useful feedback—praise, disapproval and also engaging suggestions. We understood the program would prompt questions—What is PEAK? Why participate? How does it work? Do I have to do it?—and lead discussions within the engineering community and public at large. It has also encouraged us to share more FAQs to highlight key features of the program and, hopefully, debunk myths.

The feature articles in the March/April 2017 issue of *Engineering Dimensions* also provide more background information about the program.

What is the PEAK program?

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

What are the key features of this program?

1. It's risk-based: it focuses on risks to the public attributable to practising licensees due to the particulars of their work and the use of risk mitigators in their practice;
2. It's flexible: it allows practising licensees to design their own knowledge plan to align with the needs of their practice and available opportunities;
3. It's relevant: it focuses only on technical activities relevant to a practising licensee's scope of work; and
4. It's not a one-size-fits-all solution: practising licensees get continuing knowledge recommendations unique to their risk, and non-practising licensees are exempt from the continuing knowledge portion of the program.

Why is the program relevant?

The PEAK program has two primary functions:

1. It demonstrates the commitment of Ontario's engineers to the public, the profession and self-governance by gauging what licensees do to annually maintain a level of knowledge and skill commensurate with safeguarding the public interest; and
2. It helps PEO to more effectively serve as Ontario's engineering regulator by collecting an accurate and up-to-date regulatory profile of its membership for evidence-based policy development.

How many elements make up the PEAK program?

There are three elements:

1. Practice declaration/questionnaire (20 questions)
2. Ethics module refresher (30-minute interactive video)
3. Continuing knowledge reporting

Where is the PEAK program?

Currently the program is available online through your password-protected account in the PEO member portal at secure.peo.on.ca/ebusiness/home. Check your account today—you will find the new PEAK tab there.

Who should participate in the PEAK program?

All licence holders—P.Engs and limited licensees—up for licence renewal should participate. Exempt from the program are engineering interns (EITs), P.Engs or limited licensees who are in their first year of membership and temporary and provisional licensees. But EITs and first-year licensees should familiarize themselves with the program for when they become eligible.

WHO SHOULD PARTICIPATE IN THE PEAK PROGRAM?

Elements of the PEAK program	Practising licence holder	Non-practising licence holder	Engineering interns (EITs) [1] First-year licence holders [1,2] Temporary and provisional licence holders
1. Practice declaration & practice evaluation questionnaire	✔ ✔	✔ ✖	✖ ✖
2. Ethics refresher	✔	✔	✖
3. Continuing knowledge activity reporting	✔	✖	✖

[1]EITs and first-year licence holders should become familiar with the PEAK program for when they become eligible.

[2]First-year licence holders are P.Engs and limited licence holders who were granted licences within the past year.

What are the program due dates?
As of March 31, 2017, your licence renewal notice will explain how and when to participate. Complete elements (1) Practice declaration/questionnaire and (2) Ethics module refresher video only after you receive your licence renewal notice. Complete element (3) Knowledge reporting during the 12 months between this renewal and your next renewal.

Element (1) is due with your current licence renewal.
Element (2) is due with your current licence renewal.
Element (3) is due with your next licence renewal.

DUE DATES EXPLAINED

What if I miss the PEAK due dates? How will I renew my licence?
The program is currently voluntary and not a prerequisite for your licence renewal. But your participation will be listed in the online licence holder directory on PEO's website.

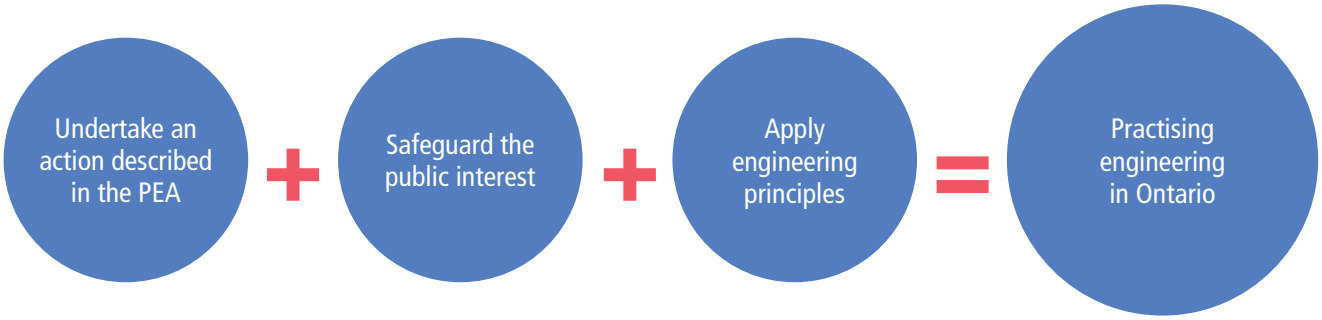
Am I a practising engineer?
The *Professional Engineers Act* (PEA) says the practice of engineering in Ontario—your work and volunteer activities—occurs when three criteria are satisfied. You must undertake any act of planning, designing, composing, evaluating, advising, reporting, directing or supervising, or the managing of any of these acts, for the purpose of safeguarding the public interest (life, health, property, economic interests, public welfare or the environment) by applying engineering principles (knowledge from an engineering-accredited program). This meaning extends to all jobs in industry, government and consulting—you can be practising engineering under an employer not holding a certificate of authorization and even when not sealing engineering documents.

You are non-practising when unemployed, on leave, retired and not working, or if you are employed but your work is not in the practice of engineering.

PEO's director of policy and professional affairs, Bernard Ennis, P.Eng., elaborated on this topic in the article "Are you a practising professional engineer?" (*Engineering Dimensions*, March/April 2017, p. 29).


ARE YOU A
PRACTISING PROFESSIONAL ENGINEER?
BY BERNARD ENNIS, P.ENG.

AM I A PRACTISING ENGINEER IN ONTARIO?



I am a non-practising licence holder. How does the PEAK program apply?
You can simply declare yourself a non-practising licence holder in the practice declaration, then view the interactive ethics module refresher video. You are not asked to complete the questionnaire or the activity reporting elements.

If I declare myself non-practising, can I practise engineering again?
Regardless of your declaration, you retain full right to practise engineering unless you are restricted by fee remission or other PEO conditions. When you return to practising engineering, just remember to update your practising status and complete the PEAK questionnaire and knowledge activity reporting.

What is the difference between practising status and licence status?
Practising status indicates whether you declared yourself as practising engineering in Ontario in any capacity. Licence status describes the status of your licence to practise engineering in Ontario, whether active or inactive (retired, resigned, cancelled, revoked, suspended, or on fee remission).

How many hours of activities do I have to report?
As you complete the questionnaire (remember, this is only for practising licensees) your responses will be evaluated by a risk-based approach that considers both the risk and the risk mitigators associated with your practice environment. At the end of the questionnaire, you will instantly get your knowledge activity recommendation in hours to pursue and report to PEO. Your technical activities during the next 12 months (between licence renewal dates) count towards PEAK hours.

What professional development should I undertake?
The PEAK program focuses on technical knowledge, beginning with annual activities already undertaken by practising licensees to keep their technical knowledge current. PEO recognizes three types of continuing knowledge activities: formal education, informal education and contributions to knowledge. The program lets you customize a unique learning plan that is relevant to your practice and convenient for you. But remember to report the activities to PEO. Formal education refers to courses that are instructed and evaluated by subject-matter experts, such as college or university courses or courses for industry certifications, and the teaching of these. Informal education refers to self-study and non-class-based learning and mentoring, such as reading technical journals or attending workshops or seminars. Contributions to knowledge refers to disseminating (preparation and delivery) of technical knowledge to engineering peers and establishing best practices for the profession, such as providing technical seminars, presentations, serving on technical committees or publishing papers, technical articles or books.

I work part-time. How does the PEAK program account for this?
The PEAK program recognizes the significance between practising and non-practising licensees. But the program does not further separate part-time practising status from full-time practising status. Instead, the program adopts a risk-based approach to address this diversity. Consider this: Part-time practice could present risks akin to full-time practice; it all depends on your scope and the quality management system at work.

I have more questions and want to provide feedback. What do I do?
The PEAK program team is available to assist you. If your suggestions can't be implemented right away, they may be banked for future program upgrades.

1. Peruse the PEAK program website for more details and FAQs: peopeak.ca
2. Watch the video introduction on PEO's YouTube channel: youtube.com/PeoOnCa
3. Contact the PEO PEAK program team by phone (416-224-1100, ext. 1123; or 1-800-339-3716, ext. 1123) or email (PEOPEAK@peo.on.ca) e

Arden Heerah, P.Eng., is PEO's PEAK program coordinator.

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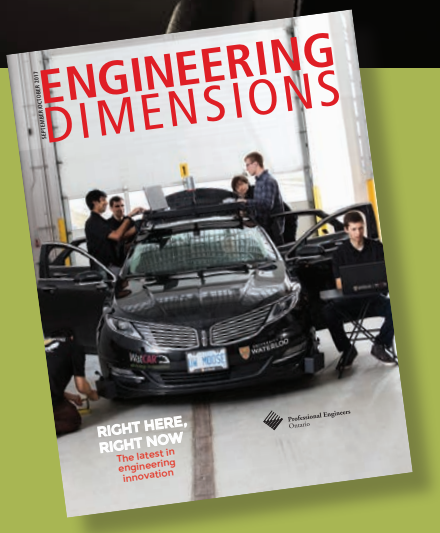

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MINUTES OF THE 95TH ANNUAL BUSINESS MEETING

SATURDAY, APRIL 22, 2017
PRESIDENT AND CHAIR: GEORGE COMRIE, P.ENG., CMC

The 95th Annual General Meeting of Professional Engineers Ontario was held at the Valhalla Inn, Thunder Bay, Ontario on Saturday, April 22, 2017.

President George Comrie advised that PEO was webcasting the business meeting to increase the accessibility of PEO information to more members, no matter where they are located.

The president thanked the participants and attendees of Friday's Volunteer Leadership Conference. He then acknowledged the seven inductees into PEO's Order of Honour, as well as recipients of the President's Award and G. Gordon M. Sterling Engineering Intern Award, all of whom were honoured during a gala ceremony the prior evening.

President Comrie announced that a delegation of the local Lakehead Chapter would provide a presentation on the history of Thunder Bay and local engineering during the keynote luncheon, and that the 512th meeting of PEO Council would be held following the luncheon. The president invited delegates of the AGM to participate in social media conversations using #PEOAGM.

CALL TO ORDER

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

INTRODUCTION OF COUNCIL

The president introduced the members of the 2016-2017 PEO Council.

The Executive Committee members: Bob Dony, PhD, P.Eng., C.Eng., FIEE, FEC, president-elect; Thomas Chong, MSc, P.Eng., FEC, PMP, past president; Pat Quinn, PhD (HC), P.Eng., C.Eng., FCAE, FEC, FIEI, vice president (elected), who was unable to attend; David Brown, P.Eng., BDS, C.E.T., vice president (appointed); and Councillors Marilyn Spink, P.Eng., Changiz Sadr, P.Eng., FEC, and himself as chair.

The remaining members of Council: Councillors-at-Large Roydon Fraser, PhD, P.Eng., Christian Bellini, P.Eng., FEC, and Roger Jones, BSc, P.Eng., who was unable to attend; Regional Councillors Guy Boone, P.Eng. (Eastern Region), Noubar Takessian, P.Eng., FEC, BScME, GSC (East Central Region), Dan Preley, P.Eng., and Michael Wesa, P.Eng. (Northern Region), Gary Houghton, BESc, P.Eng., FEC, and Ewald Kuczera, MSc, P.Eng. (Western Region), both of whom were unable to attend, Danny Chui, P.Eng., FEC, and Warren Turnbull, P.Eng. (West Central Region); Lieutenant Governor-in-Council Appointees Michael Chan, P.Eng., Richard Hilton, P.Eng., who was unable to attend, Tim Kirkby, BEng, P.Eng., FEC, Qadira Jackson Kouakou, barrister and solicitor, Lew Lederman, QC, Mary Long-Irwin, Tomiwa Olukiyesi, P.Eng., and Nadine Rush, C.E.T, who was unable to attend.

PEO's Directors to Engineers Canada for 2016-2017: Annette Bergeron, P.Eng., FEC, Rakesh Shreewastav, P.Eng., AVS, FEC, Chris Roney, P.Eng., BDS, FEC, David Brown and George Comrie. President Comrie also acknowledged Registrar Gerard McDonald, P.Eng.

ORDER OF BUSINESS

President Comrie welcomed the special guests attending the meeting and introduced representatives from provincial and national engineering associations from across the country:

- Chris Roney, P.Eng., BDS, FEC, president, Engineers Canada;
- Jay Nagendran, registrar and CEO, Association of Professional Engineers and Geoscientists of Alberta;
- Tara Zrymiak, president, and Bob McDonald, executive director and registrar, Association of Professional Engineers and Geoscientists of Saskatchewan;
- Lindsay Melvin, president, Engineers Geoscientists Manitoba; and
- Chris Zinck, president, and Len White, CEO and registrar, Engineers Nova Scotia.

He also welcomed representatives of PEO's partners in the Ontario engineering community and allied professions:

- Michael Monette, president and chair, and Sandro Perruzza, CEO, Ontario Society of Professional Engineers (OSPE);
- Stephen Morley, past president, Ontario Association of Certified Engineering Technicians and Technologists (OACETT);
- Tony Lotimer, president, Association of Professional Geoscientists of Ontario;
- Doris Chee, president, Ontario Association of Landscape Architects;
- John Stephenson, president, Ontario Association of Architects;
- Matt Farrell, vice president, Ontario Building Officials Association;
- Marisa Sterling, president and chair, Ontario Professional Engineers Foundation for Education; and
- Michael Lavdas, president, Engineering Student Societies' Council of Ontario.

IN MEMORIAM

The president asked all present to stand for a moment of silence in remembrance of those PEO members who had passed away in 2016.

ADOPTION OF MINUTES

President Comrie referred members to the minutes of the 2016 AGM.

It was moved by Noubar Takessian, P.Eng., seconded by Richard Chumra, P.Eng., that the minutes of the 2016 AGM, as published in the November/December 2016 issue of *Engineering Dimensions* and as distributed at the meeting, be adopted.

Motion carried

BUSINESS ARISING FROM THE MINUTES

The president reviewed the actions taken by Council on submissions discussed at the 2016 AGM. Members made four submissions to the meeting, one of which was passed. This submission dealt with PEO's continued discussions with government to eliminate the industrial exception. Since the 2016 AGM, PEO's efforts to repeal the industrial exception intensified after the government's decision to cancel it through Bill 27, the *Burden Reduction Act*, 2016.

President Comrie advised that PEO's efforts to eliminate the exception included several discussions with MPPs throughout the year, as well as the release of a research report to uncover causal links between worker injuries and fatalities in Ontario and the industrial exception. He said researchers used statistics, court prosecutions and Ministry of Labour investigations to analyze workplace incidents resulting from engineering work done by unlicensed employees. Four such incidents were found that resulted in worker injuries, including two fatalities.

PEO also presented its case to the Standing Committee on General Government in February 2017. Unfortunately, Bill 27 passed in March, cancelling the repeal.

PEO maintains that the repeal of the industrial exception is a workplace safety issue and will now work to facilitate the sharing of relevant information between the association and the Ministry of Labour so that PEO may more effectively regulate engineering in Ontario.

FINANCIAL REPORT

The president then referred members to the auditors' report and financial statements, which were published to PEO's website prior to the meeting, distributed as part of the meeting registration package and printed in the May/June 2016 issue of *Engineering Dimensions*.

He also noted the *Questions and Answers on PEO Operations* booklet, which addressed common questions on PEO operations and was included in the registration package.

With no questions from the floor regarding the financial statements, it was moved by Ravi Gupta, P.Eng., and seconded by Christian Bellini, P.Eng., that the financial statements, as presented, be received.

Motion carried

APPOINTMENT OF AUDITORS

Past President Chong advised that the Audit Committee recommended the firm of Deloitte LLP be reappointed.

It was moved by Danny Chui, P.Eng., seconded by Warren Turnbull, P.Eng., that the firm of Deloitte LLP be appointed auditors of the association for the 2017 financial year.

Motion carried

REGISTRAR'S REPORT

Registrar McDonald reported that revenues for the year ended December 31, 2016 were $24,140,235 less expenses of $23,732,739, resulting in a $370,625 surplus. Cash reserves, he noted, were $8 million, double the amount since 2012, which should place PEO in a good position when the mortgage comes due in 2019 and when it will be decided whether to pay down the mortgage or continue with investments. The registrar said PEO continued to have the lowest P.Eng. fees in Canada and the highest ratio of members to employees. Licence fees, he added, were frozen for the 10th consecutive year.

The registrar noted P.Eng. membership continues steady growth from 1.5 to 2 per cent a year, which has been constant over the past five years. He then provided additional statistics for 2016:

- 80,576 professional engineers;
- 13,101 engineering interns (EITs); and
- 290 limited engineering licences (LELs).

The registrar highlighted progress on initiatives related to PEO's 2015-2017 Strategic Plan—now in its third and final year. He said that approximately 71 per cent of the strategies that have been identified are now complete, with 29 per cent remaining to be completed. In terms of the activities associated with those particular strategies, over 90 per cent have been completed. He said PEO is on track to complete all of the its strategic priorities. Consultations for the 2018-2020 Strategic Plan have begun.

The registrar also discussed PEO's efforts to repeal the industrial exception, including lobbying both government and opposition MPPs on the public safety risks involved with the exception, as well as the release of PEO's Industrial Exception Research Project, which examined causal links between worker injuries and fatalities in Ontario and the industrial exception.

He said that though the appeal was lost, PEO established several good practices in collecting workplace incident data, which will be continued to build a case for the appeal. The Ministry of Labour has also committed to share more data.

The registrar then reviewed 2016 accomplishments, including the development of the Practice Evaluation and Knowledge (PEAK) program, which launched on March 31, 2017. The PEAK program sees licence holders reporting on both their practice risk and continuing professional development activities. He said he will report back to Council in June 2018 to advise how the program has worked so far and to recommend any changes.

The registrar reported that PEO issued its first licensed engineering technologist (LET) licence to Lisa Miller of Toronto, an OACETT member.

He also noted PEO conducted five successful enforcement prosecutions in 2016.

The registrar said Council approved several practice guidelines on structural design services in buildings, structural condition assessment for existing buildings (related to Elliot Lake Commission of Inquiry recommendations) and solid waste management.

INTRODUCTION OF ASSOCIATION GUESTS—ENGINEERS CANADA

The president invited Engineers Canada to provide an update.

Engineers Canada President Chris Roney, P.Eng., BDS, C.E.T., thanked PEO for the invitation to attend the AGM. He said he was honoured to bring greetings and best wishes from Engineers Canada, the national body that unites the engineering regulators and the engineering profession in Canada.

President Roney noted PEO now licenses more internationally trained engineering graduates than graduates of Canadian accredited engineering programs. On top of this, PEO and other Canadian engineering regulators are obligated by fairness commissions and human rights tribunals to ensure everyone seeking licensure is treated fairly and consistently regardless of where they received their training and experience. He said Engineers Canada is working with Canadian engineering regulators to meet these requirements while ensuring everyone is working to the highest common denominator to maintain the high standards that define engineering in Canada.

Roney then discussed the challenges of globalization and its work ensuring Canadian engineers are positioned to succeed in a global engineering environment. He said Engineers Canada has been working to ensure the federal government clearly understands the important public welfare role that engineers play in Canada and how trade agreements may impact how engineering is regulated, and the public protected, in Canada.

President Roney also discussed how Engineers Canada is making sure Canadian engineers are recognized as meeting the highest standards of qualifications and professionalism in the world. For example, through membership on the International Engineering Alliance, Canadian engineers can have their professional standing recognized by 15 member nations representing approximately 65 per cent of the world's GDP. He also discussed the new mobility register for engineers who want to be internationally recognized as professional engineers. Those on the register can use the designation "IntPE" after their names.

President Roney said Engineers Canada recently completed a cross-Canada survey of the public's perception of engineers and the engineering profession to get a sense of their level of confidence in the profession—and their expectations of it. He said survey results were very positive, with the public viewing engineers as technically proficient, having a high level of professional standards, innovative, doing their job well and being responsible for their actions. The survey also found the public has a high level of trust in engineers and that engineering work creates economic value. The bad news is that the public's confidence and trust in engineers is something that can't be taken for granted. The survey also showed that attitudes towards engineering in Quebec is distinctly lower than the rest of Canada—a direct result of the Charbonneau Commission into corruption and collusion in the construction sector that implicated some professional engineers in unethical and illegal practices. Engineering will exist as a self-regulated profession only so long as the public's trust and confidence is maintained.

President Roney said the survey results show there is room for improvement. The public's familiarity with engineers, when compared to other professions, is low—but as the public becomes more familiar with the profession, the scores on all of those positive characteristics increase even more. There is work to be done in strengthening the presence of the engineering profession in the minds of Canadians.

INTRODUCTION OF ASSOCIATION GUESTS— – ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

The president invited the Ontario Society of Professional Engineers (OSPE) to provide an update.

OSPE President and Chair Michael Monette, P.Eng., expressed his appreciation for the opportunity to attend and bring greetings on behalf of the society.

President Monette said he was proud of OSPE's ongoing collaboration, as illustrated in the *Two Sides of the Same Coin* brochure.

He said a good example of PEO-OSPE collaboration was last year's first-ever Government Relations Conference with Political Action Network (OSPE) and Government Liaison Program (PEO) volunteers at the University of Toronto's Hart House.

President Monette stated that he was very proud of the progress OSPE has made in advocating for the profession over the past year. Three examples of OSPE's most recent advocacy accomplishments include:

1. Participating in the *Construction Lien Act* review process, which will create new legislation to bring Ontario's construction laws up to date, supporting more than 400,000 Ontarians who work in the industry, including thousands of engineers.
2. Playing a role in creating Ontario's first chief science officer—a government advisory role involving practical science and engineering evidence to help establish policy.
3. Facilitating the inclusion of five OSPE members on Ontario's Building Code Technical Advisory Committee, to ensure environmental integrity, safety, accessibility and other key considerations are paramount at the Ministry of Municipal Affairs.

Additionally, President Monette said OSPE is building on its popular "An Engineer Was Here" campaign in 2017 by highlighting the work of

professional engineers and, in particular, women in engineering.

He said OSPE's upcoming membership campaign will focus on becoming a "complete engineer"—involving both a P.Eng. licence and committing to bettering society through advocacy, by way of an active OSPE membership.

President Monette said OSPE must engage more directly with new graduates and newcomers to provide them with adequate help and support, and show them the value of fully joining the profession by obtaining their P.Eng. OSPE wants to help them work their way towards a successful career in engineering while showing them the importance of advocacy and why engineering expertise must be considered in public policy.

ONTARIO PROFESSIONAL ENGINEERS FOUNDATION FOR EDUCATION

The president invited the president and chair for the Ontario Professional Engineers Foundation for Education (OPEFFE) to provide an update.

OPEFFE President and Chair Marisa Sterling, P.Eng., expressed her appreciation for the opportunity to attend and bring greetings on behalf of the foundation—a body that provides financial assistance to engineering students.

She said that, to date, the foundation has awarded over $2.7 million to more than 3000 students and engineers.

Over 2016, 118 awards were given out across all of Ontario's 15 accredited engineering schools, including Lakehead University, which is 50/50 gender balanced; to first-year students; course awards for students between second and fourth year; a gold medal for the highest achieving engineering graduate with leadership skills; the Engineers Without Borders Leaders for the Future partnership award, which supports a student to go overseas for development; and the benevolent fund, which provides assistance for engineers in financial need. This has amounted to $155,000 for the year, which is equivalent to giving back over 13,000 hours for students in time to study, to innovate and to create.

PRESIDENT COMRIE'S OUTGOING REPORT

President Comrie said it was a productive year in spite of the setback regarding the industrial exception. He stated that he wanted to broaden the scope of his review, similar to a mini "state of the union" address or—in this case—the "state of the profession." He asked attendees to participate in a short survey to produce a PEO report card by answering a series of questions. Each question was in the form of an assertion as to how well PEO was doing at some aspect of professional self-regulation.

1. **PEO licenses only those who will practice competently and responsibly**
   Not accurate at all (11 per cent); more inaccurate than accurate (8 per cent); neither accurate nor inaccurate (8 per cent); mostly accurate (59 per cent); completely accurate (14 per cent).
2. **PEO deals effectively with licensees for whom there is evidence of incompetence or professional misconduct**
   Not accurate at all (5 per cent); more inaccurate than accurate (7 per cent); neither accurate nor inaccurate (11 per cent); mostly accurate (60 per cent); completely accurate (17 per cent).
3. **PEO helps its licensees to understand what is expected of them in terms of professional practice in various situations**
   Not accurate at all (7 per cent); more inaccurate than accurate (21 per cent); neither accurate nor inaccurate (37 per cent); mostly accurate (30 per cent); completely accurate (5 per cent).
4. **Engineering work that fits the definition of the practice of professional engineering in our act is being done by licensed professionals**
   Not accurate at all (17 per cent); more inaccurate than accurate (23 per cent); neither accurate nor inaccurate (32 per cent); mostly accurate (23 per cent); completely accurate (6 per cent).
5. **Most practicing professional engineers do so competently and professionally**
   Not accurate at all (3 per cent); more inaccurate than accurate (4 per cent); neither accurate nor inaccurate (11 per cent); mostly accurate (61 per cent); completely accurate (22 per cent).
6. **Most practicing professional engineers are maintaining their technical and professional competence**
   Not accurate at all (5 per cent); more inaccurate than accurate (12 per cent); neither accurate nor inaccurate (22 per cent); mostly accurate (50 per cent); completely accurate (11 per cent).
7. **Professional engineers are living up to our obligation to serve and protect the public interest**
   Not accurate at all (5 per cent); more inaccurate than accurate (4 per cent); neither accurate nor inaccurate (11 per cent); mostly accurate (68 per cent); completely accurate (14 per cent).
8. **Professional engineers have influence in society comparable to members of other senior professions like accounting, law and medicine**
   Not accurate at all (21 per cent); more inaccurate than accurate (33 per cent); neither accurate nor inaccurate (22 per cent); mostly accurate (20 per cent); completely accurate (3 per cent).
9. **Professional engineers are appropriately compensated for their contribution to society**
   Not accurate at all (42 per cent); more inaccurate than accurate (28 per cent); neither accurate nor inaccurate (16 per cent); mostly accurate (10 per cent); completely accurate (4 per cent).
10. **PEO's culture as an organization is appropriate to sustain its leadership and to achieve its mission and vision**
    Not accurate at all (8 per cent); more inaccurate than accurate (28 per cent); neither accurate nor inaccurate (30 per cent); mostly accurate (29 per cent); completely accurate (6 per cent).

President Comrie said that one year ago he mentioned three areas which he believed PEO should focus on improving. He was pleased to report on each of the three areas, but cautioned that each still required work.

He said the first area was regulatory excellence. Over the last Council term, most of the backlog of regulation changes that had accumulated over 10 years (mostly related to licensing) was dealt with. This achievement resulted from a sustained effort of PEO's Academic Requirements, Experience Requirements, Licensing, and Legislation committees.

President Comrie also reported that PEO is substantially ready to respond to the recommendations of the Bélanger Commission as soon as the Ontario legislature passes the required enabling legislation.

In addition, said President Comrie, 2016-2017 saw substantial progress towards implementation of continuing competence assurance for PEO licensees, culminating in the rollout of the Practice Evaluation and Knowledge (PEAK) program on March 31, 2017. When the current membership renewal cycle is complete a year from now PEO will, for the first time in its history, have a reliable database of information on its licensees' scope(s) of practice, their practice environments and associated risks, and what they are doing to maintain technical competence in those scopes of practice. He said credit is due to PEO's $(CP)^2$ Task Force for their leadership and innovation on this important project. However, the task of continually improving PEO's regulatory instruments and processes will never be complete. A backlog of issues remains to be addressed, such as:

- the introduction of structured engineering internships;
- requirements and processes to assess suitability to practice; and
- an enhanced (internal) appeal process for licensing decisions.

Comrie said he believed the absence of exclusive scopes of practice for so many PEO licence holders is the biggest obstacle to effective regulation of professional engineering in the public interest in Ontario, and to improving PEO's capture rate of individuals with engineering qualifications. All the evidence at hand suggests that:

a) Only about a third of those with engineering qualifications in our labour force are practising professional engineering;
b) A majority of PEO licence holders do not require their licence to earn a living; and
c) Much of professional engineering that clearly falls within the definition of the practice of professional engineering in the *Professional Engineers Act* is being done by unlicensed individuals, with impunity.

President Comrie said he clearly supports increased enforcement of section 12 of the act; however, he said this alone will not substantially impact the problem of unlicensed practice. He said that without demand-side mechanisms like building code requirements for engineering work product to be signed and sealed, PEO's ability to identify occurrences of unlicensed practice, and to obtain sufficient evidence to prosecute it, is severely limited. In a recent meeting with the attorney general of Ontario, he said he raised this "enforceability" issue as an example of how the engineering profession is hampered in its self-regulation as compared to other senior professions that have mechanisms to enforce their requirement for licensure built into acceptance of (and in the case of doctors and teachers, for example, payment for) their services.

At its workshop last spring, President Comrie said Council discussed the possibility of a public information campaign to help the public better understand how professional engineers are protecting their safety and wellbeing—mostly out of sight and mind. He said a task force has been formed to develop the terms of reference for such a campaign.

President Comrie said a similar topic involves embracing emerging disciplines, such as industrial engineering, software engineering, communications infrastructure engineering (CIE) and nanomolecular engineering (NME). He said that while both industrial engineering and software engineering emerged some time ago, the engineering profession failed to embrace them as the practice of professional engineering and to begin regulating them in a timely manner, and so to a large extent they escaped PEO's purview.

President Comrie stated PEO is now trying to avoid making the same mistake with CIE and NME. To this end, he said, over the past year PEO staff and volunteers have attempted to license a "critical mass" of CIE practitioners. He said licensing existing practitioners in an emerging discipline such as CIE tends to pose problems for PEO's licensing process, since none of them hold degrees in accredited Canadian engineering programs with that specialization (to this day, no such programs exist), and many of them lack post-secondary degrees or diplomas in any field of engineering, science or technology—having acquired their domain knowledge of networking and cyber security on the job.

He said the good news is that there are just under 50 applications from CIE practitioners currently working their way through the licensing system, with some expected to be licensed shortly.

The bad news is the current lack of process by which applicants for limited licences who do not meet the academic requirement can demonstrate they have, in fact, acquired the necessary knowledge to support their intended scope(s) of practices. Some may ask, why bother with such applicants? The answer is that they are currently practising engineering (within the meaning of the act) without a licence, and PEO is powerless to stop them. Many such individuals are seeking credentials to substantiate their knowledge and skill, but if it is made too difficult for them to obtain licensure, they will simply turn elsewhere for credentials, said President Comrie. PEO has a very limited window of opportunity to capture a critical mass of CIE practitioners before the engineering profession loses its claim to these scopes of practice by default.

President Comrie reported significant progress on PEO leadership development and succession—the third topic he mentioned a year ago. He said many AGM attendees participated in the Volunteer Leadership Conference held during the same weekend. Facilitated by David Irvine, the conference focused on building PEO's leadership capacity and provided an opportunity for PEO's volunteer leaders to meet and enhance their leadership skills in a workshop setting.

In 2016, said President Comrie, PEO Council mandated all standing committees to incorporate into their terms of reference provisions for term limits and succession planning by April 2017. He said the Regional Councillors Committee is now considering extending a similar mandate to chapter executives.

President Comrie said the Council Term Limits Task Force had reported twice to Council, and was expected to bring its final recommendations to Council for approval in June. To address questions raised at the end of yesterday's conference, Comrie stated he believes Council supports the introduction of "moderate" term limits for Council positions—the challenge will be to arrive at a consensus on the definition of moderate.

President Comrie noted that, taken together, these measures will help to achieve greater consistency and sustainability of PEO's volunteer leadership. He stated it must be recognized, however, that term limits in and of themselves will not achieve the desired sustainable leadership succession. Additional measures in the areas of leadership development, formalized succession planning and election procedures will be required to round out the effort.

President Comrie reported that the first of a series of online learning modules covering various aspects of PEO-specific domain knowledge rolled out late in 2016, and will be followed by several more in 2017. The goal of these modules is to assist in onboarding new PEO volunteers and staff by conveying essential information about PEO's role and mandate, regulatory operations, organization and governance in order to achieve greater consistency in understanding of key concepts. He encouraged attendees to check out PEO's website under the Resources tab to test drive the modules available.

In summary, President Comrie indicated there has been slow but steady progress on many fronts; however, there is still lots of work to do on these and other strategic initiatives. He said he remains optimistic for the future of the self-regulating engineering profession. President Comrie said there is talent, energy and commitment, and he said he believes there are now better processes in place to avoid some of the mistakes and conflicts of the past.

President Comrie stated it had been his pleasure to serve as president and he looks forward to continuing to work closely with Council and the other members of the Executive Leadership Team in the coming Council term.

MEMBER SUBMISSIONS

President Comrie stated that, as noted in section 17 of By-Law No. 1, PEO's annual general meeting is held:

- to lay before members, reports of the association's Council and committees;
- to inform members of matters relating to the affairs of the association; and
- to ascertain the views of the members present on matters relating to the affairs of the association.

He noted that submissions presented to the AGM are a way for members in attendance to express their views on matters relating to the affairs of the association. Member submissions are not binding on Council, he continued, but Council considers the issues raised at AGMs to be very important and will be addressed expeditiously.

President Comrie asked the proponent of the first submission to introduce their motion.

Darla Campbell, P.Eng., introduced her motion by noting various news reports (included as background information in the AGM package) on other Canadian regulators that had lost their ability to self-regulate due to ineffective governance practices. She stated engineering exists as a self-regulating profession only as long as public confidence is maintained in PEO's ability to govern itself. She then stated she felt PEO should solicit

expert advice on governance practices to ensure it maintains self-regulatory status.

There were some suggestions regarding the engagement of a consultant to undertake a governance review.

Peter DeVita, P.Eng., noted it is important the consultant understand self-regulation. He further noted engineering tends to have expanding scopes of practice as new science and new technology emerges, creating entirely new engineering disciplines (i.e. software engineering) and this needs to be taken into account so Council is able to deal with an expanding profession. He stated there should also be good key performance indicators in place—i.e. how many PEO members actually need their P.Eng. to do engineering and how much engineering is done outside the profession.

Ravi Gupta, P.Eng., suggested consideration be given to what is available within the organization in terms of corporate memory.

Ammar Nawaz, P.Eng., noted it is important there be a clear mandate and to articulate a set of criteria to ensure PEO is equipped to fulfill its role on a continued basis.

Annette Bergeron, P.Eng., suggested the development of a problem definition.

Moved by Darla Campbell, P.Eng., seconded by Kelly Reid, P.Eng.

WHEREAS Since our last AGM, other regulators have lost their ability to self-regulate due to ineffective governance practices (e.g. Ordre des ingénieurs du Québec, Tarion in Ontario and the BC real estate industry);

WHEREAS Council has powers to seek new governance perspectives and approaches to enhance excellence in governance with a commitment to innovation and evidence-based approaches;

WHEREAS Council needs expert advice to ensure it makes the best decision in modernizing its governance with a commitment to being proactive, effective and innovative using an evidence-based approach; and

WHEREAS Self-regulation is a privilege, not a right or entitlement. The profession must protect the public interest or risk losing that privilege, along with the confidence of government and the public.

THEREFORE BE IT SUBMITTED THAT:

PEO engage an external governance expert to advise Council independently on how to modernize the governance of the organization in order to ensure self-regulatory status and that the principles of the new governance model be presented to Council for approval before the next annual general meeting.

Motion carried

President Comrie asked the proponent of the second submission to introduce their motion.

Gordon Ip, P.Eng., advised that his motion was intended to extend goodwill and enhance inclusiveness in PEO by expanding the Financial Credit Program (FCP) to include refugee international engineering graduates.

Registrar McDonald, responding to a query about the Financial Credit Program, advised that the requirement for proof of Canadian citizenship or permanent residency status was based on the 2007 requirements for licensure, when a P.Eng. had to be a Canadian citizen or permanent resident. Consequently, at that time, international engineering graduate refugees were not considered eligible for the FCP.

Registrar McDonald further advised that 2010 amendments to the *Professional Engineers Act*, under the *Open for Business Act*, removed the citizenship and residency requirements for licensure—however, the qualifications for the Financial Credit Program were not adjusted. He stated PEO recognizes a change to the policy is required and the matter is now before the Licensing Committee. PEO needs to ensure the person the licence is being issued to is able to work in Canada. This will ultimately be presented to the Licensing Committee and then to Council for final approval.

Joe Podrebarac, P.Eng., referred to the preamble regarding the 12-month period of support after submitting to FCP within six months of their landing date in Canada and that in this situation this would apply not to the landed date for the legal immigrants but to the refugee acceptance date.

Moved by Gordon Ip, P.Eng., seconded by Vimbai Munyukwi, P.Eng.

WHEREAS Members with permanent resident and Canadian citizenship immigration status in Canada are eligible and exempt (under the Engineering Intern Financial Credit Program (FCP)) from having to pay membership fees for the first 12 months (after submitting to FCP within PEO, the same conditions should apply or be extended to similarly situated; refugee international engineering graduates in the interest of parity and fairness;

WHEREAS Canadian men and women of various ethnic, cultural and racial backgrounds are looking for entry into either engineering, engineering technology, computers and information technology, accounting, health and other various fields of employment, be it resolved that, given PEO provides accreditation of academic and professional engineering experience, providing guidelines to newcomers and skilled immigrants,

it is within the mandate of PEO to provide assistance to qualified applicants;

WHEREAS PEO provides workshops and seminars on various aspects and approaches to seeking and securing employment for newcomers through its chapters, that: registration fees on job seekers who fit the profile of "refugee international engineering graduates" be waived where they may otherwise be too onerous and an impediment to satisfying the requirements to be members, so as to benefit from the rights and privileges that would otherwise accrue to fee paying members;

WHEREAS The Engineering Intern Financial Credit Program (FCP) motion was approved by PEO Council in 2007 in the same spirit and intent of this Member's Submission "Inclusiveness." "At its January 2007 meeting, Professional Engineers Ontario (PEO) Council approved motions to enhance inclusiveness in the profession by creating an Engineering Intern Financial Credit Program (FCP). Subsequently, at its March meeting, Council approved the implementation plan for this program. Under this initiative, which will launch May 1, 2007, individuals who have graduated from Canadian Engineering Accreditation Board (CEAB) accredited bachelor of engineering programs or international engineering graduates (IEG) with a bachelor of engineering or applied science degree may register in the Engineering Intern (EIT) program for the first year provided they meet specific criteria established by PEO";

THEREFORE BE IT SUBMITTED THAT:

The Engineering Intern Financial Credit Program (FCP) be expanded to include refugee international engineering graduates.

Moved by Marcelo Sarkis, P.Eng., seconded by Gordon Ip, P.Eng.

That the motion be amended by including the words "legally recognized" before refugee.

Amendment carried

Members then voted on the main motion as amended.

The Engineering Intern Financial Credit Program (FCP) be expanded to include legally recognized refugee international engineering graduates.

Motion carried

REMARKS BY THUNDER BAY-RAINY RIVER MP DON RUSNAK

President Comrie introduced Thunder Bay-Rainy River MP Don Rusnak advising that, being born and raised in Northwestern Ontario, MP Rusnak has deep roots in the area; and as the proud son of Ukrainian and Anishinaabe (Ojibway) parents, he understands the diverse and pressing issues facing his community.

President Comrie then stated MP Rusnak has extensive professional experience drawing from his work in the forestry industry, public sector, and from his own legal practice. While working with Manitoba Health, he helped to improve the delivery of healthcare services for Northern Manitobans, and as a Crown prosecutor in Eastern Alberta, he prosecuted criminal and regulatory offences. The president said MP Rusnak has long demonstrated strong leadership skills, having served as the interim executive director for Grand Council Treaty #3 in Kenora.

President Comrie went on to note MP Rusnak has volunteered his time with many organizations, such as the Ontario Justice Education Network and the Martin Aboriginal Education Initiative, a group that improves elementary and secondary school education outcomes for Aboriginal Canadians through the implementation of specific programs and the application of appropriate research.

President Comrie finished his introduction of MP Rusnak by noting that he studied political science and integrated forest resource management at Lakehead University. He stated that in 2001, MP Rusnak attended the University of Manitoba, Robson Hall faculty of law and, during his final year, attended Osgoode Hall Law School to study in the intensive program in Aboriginal lands, resources and governments.

In the beginning of his address to the AGM, MP Rusnak advised that it was an honour to welcome everyone to his hometown of Thunder Bay. He noted how important engineers are to Canada and that as the only First Nations Member of Parliament in Ontario, he is aware the quality of work, safety and care engineers take in their work with First Nations is extremely important to those communities.

MP Rusnak stated that as the Member of Parliament for Thunder Bay-Rainy River, he was delighted to hear Professional Engineers Ontario was hosting its 95th annual general meeting in his community for the first time in its history. He said when he thought of engineering, two individuals came to mind: One was an engineer friend who had worked in the North Sea aboard oil platforms, in the wilds of Alaska, and in corporate offices in Houston, Texas and Paris. The second, he said, was one of his predecessors who also served as the Member of Parliament for the local riding, then known as Port Arthur—a certain engineer by the

name of CD Howe. Mr. Howe was recruited by former prime minister Mackenzie King and went on to become the federal minister of almost everything for 22 years. His wide range of skills and knowledge are a testimate to the profession, said MP Rusnak.

MP Rusnak advised that since he was first elected, he has enjoyed a strong relationship with PEO's colleagues at Engineers Canada and was particularly interested to see Engineers Canada's initiative to encourage more participation of First Nations people in engineering schools. He indicated that he was delighted to acknowledge PEO for the important work they have done to improve public safety in their role as the regulator of professional engineering in Ontario.

PRESENTATION OF OUTGOING COUNCILLORS

President Comrie congratulated members of the 2016-2017 Council who had worked diligently to move the profession forward.

In recognition of their service, he presented certificates, name badges and desk plaques to retiring members of Council: East Central Region Councillor Changiz Sadr and Lieutenant Governor-in-Council Appointees Rakesh Shreewastav and Mary Long-Irwin.

Three outgoing councillors unable to attend were recognized as well: Roger Jones, councillor-at-large, Ewald Kuczera, Western Region councilor, and Pat Quinn, vice president (elected).

INSTALLATION OF NEW PRESIDENT

Past President Comrie administered the oath of office to Bob Dony as president for the 2017-2018 term and presented him with the president's chain of office along with the gavel of office.

INTRODUCTION OF INCOMING MEMBERS OF COUNCIL

President Dony then introduced the 2017-2018 members of Council: Past President George Comrie, President-elect David Brown, Vice President Nancy Hill, BASc, P.Eng., LLB, FEC, FCAE, Councillors-at-Large Christian Bellini, Roydon Fraser and Kelly Reid, P.Eng., IACCM CCMP, Eastern Region Councillors Guy Boone and Ishwar Bhatia, MEng, P.Eng., East Central Region Councillors Noubar Takessian and Thomas Chong, Northern Region Councillors Michael Wesa, and Dan Preley, West Central Region Councillors Danny Chui and Warren Turnbull, Western Region Councillors Gary Houghton and Lola Hidalgo, P.Eng., PMP, and Lieutenant Governor-in-Council Appointees Michael Chan, P.Eng., Tim Kirkby, P.Eng., Qadira Jackson Kouakou, Lew Lederman, Tomiwa Olukiyesi, P.Eng., and Marilyn Spink, P.Eng.

CLOSING REMARKS BY PRESIDENT DONY

President Dony thanked Past President Comrie and expressed his appreciation for the dedication and enthusiasm with which he had approached his role as president.

President Dony noted that he was humbled and grateful for the support of the members and his colleagues in allowing him the honour and privilege to serve as the 97th president of the association. He advised that when he stood for election he talked about "moving forward" and that his focus on the future of the profession comes naturally to him as a university professor in Guelph's biomedical engineering program where he is surrounded by the next generation of engineers. It is their profession PEO should be working for, he said.

President Dony then discussed his personal perspectives, noting that he has one son in third-year mechanical engineering, another son who is an environmental engineering graduate and a daughter who is completing her masters in biomedical engineering.

So, what does their profession look like?, President Dony asked. He said it is certainly different than the one he entered when he graduated in 1986 with his degree in systems design engineering. At that time, he noted, such a non-traditional program was very much the exception to the classical engineering disciplines of the day.

Today, said President Dony, there are over 100 different accredited engineering programs in Canada, and the old framework of discrete engineering disciplines is obsolete. Instead, he said, there is a continuum of engineering competencies and scopes of practice, a spectrum that ranges from civil engineering to biomedical engineering, and everything in between. He noted this is a world of maker spaces, hack-a-thons, unicorns and self-driving cars. He asked how would one take a regulatory framework that, some would argue, was designed for 19th-century technology and adapt it to today's 21st-century reality?

President Dony advised that at Ontario universities, he sees innovations in both engineering research and teaching methods, including problem-based learning, flipped classrooms and massive open online courses (or MOOCs). The classroom of 1986 is not the classroom of 2017, he said. President Dony then noted that to ensure PEO as a regulator keeps up with these changes in engineering education, he had organized a workshop between PEO and the Ontario deans of engineering in June to discuss how the accreditation system can adapt to the new realities of engineering education.

President Dony then said PEO must embrace a culture of change as part of its DNA, with succession planning and renewal both key to ensuring fresh perspectives are brought into the organization, from the chapter system, through committees, right up to Council. He said the members' motions concerning term limits at the 2015 AGM spoke to this issue directly, and the resulting Council-appointed Council Term Limits Task Force will be presenting its final recommendations at the June Council meeting.

President Dony advised that while encouraging new voices to enter the conversation, PEO must ensure a diversity of voices that represent not just the profession, but society as a whole. He stated that he is a middle-aged, white, cis-gendered straight male—and hardly a poster-boy for such a diverse conversation. However, he said, this not a "women's issue" or a "minority issue," but an issue that everyone must own—particularly those in that median demographic such as himself. For example, President Dony noted, Engineers Canada has the "30 by 30" goal to raise the percentage of newly licensed female engineers to 30 per cent by 2030. Can PEO take a leadership role and exceed this goal for its own leadership, he asked? President Dony noted the past election saw three women successfully elected for the seven contested positions. While this one result is very encouraging, he said, there still is much to do.

President Dony stated the expectations of society on whose behalf PEO serves has also changed over the years. He said today's public rightly demands much more transparency in how professions govern themselves. He said Past President Comrie has often spoken of the "contract" between the public and the profession, and that PEO gains the privilege of self-regulation in exchange for the obligation to protect the public as its primary function. This arrangement is increasingly under scrutiny for all professions, he noted. President Dony then stated PEO is very disappointed by the government's about-face on the repeal of the industrial exception. He said doctors are concerned about the erosion of their self-governing powers with the new *Protecting Patients Act*; and the placing of the Quebec regulator, Ordre des ingénieurs du Québec (OIQ), into trusteeship last year is yet another blow to self-regulation.

President Dony stated he believes that understanding the need for more transparency and taking a proactive response is the best approach. And he said the introduction of PEO's Practice Evaluation and Knowledge (PEAK) program is an excellent demonstration to the public of PEO's desire to regulate the profession openly and transparently. He noted last month's Supreme Court of Canada ruling upholding mandatory professional development standards for lawyers, and quoted from the court's decision: "While they may improve the currency of a lawyer's knowledge, these standards also protect the public interest by enhancing the integrity and professional responsibility of lawyers, and by promoting public confidence in the profession." President Dony said he fully supports the PEAK pilot that was launched on March 31 and that he will work to support its further evolution as more experience is gained with the program over the coming year.

President Dony again expressed his gratitude to those members of the profession who put their trust in him. He thanked Past President Comrie for his past year of service as president. He stated he was looking forward to the challenges ahead, to working diligently to fulfill his obligations as PEO president, including: working with the new Council and various partners in the engineering profession, OSPE, CEO, OACETT, and others; meeting many PEO volunteers and members at chapter events and other engineering activities across Ontario; and hearing peoples' diverse views on the myriad issues facing the profession. President Dony finished by saying the strength of the profession rests on the shoulders of its over 85,000 members; and he looks forward to "crowd sourcing" a path together to move the great profession forward for the next generation of practitioners.

CONCLUSION

President Dony then declared the 95th Annual General Meeting of the Association of Professional Engineers concluded.

Gerard McDonald, P.Eng.
Registrar

COUNCIL AMENDS ELECTION PUBLICITY PROCEDURES

By Nicole Axworthy

514TH MEETING, SEPTEMBER 28, 29, 2017

Council has approved an amended version of the 2018 election publicity procedures as printed in the July/August 2017 issue of *Engineering Dimensions* (p. 45).

At its June meeting, Council approved the *2017 Central Election and Search Committee Issues Report*, which suggested PEO provide candidates with a more structured template for their bio and platform material in order to present material in a more uniform manner and assist voters in comparing candidates.

At its September meeting, Council approved the new template as an option for candidates to use. The amended 2018 election publicity procedures will be published on PEO's website (www.peo.on.ca) and the *2018 Council Elections Guide* will be updated to reflect the changes in the publicity procedures.

AGM SUBMISSION APPROVED

At its September meeting, Council directed the Licensing Committee to expand its review of the Engineering Intern Financial Credit Program (FCP) to include refugee international graduates. This was the result of a member submission that was passed at PEO's 2017 Annual General Meeting.

At its January 2007 meeting, Council approved motions that established the FCP. Under the approved implementation plan, qualified applicants are permitted to register for the FCP and are provided membership for the first year of the Engineering Intern (EIT) program at no cost (PEO waives the $300 P.Eng. application fee and the $75 fee for the first year of registration as an EIT).

Qualified applicants are defined as either graduates of a Canadian Engineering Accreditation Board-approved program for up to six months after graduation or internationally trained engineering graduates for up to six months after landing in Ontario. The requirement for proof of citizenship for permanent residency status was based on the 2007 requirements for licensure that a P.Eng. must be a Canadian citizen or permanent resident. Amendments to the *Professional Engineers Act* in 2010 under the *Open for Business Act* removed the citizenship and residency requirements for licensure but the qualifications for the FCP were not adjusted.

The Licensing Committee currently has on its meeting agenda a review of the overall FCP based on the changes to the licensing requirements and the overall effectiveness of the program, as well as a request by some Ontario universities to consider extending the FCP to graduates with student visas.

30 BY 30 ENDORSEMENT

Council has formally endorsed Engineers Canada's 30 by 30 initiative, a commitment to raising the percentage of newly licensed engineers in Canada who are women to 30 per cent—a widely accepted threshold for self-sustaining change—by 2030. Currently, only 14.7 per cent of newly licensed engineers in Ontario are women.

Engineers Canada confirmed that all provincial and territorial engineering regulators across Canada, except for PEO, have signed on to this goal. PEO didn't initially endorse the initiative because, unlike other regulators, Ontario has a separate advocacy body, the Ontario Society of Professional Engineers (OSPE), and it was agreed that OSPE should take on the champion role, as is appropriate under its mandate of advancing issues of importance to the profession. However, for the 30 by 30 goal to be fully realized, PEO, in its regulatory capacity and as the official constituent association of Engineers Canada, should also formally sanction the initiative.

PEO Council has directed the Executive Committee to work with OSPE to develop a joint action plan and present a draft plan to Council at its February 2018 meeting, and directed the registrar to develop terms of reference, membership, proposed recommendations and a budget for Council approval of a 30 by 30 Task Force to be established for a maximum two-year duration.

PEO/OSPE JOINT POSITION PAPER

Council has approved the *PEO-OSPE Joint Position Paper on Mathematics Education Quality in Ontario* to present to the Ministry of Education on behalf of engineers in Ontario. Given the persistent decline in math achievements compared to other countries and provinces on international test scores, and in the quality of math education in the province, the position paper, drafted by PEO's Education Committee, urges the Government of Ontario to form a provincial roundtable comprised of relevant stakeholders, including Ontario's engineering regulatory and advocacy bodies, to help improve the quality of math education for all Ontarians.

APPOINTMENT TO CNEA

At its September meeting, Council appointed Kathryn Woodcock, P.Eng., as a PEO representative to the Canadian National Exhibition Association (CNEA), which governs the Canadian National Exhibition (CNE).

PEO received a formal request from the CNEA for a PEO representative to be appointed to CNEA general membership for a one-year term, however, he or she can serve to a maximum of six terms. All CNEA members are then eligible to apply to participate in the CNE board's committees and task forces.

Woodcock, a professor in the School of Occupational and Public Health at Ryerson University, has volunteered for a number of organizations in the attractions industry. e

AD INDEX

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Deadline for the March/April issue is January 26, 2018. Deadline for the May/June issue is March 23, 2018.

Global warming—us or them

Peter Broad, P.Eng.,
London, ON

I fully concur, "It is important to consider all sides of an argument" ("Considering all sides," *Engineering Dimensions*, September/October 2017, p. 49). Last year (2016) NASA confirmed (again) that global warming is occurring—on MARS.

Science is one of the few institutions that still seeks the truth; but natural science is not engineering. Thus, engineers should not waste time debating who is to blame. Rather, our task is to seek effective engineered solutions. We need not look to repetitive damage that was caused by Hurricane Andrew and reoccurred due to Hurricane Irma. In 2011, the Goderich tornado ripped roofs off buildings that were not built to code (one truss nail, not three). Toronto suffers from repeated flooding, in part because we delegate planning to idealists rather than engineers.

Despite the rhetoric, deforestation continues, while reforestation is merely discussed. Our wind farms do not conform to ministry standards, yet no corrective action is taken, and engineers are merely reprimanded for inadequate solar panel installations. Ineffective North American public transport necessitates automobiles, yet electric cars have a higher lifetime CO_2 footprint than current gas-driven vehicles. The US, a major CO_2 producer, is reverting to coal-fuelled power, not only putting CO_2 into the atmosphere, but also putting mercury into the rivers and emitting more radiation than nuclear plants.

International populations are exploding. More fuel is needed for cooking. People migrate to cities and heat islands are created. These problems and others even more urgent need solutions. So why waste time debating who is to blame?

Global warming has been downgraded to climate change, and we all know change is inevitable and the only constant in our lives, but because problems change we need solutions.

Email me if you want references, or use the PEO forum if you can offer solutions: forum.peo.on.ca.

No science backing

Lee Norton, P.Eng.,
St. Catharines, ON

I believe everyone has the right to their own personal beliefs, however I don't believe reputable magazines should print beliefs that have no scientific backing, especially a magazine for engineers. I'm referring to Hendrik Borgdoff's letter, "Beyond our control" (September/October 2017, p. 50). Back in 1824, the mathematician Joseph Fourier, whom engineers should have come across in their studies, calculated that the Earth's average temperature, from the energy received from the sun, should be about -18 C instead of +15 C. He attributed this to our atmosphere holding in the heat. In 1896, Svante Arrhenius, a Nobel-Prize-winning chemist, put the blame on carbon dioxide. Scientists have been peer reviewing this ever since, and it is now considered a fact. We now know that CO_2 is responsible for about 80 per cent of all non-condensing greenhouse gasses that are warming the planet.

PhD or not, I also take issue with Tapan Das' letter where he states CO_2 is now increasing at 2 ppm/yr ("Innovative solutions," September/October 2017, p. 50). I expect a PhD to be better at research. According to NOAA, CO_2 has increased as follows: 2016 404.39, 2015 401.31, 2014 399.04, or in other words CO_2 increased 3.08 ppm in the last full year of data. Scientists are still debating the rate of sea level rise. The IPCC seems to be Das' source and is the most conservative of the models. The majority of scientists are in the range of up to a two metre rise by 2100, although James Hansen, using the increasing rate of ice loss from GRACE satellite data and extrapolating, shows it could be as high as five metres. A six-foot increase (USA data) shows that two-thirds of the world's population would have to relocate away from the oceans. Over half our major cities would have to be relocated. The year 2100 is an odd date for considering sea level rise, as what we have done to date will result in the seas continuing to rise for thousands of years. Three million years ago, in the mid-Pliocene, when CO_2 levels were similar to ours, sea levels were about 20 to 25 metres higher than today. In the past, it took about 10,000 years to come out of an ice age to a peak warmer climate. In the past, CO_2 increased at about an average of 1 ppm per 100 years (Dome C ice cores). We are now increasing 300 times faster than that, and that is why we really don't know how quickly the Earth's systems respond. To date, it's been faster than our predictions.

As engineers, it's interesting to look at what it would take to design a machine to remove CO_2 from the air. 400 ppm is equal to one part in 2500 volumes. In other words, using a machine that is 100 per cent efficient, this machine would have to run 2500 volumes of air through it for every volume it extracted. Then we would have to do something with the extracted CO_2.

This is a crisis

Andrew Gibson, MSc, P.Eng.,
Saint-Lambert, QC

I noted two strong objections to a previous article on climate change in the July/August edition of *Engineering Dimensions*. I wanted to challenge some of the assertions made and highlight some misinformation cited in those letters:

- A statement was made by R. Bradshaw ("Questioning the cause," July/August 2017, p. 53), dismissing temperature variations as "obviously not caused by man." There are contributions from both natural and anthropogenic sources. I invite you to read an insightful article that quantifies and compares the sources, called "What's really warming the world?" As engineers, we cannot accept over-simplified logic and should seek broad sources to confirm viewpoints and formulate sound policy: www.bloomberg.com/graphics/2015-whats-warming-the-world
- S. Korn ("The other side," July/August 2017, p. 54) cites a CERN article as dismissing climate change. In fact, the lead author Kirkby was quoted in 2013 saying that, at the present time, we cannot say whether cosmic rays affect the climate. A review of the climate-skeptic-driven hype around this myth is discussed in detail at: skepticalscience.com/cern-cloud-proves-cosmic-rays-causing-global-warming-intermediate.htm
- The online petition cited by Korn is based on politically-driven believers of a fabricated paper that is debunked here ("The 30,000 global warming petition is easily-debunked propaganda"): www.huffingtonpost.com/kevin-grandia/the-30000-global-warming_b_243092.html. The article says that the petition was so misleading, the National Academy issued a news release stating: "The petition project was a deliberate attempt to mislead scientists and to rally them in an attempt to undermine support for the Kyoto Protocol…[the petition] was not based on a review of the science of global climate change, nor were its signers experts in the field of climate science." I tried to find a place to write a comment on this petition site, but there was no way to register an objection. It seems to be a one-way valve for self-validation of skeptics.

We are at the hottest global temperature in over 100,000 years. It is unreasonable to dismiss an increase in atmospheric carbon dioxide by 40 per cent as a normal perturbation in the Earth's history. Note this increase of the gas content is measured in the atmosphere already considering some of the excess has been absorbed by other sinks. The optical absorption effect is indisputable. Feedback mechanisms and other variables make it more complex but the energy input is real. Atmospheric chemistry is incredibly complicated as there is much more going on with methane, water and other constituents having their own impacts.

This is a crisis that definitely bears our concern, increased research and timely measures to limit our impact. We can't allow political and financial influences to affect our judgment, cloud public opinion and delay action further. People trust the view of engineers on technical topics, even if outside of our expertise—but spreading false information as a professional can damage our reputation as well as the environment.

A P.Eng. is a P.Eng.

Christopher Morris, P.Eng.,
Ottawa, ON

I wanted to tell you how impressed I was with the March/April 2017 issue of *Engineering Dimensions*, which contained many articles on PEAK. Congratulations are in order, even though a few months late!

But I wish to pass on my personal conclusions on this issue. An engineer is an engineer and as such I don't believe in confusing and complicating the issue.

To self-identify oneself as an engineer means you better have P.Eng. credentials, whether practising or not! Following that logic means that all P.Engs should meet the continued learning guidelines.

I am interested in learning how many other engineers feel the same way (and I'm guessing it would be the majority of them).

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.

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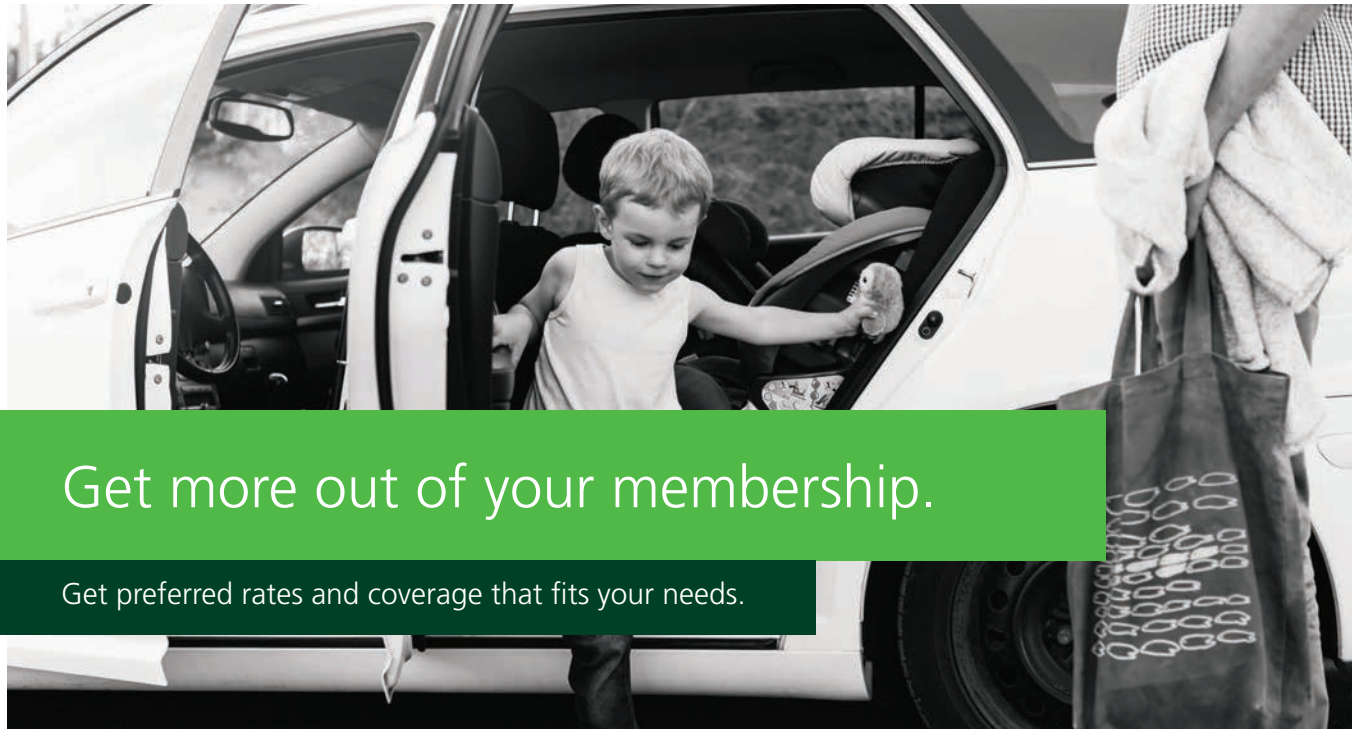

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