



Professional Engineers
Ontario

ENGINEERING DIMENSIONS

MARCH/APRIL 2016

A photograph of three business professionals in a meeting. A woman in a light blue shirt stands and smiles, looking at a man in a suit who is leaning over a table and writing. A woman with glasses is seated in the foreground, looking towards the man. The background is a blurred office setting.

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AN AGILE GAME CHANGER TO MAKE PEO GREAT AGAIN



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

WHEN I BEGAN my term as president and chair of PEO, I committed to engaging with the engineering community to help raise the relevance and value of our profession. As a long-time volunteer with the association, I have always believed that enhancing the relevance and value of the P.Eng. licence to society and to our licence holders is one of the most important roles of the association. I am pleased to report we have taken great strides on this front by leading change throughout PEO operations,

with an agile strategic thinking approach in three priority areas: innovation, recognition and collaboration.

INNOVATION

During the year, I challenged PEO senior management to find innovative ways to reduce costs and improve the organization's efficiency and operational effectiveness. The team responded with a surplus budget and was devoted to fiscal responsibility, while delivering high-quality regulatory programs, designing thoughtful policy and, above all, working to improve and protect the health, safety and well-being of Ontarians. We also enhanced our outreach efforts to students, interns and women in engineering, and increased learning and development opportunities for our nearly 1000 volunteers working in the chapter system and in the various committees of PEO. PEO's 36 chapters also received a 10 per cent increase in funding in 2016, to enable healthy growth, outreach efforts in their local communities and enhanced involvement with regulatory functions.

Innovation is based on taking good ideas and developing them into something new and valued. And PEO's Ottawa Chapter is doing just that with its Innovative Entrepreneur Leadership Program. I was privileged to attend the kick-off of this innovative program in Ottawa on September 30, 2015. Also in attendance was Councillor Marianne Wilkinson (Ward 4 Kanata North, Ottawa), who praised it as a "lead to win" entrepreneurship program. I commend the program's fusion of the entire innovation chain, stretching from basic and applied research through the business case to the proposal for early-stage financing for new companies. A true collaboration and fusion of PEO, the Ontario Society of Professional Engineers (OSPE), the learned societies, universities, govern-

ment and industry, I believe this program, rolled out across the province, could play a real part in helping to shift our economy into high gear again, restoring growth, boosting employment, helping small business thrive, restoring manufacturing competitiveness, bringing back Ontario's leadership in high technology, and shifting the country away from resource dependency.

I will watch the program's growth with interest, from an intra-entrepreneurship to inter-entrepreneurship synergy, acting as an enabling tool to stimulate economic development with engineering as the innovative backbone. It can further blossom into a new innovation hub, engineering/technology incubator and accelerator, or engineering change lab. It helps recognize and nurture the innovative talents of the best and brightest engineering practitioners to help them grow their big ideas. I look forward to seeing it emulated in other chapters.

RECOGNITION

Continuously improving our core, self-regulatory functions is key to PEO earning greater recognition, which is why we devoted significant attention to enforcement efforts and the development of additional professional practice guidelines and standards to ensure engineering work is done by professional engineers. It is also why we expressed our displeasure at the government's surprising decision, without consultation, late in 2015 to cancel the repeal of the industrial exception, subsection 12(3)(a) of the *Professional Engineers Act*, without consulting us. Permanently abandoning this repeal, which has been interpreted much more broadly by Ontario industry than originally intended, signals to that sector that it does not need engineering licence holders to be successful. In fact, it misleads manufacturers into thinking they do not need to make engineering "investments" to fuel their future growth of new products and productivity enhancements. This perception is incorrect in philosophy—and in law.

Good engineers reduce costs, improve productivity and protect the health, safety and well-being of all Ontarians. Engineering must be viewed as an investment for the future of any wealth-generating enterprise, not as a cost of production. Canadian companies need engineering help to ensure they stay in business for the long term. Money chases good ideas. If we stimulate economic development with engineering as the innovation backbone, we will generate many more good ideas. Remember that engineering creates wealth, well-paid jobs, public safety, prosperity and a better quality of life for those in Ontario and around the world.

PEO is also working with OSPE to increase the profile of volunteers to the profession through the creation of a new



PEO President Thomas Chong, P.Eng., FEC, speaks to attendees at the East Central Region town hall November 12, 2015.

form of volunteer recognition award. If approved, this award would be presented by the lieutenant governor of Ontario, the Honourable Elizabeth Dowdeswell, at PEO's Order of Honour gala. Let's keep our fingers crossed that this worthy cause for our profession is realized.

COLLABORATION

I have always supported the idea that, as a self-regulating profession in Canada, each member has a part to play in regulating it. Future leaders in self-regulation will have to make a commitment to self-monitoring, self-surveillance, and relentless self-improvement that makes Orwell read like Pollyanna.

I believe members should be involved in all major regulation changes affecting our profession.

The seven town hall meetings held throughout the province from late September until late November were certainly an exercise in collaboration. These meetings provided an opportunity to consult with members on how PEO might best strengthen the engineering profession by implementing recommendations from the Elliot Lake Commission of Inquiry in ways that make sense for both practitioners and the public. Specific attention was paid to the recommendations aimed at creating a specialist designation for those inspecting existing buildings and signing structural adequacy reports, and putting into place a continuing professional development program for PEO licence holders. My sincere thanks go to the more than 500 engineers and engineering interns who attended the meetings and gave us valuable feedback.

Along with our work serving the public, PEO also extended its support to local communities and charities this year, including our Big Bike Ride with OSPE, which raised donations for the Heart and Stroke Foundation. I am deeply proud of the strong culture of volunteering across PEO, and I would like to thank all our volunteers for the passion and dedication shown to these very important causes. I'm pleased to report we are already working toward our Big Bike Ride in 2016.

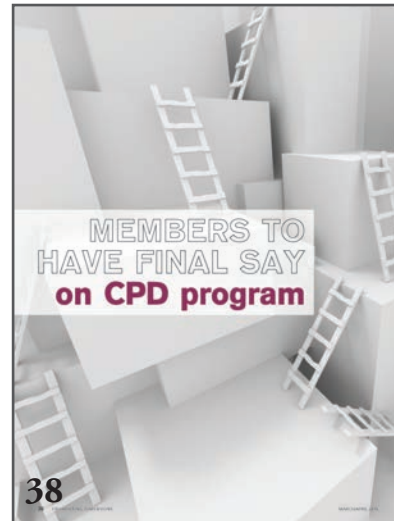
I have been fortunate this year to have served on such a co-operative and productive team. I have enjoyed working with the dedicated men and women on council who shared my focus on regulatory matters and worked hard to advance and regulate the practice of engineering to protect the public interest. My heartfelt thanks to PEO's registrar, Gerard McDonald, P.Eng., his senior management team and their staff, for their ongoing support of our concerted efforts, as well as to everyone who contributed to PEO initiatives.

It has been an honour to represent you as PEO president. Σ

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Members to have final say on CPD program
By Michael Mastromatteo



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Professional Engineers Ontario

THIS ISSUE: PEO is actively engaged in developing an effective and meaningful continuing professional development program specially suited to Ontario's diverse group of practitioners. It's not a simple process but the regulator is optimistic that whatever form it takes, the program will strike the right balance between regulatory enhancement and an individual practitioner's sense of professionalism.

ENFORCEMENT HOTLINE

Please report any person or company you suspect is practising engineering illegally or illegally using engineering titles. Call the PEO enforcement hotline at 416-224-9528, ext. 1444 or 800-339-3716, ext. 1444. Or email enforcement@peo.on.ca.

Through the *Professional Engineers Act*, Professional Engineers Ontario governs licence and certificate holders and regulates professional engineering in Ontario to serve and protect the public.

GATHERING MOMENTUM



Jennifer Coombes
Editor

PEO IS NOW ENTERING a crucial phase in the development of its continuing professional development (CPD) program, with a new task force in place to flesh out the framework and general elements of the program envisioned by the Continuing Professional Development, Competence and Quality Assurance Task Force (p. 8, 23, 38).

The Continuing Professional Competence Program Task Force, or (CP)² TF, as it's currently being called, will focus on developing the centrepiece of the program—the risk review—among other elements. Licence holders will eventually use the risk review to determine the level of risk they personally present to the public and the profession with the engineering work they do and, consequently, the amount of professional development they will be required to report to PEO (right now, set to a maximum of 30 hours). For those members who self-declare as non-practising, CPD requirements will be minimal.

The (CP)² TF will work through the details of the program for much of this year and provide a report to council in November. It's expected that a version of the program will be ready for members to test drive as we near the end of 2016. PEO's CPD program will at first be a voluntary endeavour. Members will decide by referendum if the program will be made mandatory at a date yet to be decided.

PEO is also working on projects stemming from recommendations made by Justice Bélanger in his report of the inquiry into the partial collapse of the Algo Centre Mall in Elliot Lake. In fact, council approved the policy intents for several amendments to the *Professional Engineers Act* that, when enacted, fulfill some of Bélanger's recommendations, including expanding information on PEO's register to include

any discipline hearings a licence holder may have undergone and the outcomes (p. 23).

PEO is, of course, also closely watching the investigation into the failure of the Nipigon River Bridge and is in touch weekly with the transportation ministry to determine if engineering may have contributed to the failure (p. 16). *Engineering Dimensions* will report on the investigation as details emerge.

Although our attorney general has clearly stated the government has no intention of eliminating the industrial exception, research PEO began before the announcement last November to maintain the exception permanently is still ongoing. PEO has continued to collect and analyze Ministry of Labour data and now anticipates releasing its final report in June (p. 10).

This issue, we also include a summary of the annual OSPE/Mercer compensation survey. If you're a member of OSPE, you have free access to the full report. If you don't, this summary is the next best thing and a must-read for engineers and employers of engineers—especially those of the millennial generation (p. 19).

Finally, our Order of Honour (OOH) gala is fast approaching. On April 29, PEO inducts two Officers and five Members into the OOH, an honorary society that recognizes outstanding service to the engineering profession. For more on these seven exemplary individuals, see page 11. Σ

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PEO has applied for membership with the Alliance for Audited Media.



CPD PLANS MOVE to detail design phase

By Michael Mastromatteo



PEO IS MOVING INTO THE NEXT PHASE in developing a proposed continuing professional development program for members.

At its February 2016 meeting, council approved the terms of reference for a new task force to develop the details for what's currently called the Continuing Professional Competence Program (CP)². This task force will carry on the work started in March 2014 by the regulator's Continuing Professional Development, Competence and Quality Assurance (CPDCQA) Task Force (see "Members to have final say on CPD program," p. 40).

Council also approved an accompanying communications plan aimed at fully informing members of the new task force's work as it unfolds and encouraging members to test drive the proposed program when its online components are available.

Headed by original CPDCQA Task Force Chair Annette Bergeron, P.Eng., FEC, the new task force will:

- review and revise, if necessary, the questions to be used in each practitioner's risk review;
- establish such details as when and how often a risk review would be completed, the weighting of the risk review parameters, maximum CPD hours and effect of weighting factors, how often the ethics refresher would be taken, requirements for non-practising licence holders, and how fulfillment of requirements would be verified;
- determine criteria and weighting for acceptable technical activities;

- identify PEO operational and budgetary changes required for the program's implementation;
- review and approve an explanatory guideline to assist members in carrying out a practice risk review and reporting compliance with requirements;
- review and approve an initial Frequently Asked Questions document;
- review and approve the (CP)² online assessment and reporting site;
- propose a strategy to council for the program's phased implementation from concept to voluntary compliance to mandatory implementation; and
- develop a proposed referendum question and consultation plan.

The task force is scheduled to provide its report to council in November 2016. It is anticipated that a beta version of the program's online review and reporting tools will be available for members to try by late in 2016.

At its September 2015 meeting, council committed to asking members to ratify in a referendum any mandatory requirement to participate in a continuing professional development, competency and quality assurance program.

In November, council received the final report of the CPDCQA Task Force and approved its proposed program's guiding principles and basic elements. The guiding principles are that the program:

- be necessary to improve the regulation of professional engineering (i.e. not be window dressing);
- have requirements that are relevant for professional engineering practice;
- be pragmatic (i.e. focus on maintaining a level of knowledge and skill in keeping with safeguarding the public interest);
- recognize diversity of practitioners' needs and resources;
- be scalable in relation to the risk to the public of each practitioner's practice; and
- be effective.

In developing the guiding principles for the proposed program, the CPDCQA Task Force recognized there are both practising and non-practising licence holders and focused on maintaining provision of competent engineering services rather than introducing a bureaucratic hurdle. It also wanted to ensure CPD requirements would be based on the risk a licence holder's work presents to the public and the profession, encourage licence holders and their employers to adopt risk mitigation measures within their work environments, and improve on programs implemented by associations in other provinces.

At present, PEO is one of only two Canadian engineering regulators without some form of voluntary or compulsory professional development program for members.

The (CP)² Task Force held its first meeting on February 29.

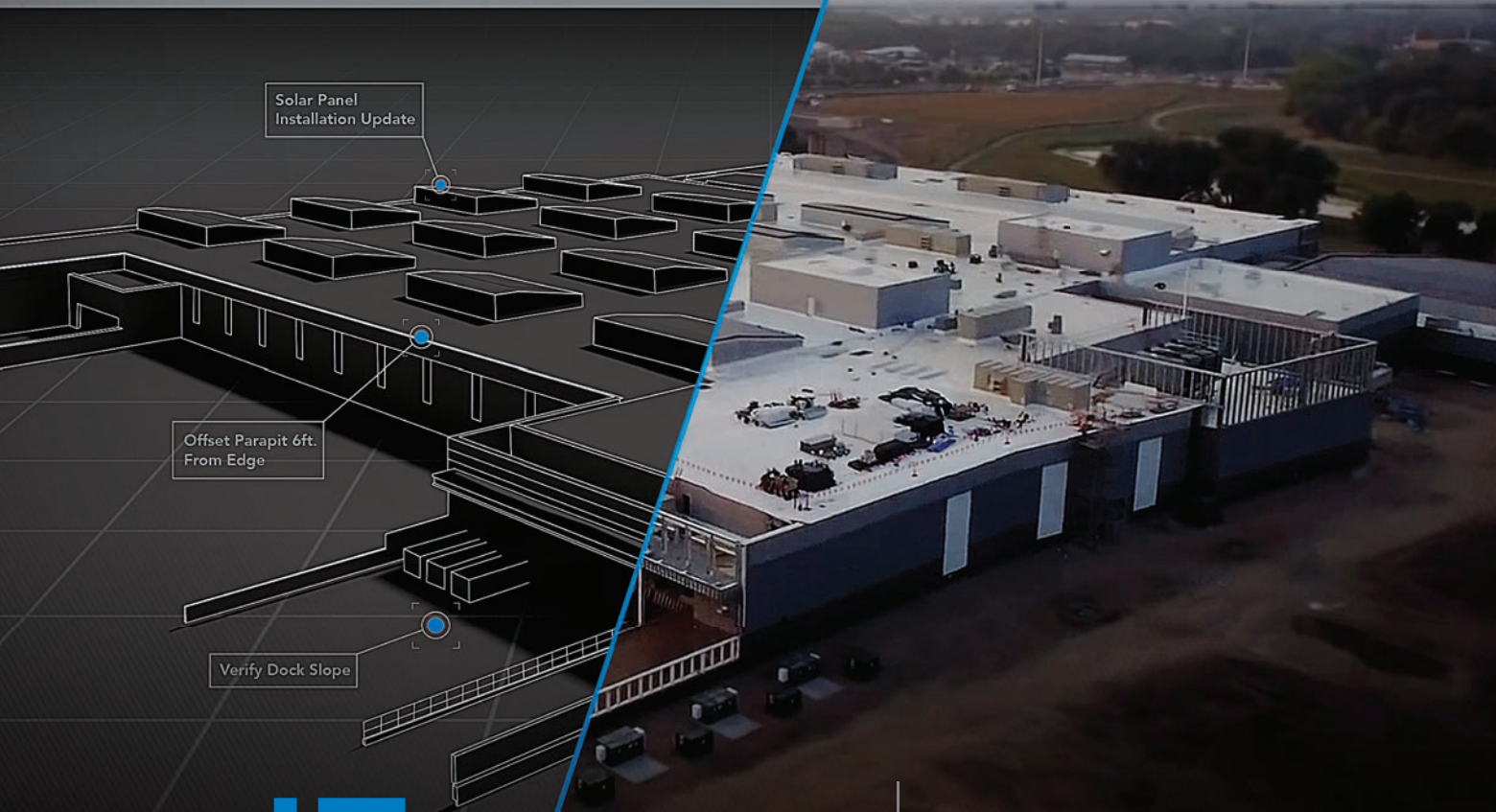
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INDUSTRIAL EXCEPTION RESEARCH STUDY report likely delayed until June

By Michael Mastromatteo

PEO is continuing to collect and analyze relevant Ministry of Labour prosecutions, field visit reports and stop work orders under the *Occupational Health and Safety Act*, but the final report on this work will not likely be completed before June, council learned at its February meeting.

The delay in completing the research is due to the time required to access files from 57 Ontario court houses, as well as a delay from the Ministry of Labour in fully responding to Freedom of Information requests filed in August.

The PEO research project was commenced prior to the Ontario government's sudden decision last November to cancel the repeal of section 12(3)(a) of the *Professional Engineers Act*, often called the industrial exception.

**"THE GOVERNMENT'S
POSITION ON THIS
ISSUE HAS NOT
CHANGED SINCE [2013]."**

Ontario Attorney General
Madeleine Meilleur

The industrial exception, which in the government's November economic statement said it intends to maintain permanently, allows non-licensed people to carry out engineering work on machinery or equipment used to produce products in their employers' facilities. Ontario is the only province in Canada to have such an exception in its engineering legislation.

In its discussion of the industrial exception on February 5, council noted a letter from Ontario Attorney General

Madeleine Meilleur that states the government has not changed its position on the industrial exception, since it delayed proclamation of the repeal in 2013.

"The government's position on this issue has not changed since [2013]," Meilleur wrote, "and the announcement in the fall economic statement simply formalizes this decision."

The attorney general also states the decision to keep the industrial exception in force reflects concerns that repeal efforts were creating uncertainty in Ontario's manufacturing sector.

PEO President Thomas Chong, P.Eng., FEC, last November suggested the decision to leave the exception in force was made after stakeholder consultations to which PEO was not a party.

PEO will continue to make known its displeasure with the government's decision, as well as monitor workforce accidents to identify causal links between a lack of professional engineering and the acci-



dents. It will also continue to work with the labour ministry to change data gathering and reporting processes to make relevant data easier to access, and will share relevant results of the current research study with the government.

PEO will also focus on highlighting the value of proper utilization of engineering licence holders in industry, and look at how to ensure the scope of the exception is not exceeded in Ontario manufacturing.

Meanwhile, the dean of the University of Ottawa's faculty of engineering has added his voice in support of PEO's position.

Claude Laguë, PhD, P.Eng., FCAE, in a January 26 letter to the attorney general, said the government's failure to repeal the industrial exception leaves a gap in PEO's ability to regulate acts of engineering: "This decision [to keep the exception in force] is a significant missed opportunity to protect the public and I respectfully demand the government reconsider it immediately." A February 11 reply from Meilleur is substantially the same as the January 26 letter to PEO.

President Chong, President-elect George Comrie, P.Eng., FEC, and Registrar Gerard McDonald, P.Eng., are scheduled to meet New Democratic Party Leader Andrea Horwath on March 3 to outline PEO's position on the issue.

PEO honours seven through 2016

ORDER OF HONOUR AWARDS

By Nicole Axworthy



THIS YEAR, PEO WILL INDUCT two Officers and five Members into the Professional Engineers Ontario Order of Honour (OOH). The OOH is an honorary society of PEO. Its purpose is to recognize professional engineers and others who have rendered outstanding service to the engineering profession in Ontario, primarily through the association. The honourees will be recognized at a ceremony on Friday, April 29, held in conjunction with PEO's annual general meeting in Toronto.

Paul Charles DiNovo, P.Eng., FEC, who will be inducted as an Officer, was first inducted as a Member of the OOH in 2000 and continues to serve as an ambassador for the profession. DiNovo is a member of the steering committee for the Engineering Innovations Forum, a public event held annually in conjunction with National Engineering Month. As the event's fundraising director, his efforts have led to sustained sponsorships from various organizations that have helped ensure the forum's continued success. He is a valuable member of PEO's Oakville Chapter, serving in numerous roles, including treasurer, webmaster and on the executive. His commitment to staging and organizing events has helped increase member engagement and the chapter's profile within the community. Throughout his volunteer career, DiNovo has been committed to providing students of all ages with practical learning opportunities. Since 2014, he has provided generous financial assistance to engineer graduate students through the establishment of scholarships at the PhD level at the University of Toronto and McMaster University.

Stephen G. Jack, P.Eng., who will be inducted as an Officer, has been at the centre of many of the profession's major initiatives for nearly four decades and was first inducted as a Member of the OOH in 2007. As a director, president and chair, secretary and a member of the Ontario Professional Engineers Foundation for Education, a registered charity that awards scholarships financed through donations from Ontario engineers, Jack has encouraged the

pursuit of licensure among university students for nearly 20 years. As a result of its success, the foundation in 2015 increased its scholarship funding to the province's 15 engineering schools by 50 per cent, providing more than 100 engineering students with scholarships of \$1,500 each. Jack was an influential member of the team that helped to establish the Ontario Society of Professional Engineers (OSPE) in 2000, and he continued to provide leadership and support to OSPE during the past decade as an elections scrutineer and member of several committees.

Raymond S. Hong, P.Eng., FEC, who will be inducted as a Member, has been on PEO's North Bay Chapter executive since 1997 and has helped ensure the chapter's financial stability for 10 years as treasurer. He also worked to improve communication to chapter members as webmaster and by redesigning the chapter newsletter. To encourage the development of leadership skills among members and a unique networking opportunity for his colleagues, Hong founded the North Bay Wings hockey team in 1998. The team comprises local professional engineers and engineering interns who compete in the annual Northern Region PEO hockey tournament. For nearly a decade, Hong has been a member of the North Bay Regional Science Fair Committee, including several years as its chair. This annual event enables students to showcase their skills, and raises the profile of engineering in the community.

Angela R. Scott, P.Eng., FEC, who will be inducted as a Member, has excelled in leadership roles on the executive of PEO's Chatham-Kent Chapter since 2001, first as education coordinator, and progressing to vice chair and chair. She was instrumental in developing the chapter's Education Outreach Program, an initiative that includes classroom visits, design competitions, a bursary program and highly successful engineering PA day camps run by engineers and local high school students. She has also been influential in organizing and running an annual golf tournament and curling bonspiel, both of which raise funds for the chapter's bursary program and a local food bank. Scott has actively participated in the governance of the profession through service

on PEO committees, including the Advisory Committee on Volunteers, and has represented her chapter and region at regional congresses, Chapter Leaders conferences and annual meetings.

Syd Van Geel, P.Eng., who will be inducted as a Member, has developed numerous successful education outreach programs as a member of PEO's London Chapter executive. In his first year with the chapter, he assumed responsibility for organizing local National Engineering Month events, which led to the chapter's now-annual bridge-building competition at the London Boys and Girls Club. Van Geel also organized the chapter's first EIT Information Night, an event at which PEO staff representatives review the licence process and provide information to those interested in becoming an engineering intern. He is a tremendous supporter of several major PEO initiatives, including the Government Liaison Program, in which he has actively participated on his chapter's committee. He played a key role in organizing and implementing the local all-candidates debate in the 2011 provincial election.

Dennis Woo, PhD, P.Eng., who will be inducted as a Member, has served on PEO's York Chapter executive since 2007, operating as program director, communications director, and chair for two years. Under his guidance in 2014, the chapter held a record 77 events with a combined attendance of more than 2500 people. He subsequently led the staging of the chapter's highlight event in March 2015, the Transportation Symposium, which was attended by nearly 400 people and featured an elite list of speakers, including politicians and subject matter experts. To promote succession planning and the recruitment of new members to the executive, Woo created deputy positions for its chapter committees to provide on-the-job training and improve continuity of work, a "woman in engineering" executive position to encourage women's involvement in the profession, and a "business liaison" position

to increase the chapter's presence in the business community and assist with fundraising efforts.

Martha Stauch, who will be inducted as an Honorary Member, was appointed by the provincial government to serve on PEO council as a lieutenant governor appointee (lay member) in 2008. During her six years of service, she continuously went above and beyond expectations for participation in PEO affairs. She was dedicated to understanding the issues before council and actively engaged in debate. As a former teacher, Stauch brought valuable insight and an important perspective to many outreach initiatives supported by PEO, including the Engineer-in-Residence Program and the Education Committee, on which she served as the council liaison. She helped maintain the profession's high standards of professional practice and ethics as a member of the Discipline and Registration committees, and made a significant commitment of time to assisting PEO's search for a new registrar as a member of the Human Resources Committee.

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PEO ANNOUNCES RECIPIENT OF 2016 G. GORDON M. STERLING ENGINEERING INTERN AWARD

George Crouch, EIT, has been named the recipient of this year's G. Gordon M. Sterling Engineering Intern Award.

A civil engineering graduate of Western University and a member of PEO's East Toronto Chapter, Crouch has gained experience as an engineering intern at Deep Foundations Contractors Inc., a leading foundation and shoring contracting firm specializing in pile foundations and excavation support. He was assigned to the TTC Vaughan Metropolitan Centre Station subway project as an assistant site superintendent and is currently assigned to the Eglinton Crosstown LRT project as a site superintendent. These important roles have given him an opportunity to lead construction teams, liaise with designers and general contractors, interact with inspectors, perform and design quality assurance activities, create procedures for construction activities, generate value design options, and respond to safety issues.

Crouch has illustrated a strong commitment to leadership within the engineering profession through his volunteer work. He currently represents young Toronto civil engineers on the Canadian Society for Civil Engineering (CSCE) National Young Professionals Committee and the CSCE Toronto Section Executive Committee. He also organizes monthly dinner-lectures on current civil engineering topics like congestion and road pricing, Waterfront Toronto, and transit planning.

The G. Gordon M. Sterling Engineering Intern Award promotes leadership development and is available to engineering interns in good standing with PEO's EIT program. Those chosen for the award demonstrate a commitment to their chosen profession, an interest in assuming leadership responsibilities within it, and a readiness to benefit from a leadership development experience.

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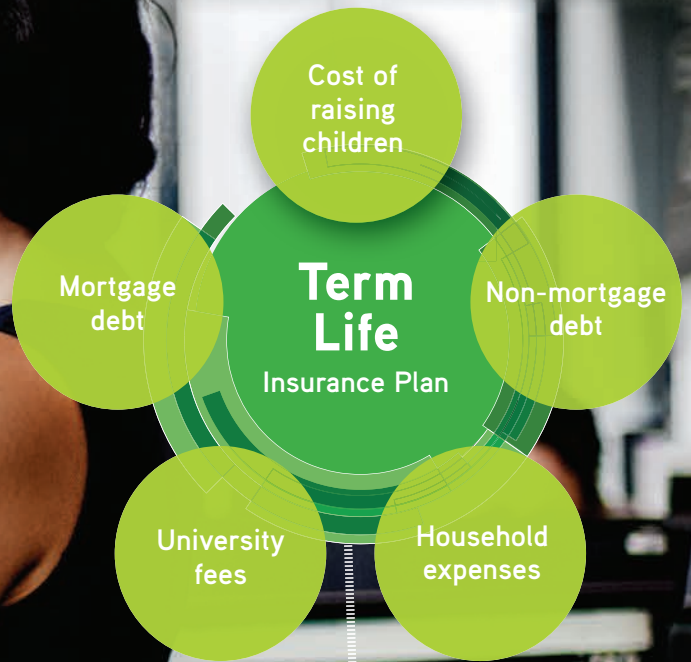
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Regulator keeping tabs on NIPIGON RIVER BRIDGE failure investigation

By Michael Mastromatteo



PEO is monitoring the Ontario transportation ministry's ongoing investigation into the causes of the Nipigon River Bridge failure, which in early January led to the closing and emergency repair of a newly opened cable-stayed bridge in northwestern Ontario. PEO staff, including the registrar, is liaising weekly with the ministry as it conducts its investigation, to narrow down where engineering may have been a factor in the failure. It is assessing the information from its standpoint as a regulator.

The Nipigon River Bridge, a key link in the TransCanada Highway, opened to traffic in late November. On January 10, however, the bridge had to be closed to traffic after commuters noted a 60 cm elevation in the road surface from the supporting deck. The Ontario northwest had experienced a winter storm and high winds at the time of the failure.

Ministry engineers were able to reopen one lane of the bridge to traffic after loading concrete

barriers on the opposite side of the structure. The weight of the concrete lowered the raised portion to its original elevation.

The new bridge replaces the original Nipigon River Bridge built in 1937. It is scheduled for full completion in 2017 and is to include three towers with cables supporting the bridge deck and a separate sidewalk for pedestrians.

The transportation ministry investigation has determined that bolts holding together a section of the new bridge snapped off and allowed a portion of the bridge to rise. The ministry has been testing the bolts to see under what load they break and is looking at the structure from a computer-modelling perspective to understand what the loads were at the time of the failure. It is also working with labs from Surface Science (Western University) and National Research Council Canada (NRC) to conduct further testing on the damaged bolts, including a chemical analysis of the bolts, determination of the nature of the failure, a confirmation of the mechanical properties, and a comparison of the bolts to design specifications.

In a January 19 statement, Ontario Transportation Minister Stephen Del Duca said the ministry is also working with engineers who were involved in the design and construction of the bridge. "The design was performed in accordance with the Canadian Highway Bridge Design Code and is capable of withstanding the necessary code design parameters for winds in excess of 100 km/h and climatic conditions, including freezing temperatures well below -40 degrees Celsius," Del Duca said. "All of this work, combined with the results from the Western University and NRC analysis, will help the ministry determine the cause of the issue and allow our engineers to begin the development of a permanent solution. Together with the contractor, a joint venture with Bot Construction Canada and Ferrovia Agroman Canada Inc., and their suppliers from within North America, significant efforts will continue to provide a safe and reliable solution that will open the bridge to two lanes."

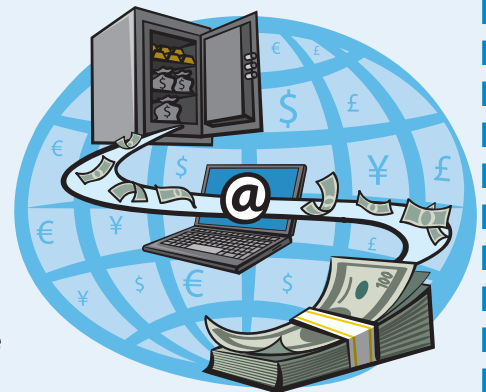
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Court upholds APEGA's procedures for international applicants

By Michael Mastromatteo

An Alberta court has upheld the engineering regulator's right to impose equivalency exams on certain internationally educated applicants for licensure.

In a January 28 decision, Madam Justice June Ross of the Alberta Court of Queen's Bench ruled that the Alberta Human Rights Commission erred in finding the Association of Professional Engineers and Geoscientists of Alberta (APEGA) guilty of human rights violations.

The ruling responds to an APEGA appeal of a February 2014 decision of the province's human rights commission that the regulator discriminated against Czech Republic-born applicant Ladislav Mihaly by requiring him to write confirmatory exams before he could obtain a P.Eng. licence in Alberta.

Mihaly, who has master's degrees from engineering institutions in Prague and Bratislava, first applied to APEGA in 1999. He was assigned several confirmatory examinations over the years, which he failed or did not sit. Citing discrimination based on place of origin, he filed a complaint with the Alberta Human Rights Commission in 2008.

Ross said that while APEGA's equivalency exam regime imposes hardship against some internationally educated applicants, such "dis-



crimination is reasonable and justifiable" and that regulatory bodies should not be expected "to change their mandate in a fundamental way."

The decision is welcome news to APEGA, which for 17 years had sought to accommodate Mihaly's application.

"Madam Justice Ross' ruling will help protect public safety and confirms that our application process is fair, equitable and transparent," said APEGA CEO Mark Flint, P.Eng. "Applicants need to get the requisite education and write the professional practice and ethics exam. Those are appropriately rigorous bars to meet and the process is straightforward. The attainment of those standards is not always easy."

continued on p. 18

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[NEWS]

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Registrar Carol Moen, P.Eng., added that the court ruling is in keeping with the wider public interest.

“Regardless of where applicants for licensure have studied, the same rigorous standards apply and ought to apply. Individually adjusting standards used to examine whether an applicant has the appropriate education and experience to be licensed as a professional engineer would result in an unacceptable risk to public safety and well-being,” Moen said in a statement.

Mihaly is appealing the court of Queen’s Bench decision to uphold APEGA’s appeal. The court date has not been set.

Guideline for forensic engineering investigations now available

By José Vera, P.Eng., MEPP

The *Forensic Engineering Investigations* guideline is now available at peo.on.ca/index.php/ci_id/29496/la_id/1.htm.

Developed by PEO’s Professional Standards Committee to assist engineers who practise forensic engineering and/or offer forensic engineering services and those who conduct forensic engineering investigations, the guideline is also intended to educate clients and employers of engineers about the work needed to properly carry out a forensic engineering assignment.

Forensic engineering can generally be defined as applying professional engineering principles and methods to investigating failures and incidents, usually to determine the cause. Normally, it involves preparing a report of findings, which may form the basis for testimony in legal proceedings as an expert witness. Professional engineers called to appear as an expert witness should also consult the PEO guideline *The Professional Engineer as an Expert Witness*, which is available at peo.on.ca/index.php/ci_id/22088/la_id/1.htm.

To view other PEO guidelines, please visit the Forms & Publications section of peo.on.ca/index.php/ci_id/1834/la_id/1.htm.



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JOB-HOPPING MILLENNIALS and flexible rewards

By Tim Haggstrom

Each year, Mercer and the Ontario Society of Professional Engineers (OSPE) partner to produce the Mercer OSPE National Engineering Compensation Survey, which helps establish meaningful criteria for engineering pay levels to benefit engineers and their employers.

This year, the “how” and “how much” factors of engineer compensation can be assessed by analyzing the driving factors of pay, such as year of graduation, industry and size of organization (Graph 1). The graph shows 2015 median salary levels for engineers in Ontario, based on year of graduation, for the consulting industry compared to all other industry segments.

Of course, it’s difficult to know what to conclude from this single graph. Are we seeing a trend due to different types of career opportunities? Is it the result of different strategies

related to pay mix? Perhaps if we factor in other elements, such as work-life balance, opportunity for advancement or benefits provided, the value of the “total rewards package” between the two industry groups would look more aligned.

TOTAL REWARDS

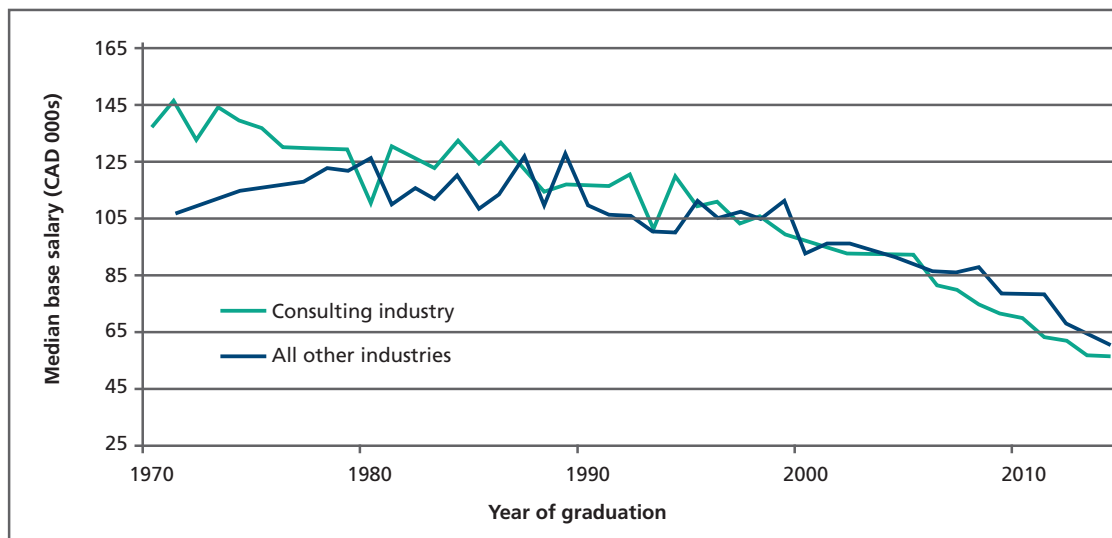
The objective for employers is to provide a better overall offering than other firms competing for the same talent. It’s important to identify the elements of a rewards package that act as the real differentiators for potential hires when choosing an employer. Of equal, or even greater, importance is identifying the rewards package that will cause employees to stay even while being pursued by the competition.

THE GENERATION MIX

An important driver of a total rewards strategy is the age of engineers in the workforce. This information is summarized in Graph 2. Data for the last three years show a gradual decline in the number of baby boomer engineers, mirrored by an increase in the number of engineers of the millennial generation. This has important implications for the total rewards package provided to employees.

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Graph 1. Median base salary by year of graduation in Ontario–2015



Source: 2015 Mercer OSPE National Engineering Compensation Survey

NEWS

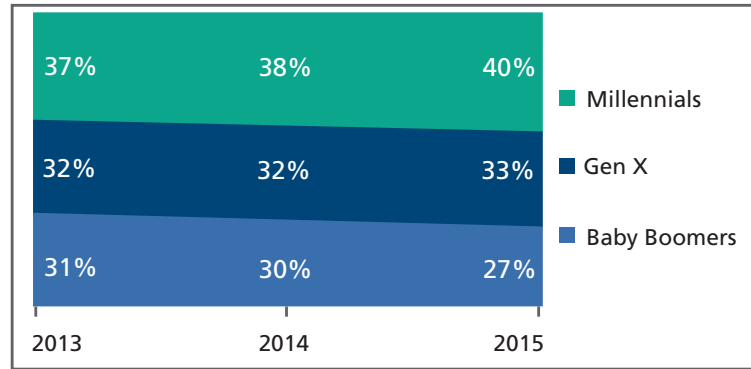
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Also important is the degree to which millennial employees are likely to stay with an organization. The survey collects data on year of birth and tenure at current employer, which suggests some meaningful turnover differences across generations. Table 1 shows two simple, related metrics. One can only wonder what the figure in the column to the right will look like for the millennial generation years from now.

HAPPY...BUT LEAVING?

To further shed light on the evolving employee value proposition and generational differences in the workforce, Mercer conducted a random survey of more than 1000 Canadian employees in 2015, entitled

Graph 2. Distribution of engineers in Ontario by generational cohort—2013 to 2015



Sources: 2013 and 2014 OSPE Employer Compensation Survey and 2015 Mercer OSPE National Engineering Compensation Survey

Inside Employees' Minds. One phenomenon stood out from the research: the “happy but leaving” trend. This refers to the number of employees who are seriously considering leaving their job despite being engaged at their current employer. Interestingly, this trend is led by the millennial generation, of which 44 per cent are seriously considering a job change.

While the opportunity to be tasked with engaging work is an important part of an employer’s value proposition, it’s also important to look at other elements. The survey reported on the value proposition elements most valued by different employee groups. For instance, employees aged 34 and under value career opportunities more than other

age groups do, while those 50 and above favour a retirement plan. This reminds us that each dollar spent on any single benefit resonates more with one employee group than it might with another.

The research also concludes that most Canadian workers would like greater benefit flexibility and choice. Support for this is strongest among workers under 35 years of age, where 65 per cent of respondents would like the option to reduce the value of some benefits and increase the value of others.

FLEXIBLE BENEFITS THE ANSWER?

There are many ways to structure flexible benefits. Generally, a flexible rewards offering contains a core plan, which includes basic protection and covers all eligible employees. To supplement this, employers can provide benefit credits that employees can allocate to a selection of enhancements,

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Table 1: Turnover metrics from the 2015 Mercer OSPE National Engineering Compensation Survey

Generation	Changed employer in last year*	Spent last 20 years at current employer
Baby boomer	1 in 20 engineers	1 in 3 engineers
Millennial	1 in 10 engineers	N/A

Sources: 2015 Mercer OSPE National Engineering Compensation Survey

*Calculation includes only engineers who are already well into their career, having attained responsibility level C or higher.

for example, healthcare/wellness spending accounts, RRSP contributions, offsetting pension plan contributions, or home and auto insurance.


Instituting a flex plan may be a starting point for better understanding what’s important to your employees. Many organizations are showing innovation—from encouraging sabbaticals or providing unlimited vacation days to installing standing desks or implementing healthy living programs. There are myriad opportunities for building a workplace that will help your engineers feel most engaged and productive. Doing this in a way that resonates with the newest generation of engineers could keep them from jumping at the next job offer from a competitor.

ABOUT THE SURVEY

The design and implementation of the survey was overseen by an advisory committee comprising representatives from industry, as well as

the engineering and human resources communities. The committee ensures the survey remains a current and reliable resource on compensation for engineers across Canada. The results are available in PDF and online through Mercer WIN, and employers can order the 2015 Mercer OSPE National Engineering Compensation Survey by contacting Mercer at imercer.com/engineering, 800-333-3070 or info.services@mercer.com. OSPE members can access a complimentary copy of the member market compensation summary online at www.ospe.on.ca.

Tim Haggstrom is with Mercer (Canada) Limited.



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NOTICE OF ANNUAL GENERAL MEETING

In accordance with section 20 of By-Law No. 1, which relates to the administrative affairs of PEO, the 2016 Annual General Meeting (AGM) of the Association of Professional Engineers of Ontario will be held on Saturday, April 30, 2016, commencing at 8:30 a.m. at the Fairmont Royal York, 100 Front Street West, Toronto. No registration is required.

As noted in section 17 of By-Law No. 1, the AGM of PEO is held for the following purposes: to lay before members the reports of the council and committees of the association; to inform members of matters relating to the affairs of the association; and to ascertain the views of the members present at the meeting on matters relating to the affairs of the association. Officers of PEO and other members of both the outgoing and incoming councils will be in attendance to hear such views and to answer questions. PEO President Thomas Chong, P.Eng., FEC, will preside and present his annual report to the AGM. The president-elect, officers and councillors for the 2016-2017 term will take office at the meeting.

Process for making submissions to the 2016 AGM

Submissions by members at PEO's AGM are a vehicle for members in attendance to express their views on matters relating to the affairs of the association, but are not binding on council. A member submission should clearly describe the

issue being addressed and indicate how it advances the objects of the *Professional Engineers Act*, which define the mandate and responsibilities of PEO. To ensure member submissions receive proper consideration at the AGM, members must submit typed submissions to Registrar Gerard McDonald, P.Eng., MBA, by no later than 4:00 p.m., Friday, April 15, 2016. Submissions must be signed by the mover and seconder, either of whom must be present at the meeting. Submissions will only be accepted by email to agmsubmissions@peo.on.ca. A guidance document on the content and format of submissions is available from the AGM page of the PEO website at www.peo.on.ca. Submissions received by the April 15, 2016 deadline will be published on the AGM page of the PEO website and included as part of the registration package.

Member submissions will be referred to the Executive Committee or council for consideration after the AGM. The mover and seconder of a member submission will be invited to address the submission at the meeting at which the submission is to be considered.

Gerard McDonald, P.Eng., MBA, Registrar

PROCEDURES FOR ADDRESSING SUBMISSIONS AT 2016 AGM

During the meeting

PEO's 2016 AGM will be conducted on Saturday, April 30 from 8:30 a.m. to 12:30 p.m. and continue, if necessary, from 2:30 p.m. to 3:00 p.m. Consideration of member submissions will begin at approximately 9:30 a.m. Submissions will be published to PEO's website before the meeting and included in members' registration packages.

The president will chair the portion of the meeting dealing with member submissions and manage the discussion. His direction must be respected.

The mover and/or seconder of a submission will be given up to 10 minutes to present their submission to the AGM. When time permits, members at the AGM may make comments of up to two minutes on the submission. The mover and/or seconder of a submission will be allowed two minutes for a closing statement. Members will then vote on the submission as an expression of the views of those present at the meeting.

In circumstances where the overall time allocation will not permit the above timing, the total amount of available time for submissions will be divided evenly among the number of submissions, and movers and seconders of submissions will be informed.

Following the meeting

Member submissions will be referred to the 2016-2017 Executive Committee or council to consider whether to initiate any action on them. The mover or seconder will be invited to address the submission in detail at the meeting at which the submission is to be considered.

All submissions to the 2016 AGM will be considered during the 2016-2017 year, and their disposition reported to council and at the 2017 AGM.

Disposition of submissions to the 2016 AGM will be published on the PEO website and updated periodically, if necessary. Progress on 2016 submissions will also be published in *Engineering Dimensions* following the 2017 AGM.

COUNCIL PROPOSES ACT CHANGES BASED ON INQUIRY RECOMMENDATIONS

504TH MEETING, FEBRUARY 4, 5, 2016

By Jennifer Coombes

AT ITS FEBRUARY MEETING, PEO council approved the policy intents for a number of changes to the *Professional Engineers Act* based on the inquiry into the 2012 partial collapse of the Algo Centre Mall in Elliot Lake. The proposals, which have been forwarded to the government to be drafted into legislative language, would:

- authorize PEO to mandate continuing professional development (CPD) requirements for all licence holders;
- expand information that may be included in PEO's register, and make such information accessible from PEO's website, in particular, the date of any discipline hearing, the date of a decision of the Discipline Committee, findings of professional misconduct or incompetence, the penalty imposed, and a link to the decision and reasons;
- amend section 8(3) of the act to allow bylaws requiring confirmation by the members to be confirmed by a majority of members voting;
- add limited licence holders to the list of those qualified to design certain building structures, within their limited scope of practice;
- provide the registrar the authority to issue a notice of proposal to suspend a licence where warranted by past conduct, subject to a hearing on the notice of proposal by the Registration Committee;
- update the language in section 28(4)(h) to match that of the *Financial Administration Act*;
- authorize PEO providing members of the public copies of disciplinary hearing evidence, exhibits and transcripts at their own expense, unless the Discipline Committee excludes evidence or exhibits pursuant to section 28(4.1); and
- give the registrar authority to release information pertaining to a holder of a licence, limited licence or temporary licence that comes to an authorized person in the course of their duties, employment, examination, review or investigation to other

regulatory authorities for their investigation within their respective jurisdictions.

CONTINUING PROFESSIONAL DEVELOPMENT

In working toward a CPD program for PEO licence holders, council approved creating a new task force, currently called the Continuing Professional Competence Program (CP)² Task Force, its terms of reference, and an accompanying budget of \$10,000. The new task force is to develop the details needed to implement the PEO CPD program proposed by the Continuing Professional Development, Competence and Quality Assurance (CPDCQA) Task Force.

In November 2015, council received and approved the guiding principles for and basic elements of the task force's model for a proposed CPD program for PEO members. The basis of the proposed program is a self-assessed risk review procedure that will be used to determine the self-directed professional development requirements for each licence holder. Council had, at a prior meeting, decided that members will have to approve by referendum any mandatory elements of a proposed CPD program.

The (CP)² Task Force will now review the proposed CPD program developed by the CPDCQA Task Force and develop the required details to make it operational. It will also provide oversight for all activities conducted by the registrar and staff to produce a working program, including communications.

Specifically, the task force will:

- review and revise, if necessary, the questions to be used in the risk review process;
- establish when and how often a risk review would be done, requirements for non-practising members, and how compliance would be measured;
- determine criteria and weighting for technical activities;
- identify legislative amendments and PEO operational changes needed to implement the program;
- develop a program guide, a Frequently Asked Questions document, and other communications materials to assist licence holders;
- review and approve a continuing professional development risk review and CPD reporting website;
- propose a strategy for the phased implementation of the program; and
- develop the referendum question and a plan for consulting with PEO members concerning mandatory participation in the program.

The task force will be chaired by Annette Bergeron, P.Eng., FEC, and will include as members Rick Hohendorf, P.Eng., and Tyler Ing, P.Eng., as well as sitting councillors David Brown, P.Eng., Roger Jones, P.Eng., FEC, Changiz Sadr, P.Eng., FEC, Marilyn Spink, P.Eng., and Warren Turnbull, P.Eng.

Council also endorsed the plan for informing PEO licence holders and others about the CPD program. The plan is intended to encourage licence holders to test the program once its components are online and prior to the referendum on whether it should be made a mandatory program. Σ

MPPs KEY IN HELPING REGULATORS GET THEIR MESSAGE ACROSS

By Howard Brown and Blake Keidan



Mike Colle, MPP, Eglinton-Lawrence (third from left), took part in a GLP Take Your MPP to Work Day at Toronto Rehabilitation Institute on April 22, 2014. With him are, left to right: Jacob Kachuba, P.Eng.; William Cachia, manager, outpatient services, University Health Network; Parvin Marzban, P.Eng., Toronto West Chapter GLP chair; Rob Willson, P.Eng., then PEO councillor; and Georg Kralik, P.Eng., past chair, West Toronto Chapter.

PEO HAS BEEN RECOGNIZED for the effectiveness of its Government Liaison Program (GLP) by many. Former MPP Christine Elliot has said many times she felt lawyers would benefit from introducing a similar program, and was particularly impressed that PEO was making efforts to get more engineers elected as MPPs.

One of the MPPs who has been a long-time advocate for PEO is Mike Colle, MPP, Eglinton-Lawrence. First elected in 1995, he's served on both government and opposition benches, including a period as minister of citizenship and immigration.

One of his proudest achievements as minister, he says, was working directly with PEO in 2007 on the *Fair Access to Regulated Professions Act*, which improved the ability of regulators to ensure international engineering graduates are given the tools to be licensed in Ontario. It also saw the introduction of the Office of the Ontario Fairness Commissioner, aimed at ensuring everyone qualified to practise in an Ontario regulated profession gets a licence.

In a January 15 interview, Colle expressed strong support for PEO's GLP, stressing how grassroots movements are necessary and beneficial for an organization's success.

"Witnessing a 20-year period as an MPP, I've seen some excellent government relations programs," says Colle. "I saw PEO go from no government relations to having a very enriched involvement. I have been impressed with their work on getting internationally trained engineers licensed, their Take Your MPP to Work days and their participation in MPP events. It is

without a doubt a no-brainer that it is critical to the relationship between MPPs and engineers."

Colle says MPPs get a lot of requests for their time. The organizations that tend to get heard are those speaking with MPPs on a regular basis, attending events, hosting meetings and engaging them in the organization's activities.

Having a government relations program builds relationships with elected officials. These connections open doors that may otherwise remain closed. It is the only way to make progress for your cause within the government.

"Whether for credentials, training, health and safety, or licensing, relationships matter," says Colle. "Issues are totally in the hands of government, whether you like it or not. It's important for engineers to be at the table. If you're not at the table they will make decisions without you! Top officials, like the premier, are often overwhelmed," he continues. "Doors are not always open. The way to achieve success is ground up through working with MPPs on legislative committees, cabinet committees, caucus, private member's bills, or even private member's motions."

Not every profession has a government relations program or strategy. But the ones that do are in the news, constantly fighting for their issues and achieving success. Colle spoke of the success of other regulators and professions in having their point of view heard.

"Nurses are constantly talking to government," Colle says. "Teachers are in constant interaction with government. Police, fire and EMS are in touch constantly. There isn't a day that goes by when there isn't a discussion...They wouldn't dream of not being in touch with their MPPs."

"Ignoring MPPs undercuts your grassroots efforts," stresses Colle. "By not focusing on MPPs, you put all your eggs in one basket. You're competing with everyone else like the manufacturers, hospitals and municipalities. By having a grassroots organization you have a better chance of having your voice heard. There is a small doorway with lots of people trying to get in. The door is not always open at the top, but with MPPs, sooner or later you are going to be heard."

Sometimes there are disappointments when organizations don't get the support of government. "That means you have to redouble your efforts, not abandon them," he says. Σ

Howard Brown is president of Brown & Cohen Communications & Public Affairs Inc., and PEO's government relations consultant. Blake Keidan is an account coordinator at Brown & Cohen, and PEO's government relations coordinator.

SUMMARY OF DECISION AND REASONS

In the matter of a hearing under the *Professional Engineers Act* and in the matter of a complaint regarding the conduct of NIDHAL NAAMI, P.ENG., a member of the Association of Professional Engineers of Ontario, and ORION PACIFIC ENGINEERING INC., a holder of a Certificate of Authorization.

This matter came to a hearing before a panel of the Discipline Committee on March 17, 2015, and June 16, 2015. The Association of Professional Engineers of Ontario was represented by Leah Price. The member (Naami) and the holder (Orion Pacific Engineering Inc.) were represented by Harpeet Khukh. David Jacobs provided independent legal advice to the panel.

The parties entered into an Agreed Statement of Facts and the member and the holder admitted the allegations of professional misconduct set out in the Agreed Statement of Facts.

The member was the president of Orion Pacific Engineering Inc. (the holder), an engineering firm that held a Certificate of Authorization under the *Professional Engineers Act*. The member was the responsible professional in the application for the Certificate of Authorization.

The member and the holder entered into an agreement with a client to provide engineering services for modifications to an existing building. The assignment included development of conceptual plans to convert the existing structure into a two-storey office building, preparation of detailed engineering plans bearing a professional engineer's seal for the approved concept, preparation of short-form specifications for the work, preparation of the required submission to the Town of Caledon for a building permit, making application on behalf of the client for the building permit, expediting the processing of the building permit application, and provision of field review services during construction.

The member and the holder submitted a package of documents to the town on behalf of their client.

The town responded, identifying approximately 22 deficiencies that needed to be addressed in order to issue a building permit for the project.

The client subsequently made numerous attempts to communicate with the member and the holder, in order to address the concerns raised by the town and seek updates. The member and the holder either did not respond to inquiries or responded but failed to carry out their promises. The member eventually provided a "full revised set of architectural drawings" to the client as an attachment to an email. The client requested that the revised drawings be submitted to the town, but the member and the holder failed to do so. No revised drawings were ever submitted to the town by the member or the holder. The revised drawings did not bear any revision notations or dates and did not address a number of the deficiencies listed in the town's original response to the building permit application.

Thereafter, following further unsuccessful attempts to have the member and the holder provide the required materials to the town, the client formally terminated the retainer and requested that the member and holder provide the client with CAD files that had been created by them, so that the client could move forward with the project. These requested materials were not provided.

It was agreed that the drawings and the work carried out by the member and the holder fell below the expected standard of practice for engineering work of this type, and consequently, that the member and the holder were guilty of professional misconduct.

The panel found that the facts supported findings of professional misconduct and, in particular, found that the member and the holder were guilty of professional misconduct as alleged in the Agreed Statement of Facts in that:

- (a) They provided deficient professional engineering services in respect of an addition to an office building as detailed above, amounting to negligence and professional misconduct as defined by section 72(2)(a) of Regulation 941;
- (b) They failed to make responsible provision for complying with applicable statutes, regulations, standards, codes, bylaws and rules in connection with professional engineering services in respect of the design of an addition to an office building, as detailed above, amounting to professional misconduct as defined by section 72(2)(d) of Regulation 941;
- (c) They engaged in conduct through their work and dealings in providing professional engineering services that, having regard to all of the circumstances, would reasonably be regarded as disgraceful, dishonourable or unprofessional as defined by section 72(2)(j) of Regulation 941, as detailed above and, in particular, as follows:
 - by failing to respond to their client's multiple requests for communications, updates and action in respect of obtaining a building permit,
 - by failing to take the necessary steps to rectify the deficiencies in the design drawings they had prepared,
 - by failing to submit revised drawings to the town,
 - by failing to provide their client with the soft files specified by the retainer, which they had prepared on the client's behalf and that were required in order to permit the client to retain other service providers to complete the work left incomplete by Naami, and
 - by acting in a negligent manner in providing deficient structural engineering design services to their client.
- (a) Pursuant to s. 28(4) (f) of the *Professional Engineers Act*, the member and the holder shall be reprimanded, and the fact of the reprimand shall be recorded on the register for a period of six months;
- (b) The finding and order of the Discipline Committee shall be published in summary form under s. 28(4)(i) of the *Professional Engineers Act*, with reference to names;
- (c) Pursuant to s. 28(4)(d) of the *Professional Engineers Act*, it shall be a term or condition on the member's licence that he shall, within eighteen (18) months of the date of pronouncement of the decision of the Discipline Committee, successfully complete the Professional Practice Examination (PPE);
- (d) Pursuant to s. 28(4)(b) and (k) of the *Professional Engineers Act*, in the event that the member does not successfully complete the PPE within the time set out in (c) above, his licence shall be suspended for a period of six (6) months thereafter, or until he successfully completes the PPE, whichever comes first; and
- (e) There shall be no order as to costs.

The parties waived appeal rights and a written reprimand was imposed with the release of the Decision and Reasons.

This summary of the Decision and Reasons was signed by William Walker, P.Eng., as chair of this discipline panel and on behalf of the other members of the discipline panel: Bruce Clarida, P.Eng., Charles Kidd, P.Eng., Sharon Reid, C.Tech., and Santosh Gupta, P.Eng.

The parties agreed on a Joint Submission as to Penalty and Costs. The panel accepted that the proposed penalty in the joint submission was reasonable and in the public interest, and the panel accordingly ordered:

Please report any person or company you suspect is violating the act. Call the PEO enforcement hotline at 416-224-9528, ext. 1444 or 800-339-3716, ext. 1444. Or email your questions or concerns to enforcement@peo.on.ca.

FORMER PROFESSIONAL ENGINEER FINED \$10,000 FOR USING PROFESSIONAL ENGINEER'S SEAL

On December 3, 2015, Michael Martin Cook of Belleville, Ontario, was fined \$10,000 for continuing to use a professional engineer's seal while no longer licensed or acting under a Certificate of Authorization.

Cook was convicted on four counts of breaching the *Professional Engineers Act*. The counts pertained to using a professional engineer's seal on a technical document and signing a Commitment to General Review by an Engineer. These documents were submitted to the Ottawa Building Department in support of a building permit application for a large covered structure for storing recycling waste.

Licensed by Professional Engineers Ontario (PEO) in 1981, Cook's licence and Certificate of Authorization were suspended in 2012 as a result of a Discipline Committee hearing and order. His licence was revoked in 2014 when he failed to pass specific technical examinations required by the order. Cook surrendered his seal to PEO in late 2014.

However, he had made a duplicate seal, which was used on the documents in question.

The matter came to PEO's attention when a building official checked Cook's licensure status after receiving documents bearing his seal and signature.

His Worship Justice of the Peace Jacques Desjardins, of the Ontario Court of Justice in Ottawa, levied a fine of \$10,000. Justice of the Peace Desjardins acknowledged the significant risk posed to the public by unlicensed practitioners. Upon conviction, the court further imposed a 25 per cent victim fine surcharge as required by the *Provincial Offences Act*. The surcharge is credited to a special provincial government fund to assist victims of crime.

Representing PEO in this matter was Nick Hambleton, associate counsel, regulatory compliance.

PEO thanks the Ottawa Building Department and the owner of the project in question for their co-operation with its investigation. The success of this enforcement effort was possible due to the diligence of a PEO member in immediately reporting unlicensed practice.

FORMER ENGINEERING FIRM ORDERED TO STOP USING TERMS "ENGINEERING" AND "ENGINEER," PRINCIPAL NOT TO CALL HIMSELF AN "ENGINEER"

On January 11, 2016, PEO obtained an order against Emmanuel de Guzman and Falcon Group International Inc. requiring that they cease holding themselves out as being qualified to practise professional engineering contrary to the *Professional Engineers Act*.

Emmanuel de Guzman, Falcon Group's principal, has never been licensed as a professional engineer.

Professional Engineers Ontario (PEO) granted a Certificate of Authorization (C of A) to Falcon Group in March 2011. PEO revoked Falcon Group's C of A in December 2014 after receiving reports that de Guzman had held himself out as a professional engineer and applied a professional engineer's seal bearing his own name.

An enforcement investigation led to an application being brought under section 39 of the *Professional Engineers Act* before the Honourable David G. Stinson of the Ontario Superior Court of Justice at Toronto. Witnesses attested that their employers contracted Falcon Group to provide

engineering services while under the belief that de Guzman was a duly licensed professional engineer. While Falcon was a C of A holder at the time of the events in question, it had continued to hold itself out as a professional engineering company after the revocation of its C of A.

After considering the evidence, Justice Stinson ordered de Guzman to refrain from using the titles "professional engineer," "P.Eng." and "engineer," and not to use a professional engineer's seal. Falcon Group was further ordered to refrain from using the words "engineer," "engineering," or any other term, title or description that will lead to the belief that it may provide professional engineering services to the public. PEO was awarded \$6,600 for its costs of applying to the court for the order.

Under the *Professional Engineers Act*, only individuals who are licensed by PEO may use the titles "P.Eng.," "professional engineer" and "engineer." Further, only those holding a C of A from PEO may offer or provide professional engineering services to the public.

Nick Hambleton, associate counsel, regulatory compliance, represented PEO on the application.

The success of the above application is due in no small part to the vigilance of members of PEO and the Ontario Association of Architects in reporting their concerns.

[DATEPAD]

MARCH 2016



MARCH 29-30

Society of Petroleum Engineers Production Chemistry & Chemical Systems Workshop, San Antonio, TX
www.spe.org/events/16asan

APRIL 2016

APRIL 4-6

International Conference on Sustainable Design & Manufacturing, Chania, Crete, Greece
sdm-16.kesinternational.org

APRIL 5

SPE/CHOA Slugging It Out XXIV: Down But Not Out Conference, Calgary, AB
www.spe.org/events/sio/2016/



APRIL 6-8

2016 MACH Conference, Annapolis, MD
machconference.org

www.peo.on.ca

APRIL 9-13

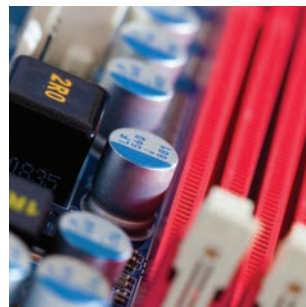
Society of Petroleum Engineers Improved Oil Recovery Conference, Tulsa, OK
www.speior.org

APRIL 10-14

Global Congress on Process Safety, Houston, TX
www.aiche.org

APRIL 12-15

Joint Rail Conference, Columbia, SC
<https://www.asme.org/events/joint-rail-conference>



APRIL 15-18

Conference on Electrical & Computer Engineering, Vancouver, BC
ccece2016.ieee.ca

APRIL 18-21

IEEE International Systems Conference, Orlando, FL
2016.ieeesyscon.org

APRIL 21-22

International Conference & Business Expo on Wireless & Telecommunications, Dubai, UAE
wirelesscommunication.conferenceseries.com



APRIL 29

PEO Order of Honour Gala, Toronto, ON
www.peo.on.ca

APRIL 30

PEO Annual General Meeting, Toronto, ON
www.peo.on.ca

MAY 2016

MAY 2-5

Offshore Technology Conference, Houston, TX
2016.otcnet.org

MAY 5-6

Mari-Tech Conference & Exhibition, St. John's, NF
www.mari-tech.org

MAY 5-6

Society of Petroleum Engineers Low Permeability Symposium, Denver, CO
www.spelps.org

MAY 16-20

Verification & Validation Symposium, Las Vegas, NV
www.asme.org

JUNE 2016

JUNE 1-4

Canadian Society for Civil Engineering Annual Conference, London, ON
www.csce2016.ca



JUNE 12-15

PORTS '16, New Orleans, LA
www.portsconference.org



JUNE 13-15

World Congress on Automation & Robotics, Philadelphia, PA
industrialautomation.conferenceseries.com

DESIGN THINKING FOR REGULATORY POLICY, PART II

By Jordan Max

IN PART I, I gave an overview of design thinking's origins and methods, and discussed its increasing use in the private sector. This part will focus on how design thinking can be applied to the public sector—and by extension to PEO—and why we chose to pilot the use of design thinking through our practitioner-centred research project.

APPLICATIONS TO THE PUBLIC SECTOR

Outside the private sector, design thinking has been used successfully by hospitals, schools and not-for-profit organizations. In the last decade, the UK and Danish governments have applied design thinking principles to improve and streamline government services to citizens, and develop policies that achieve public objectives. But how can it be applied to monopolistic regulatory bodies that issue and administer professional licences? What modifications to its methods or expectations are required? How, specifically, can we use it for regulatory policy development at PEO?

THE FIRST WAVE—PUBLIC SECTOR OPERATIONS

In the operational realm, design thinking approaches have been used to create “one-stop shopping” platforms, such as ServiceOntario's amalgamation of the health card registry and driver's licence and vehicle permit services. ServiceOntario's overhaul of the Ontario government website (www.gov.on.ca) is another example of reorienting access to government services to align with the needs of user groups (families, businesses, visitors, etc.) rather than the government's organizational structure. PEO's website was redesigned from the perspective of applicants, licence holders and engineering interns, volunteers, and students and the public, based on online data analytics of searches and clicks. Numerous other Ontario government design thinking training initiatives are also under way, and its methods and approaches are now a hallmark of government service implementation plans.

THE SECOND WAVE—GOVERNMENT POLICY MAKING

Operations are one thing, but policies are another—in particular where they are based on static legislation or programs. In addition, governments are increasingly recognizing the need to better integrate and coordinate policy solutions across different ministries and agencies, and to partner with municipalities and community organizations. One example of this is the recently announced direction to address chronic homelessness. Research into this issue provided a deeper understanding of the types of people who are chronically homeless (mentally ill, recently discharged from correctional services, victims of family violence, etc.), and aims to redesign support systems around them rather than trying to fit people into the current systems. While the task force did not explicitly use design thinking, the process mirrored design thinking processes and methods.

THE THIRD WAVE—PROFESSION REGULATORY BODIES

Like government, profession regulatory bodies are essentially monopolies, issuing licences to a captive market of those who need one to practise legally. While the skeptic may argue there is no need or incentive for regulatory bodies to innovate since they are not subject to competition, I would argue there are several valid reasons to do so.

For starters, everything can be improved. The still-unfolding digital revolution at least requires mobile and rapid access to regulatory services and information for applicants, licence holders and the public. In an age when almost all private and public services can be accessed and processed online, this is now a reasonable customer expectation.

Second, to be an effective regulator, PEO must be certain that its policies and processes are effective and efficient. Regulated professions are built on and around legislation, regulations, rules, procedures, guidelines, standards and programs to achieve certain public interest protections. As a core function, regulators are tasked with attempting to control certain practitioner behaviours in regard to clients and the broader public (end users). We typically regulate by trying to promote or mandate positive practitioner actions, such as maintaining competent practice, or by trying to avoid or stop negative practitioner actions, such as professional misconduct or ethics violations. Professionals make judgment calls daily in their practice, juggling a variety of factors and influences. We have to know what and why we need to regulate different practitioner activities to ensure regulation is in sync with changes in the engineering sector and professional engineering practice.

In reality, profession regulators know very little about what motivates, guides or frustrates practitioners to improve their professional behaviours. Consequently, they also know little about the impact, if any, of regulatory instruments and communication on those behaviours.

A recent literature review on health professions by the UK's Professional Standards Authority notes:

“...the most notable finding to emerge from this review is the shortage of systematic knowledge on the main research question... how does professional regulation affect the behaviour of those subject to regulation? We also need to understand more fully, of course, the circumstances that support the ongoing resilience of the vast majority of professionals.”

The answer lies in qualitative, not quantitative, research. By redesigning our regulatory model from the inside out, centred on the practitioner-client relationship core, we'll be able to form a more complete picture of how practitioners respond to regulatory instruments and how those instruments impact public safety.

PRACTITIONER-CENTRED RESEARCH PROJECT

Working with PEO's Professional Standards Committee, our professional affairs unit develops and updates professional practice bulletins, guidelines and standards (placed in Regulation 260/08), and its practice advisors answer, on average, 600 questions from licence holders and the public each year concerning these tools. But we know little about how effective the tools are in changing or improving licence holder practice. It became clear to us that we do not have enough relevant information and insight into how and why our licence holders practise.

We, therefore, want to focus on and better understand our licence holders working for Certificate of Authorization companies, by asking questions about their daily work experience, challenges, frustrations and barriers; their responsibilities (for what and to whom); their opportunities for growth and development; their responsibilities to other regulatory bodies; their motivations and influences; what has changed in their practice over the past five to 10 years; and why, when and how they interact with PEO's professional affairs unit. These are not questions that can be answered by quantitative data; they require qualitative research.

Our practitioner-centred research project (PCR) (see *Engineering Dimensions*, November/December 2015, p. 25) will use interviews and surveys of our practitioners in their workplaces. We plan to share the insights and findings from this in future *Engineering Dimensions* articles. The final phase of the project will use those findings and insights to redesign our professional affairs instruments and services for greater effectiveness, and to provide mechanisms that will ensure they continue to be effective.

WHAT'S NEXT?

Cynics and realists alike will point out that there is no shortage of methodologies and theories du jour propagated by academics, business consultants and think tanks every year. After all, if everyone used the same method, how would consultants make any money?

In part I, I identified some of the advantages and disadvantages of using design thinking in general, most of which could conceivably apply to PEO. However, we have taken the use of design thinking beyond the private sector and the operational realms, into the public sector and policy realm, applying it to profession regulation. In this area, PEO is boldly going where none have gone before. I can't stress enough that this is a pilot project to test the method and see how it works for PEO.

Design thinking is targeted at understanding users, with one significant caveat. Adopting a user-centric orientation, starting with practitioners, provides us a different vantage point, and there is always a risk in self-regulation of the needs of practitioners overwhelming public interest needs. To prevent this, we must be wary of focusing solely on practitioners. This suggests that in future we'll need to similarly research the needs and perspectives of other stakeholders—engineering services clients, the government (PEO's oversight) and the public (workers and end

users of public and private facilities and infrastructure)—to get a holistic view of public interest.

In terms of policy, we could examine elements of the act or regulations, or bylaws, or such components as licensing requirements, adjudicative processes or penalties. By taking a user-centric approach to regulatory policy, we could attempt to understand to whom each section of legislation applies (users), the intended policy intents or outcomes (user behaviours) and the mechanisms (processes or drivers) used to achieve those outcomes. This requires an honest, objective challenge of underlying assumptions and a willingness to make the necessary adaptive changes. Understanding other users as stakeholders will help PEO identify potential impacts and alternative approaches and mechanisms, which is another key component of the required evidence-based policy development for legislative or regulation change.

While it may be premature to plan the next project, it's not unreasonable to contemplate how design thinking approaches might be applied to PEO's regulatory policies and operations to identify alternative business models, drive incremental or wholesale change, or discover alternatives to regulations that achieve the same policy intents or outcomes. Design thinking might also be applied to core operations for aspects of applications and renewals, complaints or enforcement, based on the feedback and insights from the individuals most directly affected. Beyond that, design thinking methods might be applied to strategic planning, communications and stakeholder engagement products and practices.

In the meantime, we are looking forward to this exciting project as a learning opportunity. As always, I welcome your comments and questions via email at jmax@peo.on.ca. In particular, I would like to hear from you if you have participated in or used design thinking in your engineering practice, and what your experience was. For those curious to know more, I've listed some books and website resources to explore. The right side of your brain will thank you. Σ

FURTHER READING

- Open policy making toolkit, <https://www.gov.uk/guidance/open-policy-making-toolkit> (tools, case studies)
- MindLab, mind-lab.dk/en/ (tools, case studies)
- DIY Toolkit, <http://diytoolkit.org/> (Nesta) (tools)
- Government of Australia Public Sector Innovation Toolkit, <http://innovation.govspace.gov.au/>

Jordan Max is PEO's manager, policy.

IS IT TIME TO INCORPORATE PERFORMANCE TRAINING INTO ENGINEERING EDUCATION?

An Olympic-calibre athlete—and professional engineer—is looking to blend athletics training with engineering education to produce high-performance practitioners.

By Michael Mastromatteo

SASHA GOLLISH, P.ENG., might be the only professional engineer licensed by PEO who calls herself a “performance” engineer. A 2007 graduate of Western University’s engineering program, and the holder of an economics degree from the University of Toronto, Gollish has some novel ideas about how to train future engineers for all the rigours of a professional career.

Although listed in PEO’s records as a civil engineer, Gollish prefers the performance modifier. She’s not necessarily trying to establish a new engineering discipline, but rather looking for a way to combine lessons learned from track and field and athletics into the education of a new generation of disciplined, performance-driven professional practitioners.

Licensed by PEO in 2010, Gollish has 10 years’ experience in road safety with Anchor Shoring and Caissons Ltd., the Ministry of Transportation and Safe Roads Engineering, a division of the Powell group of companies.

But Gollish was more in the public eye last summer as a competitor in the women’s 1500-metre race at the 2015 Pan Am games. Despite nearly losing a shoe seconds after the starting gun, she persevered to finish third in the race and claim a bronze medal.

On January 13, 2016, she told a group of University of Toronto alumni that winning a medal in that race was one the most important accomplishments in her young life.

In September 2015, Gollish returned to the University of Toronto to begin the doctorate-level Collaborative Program in Engineering Education (EngEd). A multi-sport athlete, Gollish is interested in new ways of teaching mathematics to engineering undergraduates and hopes some of the training, discipline, practice and rehearsal so crucial to high-level athletics can be incorporated into engineering education.

Engineering Dimensions sat down with Gollish in January to discuss her life and work.

MICHAEL MASTROMATTEO: When did you develop your interest in engineering education?

SASHA GOLLISH: Brenda McCabe [PhD, P.Eng., associate professor, department of civil engineering, University of Toronto] introduced me to the EngEd program in the fall of 2014. She informed me that the first cohort of engineering education would begin January 2015. I had left my consulting job and was only working part-time when Brenda and I met. I had finished the advanced coaching diploma through the Canadian Sport Institute and was trying to figure out what was next. It seriously felt like little pieces were falling into place.

I would say I have always been interested in education and teaching, and had really been missing teaching since I left the world of ski coaching to pursue my athletic endeavours.

MM: Do you have a specific thesis you need to defend to complete the PhD? What is it?

SG: Yes, as part of my PhD I do have to do a thesis defense. We see this as an evolving project, and while it is currently titled “How to make mathematics education within engineering education better,” we are almost certain that while the title may change, the foundation of the project will remain the same. That is, I will have to defend my project regarding improving education techniques within mathematics for engineers.

MM: You mentioned in your January 13 presentation that you consider yourself a “performance engineer.” Is this a recognized engineering discipline, or something you’re hoping to explore with your PhD study?

SG: We all define ourselves as construction, mechanical, computer, electrical, bridge, etc. engineers. I want to help change individuals’ performances, be that in the classroom for a student, teaching assistant or instructor/professor, or out in the sports arenas. I believe that there are



Gollish celebrates after winning a bronze medal in the women's 1500-metre race at the 2015 Pan Am games.

certain aspects one can “engineer” to make students and athletes’ performances better, and I’m going to figure out what the best way is to do that.

MM: The title of your January 13 presentation was “Advancing engineering education with lessons from the track.” I understand you didn’t come up with that title, but could you summarize what some of the track lessons are that you think can advance engineering education?

SG: While I didn’t come up with the title, it is definitely something I employ with my research every day. Actually, I would say my athletic/coaching life is helping me reshape how I approach my every day. For instance, in coaching we talk about creating a yearly training plan, supported by macro-, meso- and micro-cycles. It’s based upon a created mission, vision and set of values. It made sense for me to employ the same thinking to what I’m doing every day and, specifically, with this project. Another coaching philosophy that really has changed how I operate is the notion of creating an “integrated support team” (IST). We all know and understand the strengths of working with a team, so why not apply it to everything we do? I am not afraid to admit that I am not an expert at everything. I have my niches, and I go to the experts in areas that I am not the expert in.

MM: You seem to have a special focus on the teaching of math to engineering students. Is this an area you feel is in need of study and development?

SG: To be honest, I didn’t really think about it until I first sat down with Bryan Karney [PhD, P.Eng., professor, civil engineering, University of Toronto]. When we started talking and I reflected back upon my time as an undergraduate, I saw the divorce between traditional engineering courses and mathematics. And, really, if you think about it, the natural sciences probably fall the way of mathematics. We do not necessarily see the connection of the natural sciences as the foundation to engineering courses. I think education as a whole is going through an evolution. This is just a small piece of the entire puzzle, but one I see that plays an integral role in changing engineering education.

MM: Here is an excerpt from your presentation: “...creative variation [is] where you take something and you make it your own...in education, and in design, where engineers are so powerful, this creative variation stage [is] where we go above and beyond autonomy, autonomous reaction and rote rehearsal.” Why is “creative variation” so important?

SG: This is where the magic happens! This is where engineers separate themselves from others; it’s where we [engineers] blend creativity and design to create new solutions for the future. And not every engineer will get here, but the engineers who minimize the use of gasoline in cars, the ones who design materials that are more easily recyclable or, even better, decompose within a lifetime, create materials that do not strip the world of its natural resources—all these revolutionary, sustainable ideas for the future—those

[VIEWPOINT]

are the few who will change the world, and hopefully for the better.

MM: Do you think engineering educators would do a better job if they think of themselves as coaches and mentors, rather than as teachers?

SG: Coaching went through a revelation, I would say 10 to 15 years ago, where they recognized it was important to blend educational principles into their practices; coaches recognized that it would be easier to teach and explain a skill by employing teaching principles. Now I think it's time for educators to do the same, to adopt coaching principles in the classroom, to blend engagement and motivation with teaching a skill. After all, we know that with engagement and motivation, this only helps athletes learn a skill. And I believe the same will hold true in the classroom.

MM: Please expand briefly on the following, again from your presentation: "...I think it's really important to have fun in the classroom [and] be passionate about what you do, to then be passionate about what you're going to do in life, career-wise. For engineers, it's about life-long learning. We need to blend rote rehearsal with deliberate practice and playing, to keep on learning."

NOW I THINK IT'S TIME FOR EDUCATORS... TO ADOPT COACHING PRINCIPLES IN THE CLASSROOM, TO BLEND ENGAGEMENT AND MOTIVATION WITH TEACHING A SKILL.

SG: One of the things you commit to as an engineer is life-long learning. In many of the provinces and states, an engineer is required to complete continuing education credits through the year to maintain their licence. Regardless, I think when you're passionate about something that the desire to learn more about it naturally follows.

Back to rote rehearsal for a second. From education we know that students can do something automatically when they have reached a stage of learning—the ability to reproduce something without



Sasha Gollish, P.Eng., in a January 13 presentation to University of Toronto engineering alumni, discussed how engineering educators might benefit from incorporating lessons from track and field into the classroom.

even really thinking about it. It is a point you get to after a path of lots of practice, specifically, deliberate practice. Deliberate practice is a special type of practice where one is deeply cognitively engaged with the task at hand. Rote rehearsal shouldn't be the end goal. The only way to be creative and innovative as an engineer is to go that one step further, to continue down that path of deliberate practice (i.e. to keep learning), to uncover the next revelation of whatever it is you are designing or researching.

And really, you are not going to want to continue down that path of deliberate practice unless you truly love what you do. That it is something that makes you want to jump out of bed most days and pursue. I think to Steve Jobs or Alan Watts; both of these people challenge us to look more deeply into what we do. Pick something you're passionate about as a career.

After all, whatever it is, if you pursue it with deliberate practice and continuing education, you will become an expert at it and can make a living at it.

MM: What does the future hold for you, both in terms of athletics and in your engineering education career?

SG: I do not have a crystal ball to answer that. I will continue to work hard at both, pushing myself to new limits on the track and ploughing through research and projects. I love what I do. Every day, I'm excited to wake up and see what I can do. Σ

LIEUTENANT GOVERNOR-IN-COUNCIL APPOINTEES ON COUNCIL

By Peter DeVita, P.Eng., FEC

AS THE LAST ISSUE of *Engineering Dimensions* illustrated, under section 3(2) of the *Professional Engineers Act*, up to 12 of PEO's 29 councillors are appointed by the lieutenant governor of Ontario and are known as lieutenant governor-in-council appointees, or LGAs.

Some LGAs are professional engineers appointed (historically) to bring the perspectives of the engineering profession's diverse disciplines, an outcome that can't be guaranteed through the election process, while others are members of the public (lay LGAs) who can provide the perspective of non-engineers to balance council deliberations.

All PEO councillors, whether elected or appointed, carry the same responsibilities.

ENGINEER LGAs

How did PEO come to have LGAs on council? The answer is that government appointments representing disciplines of engineering on PEO council have been there almost from the regulator's inception.

Five months after PEO council's first meeting in August 1922, council comprised 18 members: a president, a vice president, an immediate past president and three councillors from each branch of engineering identified in the *Professional Engineers Act*.

Internal conflicts had arisen among the engineering disciplines, in particular mining engineers, who were apprehensive about losing control of their profession to the southern Ontario engineers, who were mainly in other disciplines. The idea of various disciplines, or "branches," of engineering arose during the debates on revising the Canadian Society for Civil Engineering into the Engineering Institute of Canada (EIC). The word "civil" had now become more focused in its meaning, referring to fixed structures of all types, and had lost its connotation of "civilian engineer" (in contrast to military engineers). The EIC revision ensured these branches of engineering now had their own journals and conferences so their practitioners could focus on the technology and issues important to their practices. The 1922 act continued in this vein and was structured to have five branches represented on

council—civil, mechanical, electrical, chemical and mining. Each branch elected its own two council members. Additionally, the government appointed one more engineer member to each of the branches.

The 1922 act reads:

"(4) Two councillors shall be elected annually from each branch of the Association by the vote of the registered members in such branch, and one councillor from each branch shall be appointed by the Lieutenant-Governor in Council."

With the hand of government involved with appointments representing the branches, some measure of conflict avoidance was created, as well as protection for branches that might not get a representative elected should the act change—which it did.

In the 1969-1972 act revisions, the two elected councillors now came from regions rather than branches. Two councillors-at-large were also added, each with a two-year term, and elected in alternating years. However, the appointed councillors continued to represent the five branches with mechanical now including aeronautical and industrial, chemical now including metallurgical, and mining now including geology.

My appointment to council in 1990 still had these traditions floating around but showing signs of falling into disuse. I was an electrical engineer filling a civil slot. There was still some sense that branches of engineering needed representing. However, in time, since the 1984 act no longer contained any reference to appointments by branches, the tradition vanished.

LAY LGAs

Where do lay LGAs on council come in? Some history concerning Ontario lawyers sheds light on this issue.

The Law Society of Upper Canada (LSUC) website chronology contains an entry from 1974: "the first lay (non-lawyer) benchers are appointed by the Ontario government to represent the public interest at convocation" (<https://www.lsuc.on.ca/with.aspx?id=1052>).

Lay benchers (similar to PEO councillors) were appointed in 1974 to represent "the public interest at convocation," (convocation being the term used to refer to a council meeting). However, since a licensing body is supposed to always act in the public interest, whether the councillors are elected or not, one wonders why this was needed.

Additional insight is suggested by a letter written to PEO by then Attorney General Howard Hampton in the early 1990s. In the letter, he asked PEO's lay LGAs (which had been installed on council by that time) to tell him if PEO should have more appointed lay councillors. The apparent concern stemmed from the large number of complaints about the medical profession. Too often, it seemed, the public had the impression that doctors looked after their own with very light penalties

given to those brought to discipline. The Ontario government had increased the number of lay appointees on the College of Physicians and Surgeons of Ontario's (CPSO) council to 44 per cent. Should PEO do the same? Clearly, it was seen as important to give the public and government confidence that the system worked as expected to serve and protect the public interest.

Politically, it makes sense for the government to point to the fact that our self-regulating bodies have non-members on their councils as an additional public eye. This is strengthened further by the requirement that at least one of these people sit on discipline hearings.

Indeed, the Royal Commission Inquiry into Civil Rights, also known commonly as the McRuer Reports, supported this perspective, as seen in this snippet from a recent LSUC paper:

"Between 1968 and 1971, the Commission submitted three reports to the Lieutenant-Governor of the Province of Ontario. The first report was submitted on February 7, 1968, the second on September 15, 1969, and the third was submitted on February 22, 1971 (collectively, the 'McRuer Reports'). With respect to the professions, the McRuer Reports urged that organizations governing lawyers, doctors, engineers, and other professionals had to be made more observant of due process in the exercise of their authority, more responsible to their membership, and more effectively subject to scrutiny by the legislature which empowered them. The reports proposed greater accountability in all the professions, and became the authoritative works used to advocate for lay representation in the legal profession."

WERE WE THE FIRST?

In his paper, *The History of Lay Benchers at The Law Society of Upper Canada: Marking 40 years of Public Representation*, Ross Gower writes in reference to the new LSUC act:

"The third reading of Bill 104 took place on June 22, 1973, and it received royal assent that same day. As a result, the Law Society of Upper Canada became the first professional body in Ontario to officially include public representation in its governing body.

"...On Friday, January 17, 1975, Treasurer Stuart Thom welcomed the four Benchers appointed by the Lieutenant Governor on 20th November, 1974: Mr. Joseph D. Carrier, Toronto, Mr. Noel Ogilvie,

Grimsby, Mrs. Roseanne Sutherland, Sudbury, and Mrs. Reginae M. Tait, Toronto. Roseanne Sutherland and Reginae Tait 'were the first women ever to participate in governing the Law Society.'" (www.lsuc.on.ca/PDC/Archives/Resources/ArchivesResources/#laybenchers).

OUR SELF-REGULATING BODIES HAVE NON-MEMBERS ON THEIR COUNCILS AS AN ADDITIONAL PUBLIC EYE.

The 1969-1972 engineering act sees the addition of lay appointees as an option. The clause says:

"Lay Councillor, Legal Councillor

- (6) In addition to the councillors mentioned in subsection 1, the Lieutenant Governor in Council may appoint as councillors,
- (a) a person who is not a member, and
 - (b) a person who is a barrister and solicitor of at least ten years standing at the bar of Ontario, both of whom are residents of Ontario."

Their terms of office were three years and renewable. In reviewing PEO's records it was found that: "The March 1975 issue of *Ontario Digest* lists lay members of APEO council. The names are Stanley Friese (lay member) and James F. Kelleher, QC (legal member)."

This seems to suggest the first PEO lay appointees were appointed within months, if not at the same time, as those of the LSUC.

Oddly enough, APEO's new act was dated October 1972, about eight months before LSUC's act that created lay LGAs. Perhaps PEO was the first professional body in Ontario to officially include representatives of the public in its governing body.

What is undeniably true is the Ontario engineering profession was on the leading edge of new legislation coming forth on the heels of the McRuer Reports.

LAY VERSUS ENGINEER LGAs

We have a tendency today to lump all LGAs into the same category, but they are significantly different. Lay appointees, of course, stem from the work of McRuer on civil liberties.

Given that the McRuer Commission deliberated from 1968 to 1971 and that the revised engineering act was introduced virtually at this same time, it's not surprising to see the introduction of new ideas on ensuring licensing bodies acted in the public interest. In *The Law Society of Upper Canada and Ontario's Lawyers 1797-1997*, Christopher Moore says the McRuer Reports set the tone for licensing bodies to be "more effectively subject to the scrutiny by the legislature which empowers them" (www.amazon.ca/Society-Canada-Ontarios-Lawyers-1797-1997/dp/0802041272).

The LSUC act was also under revision at this time and Attorney General Arthur Wishart played an active role in its revision. Since engineers also report through the attorney general, it is understandable that lay appointments were also introduced into the engineering act as well. Hence, this time period evidenced a desire to add lay appointees to self-regulating bodies, with a strong body of law to support the idea, and an attorney general highly involved in these affairs.

The engineer LGA, as previously discussed, is fundamentally different in its origin to the lay LGA. The engineer appointee comes from a historical quirk in the Ontario engineering profession's formation. Not many other professions have "branches" or disciplines that are considerably different in their body of knowledge and works.

With over 30 disciplines of practice and adding a new one about every five years, PEO would do well to consider the need for such external government appointments. Given that the original concept of representation by branches has long since disappeared, the elimination of the engineer LGA would reduce the size of council to a more manageable size. However, before impulsively carrying this out, the profession needs to determine how it will govern an ever-expanding profession.

CONCLUSION

It was not until the McRuer Reports in 1968-1971 that a documented body of law was set down concerning how licensing bodies were to behave. That is: in the interest of the public and *not* in the interests of the specific profession. Since they are extensions of government exercising delegated authority, the self-regulating bodies are expected to be open and transparent in all they do so the public can be assured they are indeed acting to serve and protect the public interest. Given that the act of 1969-1970 was revised in this same time period, we can see the inclusion of lay appointees as an outgrowth of government's desire to keep a closer eye on how professions operate. It appears PEO was on the leading edge of the new wave of thinking.

It's clear from the body of law supporting the lay appointee that they are here to stay for all the self-regulating professions. It seems 20 to 33 per cent of the council is the going percentage of such appointees in other professions, with the CPSO a notable exception at 44 per cent. LSUC, for example, has had 16.7 per cent lay appointees since 1998, up from 9 per cent in 1974.

In the meantime, it's clear PEO is one of Ontario's and Canada's leading self-regulating professions. Looking forward, the onus is on PEO to be innovative and creative in its mandate to govern the profession. Σ

Peter DeVita, P.Eng., FEC, is president of DeVita Associates and is a former PEO president.



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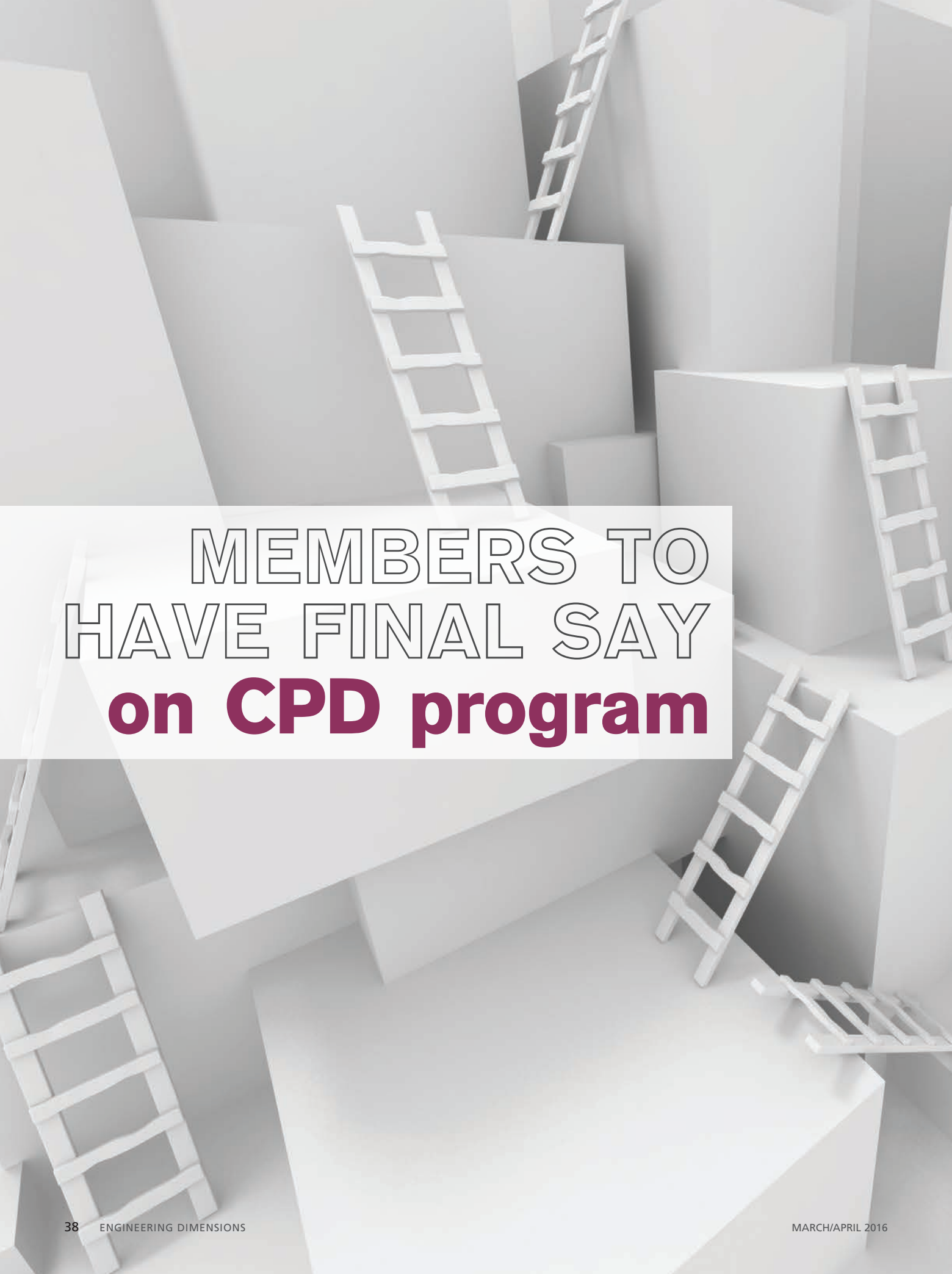


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MEMBERS TO
HAVE FINAL SAY
on CPD program



To some observers, PEO is playing catch-up when it comes to developing a continuing professional development program for licence holders. Ultimately, it will be the licence holders who determine whether PEO's program becomes mandatory or remains a voluntary reporting system.

By Michael Mastromatteo

Retired Ontario Justice Paul Bélanger might take credit for lighting a fire under PEO's collective feet with his recommendation that Ontario's engineering regulator "establish a system of mandatory continuing professional education for its members as soon as possible, and in any event, no later than 18 months from the [October 2014] release of this report" (recommendation 1.24 of the Elliot Lake Commission of Inquiry).

In looking to weave a stronger regulatory safety net to prevent disasters similar to the June 2012 partial collapse of the Algo Centre Mall in Elliot Lake, Bélanger was clearly of the opinion that PEO should require the practitioners it licenses to demonstrate to their regulator their ongoing professional development.

Yet continuing professional development (CPD) for its members is a thorny question that has beset PEO policy-makers for several decades.

This latest round began in late September 2013 when PEO council received the report *Continuing Professional Development: Maintaining and Enhancing our Engineering Capability*, produced by the continuing education working group of the Ontario Society of Professional Engineers (OSPE), and supported in principle the implementation of a PEO continuing professional development program. To get the ball rolling, council referred OSPE's report to the Professional Standards Committee (PSC) for review and comment, and directed that PSC solicit written and oral comments from the PEO membership during its review. PSC was to report its findings and proposed plan of action to council at its February 2014 meeting.

At that meeting, PSC presented its report, which recommended developing a problem definition as the next step. Ultimately, council directed that PEO's Executive Committee, with input from PSC, draft terms of reference for a continuing professional development and quality assurance task force, for council approval. Thus, in March 2014, seven months before the release of the Bélanger report, PEO established

its Continuing Professional Development, Competence and Quality Assurance (CPDCQA) Task Force, which for some 18 months worked to develop the concepts and framework for a CPD program tailored for PEO members. The task force presented its final report to council in November 2015.

VOLUNTARY OR MANDATORY?

An overriding question in any proposed CPD program is whether to make professional development activity reporting voluntary or compulsory.

PEO is one of only two Canadian engineering associations without some form of CPD program for members. The other regulator, the Association of Professional Engineers and Geoscientists of BC (APEGBC), had a proposed mandatory program rejected by members in a recent referendum.

A recent Engineers Canada survey of the CPD programs offered by the other provincial and territorial engineering regulators shows almost all require reporting of at least 240 professional development hours over a three-year period. The hours can be earned in various categories, including professional practice, formal education, informal education, participation in events, and offering presentations or contributions to knowledge.

Each of the provincial/territorial regulators allows non-practising members to be exempted from CPD reporting.

PEO had long envisioned a voluntary annual reporting mechanism for members to list professional development activities and, in fact, developed the means for members to do so on their annual licence renewal forms. The practice was never embraced by licence holders, or promoted by PEO, however. At town hall meetings on the CPDCQA Task Force's work, held last fall, PEO reported that only about 15 practitioners out of a membership of more than 80,000 have voluntarily reported their CPD activity.

RISK-BASED APPROACH

Chaired by former president Annette Bergeron, P.Eng., FEC, the CPDCQA Task Force spent about 18 months developing the guiding principles for and basic elements of a PEO program, based on extensive research that included membership surveys, feedback from seven town hall meetings and a review of the CPD programs in place elsewhere. The PEO task force, however, looked to create a unique program for Ontario members—one that stressed risk to the public as the determining factor in how much professional development activity a member might be required to undertake.

The salient point in PEO's proposed model is an engineering practice risk review—an effort to align any CPD requirements with the risk associated with the type and area of engineering in which a member works.

The task force's risk-based approach to CPD formed a major discussion point at last fall's town hall meetings conducted in each of PEO's five Ontario regions. As Bergeron said at the meetings, it is anticipated that non-practising engineers would have no CPD requirement other than a one-hour, no-cost, ethics refresher. Under the proposal, practising engineers would complete an online risk review that helps to reduce their CPD hours from an anticipated maximum of 30 hours and any associated costs. Current CPD activities would be taken into account in the assessment.

Bergeron came away from the town hall meetings with the sense that, for the most part, PEO members are receptive to CPD objectives. While there was some hostility to CPD expressed at the town halls—essentially that it would be overly bureaucratic and an intrusion on practitioners' time—Bergeron believes the CPD message was fairly well received.

"After [town hall] attendees heard about our unique proposal for PEO, they relaxed and responded typically with an 'I can manage this' attitude," she said last

December. “I estimate from five town halls that 70 per cent of attendees came around to supporting our program while 30 per cent of attendees didn’t really want to listen. I’m encouraged that once licence holders have the opportunity to understand how our proposal is different from their assumptions, they realize that this is a truly innovative approach to managing practitioner risk, and reporting on how practitioners increase their knowledge throughout the year.”

To further allay concerns about PEO forcing through a CPD program without acceptance by members, council in September stipulated that licence holders will have to ratify any mandatory elements of a PEO CPD program through a referendum.

The task force presented its final report at the November 2015 meeting of council and was stood down. Council approved the guiding principles of the task force’s proposed program and its basic elements and directed that a new task force be formed to work further on the details. The terms of reference and members of that task force were approved by council in February.

The council-approved proposed program:

- recognizes the licence of both practising and non-practising engineers;
- focuses on maintaining provision of competent engineering services rather than introducing a bureaucratic hurdle;
- ensures CPD requirements are based on the risk the work of each licence holder presents to the public and the profession;
- encourages licence holders and employers to adopt risk-mitigation measures; and
- improves on programs implemented by regulators elsewhere in Canada.

This last point—improving on programs implemented by other regulators—was especially important to the task force. In putting all the components together, task force members were adamant that the finished



product be relevant to Ontario’s engineering practitioners, and not simply an effort to impose an existing CPD template on PEO. As expressed by task force member Chris Roney, P.Eng., BDS, FEC, any PEO-originated program should focus on areas of practice with greater risk to the public and where there is a clear need for practitioners engaged in such work to obtain a level of knowledge and currency beyond what is needed for initial licensure.

THE END GAME?

PEO Councillor David Brown, P.Eng., BDS, a member of both the CPDCQA Task Force and the new detail-focused task force, says this of the regulator’s experience developing a proposed program over the last two years: “Personally, having been a member of the task force and as a councillor, there is a divergence between the two in terms of what I see as the end game. As a task force member, we had a specific job to do under our terms of reference and, for the most part, I believe we successfully completed that task. The report and the subsequent work to be undertaken by the new task force will provide what I believe will be an excellent program for our licensees and bring us into the 21st century as a regulator.”

He says external groups, including government, other constituent associations, and sister organizations like the Ontario Association of Certified Engineering Technicians and Technologists, which in January 2016 enacted mandatory CPD for its members without a referendum, are putting additional pressure on PEO.

“With respect to the end game, my thoughts are now focused not so much on the detail work to be completed, but rather the referendum,” Brown told *Engineering Dimensions*. “Right now, council has agreed to go to referendum to determine if our program is to be mandatory or voluntary. The reality is that a voluntary program is all but useless in much the same manner as our current voluntary reporting program is useless. Apparently, only about 10 members report each year and, in truth, I’m not one of them. Therefore, the mountain before us is that the program must be mandatory if it is to be considered seriously by our licensees or, more importantly, the public at large.”

Brown is hopeful these outside forces will encourage members opposed to mandatory CPD to see the light. “I’m hoping that the external forces on us play a significant role in getting our licensees to pull their collective heads out of the sand before we forgo our ability to self-regulate...or at least start down that slippery slope.”

Engineers Canada, the federation of the provincial and territorial associations, is also onside with mandatory, practice-focused CPD. In its recent “Framework for

“Meaningful CPD programs serve to maintain public and government confidence in the ability of engineers to regulate themselves with professionalism and high ethical standards”

Kim Allen, P.Eng., FEC
CEO, Engineers Canada

Regulation” statement, it argues that mandatory CPD requirements “...protect the public by ensuring that licence holders meet ethical obligations to maintain the currency of their professional competencies and undertake continuous learning throughout their careers. Harmonization of requirements facilitates mobility and provides clarity to registrants regarding their obligations.”

Kim Allen, P.Eng., FEC, CEO of Engineers Canada and former PEO CEO/registrar, suggests meaningful CPD programs serve to maintain public and government confidence in the ability of engineers to regulate themselves with professionalism and high ethical standards.

“Should a component of CPD related to ethics and professionalism be a requirement for every licence holder, whether they are practising or not?” he asks. “My view is: absolutely. Our model is fueled by engineers being held accountable for their professional conduct and competence.”

Allen adds that society rests secure in the knowledge its interests are overseen by engineers who act with competence and integrity: “Through self-regulation, government has delegated this authority and responsibility to the profession. The public has trust in the profession to understand the social need and the special aspects of the profession, and derive an appropriate set of rules to

govern its use. Ethical behaviour and professional conduct are necessary conditions of this set of circumstances.

“The Code of Ethics has always required engineers [to be] accountable to offer services, advise on or undertake engineering assignments only in areas of their competence and practice in a careful and diligent manner. CPD means that engineers have knowledge of developments in the area of engineering relevant to any services that are undertaken. This offers important safety protections to consumers of engineering service. The issue is that the public is better served if the engineer reports to the regulator that they have undertaken CPD.”

Allen believes regulators must carefully weigh the additional costs of mandatory reporting, to both the regulator and the engineer, and the benefits of CPD to the consumers of engineering services to strike the right balance.

NEXT STEPS

With the CPDCQA Task Force’s work now complete, council has created a new task force to finalize the risk review algorithm, and establish the criteria and details of the other elements of the proposed program. It will also identify any regulatory or act changes necessary to make the program fully operational.

Currently called the Continuing Professional Competence Program (CP)² Task Force, the new task force is chaired by Bergeron and comprises past CPDCQA Task Force members Rick Hohendorf, P.Eng., and Tyler Ing, P.Eng., plus sitting councillors Changiz Sadr, P.Eng., FEC, Warren Turnbull, P.Eng., Brown, Roger Jones, P.Eng., FEC, and Marilyn Spink, P.Eng.

The task force will oversee the activities of the registrar and PEO staff in producing a working implementation of the program.

It’s anticipated that by late 2016 members will be able to use basic, online forms to do a voluntary self-assessment of their practice risk. The forms will also enable users to determine their CPD requirements and report any work already achieved. The number of hours of CPD a licence holder might be required to undertake would relate directly to the risk of their own practice and what they are already doing to maintain their currency. Each licence holder’s CPD would be self-directed, based on their self-assessment.

COMMUNICATION IS KEY

Of course, ensuring that those who might be affected by the proposed program are fully aware of it and have a chance to try it out prior to the referendum is key.

Toward that end, a communications plan has been developed that will use all of PEO’s communications channels to provide updates on details of the program as they are developed. Information will be provided via articles in *Engineering Dimensions* and other relevant media, a dedicated page on PEO’s website, eblasts, social media (PEO’s Twitter, Facebook, LinkedIn accounts and YouTube channel), and media releases. A guideline to assist members in using the program’s tools will be developed, as well as a Frequently Asked Questions document.

When the initial online assessment and reporting forms are available, licence holders will be invited to “test drive” the program, so they’ll know how it would affect them personally, prior to a referendum on the program becoming mandatory. Timing of the referendum has yet to be determined.

Please stay tuned! Σ

FUEL CELL SYSTEMS FOR REMOTE COMMUNITIES: THE FIRST STEP TOWARDS A RENEWABLE-HYDROGEN ECONOMY IN CANADA

By Jaimilla Motay

This paper describes the technical feasibility of a stand-alone, renewable energy, regenerative fuel cell system, evaluates the sustainability of the proposed system for off-grid communities, reviews current policies and proposes a framework to support implementation.

This paper has been edited for length. To view the original, please visit www.peo.on.ca/index.php/ci_id/29078/la_id/1.htm.

IN CANADA, there are 292 remote off-grid communities with a total population of 194,281. Most off-grid communities are Aboriginal. And most rely on diesel-fuel power plants. The rest use alternative energy sources with diesel generators as a back-up system.

Renewable energy, such as hydro, wind and solar energy, is an attractive alternative to diesel generators and power plants. However, its intermittent nature leads to a requirement for a reliable energy storage system.

A viable storage solution is a discrete, regenerative fuel cell system. Renewable energy sources are preferentially used to meet the load demand. In times of excess renewable energy, electricity can be converted through water electrolysis to hydrogen—now the system's energy carrier—which is then stored in a compressed tank. When the available, renewable energy sources are insufficient to supply the load demand, a fuel cell, hydrogen turbine or combustion engine converts the stored hydrogen back to water, producing electricity.

A transient study was performed through Transient System Simulation Tool (TRNSYS 17) to simulate a system that could cover the residential load for one year in a community of 10 dwellings and a total peak load demand of 60kW.

During the day (8:00 a.m. to 4:00 p.m.), when the power from renewable energy sources exceeded the power required, the electrolyser operated. The fuel cell switched on from 4:00 p.m. to 8:00 a.m. when there was a deficit in the available renewable

energy. The power from the fuel cell matched the load demand.

Over the one-year simulation, an average system efficiency of 23 per cent and an average hydrogen loop efficiency of 32 per cent were obtained for a renewable-regenerative fuel cell system made up of electrolyser stacks with a total power rating of 75kW, and fuel cell stacks with a total power rating of 60kW. This represents a significant loss of efficiency compared to competing technologies, such as diesel generators and battery systems.

However, for a stand-alone, renewable system, reliability and dynamic response of the back-up system are more important than efficiency. To better match the input and output requirements of the components, improve efficiency and ensure autonomy, key parameters to take into consideration in designing the system are load profile, control strategy, climate and available renewable energy.

SUSTAINABILITY OF PROPOSED SYSTEM

Environmental

The only viable competitor to a hydrogen energy storage system is a diesel generator. In the cold climate of off-grid Canadian communities, lead acid batteries tend to freeze and their efficiency is reduced with decreasing temperature. Their end-of-life disposal and relatively long charging time are further concerns. Diesel generators produce considerable greenhouse gas emissions, smog and air contaminants during operation, which contributes to global warming. Fuel spills and leaks can contaminate the soil and groundwater resources.

A regenerative fuel cell system is pollution free with water and waste heat being its only outputs. Waste heat from the fuel cell system can be used for heating needs in a combined heat and power subsystem, which improves the system's overall efficiency.

Emissions resulting from transporting diesel by road or air to remote locations would also be eliminated. Because hydrogen fuel would be generated on site, energy independence would result and risks to the ecosystem would be reduced.

Because surplus hydrogen could be used to fuel automobiles in remote communities, the replacement of fossil fuel vehicles would further reduce pollution and decrease dependence on fuel imports.

The water requirements of an electrolytic process could be a potential impediment in some off-grid locations where water is a scarce resource. However, water would be produced by the fuel cell with the water balance dependent on the available renewable energy and load profile. Accordingly, this should be factored into an environmental impact assessment of a renewable hydrogen system. However, the water requirement is quite low: 250-560 litres of water for each MWh of hydrogen produced.

Economic

Without subsidies, the cost of running diesel generators is higher than a renewable hydrogen storage system. In Ontario, most diesel is transported by plane at a high cost. The fluctuating market price of diesel, combined with its high demand in colder, remote locations further contributes to a high electricity rate for consumers unless subsidized by government.

Economic development is also hampered by high energy costs. Annual operating cost savings of over \$900,000 from a renewable hydrogen storage system were obtained in a study for a hypothetical remote community (www.ballard.com/files/PDF/Distributed_Generation/Fuel_Cells_for_Remote_Communities_-_White_Paper_-_Apr_2012.pdf). However, the initial capital costs of installation are a major drawback that limits investment, especially given the low round-trip efficiency of the system.

According to Chauhan et al., such integrated renewable hydrogen systems should have a total load demand that exceeds 120kW for economic feasibility (http://publications.gc.ca/collections/collection_2011/schl-cmhc/nh18-1-2/NH18-1-2-133-2005-eng.pdf). In remote locations, this investment would be worthwhile as it would create a sustainable, clean and reliable energy system. Reducing energy costs and creating jobs and services around a self-sufficient, micro-hydrogen community could give an economic impetus and boost development.

Surplus hydrogen produced could lead to a demand for fuel cell vehicles and hydrogen fueling stations. By replicating this model in neighbouring rural areas, urban regions could become later adopters once the technology was more mature and affordable. This new market would not only benefit Canadian companies, such as Ballard Systems and Hydrogenics, which are already established leaders at the world level, but would also encourage start-ups in electrolyser and fuel cell technologies.

Social

Remote Aboriginal communities suffer from complex social issues compared to the non-Aboriginal Canadian population: poorer health, lower level of education, inadequate housing, lower income, higher unemployment level, high incarceration level and higher death rate among youth due to suicide and unintentional injuries. Installing a renewable hydrogen energy system could alleviate some of these problems by creating jobs, providing a sense of sustainability, fostering community pride and encouraging entrepreneurship.

Improved air quality could reduce the incidence of asthma and bronchitis, which is higher in these populations than the Canadian average. Having power supplies close to the home and reduced vulnerability to power disruptions could lead to a better quality of life, as would suitably heated infrastructure, such as schools and community centres.

A discrete regenerative fuel cell system operates silently, which is drastically different than noisy diesel generators that disturb the usually quiet surroundings of remote communities. First Nations have traditions in which nature plays an important role. Integrating these values with the implementation of renewable infrastructure can promote acceptance. Major social challenges to this type of energy project include lack of technical skills and support, apprehension in co-operating with non-Aboriginal companies, lack of funding, etc.

EXISTING ENERGY POLICIES IN ONTARIO AND CANADA

Canada's national energy policies have been shaped by various agreements, programs and commissions. However, energy resources are under the jurisdiction of provincial governments and each has its own acts and policies. This lack of harmonization can lead to divergence from the federal vision. At the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE) 2014 meeting in Oslo, Norway, the Canadian

steering committee acknowledged the absence of a dedicated fund and mechanism for a hydrogen and fuel cell economy.

For the hydrogen and fuel cell industry, there are implications that cut across the mandates of nearly all federal ministries. The absence of a Canadian energy policy comparable to the US Department of Energy (DOE) Hydrogen and Fuel Cells Program or EU Blueprint 2020 could be an impediment to coordinated and coherent actions toward common national policies.

Although the federal government released Canadian Fuel Cell Commercialization Roadmaps in 2003 and 2008 to lay out strategies for achieving commercial viability and mass market success, this has not brought a more focused plan of action. For instance, many of the roadmap recommendations were missing from the Ontario Fuel Cell Innovation Program.

The principal stakeholders in Canada's hydrogen and fuel cell sector are represented by the Canadian Hydrogen and Fuel Cell Association, a national, non-profit organization that collaborates with the Canadian government and PricewaterhouseCoopers LLP to publish an annual industry profile. The findings from the 2013 report identified lack of funding as the primary challenge faced by the fuel cell industry. Since 2001, there has been a considerable drop in R&D funding and people employed in the industry despite an increase in revenue. In 2012, the Canadian government contributed only 12 per cent of funding for R&D activities and 13 per cent for demonstration projects.

The National Research Council and the Natural Sciences and Engineering Research Council fund several industrial research chairs in Ontario, both in renewable energy development and fuel cell technologies. There are many other government-funded programs in other provinces, leading to a lack of interaction among research groups sharing quasi-similar objectives. In 2012, academics were involved in only three of 59 global demonstration projects.

The ecoENERGY for Aboriginal and Northern Communities 2011-2016 (EANCP) program provides around \$15 million dollars for renewable energy projects (\$250,000/project) and sustainable integration of buildings (\$100,000/project) in Aboriginal and northern communities. There are other sources of federal funding. Provincially, the Ontario Power Authority's Aboriginal Renewable Energy Fund may fund up to 50 per cent of expenditures up to \$500,000 for large projects and \$100,000 for small projects. The M'Chigeeng First Nation wind turbine project is the first successfully

commissioned project. A water power project at Pic Mobert and a wind project at Henvey Inlet also benefitted from this fund. However, an energy storage solution does not seem to have been included in the projects.

As for regulations, a Canadian Hydrogen Installation Code CAN/BNQ 1784-000 has been developed by the Bureau de Normalisation du Québec (BNQ) and approved by the Standards Council of Canada to cover installation requirements for equipment for hydrogen generation and use, hydrogen storage containers, piping systems and related accessories, with certain exceptions (www.scc.ca/en/standards/work-programs/bnq/canadian-hydrogen-installation-code). Internationally, the International Organization for Standardization (ISO) is developing ISO/TC 197-Hydrogen Technologies.

AN ALTERNATIVE POLICY FRAMEWORK TO SUPPORT IMPLEMENTATION

Federal energy policy

A national energy strategy integrating fuel cell and hydrogen technologies is required to provide a clear action plan and specific goals with timelines. This vision can then be used to guide the development of provincial policies. A harmonized approach will ensure coherence among the different Canadian stakeholders across the provinces, enabling the formation of bigger networks, collaborations and partnerships at the research, commercial and industrial levels. For instance, the European Renewable Directive sets targets and oversees the action plans of each state. The US DOE has a fuel cells technologies office that provides centralized support for developing and deploying these technologies.

There is also a need to revamp the National Energy Board to include experts with diverse energy backgrounds to represent the interests of all energy industry stakeholders. Due to a hydrocarbon-based energy strategy in western Canada, hydro-nuclear in the east, and the failure of the National Energy Program, there is a need for bold federal political actions to reunite and coordinate efforts.

Education and awareness

The Hindenburg disaster in 1937 has shaped the public perception of hydrogen as a dangerous substance, but hydrogen is less destructive to its immediate surroundings than gasoline or diesel due to its low density and propensity to combust in an upward direction rather than circumferentially. However, hydrogen is flammable and explosive. It is also odourless and combusts with an invisible flame, making leak detection challenging.

To promote acceptance of hydrogen as safe, efficient and environmentally friendly, educational activities geared to the audience should be conducted to raise awareness of hydrogen's potential. For Aboriginal audiences, successful demonstration projects led by the communities themselves—such as the projects led by the Piikani Nation in Alberta and M'Chigeeng in Ontario—could be showcased. When promoting renewables as an alternative energy solution, hydrogen energy solutions should be mentioned.

Skills and capabilities

Most personnel skilled in fuel cells and electrolyzers are from graduate research programs in engineering. To enable an expansion of the

industry, an enlarged, diversified workforce with different levels of technical knowledge and expertise is required. Governments should encourage postsecondary institutions to include a fuel cells technology module as an elective in undergraduate engineering curricula, especially in the chemical, mechanical, electrical and material programs, to promote this field. Co-op and internships in small and start-up companies could be subsidized by the government, which would give students opportunities to receive practical training and provide technical support to companies.

These measures would help ensure Canada becomes a centre of excellence in hydrogen and fuel cell education, paving the way to more research breakthroughs and preventing researchers moving to countries with stronger support for hydrogen. Despite being a pioneer and world leader in the fuel cell industry, Canada is being surpassed by the US, Japan, European Union and China.

Codes, standards and regulations

The Canadian Hydrogen Installation Code CAN/BNQ 1784-000 is not sufficient to ensure regulatory compliance. It costs around \$100 to \$300 to access the code, the last available update is for 2007 and BNQ offers only a French version of its website.

To encourage start-up Canadian companies and enable international sales of products and technology, barriers to accessing these regulations and obtaining site permits and licences should be removed.

To maintain leadership in developing quality assurance for hydrogen and fuel cell technology, further tools to ensure consumer and industrial safety must be implemented. For instance, the Pacific Northwest National Laboratory funded by the US DOE recently released a National Hydrogen and Fuel Cell Emergency Response Training Resource, which provides free first responder community training materials.

Financial incentives and funding

Although funding programs are available for Aboriginal communities, the paperwork and administration can be so complicated that it deters the pursuit of projects. A dedicated support unit within concerned ministries could conduct workshops in remote regions and assist in filling out applications.

Because system efficiency is location-specific, a solution in one community will not fit another.

Scholarships could be made available for fourth-year undergraduate engineering projects and masters-level graduate students who want to get involved in renewable-hydrogen projects in remote communities. By working under the supervision of licensed engineers, the involvement of graduate students could help bring down consulting costs. By collaborating with researchers in the social and environmental sciences, the benefits of renewable and hydrogen solutions could be compared to competing fossil fuel technologies. Government funding would then not only promote fundamental research to advance hydrogen technology, but also support demonstration projects.

Apart from increasing funding for R&D, overhauling the rules and mechanisms associated with tax incentives, loans, subsidies and risk financing support would encourage entrepreneurs. Government grants should be provided to fuel cell companies to encourage them to test the new technologies in remote and off-grid regions. However, care must be taken to ensure renewable-regenerative fuel cell storage energy system projects do not just remain demonstration projects.

The Canadian Fuel Cell Commercialization Roadmap published in 2008 predicted fuel cell penetration would start off with portable electronic devices (2009-2013), then residential co-gen (2012-2017) and finally fuel cell vehicles (2015-2017). This is clearly not happening as forecasted. After nearly seven years, this roadmap needs to be redefined, notably by placing renewable-hydrogen energy storage systems in remote communities at the forefront of near-term applications.

CONCLUSION

With nuclear reactors reaching their end of life and the strong influence of the oil industry on the Canadian economy, this is an interesting time to create a unified federal energy vision. It is essential there is a political environment conducive to this shift in energy priorities and subsidy allocations.

The classic chicken-and-egg scenario for fuel cell vehicles and hydrogen fuel stations does not exist for the near-term application of renewable-hydrogen energy storage solutions. Instead of implementing renewable-hydrogen systems in remote communities as demonstrations, such projects should be the first stage of hydrogen infrastructure development.

A distributed generation future is feasible only once a viable energy storage solution becomes mainstream. For wider adoption, research and development support is required to improve the cost, efficiency and durability of the system.

The vision of the Idle No More movement (www.idlenomore.ca/vision) calls for indigenous people to be active actors in more sustainable practices. By leading sustainable energy initiatives, Aboriginal people could be more engaged, which might have a positive impact on the socio-economic issues in remote communities. On a grander scale, this could gradually steer Canada away from the fossil fuel industry into a renewable-hydrogen economy future. Σ

Jaimilla Motay is in her second year of the collaborative master's program in chemical engineering and applied sustainability, department of chemical engineering, Queen's University.

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[LETTERS]

RESPONDING TO MR. BAIGENT

As the deputy registrar of regulatory compliance at PEO, I'd like to respond to the letter "Decrease in discipline?" in the January/February 2016 issue of *Engineering Dimensions* (p. 58). The number of complaints filed annually at PEO has remained consistent over the last five years, averaging 70 complaints each year. The number of discipline matters referred each year has also remained fairly consistent, averaging six per year. These statistics, as well as others, are reported annually in PEO's annual review. The Discipline Committee endeavours to issue its written decisions as quickly as possible following a hearing; however, some decisions take longer than others. This results in a flow of decisions for publication in Gazette that is not consistent. Editorial discretion is also sometimes exercised to make best use of the "blue pages," based on the length of decisions, to fill the centre page spread. This can result in some issues of *Engineering Dimensions* not including any discipline decisions.

Linda Latham, P.Eng., deputy registrar, regulatory compliance, PEO

RETURNING TO PRINT

To help you keep the cost of the membership low, I suggested 10 years ago to go online with *Engineering Dimensions* and for only those engineers who didn't have Internet access to receive a hard copy.

Ten years later, I receive a hard copy again! As per the Editor's Note (*Engineering Dimensions*, January/February 2016, p. 6), this is one of the new developments in our profession—reverting to the print edition as the default delivery method?! No explanation, reasoning or rationale?!

Actually, I did find a reason for the new delivery method in the letter "Return to print" on page 57: we are going back to a hard copy because your digital version is not user-friendly. Do I understand this well?

On another note, while Justin Trudeau is appointing 15 women positions in his cabinet, making up half of the total of his 31-person cabinet, we have 19 candidates for our council and ALL OF THEM ARE MEN?!

Out of curiosity, I checked the pictures in the January/February 2016 issue of *Engineering Dimensions*: a woman on the cover, a woman on the "Hire Waterloo for all your talent needs" ad; a woman on the University of Waterloo "Time for an upgrade" ad; three women P.Engs recognized for achievements, etc...but no women candidates for our council. Weird...or not?

Marijana Bulatovic, P.Eng., Toronto, ON



REJECTING CPD

Competency is learning by doing, not by filling out annual forms and logging professional development hours. You are competent or not competent, and how you got competent or stay competent has little, if anything, to do with so-called continuing professional development (CPD).

CPD was imposed on engineers in Alberta some 20 years ago while Ontario engineers have been free of such an intervention. There is no indication that Alberta engineers are more competent, better overall engineers, or better people. If you cannot measure a benefit, what's the takeaway?

PEO is vigorously promoting a compulsory professional development program that neither the members, the government, nor the public is demanding. These programs are window dressing for regulators that cannot take the liability for continuing competence but wish to give the public the impression that they are doing their jobs of ensuring their members are competent in practise.

PEO gets that this flawed product is a hard sell, and is going to spend considerable time and money convincing you that your concerns are heard (the town halls on this subject showed how anyone who disagreed with their proposal was "heard"); that it won't hurt to try it on a voluntary basis (think the frog in a pot on the stove); and that making it mandatory will be necessary to stop poor engineering, retired engineers doodling with practise, and events like the Algo Mall, which it won't.

The Ontario government's Business Growth Initiative states: "We will create a smarter regulatory environment to drive business growth by fostering a regulatory system that is outcomes-focused and evidence-based. We will boost our efforts with a new challenge to remove unnecessary red tape and by making government rules easier to follow."

Regulators like PEO should have similar objectives. The proposed CPD is not outcomes-focused or evidence-based, and in a competitive world it is unnecessary red tape.

Before it is pushed further, it must be shown that PEO's CPD proposal is an issue that solves some demonstrated need, provides a system that can be measured by results versus goals, and that it has been chosen by a rational analysis. Indeed, it must be shown to be superior in some way to the modern CPD models in Europe directed toward the certification of teams.

A last century model focusing on individual performance should be rejected.

Patrick Quinn, PhD (honoris causa), P.Eng., FEC, Mississauga, ON





Annette Bergeron, P.Eng., then chair of the CPDCQA Task Force, answers a question at a PEO town hall last fall. Photo: Kris Popielek, P.Eng.

MAKING OUR POSITION KNOWN

As an attendee at PEO's town hall meeting in November and an opponent of CPD, I disagree with Annette Bergeron's [P.Eng., then the chair of CPDCQA Task Force] assessment that "70 per cent of attendees came around to supporting our program and 30 per cent of attendees did not want to listen" ("Members warming to idea of CPD," *Engineering Dimensions*, January/February 2016, p. 16).

I believe she mistook a polite response as acceptance and it was she who failed to listen to views that did not fit her narrative.

Many believe that compulsory professional development (CPD) is a solution proposed for a problem that does not exist. No system is perfect and no credible proponent of CPD is prepared to guarantee that the proposed CPD would prevent the future failure of an aging parking garage or other similar structure.

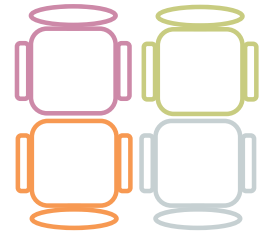
Social sciences are just as rigorous as the physical sciences. Bureaucracies are self-perpetuating and inevitably grow over time. Be reminded of Milton Friedman's famous quote: "Nothing is so permanent as a temporary government program." Once CPD is established, it grows and becomes more intrusive. As a CPA/CMA, I can attest to this result based on experience.

Customers, employers and the marketplace are more than capable of policing engineering competence. CPD bureaucracy would be superfluous, expensive and ineffective in comparison to this market discipline that has served us well throughout our history.

Adam Smith's "invisible hand" has ensured our competence in all fields of engineering endeavour more effectively and completely than any CPD bureaucrat could even contemplate.

I'm confident that our PEO members will reject CPD in a fair referendum that allows for that option.

I understand that council is concerned about what the government would do if we reject CPD. They need not be concerned. After stacking our council with 12 voting lieutenant governor appointees (LGAs), and refusing to remove the industrial exemption, the Liberal government is already on thin ice with the 80,000 voters we represent. We also collectively have the resources to make our position known to an even broader voting audience. Steve Schillaci, P.Eng., Pickering, ON



COUNCIL COMPOSITION IMBALANCED

Your piece titled "A PEO council who's who" in the January/February 2016 issue of *Engineering Dimensions* (p. 38) was apposite and useful to our members. In particular, your colour figure across pages 38 and 39 was most insightful. It showed clearly an imbalance in the composition of council, viz. too many lieutenant governor of Ontario appointees (LGAs).

My council election platform last year included these observations:

- Council should be smaller;
- Achieve this by having fewer LGAs; and
- All LGAs should be persons from other professions, known to us as "lay LGAs." No "engineer LGAs" (practising or not) would be appointed.

My reasons have not changed over the last year. They include:

- As a self-directed profession, we elect our own members to council; we do not need the provincial government to appoint them for us;
- Specifically, lay LGAs provide valuable insight to council deliberations, bringing expertise from other professions plus their own valuable achievements and experience. They represent well the people and the provincial government on our council;
- No more than, say, six lay LGAs are needed to provide this insight; and
- The early rationale for P.Eng. LGAs was to have one from each discipline. We have not held to this for decades and, anyway, we now have over 30 disciplines. So, even if it's still desirable (and I would say it isn't), it's quite impracticable now.

continued on p. 50

[LETTERS]

continued from p. 49

With this in my election platform I was elected to council, a significant number of members agreeing with me in discussions. However, as a councillor-at-large, I would still like to hear from members on this topic. If there is still good support, I intend to introduce a council motion to direct the registrar to develop a plan to (a) reduce council size, and (b) have only lay LGA appointments, such plan to be approved by council in due course. Approved changes would then be added to our list of requests to the attorney general for the next change to the engineering act.

My PEO email is rjones@peo.on.ca or, with the editor's approval, write a letter for publication on this *Engineering Dimensions* letters page.

The above is not a criticism of any P.Eng. LGA now on council, each of whom I hold in the highest regard. Indeed, had they run for council office, all of them have the qualities to be considered seriously for election by our members.

Roger Jones, P.Eng., Thornhill, ON

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 jcoombes@peo.on.ca.

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