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SEPTEMBER/OCTOBER 2013

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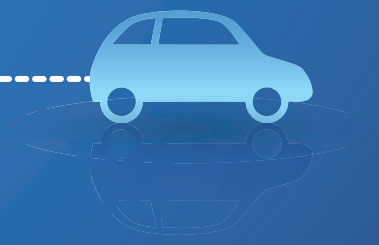

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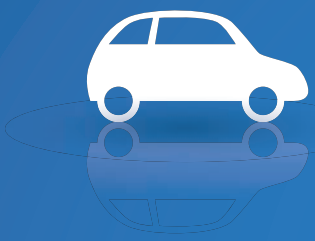

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ENGINEERING DIMENSIONS

SEPTEMBER/OCTOBER 2013

FACT OR FICTION?

Dispelling some myths and misconceptions about engineering practice

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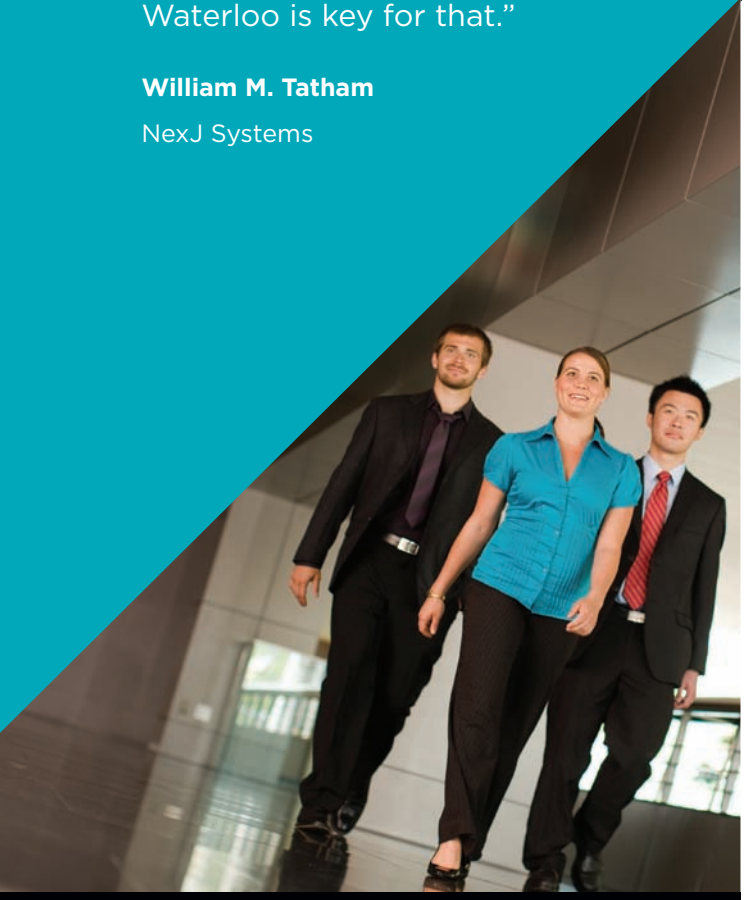

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AN EVENTFUL SUMMER

Annette Bergeron, P.Eng.
President

WHILE THE SUMMER months often provide organizations some downtime, this certainly has not been the case at PEO this July and August.

During the lead-up to the provincial byelections on August 1, several of our chapters reached out to candidates in each of the five ridings involved and held all-candidate debates in four, including London West, Ottawa South, Scarborough-Guildwood and Windsor-Tecumseh. The goal was to raise awareness of issues that affect regulation of the engineering profession in Ontario–including bringing attention to our dissatisfaction with the Ontario government's abrupt decision to put on hold the implementation of its three-year legislative commitment to repeal section 12(3)(a) of the *Professional Engineers Act*. This decision authorizes engineering work in a manufacturing setting to continue without requiring oversight by professional engineers, potentially putting workers at risk. Our chapter representatives also posed questions to candidates on infrastructure and energy cost and supply. Responses from the candidates were posted on PEO's website for reference prior to the byelections. I would like to extend my sincere appreciation to all of our chapter members and Government Liaison Program representatives who successfully staged these important events so quickly, and educated participants on PEO's role in protecting the public. Our work will continue until we secure an implementation date for the repeal.

Also in August, Phase I of the Elliot Lake Inquiry concluded. As the regulator of professional engineering in Ontario, PEO requested, and was granted, standing in the first stage of the inquiry, which dealt with events prior to the collapse of the Algo Centre Mall. As part of our involvement, PEO was provided the opportunity to recommend changes or additions to applicable legislation, regulations, standards and codes in relation to professional engineers and engineering, in areas relevant to the events leading up to the tragedy. The evidence presented during Part I of the inquiry spoke to several areas of concern, namely:

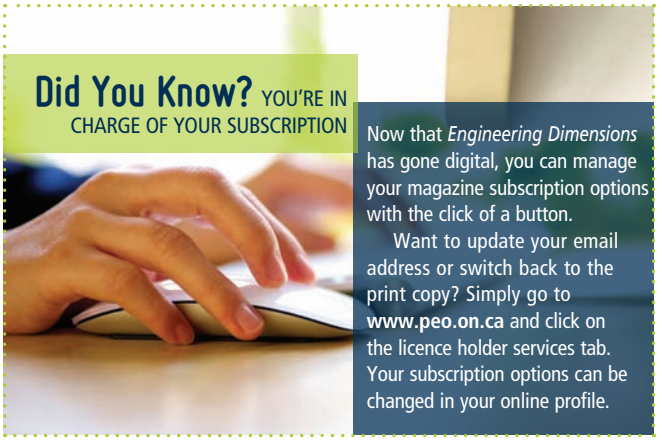
- the lack of legislative requirements or standards for structural engineering inspections of existing buildings, such as the Algo Centre Mall;
- the apparent unavailability of prior engineering inspection reports;
- the inaccessibility of comprehensive information concerning the licensing and discipline history of professional engineers;
- the qualifications of the professional engineers conducting or supervising inspections of large structures, such as the mall; and
- the applicable standards for supervision by professional engineers of work carried out by non-licensees, or people whose licences have been suspended or revoked.

PEO's 11 recommendations to the commissioner are publicly available on both the commission's and PEO's websites. They are intended to address the issues and serve as a starting point for further discussion at an upcoming policy roundtable session that will give PEO, the commission, and other participants the opportunity to fully develop the ideas set out in our submissions.

At the end of June, your council gathered for a full day of strategic review. Specifically, we reviewed our latest strategic plan from 2009 to discuss what work had been completed and what objectives should be kept, modified or created. Following the executive and council meeting in September, I look forward to posting our latest plan on the PEO website.

The search for a PEO registrar is well underway with interviews scheduled. I look forward to getting this role filled as a busy fall for PEO approaches.

I hope all of our licence holders have had a pleasant summer and are refreshed for the autumn season! Σ



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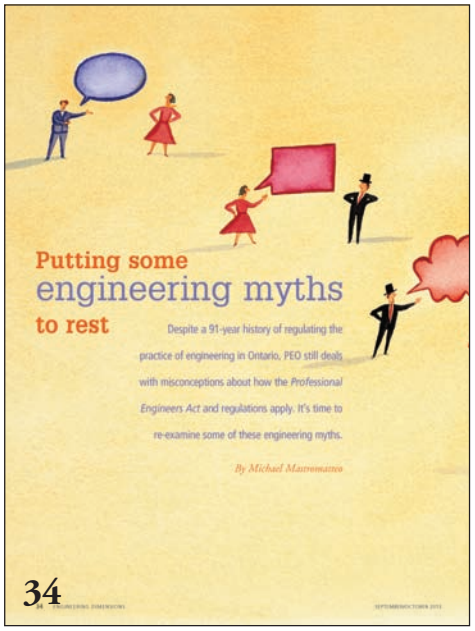

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Through the *Professional Engineers Act*, Professional Engineers Ontario governs licence and certificate holders and regulates professional engineering in Ontario to serve and protect the public.

THIS ISSUE: When misconceptions and misunderstandings arise, they are often spread widely and take on lives of their own. While many myths and urban legends are harmless, others can have significant consequences, if not debunked. This issue we set the record straight about several myths concerning engineering regulation.

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[EDITOR'S NOTE]

THE MYTHOLOGY OF ENGINEERING

Jennifer Coombes
Editor

MYTHS. Call them misconceptions, tall tales, fables, fabrications or folklore. But a myth by any other name would be, well, just as problematic for Ontario's engineers.

It's almost inevitable that in a profession as old as engineering, and with as many players, that sometimes information gets lost in translation. And lost in translation it sure does.

In this issue, we intend to lay to rest some of the most common myths–from the mild to the wild–that swirl around the practice of engineering and PEO's processes (p. 34). Many of them have been repeated for years, like a game of telephone gone terribly wrong.

For example, if you think that Ontario engineers pay the highest fees of all engineers in Canada, or your iron ring was made from the melted-down wreckage of the Quebec bridge, then this issue is for you.

If you think that you don't need insurance to practise engineering, you can't be held liable for engineering work if you haven't sealed anything, or the generic P.Eng. licence means you can do any type of engineering work you want, then this issue is *definitely* for you(!).

We also bring you the latest on two of PEO's priorities: the inquiry into the Algo Centre Mall parking deck collapse in Elliot Lake and the so-called industrial exception.

On the Elliot Lake front, Part I of the inquiry that dealt with events before the roof collapse, and in which PEO had standing, is now concluded. A PEO council committee that includes the PEO president-elect and the immediate past president has developed and submitted 11 recommendations based on concerns raised in Part I (p. 8), among them the fact that the structural assessment of existing buildings is essentially unregulated. In response, the committee proposes that PEO's *Structural Engineering Assessments of Existing Buildings* practice bulletin be enacted as a performance standard under the *Professional Engineers Act* and that under the performance standard a report be prepared by a P.Eng. following a structural assessment of an existing building. (A complete list of PEO's recommendations can be found at www.peo.on.ca/index.php/ci_id/27051/la_id/1.htm.)

As for efforts on the repeal of section 12(3)(a) of the *Professional Engineers Act*, PEO's shock at the Ontario government's decision not to go ahead with the repeal as it had planned has not given way to acceptance, but instead to renewed, energetic efforts to reiterate the message and urge politicians to make good on their promise (p. 10). This cause is particularly important to PEO President Annette Bergeron, P.Eng., who believes the repeal is important for the safety of workers in industrial and manufacturing settings and says it "should assist in reducing the more than 100 worker fatalities that occur in Ontario manufacturing each year."

Finally, I'd like to thank everyone who took the time to respond to our 2013 *Engineering Dimensions* reader survey and our annual call for ideas. Your help is very much appreciated! Σ

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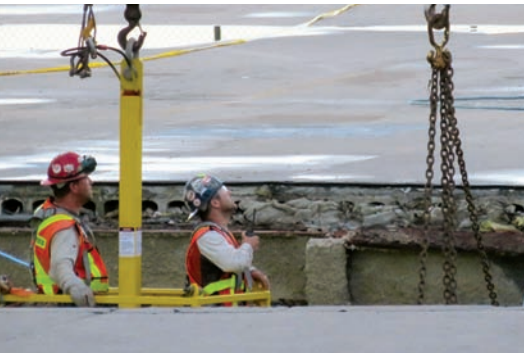
STRUCTURAL SPECIALIST DESIGNATION
central to mall collapse recommendations

By Michael Mastromatteo



PEO HAS MADE 11 recommendations, ranging from the development of a new performance standard, to the release of additional information about practitioners disciplined for professional misconduct, in its submission to the Elliot Lake mall collapse inquiry.

In the July 19 submission, PEO counsel Leah Price, LLB, and Luisa Ritacca, LLB, a Stockwoods LLP attorney obtained by the regulator for the inquiry, focused on revising the existing practice bulletin–*Structural Engineering Assessments of Existing Buildings*–into a full performance standard incorporated into regulations for the purpose of carrying out structural engineering assessments.

Recommendations also include that a mandated structural adequacy report of existing buildings be prepared and sealed by professional engineers, and that the Ontario Building Code be amended to reference such reports.

The inquiry is reviewing events leading to the June 23, 2012 collapse of part of the rooftop parking deck of the Algo Centre Mall, which killed two Elliot Lake residents and injured nearly 20 others. Led by retired Justice Paul Bélanger, the inquiry is scheduled to run until at least October 2013. Part II of the inquiry, running from August until October, is examining the actions of emergency personnel and rescue efforts.

PEO has been monitoring testimony at the inquiry with a view to recommending changes or additions to applicable legislation, regulations, and standards and codes in relation to professional engineering, in areas relevant to the events leading up to the collapse.

PEO is also conducting its own investigations to determine if professional misconduct or incompetence might have been exhibited by engineers involved with the mall.

A forensic engineering review noted severe rusting of components of the mall's roof parking lot caused the sudden collapse.

The 11 recommendations were developed by a PEO council committee comprising David Brown, P.Eng., BDS; Chris Roney, P.Eng., BDS, FEC; PEO President-elect David Adams, P.Eng., FEC; PEO Past President Denis Dixon, P.Eng., FEC; and Len King, P.Eng. Staff members assisting the committee included Leah Price, acting PEO CEO/Registrar Michael Price, P.Eng., FEC, and PEO deputy registrars Johnny Zuccon, P.Eng., and Linda Latham, P.Eng. Bernard Ennis, P.Eng., director, policy and professional affairs, also assisted the committee.

In addition to the practice standard and the structural adequacy report, PEO is recommending that additional information be made available on its public website about licensees and Certificate of Authorization (C of A) holders, including terms and conditions attached to licences or Cs of A, notices of revocations, suspensions or cancellations of the P.Eng. licence and findings of professional misconduct or incompetence that remain on the site for 10 years from the date of the findings.

In the submission, PEO also called for specialist certification of engineers carrying out structural inspections, enabled by regulation changes to create a Structural Engineering Specialist designation.

Leah Price said a structural engineering specialist would be the person taking responsibility for the content and preparation of structural adequacy reports that would become mandatory for certain existing buildings if the recommendations are implemented.

She also said implementation of the PEO recommendations will go a long way toward ensuring that incidents like the Algo Centre Mall collapse are not repeated.

Bélanger gave high marks to PEO for the recommendations. In a statement to Price when she presented PEO's submission to the inquiry on August 13, Bélanger thanked PEO "for these very detailed and very carefully considered and critically useful recommendations." He added that he was "very impressed reading them, as were counsel, and we very much look forward to PEO's further participation in the roundtables later on."

PEO's 11 recommendations to the commissioner are available on the commission's and PEO's websites at www.elliotlakeinquiry.ca and www.peo.on.ca/index.php?ci_id=2289&la_id=1, respectively. They are intended as preliminary recommendations, to serve as a starting point for further discussion at the commission's upcoming policy roundtable session, which will give PEO, the commission and those having standing in the inquiry the opportunity to fully develop the ideas set out in the submissions.

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PEO maintaining pressure on province to set new date for repeal

By Michael Mastromatteo

PEO IS CONTINUING its efforts to have the Ontario government proclaim into force repeal of section 12(3)(a) of the *Professional Engineers Act*, following the government's abrupt June 12 decision not to proceed with proclamation on September 1, 2013 as it had scheduled.

Repeal of the exception, often incorrectly called the "industrial exception," was made law in October 2010 as part of the *Open for Business Act, 2010*, but its implementation through proclamation was set for a future date to be determined to enable PEO to work with industry to ease the transition. Early in 2013, the government announced a March 1 date for proclamation, then in late February extended the date to September 1, 2013. It backed away from the September date in June and has yet to set a new proclamation date.

The decision surprised PEO and its Repeal of the Industrial Exception Taskforce (RIETF), which for nearly three years has been working with industry and the government to prepare industry for the repeal. Between 2010 and 2013, PEO actively promoted tools for compliance, offered briefings for companies and industry associations, and provided assistance and flexibility with compliance. In total, PEO:

- made contact with 450 companies;
- held 35 workshops;
- held 19 open houses for manufacturers; and
- contacted 108 industry associations and labour groups.

In addition, industry publications, including *Engineering Dimensions,* published detailed articles on the upcoming repeal, and PEO put in place a transition regulation providing employers a year following the repeal's effective date to become compliant. PEO is also offering a 42 per cent discount on the usual fees for those required to be newly licensed as a result of the repeal.

PEO maintains that failing to implement the repeal perpetuates a gap in the protection of workers in industrial and manufacturing settings. The exception permits non-licensed workers to undertake professional engineering work in relation to machinery or equipment used in their employer's facilities to produce products for their employer.

In August, PEO drew attention to two recent industrial accidents, one a fatality, the other a serious injury, to highlight the need to improve workplace safety.

"Implementation of the repeal, which the government committed to in law almost three years ago, should assist in reducing the more than 100 worker fatalities that occur in Ontario manufacturing each year," said PEO President Annette Bergeron, P.Eng., in PEO's media release.

PEO maintains that only professional engineers have expertise to design and monitor increasingly complex manufacturing processes efficiently and safely.

In July, Engineers Canada, the national association of engineering regulators, criticized the Ontario government's decision to back away from its repeal implementation date, as did the engineering regulators in Alberta, Manitoba, New Brunswick and the Northwest Territories/Nunavut. Ontario is the only province in Canada to have a full industrial or machinery exception in its engineering legislation.

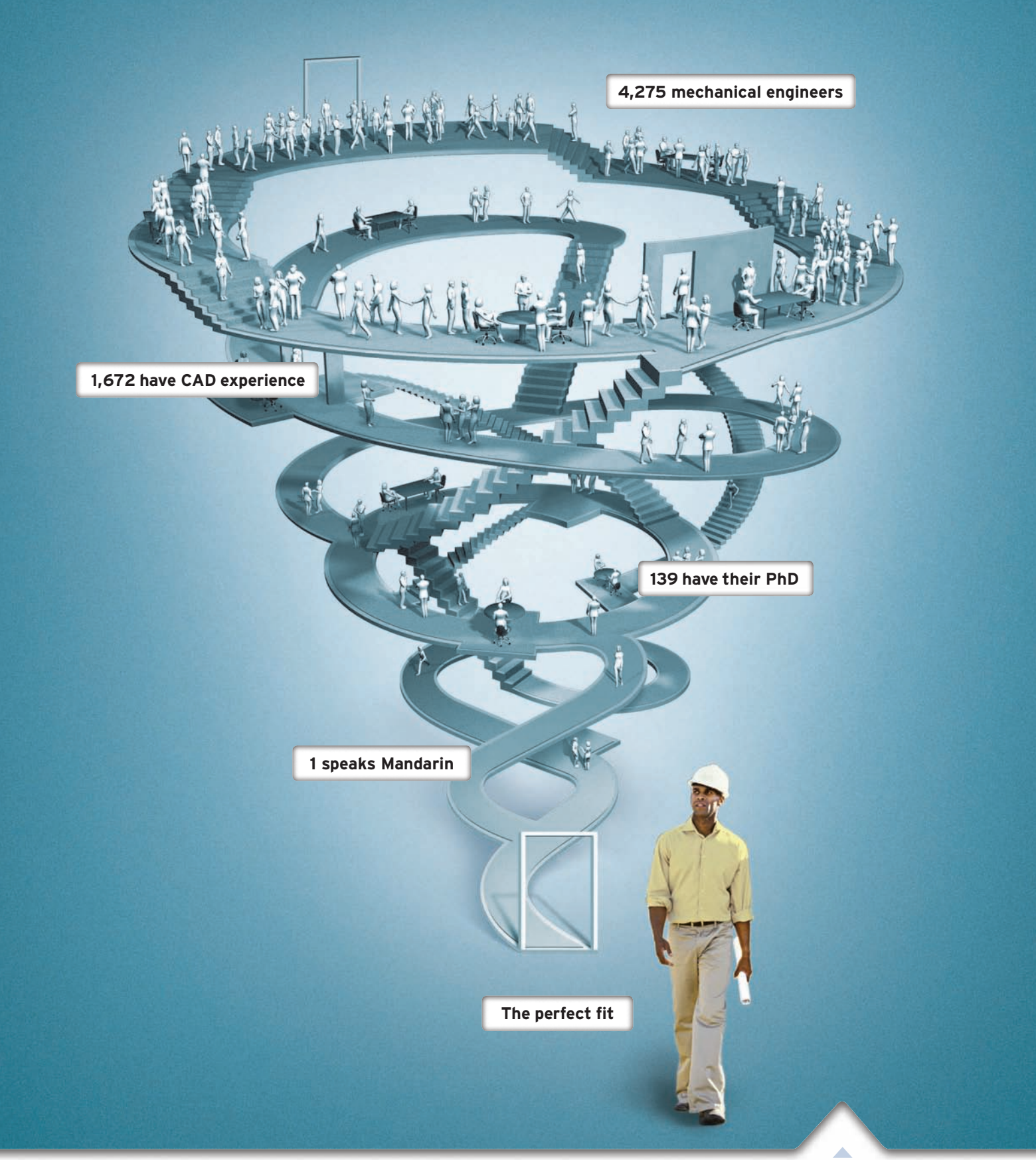
Through its Government Liaison Program (GLP), PEO also used the opportunity afforded by the August 1 Ontario byelections to raise awareness of the repeal and other issues related to engineering, by hosting all-candidate meetings in four of the five ridings electing new MPPs.

PEO estimates the cost of licensing the estimated 4000 employees who would need to become licensed should the repeal be implemented at only about $1.6 million in the first year, which it contends is a small price to pay for increased worker safety.

According to the Ontario Workplace Safety and Insurance Board, the average cost of a workplace injury claim for 2010 was estimated at more than $19,000, while the associated costs for a workplace injury could total three to 10 times that amount.

Meanwhile, PEO continues to work with the Ministry of Labour in reviewing workplace accidents, and it remains committed to highlighting the implications of the provincial government's decision to delay repeal.

For further information, visit PEO's repeal website page at www.peo.on.ca/index.php?ci_id=2259&la_id=1.



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Professional Engineers Award recipients announced

By Nicole Axworthy

Gold Medal recipient Michael Sefton, DSc, P.Eng.

This year marks the 66th anniversary of the Ontario Professional Engineers Awards, a program founded by PEO to recognize engineers for their professional achievements in a number of categories, including entrepreneurship, engineering excellence, management, research and development, and community service.

Since 2005, the awards have been presented jointly by PEO and the Ontario Society of Professional Engineers. This year, 11 awardees will be honoured at a special gala on Saturday, November 23. For ticket information, visit www.ospe.on.ca.

PROFESSIONAL ENGINEERS GOLD MEDAL

Michael V. Sefton, DSc, P.Eng., professor, department of chemical engineering and applied chemistry and Institute of Biomaterials and Biomedical Engineering, University of Toronto, has made innovative contributions to the fields of biomaterials, medical devices, chemical engineering and engineering education, and has been a long-time national and international leader in professional societies and the academic community. He has been involved with biomaterials, the substance of medical devices, for more than 35 years. Sefton has won a number of awards, including a Century of Achievement Award from the Canadian Society for Chemical Engineering, the Killam Prize for Engineering, and the R.S. Jane Memorial Award of the Canadian Society for Chemical Engineering. He has also served as president of the U.S. Society for Biomaterials.

ENGINEERING MEDAL– ENGINEERING EXCELLENCE

C. (Charles) Richard Donnelly, P.Eng., global director, water power, Hatch Ltd., is a globally-recognized leader in dam safety; independent engineer's assessments; geotechnical assessments; and project/construction management for water power facilities, dams and underground structures. Throughout his career, he accepted assignments around the world, where he developed his expertise in hydroelectric feasibility studies and fast-track project management. His specialties include designing and constructing concrete and embankment dams, tunnels and underground structures. His projects have won Canadian Consulting Engineering Awards and he has also won awards for dam safety in Canada and internationally.

Kenter Novakowski, PhD, LEL, professor and head, department of civil engineering, and director, Water Research Centre, Queen's University, is an expert in hydrogeology and groundwater engineering, a multi-disciplinary field that calls upon many aspects of engineering analysis and design. His recent research projects focus on understanding sustainable water supply and regional groundwater flow in

complex, fractured rock environments. Novakowski is a past associate editor of *Water Resources Research*, the *Journal of Contaminant Hydrology* and *Groundwater*, and has been a consultant to various private companies and agencies in North America and abroad.

ENGINEERING MEDAL–ENTREPRENEURSHIP

J. Carlos de Oliveira, P.Eng., president and CEO, Cast ConneX Corporation (CCX), transformed his graduate thesis into a product that is now used in construction projects throughout North American and is ultimately benefiting society by making buildings safer, easier to construct, and more aesthetically pleasing. In less than six years, he has grown CCX into an industry-leading building products company involved in a number of high-profile projects, including the new World Trade Center development in New York and in the Transbay Transit Center in San Francisco.

ENGINEERING MEDAL–MANAGEMENT

Robert Francki, P.Eng., global managing director, project delivery group, Hatch Ltd., joined the company following graduation from Queen's University and a few years later took on the responsibility of leading Hatch's Furnace Group. These efforts were rewarded by his winning projects around the world, including the upgrade and rebuild of Anglo Platinum's two flagship furnaces at the Waterval Smelter in South Africa. His experience in subsequent leadership roles at Hatch grew rapidly from then on, from leading and sponsoring projects, opening new offices, leading a global business

continued on p. 14

continued from p. 13

unit to his current role of directing Hatch's Global Project Delivery Group.

ENGINEERING MEDAL–RESEARCH AND DEVELOPMENT

Stavros A. Argyropoulos, PhD, P.Eng., professor, department of materials science and engineering, University of Toronto, has focused his research on aspects of the kinetics and recovery of assimilation of additions in liquid metals. He has made substantial and sustained contributions to the engineering profession through his pioneering research accomplishments, mentoring of young engineers, publications, productive interactions with industry and broad range of activities within technical societies. Some of his awards include the President's Gold Medal from the Canadian Institute of Mining and Metallurgy, the Charles W. Briggs Award from the Iron and Steel Society, US, and the Canadian Metal Chemistry Award.

Mark F. Green, PhD, P.Eng., professor, department of civil engineering, Queen's University, is known for his extensive studies on the dynamics of bridge-vehicle interaction, and as a leader in applications of fibre-reinforced polymer materials to concrete structures, and fire engineering. Through his research, he developed and validated a new algorithm for predicting the dynamic response of highway bridges to heavy vehicle loads. His technical paper on bridge-vehicle dynamics has received more than 80 citations, and his study of strengthening concrete beams and slabs with pre-stressed carbon fibre-reinforced polymer has resulted in an innovative and practical system for rehabilitating these structures.

Amir Khajepour, PhD, P.Eng., is professor, mechanical and mechatronics engineering, and Canada research chair in mechatronic vehicle systems, University of Waterloo. As a key member of the automation and controls group at the University of Waterloo, he has developed an extensive research program that applies his expertise in several key multi-disciplinary areas, including mechatronic vehicle systems and high-speed robotics. His research has resulted in several patents, technology transfers, and over 300 journal and conference publications. The processes and technologies developed from his research have been successfully translated to industry applications. As a result of his research, Khajepour founded AEMK Systems and successfully transferred his new robotic technology into a commercial industrial DeltaBot.

Jingxu (Jesse) Zhu, PhD, P.Eng., professor, department of chemical and biochemical engineering, Canada research chair in powder technology applications, and Ontario director, particle technology research centre, University of Western Ontario, has had a significant international impact in the field of fluidization and powder technology. His research has advanced the development of particle technologies for a wide variety of applications, some of which have been commercialized or are ready for licensing. These include an ultrafine powder technology for the automobile and materials industry, a dry powder coating technology for pharmaceutical solid dosage forms, a dry powder inhalation technology, and a fluidized bed bioreactor for efficient wastewater treatment.

ENGINEERING MEDAL–YOUNG ENGINEER

Michael Branch, P.Eng., president and CEO, Inovex Inc., founded the company in 2003 after graduating from the University of Toronto. Since then, Branch has grown the company into a leader in the Canadian software development industry, specializing in the development of web and mobile software applications, with a focus on health care, environmental and energy sectors. This past year, Inovex launched its first software as a service product, Maps BI, that provides visual insight into an organization's geo-spatial data, earning two Silver Stevie Awards at the 2013 International Business Awards for Best New Software Product and Best Software Design.

CITIZENSHIP AWARD

Anthony Pasteris, P.Eng., chairman and president, Minerva Canada Safety Management Education Inc., has worked with Minerva to develop safe and healthy workplaces across the country. Minerva is a volunteer, not-for-profit organization dedicated to improving businesses and reducing injuries through safety management education. As its chairman and president, Pasteris has promoted and led Minerva initiatives that have reached out to new engineering and business professors with teaching material on health and safety, and over 100 undergraduate students through its awards program and sponsored projects.

Human rights commission

TARGETS CANADIAN EXPERIENCE FACTOR

By Michael Mastromatteo

ONTARIO'S Human Rights Commission (OHRC) is calling for a review of the Canadian experience requirement for licensing used by self-regulated professions.

In a policy statement released July 15, the OHRC said the Canadian experience requirement could constitute "prima facie discrimination" and should be used only in very limited circumstances.

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SERVICE FACILITY GETS CUSTOM VENTILATION THAT DOESN'T BREAK THE BANK

Hunting Energy Casper, Wyoming

Located in Casper Wyoming, "The Hunting Energy Project" was designed for a building used for servicing oil and gas mining equipment.

The Challenge:

The nature of the facility required a high ventilation rate, to improve both the quality of the work environment as well as productivity.

The Problem:

How to improve ventilation without breaking the bank.

The Process:

The Engineer of record, using all the resources available to him, performed a detailed economic analysis. He compared three commercial options: Dual Core™, Standard Technology and a Standard MUA.

By Analyzing First Cost, Annual Operating Cost, Payback, Internal Rate of Return (IRR) and most importantly Total Present Worth (Net Present Value) a complete Life Cycle cost was performed.

When operated at a 24/7 duty cycle, the results were impressive. See the charts to the right.

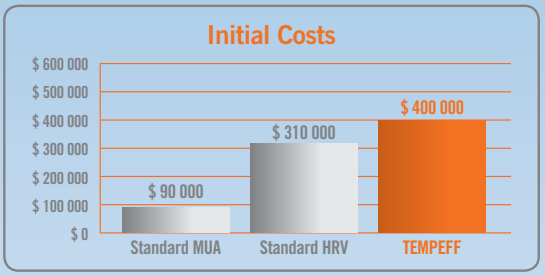
The Conclusion:

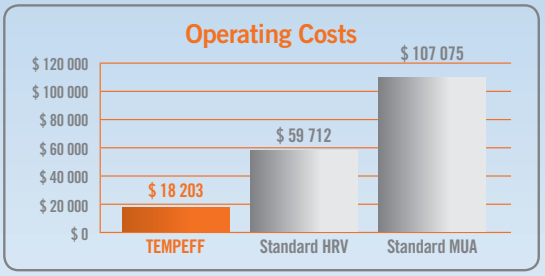
The Tempeff Dual Core™ ERV was the only true option. The equipment clearly showed the best Life Cycle Value. The Net Present Value was almost half of the compared alternate ERV. The Dual Core™ operating cost is 69.5% lower than the alternate ERV and 83% less than a standard make-up air unit.

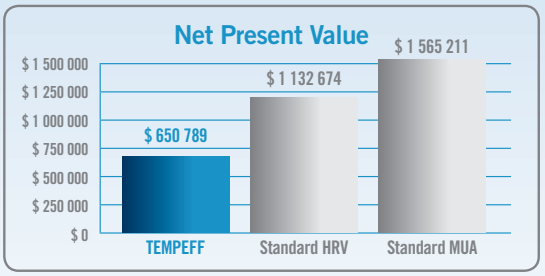
The Result:

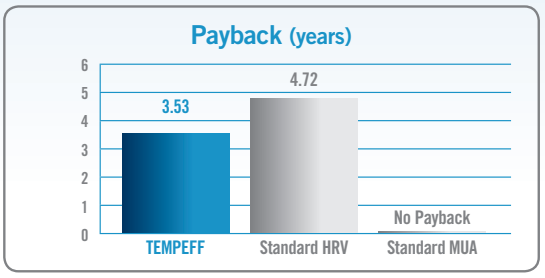
On the strength of the Engineer's detailed analysis, Hunting Energy purchased Two Tempeff Dual Core™ Energy Recovery Units.

For more info on our product, visit: **tempeffnorthamerica.com**









Turning Up the Heat on Energy Recovery

TEMPEFF
VENTILATION TECHNOLOGIES

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Section 33(1)4 of PEO's Regulation 941/90 requires that at least 12 months of the 48-months of required experience in the practice of professional engineering "be acquired in a Canadian jurisdiction, under the supervision of one or more persons legally authorized to engage in the practice of professional engineering in that jurisdiction," a requirement PEO council may vary or waive in circumstances it considers "in the public interest to do so."

"The onus will be on employers and regulatory bodies to show that a requirement for prior work experience in Canada is a bona fide requirement, based on the legal test this policy sets out," the OHRC says.

The commission also outlined a number of best practices regulators should consider to better accommodate internationally trained professionals. Among these are the use of competency-based methods to assess an applicant's suitability for licensing, removing any old practices that give rise to human rights concerns, and accepting all relevant work experience, regardless of where it was obtained.

The OHRC also calls on regulators to dispense with Canadian experience requirements generally, and to avoid the tendency to discount an applicant's experience simply because it was obtained outside Canada.

Section 6 of the Ontario Human Rights Code states that every person in Ontario has a right to be free from discrimination with respect to membership in any trade or occupational association or self-governing profession based on race, ancestry, colour, place of origin and ethnic origin.

"Even where employers and regulatory bodies may be acting in good faith," the commission says, "a candidate's Canadian experience, or lack thereof, is not a reliable way to assess a person's skills or abilities. And, imposing requirements of this nature may contravene the [human rights] code. Employers and regulatory bodies should be clear about the specific qualifications they are seeking, rather than using 'catch-all' terms like 'Canadian experience.'"

In January 2013, the Ontario Fairness Commissioner, a provincial agency aimed at reducing barriers to employment for immigrant professionals, released its *Fair Way to Go* report, which described the Canadian experience requirement as a persistent barrier contributing to a systemic disadvantage for immigrant professionals.

The fairness commissioner suggested that regulatory organizations failing to prove that all their registration requirements are fair and reasonable could be vulnerable to a human rights challenge.

In fact, Engineers Canada has been working on developing a competency-based work experience assessment system since 2008, with the intention of creating a more consistent, clear and objective way of assessing the requirement of four years of engineering work experience. The Association of Professional Engineers and Geoscientists of Saskatchewan and PEO piloted the assessment system in 2012.

Recently, the Engineers Canada project team submitted an application to Employment and Social Development Canada for funding to create an online tool for the assessment of competencies for licensure. The application is currently under review, and a response is expected by year end. Further information is available from Engineers Canada at www.engineerscanada.ca/e/pj_competency.cfm.

Momentum building for **NATIONAL LICENSING FRAMEWORK**

By Michael Mastromatteo

A PEO task force supporting Engineers Canada's national framework on licensure project is reporting significant progress on efforts to bring consistency to all Canadian regulators' registration and licensing practices.

The national framework, also known as the Canadian Framework for Licensure (CFL), is designed to produce "foundational documents" to help regulators enhance the quality, consistency and fairness of their regulatory processes.

The project also aims to improve public safety, while enabling increased mobility of registrants and licensed practitioners from one province or territory to another.

PEO has established its own national framework task force and is contributing to a steering group of regulators' senior executives who will guide the project.

Diane Freeman, P.Eng., FEC, former PEO president, is chair of the Ontario regulator's National Framework Task Force.

She told *Engineering Dimensions* that, at its July 9 meeting, the task force focused on three elements of the national framework: the definition of professional engineering, the objects of engineering acts province to province, and enforcement practices of the various regulators.

"As part of our work, we send the background research material to PEO licence holders for review and comment," Freeman said. "The comments on each element are received by the PEO task force, and vetted, and the task force reports back to Engineers Canada on each element."

Freeman said the process is for Engineers Canada to finalize each element of the national framework and send it to PEO

and the other provincial/territorial regulators for endorsement.

"It's very important to note that the element work is high-level and comes from the perspective that if you were starting from square one on each element, and also knowing what we know now, what would a best practice look like," Freeman added.

According to Engineers Canada, endorsed elements of the framework for licensing include accountability of engineering organizations, competencies and requirements for the engineer-in-training (or engineering intern, in PEO's case), competencies and requirements for the professional engineering licence, competencies and requirements for the limited engineering licence, continuing professional development, fairness in registration practices, and negotiating international agreements.

Elements now out for consultation are the Code of Ethics, complaint and investigation procedures, and a number of related regulatory and licensing considerations.

Once all the consultations are complete, Engineers Canada plans to send all elements of a proposed national framework for licensure out to each regulator for final endorsement.

Consulting engineers
LOOK TO IMPROVED CONTRACTS FOR MEMBER FIRMS

By Michael Mastromatteo

Barry Steinberg, P.Eng. (right), CEO, Consulting Engineers of Ontario, presented an award of appreciation to outgoing Chair Michael Snow, P.Eng. The presentation took place June 13 during CEO's annual general meeting in Toronto.

A VETERAN ENGINEER with the MMM Group is the latest chair of Ontario's consulting engineering organization.

Rob Kivi, P.Eng., vice president, transportation, Marshall Macklin Monaghan Ltd. (MMM), took over as chair of Consulting Engineers of Ontario (CEO) at the organization's June 13 annual general meeting in Toronto.

He succeeds Michael Snow, P.Eng., of Golder Associates, who remains on the CEO board as past chair.

Licensed by PEO in 1986, Kivi also chairs CEO's Government Relations Committee. He has more than 27 years' experience in consulting engineering in the province, and has worked extensively with public- and private-sector clients, as well as national and international projects.

Kivi said promoting fair procurement and business practices among member firms, while avoiding unreasonable risk and liability in project delivery and contract conditions, are key priorities for CEO.

"We are seeing significant changes in project delivery models and some discouraging trends towards contract conditions that assign unreasonable risks and liabilities to our members," Kivi said. "We will continue to monitor changing delivery methods and work with client groups to ensure that the interests of our members are protected under these models."

Kivi also cited government and client relations, communication with members and enhanced member services as additional objectives for the consulting engineers' organization in 2013.

Others to address the meeting were CEO Chief Executive Officer Barry Steinberg, P.Eng., who described the organization's achievements in government relations and strategic partnerships over the past year, and Theresa Erskine, P.Eng., of Munro Limited in Barrie, who outlined problem areas for consulting engineers involved in infrastructure renewal projects.

In addition to Kivi and Snow, CEO officers for the current term are Nick Palomba, P.Eng. (chair-elect), Bruce Potter, P.Eng. (treasurer), and David Bannister, P.Eng. (secretary).

New directors are Mike Delsey, P.Eng., Mike Tulloch, P.Eng., and Nadine Miller, P.Eng., who join incumbent directors John Krug, P.Eng., Mike Stocks, P.Eng., Peter Mallory, P.Eng., Fouad Mustafa, P.Eng., and Martin Tourangeau, P.Eng.

The annual meeting included seminars for younger and veteran consulting engineers. A young professionals session, led by John Boyd, P.Eng., of Design Firm Seminars–and a consultant in infrastructure projects with Foreign Affairs and International Trade Canada–included basic financial operations used throughout the industry and general advice on becoming a better consultant.

The second workshop emphasized mentoring, succession planning and tips for mature consultants to transfer their wisdom and experience to the next generation of practitioners.

CEO represents more than 200 engineering firms throughout Ontario, and is dedicated to maintaining a "sustainable business environment" for member firms.

We have our winners!

Congratulations to:
John Andrew Dixon, P.Eng.
Richard J. Marceau, P.Eng.
Thomas Scott Munro, P.Eng.

They have each won an Apple iPad mini for participating in the recent Ipsos Reid/PEO electronic survey of members about the 2012 council elections.

Many thanks to everyone who completed the survey.

You see the world differently – including your retirement

See the difference lower investment management fees could make to your retirement savings. Join the group plan sponsored by Engineers Canada for professional engineers and geoscientists.

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FINE-TUNING DISCIPLINE PROCEDURES

PEO's tribunals department organized a May 2 training and orientation session for newly appointed lay members of the regulator's Discipline Committee (DIC). The appointees, all lawyers, were appointed by the attorney general and will, as members of discipline panels, bring additional legal perspective to the existing roster of the DIC tribunal, which in recent years, has been dealing with more complex legal issues in the exercise of its various duties. The training was led by David Jacobs, LLB, who serves as independent legal counsel to the committee. Selected members of the DIC also took part in the session. Pictured above are, back row, left to right: David Robinson, P.Eng. (DIC member), Leigh Lampert, LLB, Sonia Singh, LLB, David Germain, LLB, Ishwar Bhatia, P.Eng. (DIC member), Brian Ross, P.Eng. (DIC member), Kathleen Robichaud, LLB, and Richard Austin, LLB. Front row, left to right: Tim Benson, P.Eng. (DIC member), Michael Wesa, P.Eng. (DIC vice chair), Glenn Richardson, P.Eng. (DIC chair), Evelyn Spence, LLB, and Stella Harmantas Ball, LLB. An eighth appointee, Karen Valentine, LLB, was unable to attend the session.

New executive for ESSCO

The PEO-supported Engineering Student Societies' Council of Ontario (ESSCO) has a new executive for 2013-2014. Seated is President Michael Kovacs of University of Waterloo, and back row (left to right) are: Taylor Standring (liaison from Canadian Federation of Engineering Students), Anson Chen (ESSCO vice president, finance), Blake Gecse (vice president, communications), Connor Olsen (vice president, services), and Zoë Zeiler (PEO's student representative on the Government Liaison Committee). ESSCO was created in 1987 to promote increased collaboration and awareness between PEO and Ontario's 17,000 undergraduate engineering students.

Engineers Canada CEO
KICKS OFF REVIVED HEARN LECTURE

By Michael Mastromatteo

Engineers Canada CEO Kim Allen, P.Eng., FEC, provided a stirring tribute to engineering August 10 at the prestigious Hearn Lecture, organized by the Toronto branch of the Institution of Engineering and Technology (IET).

PEO's former CEO/registrar, Allen focused on the theme of strengthening confidence in engineering by citing a number of key projects now in progress at Engineers Canada, the national federation of provincial and territorial engineering regulators.

The IET is a professional organization with more than 150,000 members in 127 countries and was formed in 2006 through a merger of the Institute of Electrical Engineers and the Institution of Incorporated Engineers. Its mission is to share and advance knowledge promoting science, engineering and technology throughout the world.

In his address, Allen emphasized Engineers Canada projects in the areas of regulation, public policy, accountability and mobility of practitioners.

He said there is much individual engineers can do to promote the profession to the next generation, and to provide support to legislators in the development of more technically informed public policy.

"Engineers need the tools to participate in public policy input, especially as we tend to be the ones who merge technical knowledge and systematic thinking," Allen said.

He also cited former Canadian astronaut and current Member of Parliament Marc Garneau, P.Eng., who recently told engineers in North Bay that it's incumbent on individual practitioners to promote engineering as "a door-opening profession."

Allen said Canadian engineering benefits from the diversity brought to the profession by internationally trained engineers, but added that the profession is still struggling with an informal goal of reaching equal numbers of male and female practitioners.

In 1971, the Toronto branch of the IET organized the Hearn Lecture to honour the late Richard L. Hearn, PhD, P.Eng., a central figure in the creation of Ontario Hydro (now Ontario Power Generation).

The lectures were held every three years, but went into a 14-year hiatus between 1998 and 2012.

The Toronto IET group, led by members George Chelvanayagam, P.Eng., and Jim McConnach, P.Eng., made a concerted effort to bring the lecture back this year, and believed the head of Engineers Canada would make an ideal presenter.

"Kim Allen made the audience clearly aware of the many projects, programs and initiatives at Engineers Canada, which are aimed at strengthening public confidence in engineering," McConnach says, "not only in the prime goal of protecting public health and safety, but in ensuring a more sustainable and better world."

Jim McConnach, P.Eng. (left), of the Toronto branch of the Institution of Engineering and Technology, thanks Engineers Canada CEO Kim Allen, P.Eng., FEC, for Allen's presentation at the August 10 Hearn Lecture.

His view was seconded by Chelvanayagam, who said the speaker brought out valid points with respect to regulations and the need to promote the engineering community far and wide.

Among the more than 100 invited guests at this year's lecture were PEO Past President Denis Dixon, P.Eng., FEC, Tony Cutner, CEng, chair of the IET's Toronto network, IET Chief Executive Nigel Fine, CEng, and Deputy President Naomi Climer, CEng.

Previous lectures have featured such prominent engineers as H.A. Smith, PhD, P.Eng., of early CANDU nuclear technology renown, Arthur Porter, PhD, P.Eng., the founder of the University of Toronto's school of industrial engineering, and Gordon Slemon, PhD, P.Eng., former dean of engineering at the University of Toronto.

Program promotes safety culture ACROSS WIDER SPECTRUM

By Michael Mastromatteo

ENGINEERS CONTINUE TO expand a safety mindset in industry and manufacturing, according to presenters at the 2013 Minerva Summer Institute.

The institute comprises safety-management education forums and other teaching materials aimed at advancing health and safety education in post-secondary institutions.

The institute was founded in 1989 by the Canadian Society of Safety Engineering. It now exists as the only educational organization of its kind in North America.

Professional engineers are major participants in the safety forums, due to the key roles they play in the design of safety systems and industrial equipment and machinery.

The 2013 forum was held May 15 at Ryerson University in Toronto, with Mohamed Lachemi, PhD, P.Eng., provost, offering welcoming remarks. Jacob Friedman, PhD, P.Eng., chair of mechanical and industrial engineering at Ryerson, chaired the 2013 forum.

Key themes this year included instilling a safety culture, the business case for health and safety, the importance of safety education to the engineering undergraduate, process safety management and the integration of health and safety into the engineering curriculum.

The annual James Ham Safe Design Award is also presented during the summer institute. The award celebrates engineering undergraduates who integrate workplace safety into design projects. This year's award went to University of Toronto engineering undergraduates Sherri Cui and Shen Wang (*Engineering Dimensions,* July/August 2013, p. 28).

The evening portion of the summer institute is devoted to award presentations to Minerva executives and volunteers.

Minerva President Tony Pasteris, P.Eng., said enhanced health and safety information is becoming a key component of an engineering education, but that the concepts must be continually addressed throughout a practitioner's career.

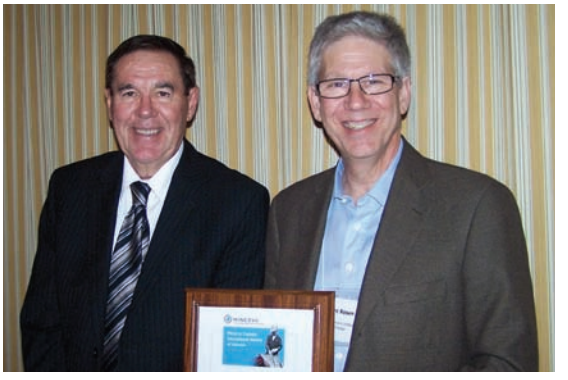
"I believe that all Canadian universities need to instill a stronger culture of safety and make safety a core value for all engineers they educate and train," Pasteris said.

Graeme Norval, PhD, P.Eng., associate chair and undergraduate coordinator, department of chemical engineering and applied chemistry, University of Toronto, and a prominent supporter of Minerva initiatives, suggested that ongoing learning will pay dividends for engineers as they enter the world of work.

"The typical engineering curriculum stops just short of safety management," Norval says.

He says the educational modules offered online by the institute are "incremental support pieces" that contribute significantly to an engineering graduate's knowledge after they leave school and enter the workforce.

In 2011, Minerva began developing health and safety engineering student modules that can be integrated into the existing engineering curriculum. The following year, it received unanimous endorsement for its teaching modules from the National Council of Deans of Engineering and Applied Science.



Tony Pasteris, P.Eng. (left), president, Minerva Canada, presented the Educational Award of Honour to Minerva board member Marc Rosen, PhD, P.Eng., May 15 as part of ceremonies marking the 2013 Minerva Summer Institute. Pasteris was recently named the recipient of an Ontario Professional Engineers Citizenship Award, which he will receive in November.

Marc Rosen, PhD, P.Eng., professor of engineering and applied science, University of Ontario Institute of Technology, attended the summer institute as part of a panel discussion on next steps in integrating safety and health in the engineering culture. Rosen also serves on the national board of directors for Minerva Canada. He said another key reason for incorporating safety, health and environmental management into the engineering curriculum is to help maintain a program's accreditation by the Canadian Engineering Accreditation Board. "For instance, health and safety is taught in many of the courses to ensure students develop an appreciation of it and an ability to manage it," Rosen said. "This includes emphasizing safety, health and environmental management in relevant courses, such as design, thermal environmental engineering, thermal power generation, sustainable engineering and pollution prevention."

Pasteris is optimistic the summer institute and teaching modules will continue to make inroads in engineering education across the country.

FEMALE ENGINEERS IN OTTAWA AND HAMILTON LOOK AT FEDERAL AND PROVINCIAL PROSPECTS

By Howard Brown and Kaitlynn Dodge

TWO FEMALE ONTARIO engineers. One already with a nomination for the legislature. Another with a try under her belt and looking at taking another shot.

Jennifer McKenzie, P.Eng., is running provincially for the New Democratic Party (NDP) in Ottawa Centre. She won the NDP nomination and is taking on Liberal MPP and recently appointed Minister of Labour Yasir Naqvi, who has held the riding since 2007. McKenzie is a graduate of Queen's University in electrical engineering. Since 2006, she has been an elected trustee on the Ottawa-Carleton District School Board and has held the position of chair for the past three years.

Anne Tennier, P.Eng., ran federally for the Liberal Party in Hamilton Centre in 2011 and is looking at running again. If she does, it will be against an incumbent NDP MP, who has held the riding since 2004. Tennier holds a master's in chemical engineering from the University of New Brunswick.

While there have been other female engineer candidates in the past–as recently as the 2011 provincial election, where East Toronto professional engineer Marisa Sterling, P.Eng., ran for the Liberal party–if either is elected, she will be the first female engineer in her respective legislature.

"Although it will be a challenge, I know that I have a strong chance," said McKenzie in an interview with *Engineering Dimensions* in July.

Jennifer McKenzie, P.Eng., is running provincially for the NDP in Ottawa Centre.

Anne Tennier, P.Eng., ran federally for the Liberal Party in Hamilton Centre in 2011 and may be looking at another shot.

Today, there are three engineers in the Ontario legislature and four in the House of Commons. All are male. Each of the provincial representatives has been profiled in *Engineering Dimensions* in the past.

McKenzie says, "I think it is important for engineers to get involved in politics, as we bring an important set of skills to the political arena." She feels those skills include strong teamwork, inclusivity, analytical skills, good decision making, and an ability to look at issues from a variety of perspectives. "I've taken on strong incumbents before and won... you may have another P.Eng. yet in the legislature," she says.

"I will make a decision in the next six months," says Tennier, who is vice president, environmental affairs, at Maple Leaf Foods. Earlier in her career, she was the first female operating superintendent in Canadian Pacific's history.

Some people are encouraging her to run in other ridings that are perceived to be more "winnable." But, although it's a tough riding, she is leaning toward Hamilton Centre, where she lives. "I feel I have an affinity to the riding and I could have a greater impact on solving the issues important to the riding, like poverty, homelessness and creating job opportunities."

When asked why more engineers should run for public office, she says: "I've been a registered engineer since 1982. I've always worked in a male-dominated environment. You do develop a bit of toughness and a thicker skin, which prepared me for the world of politics," she said. "There is a different way in how women and women engineers look at decision making–we often incorporate the social implications of an issue."

It looks like both McKenzie and Tennier are ready for the challenge. Σ

Howard Brown is president, and Kaitlynn Dodge is account manager, at Brown & Cohen Communications & Public Affairs.

ENGINEERS HONOURED FOR ACHIEVEMENTS

By Nicole Axworthy

New CAE fellows are, clockwise from top left, Bill Buckley, P.Eng., Bruce Vincent Burlton, LEL, Claudio Canizares, P.Eng., Simon Foo, P.Eng., R. Doug Hooton, P.Eng., and Andrew K.S. Jardine, P.Eng.

TWENTY PEO licence holders have been inducted as new fellows into the Canadian Academy of Engineering (CAE). The ceremony took place on June 20 in Montreal, in conjunction with the academy's 2013 AGM and symposium. New fellows are: **Bill Buckley, P.Eng., Bruce Vincent Burlton, LEL, Claudio Canizares, P.Eng., Yu-Ling Cheng, P.Eng., Simon Foo, P.Eng., Rafik Goubran, P.Eng., R. Doug Hooton, P.Eng., Andrew K.S. Jardine, P.Eng., Mark Kortschot, P.Eng., Andreas Mandelis, LEL, Dougal McCreath, P.Eng., David Naylor, P.Eng., John Douglas Pearson, P.Eng., Walter F. Petryschuk, P.Eng., Mohini Sain, P.Eng., Amir Shalaby, P.Eng., Slobodan P. Simonovic, P.Eng., Christopher Tattersall, P.Eng., Pierre François Tremblay, P.Eng.,** and **Chris Twigge-Molecey, P.Eng.** The CAE is an independent, self-governing and non-profit organization. Its members are nominated and elected by their peers to honorary fellowships to recognize their achievements and career-long service to the engineering profession.

Three PEO members have been appointed members of the Order of Canada. **Anne Sado, P.Eng.,** president, George Brown College, has been recognized for her leadership in post-secondary education and community engagement. **William Breukelman, P.Eng.,** was honoured for his contributions as an entrepreneur, notably as co-founder of IMAX and other pioneering imaging companies. **Robert Thirsk, P.Eng.,** was appointed for his contributions to space exploration and to the promotion of science education. The country's highest civilian honour, the Order of Canada was established in 1967 during Canada's centennial

More CAE fellows, top row left to right, Mark Kortschot, P.Eng., Andreas Mandelis, LEL, Dougal McCreath, P.Eng.; second row left to right, David Naylor, P.Eng., John Douglas Pearson, P.Eng., Walter F. Petryschuk, P.Eng.; third row left to right, Mohini Sain, P.Eng., Amir Shalaby, P.Eng., Slobodan P. Simonovic, P.Eng.; bottom row left to right, Christopher Tattersall, P.Eng., Pierre François Tremblay, P.Eng., and Chris Twigge-Molecey, P.Eng.

Anne Sado, P.Eng., and Robert Thirsk, P.Eng., were recently appointed members of the Order of Canada.

John Bandler, P.Eng., received the 2013 IEEE Microwave Career Award from the IEEE Microwave Theory and Techniques Society. Photo: Beth Bandler

year, and recognizes a lifetime of outstanding achievement, dedication to community and service to the nation. Since its establishment, more than 6000 people from all sectors of society have been invested in the order.

John Bandler, P.Eng., professor emeritus, department of electrical and computer engineering, McMaster University, and president, Bandler Corporation, is the first Canadian to be recognized with the Microwave Career Award from the IEEE Microwave Theory and Techniques Society. The award is given for "career leadership, meritorious achievement, creativity and outstanding contributions in the field of microwave theory and techniques." In 2004, Bandler also received the society's Microwave Application Award. The IEEE society is a technical organization with more than 11,000 members worldwide.

Three PEO members were recognized by ASHRAE for their contributions to the society. George Menzies, P.Eng.,was honoured with the Exceptional Service Award for continuing to serve the society with exemplary effort. Hugh Crowther, P.Eng., and Tim McGinn, P.Eng., were honoured with Distinguished Service Awards for giving freely of their time and talent to the society. ASHRAE is a building technology society that focuses on building systems, energy efficiency, indoor air quality, refrigeration and sustainability.

Ralph Bougher, P.Eng., has been honoured with the Queen Elizabeth II Diamond Jubilee Medal by Governor General David Johnston. Bougher was nominated by the Town of Slave Lake, Alberta, for his contribution as town recovery manager after the devastation of the 2011 wildfires.

Dean Cristina Amon, P.Eng., faculty of applied science and engineering, and Professor Javad Mostaghimi, PhD, P.Eng., mechanical and industrial engineering department, University of Toronto, have been awarded the 75th Anniversary Medal of the American Society of Mechanical Engineers (ASME) heat transfer division. Amon and Mostaghimi were among the only three recipients from Canada. Amon is known as a pioneer in the development of computational fluid dynamics for formulating and solving thermal design problems subject to multi-disciplinary competing restraints. She was also honoured with the ASME Heat Transfer Memorial Award in 2009 and the Gustus Larson Memorial Award in

2000. Mostaghimi is the founding director of the Centre for Advanced Coating Technologies, one of the world's leading research centres in the area of thermal spray technology. He was honoured with the ASME Heat Transfer Memorial Award in 2012. The anniversary award recognizes engineers who have made outstanding contributions to the heat-transfer community.

Amon was also recently named one of the Top 25 Women of Influence in the *Women of Influence* Winter 2012 issue.

Richard J. Bathurst, PhD, P.Eng., professor, civil engineering, Royal Military College, and 2013-2014 president, Canadian Geotechnical Society, has been selected to deliver the 2014 Giroud Lecture, one of the International Geosynthetics Society's highest honours. Established in 1998, the Giroud Lecture award has recognized exceptional achievement and influence in the field of geosynthetics and has been delivered every four years at the opening of the International Conferences on Geosynthetics, hosted by the International Geosynthetics Society. Bathurst will present the lecture on September 21 in Berlin, Germany.

Bathurst also recently received the 2013 C.A. Hogentogler Award from ASTM International. This annual award goes to an author or authors of a paper on soil and/or rock for engineering purposes that is published by the society. The purposes of the award are to "stimulate research, encourage the extension of knowledge of soil and rock, and to recognize meritorious effort."

Pierre Lassonde, P.Eng., chairman, Franko Nevada, was inducted into the Canadian Mining Hall of Fame in recognition of his exemplary career as a "professional engineer, astute investor, innovative financier, entrepreneurial company builder, dedicated philanthropist and senior statesman of Canada's mining and investment industries," according to his award profile. Lassonde has received many other awards, including Mining Man of the Year (1997) and Developer of the Year (1999) with Seymour Schulich, the Inco Medal (2001), several honorary doctorates in Canada and the US, and the Order of Canada (2002).

Eric Newell, P.Eng., received the Award for Excellence in Aboriginal Relations from the Canadian Council for Aboriginal Business and Sodexo Canada. During his time as CEO of Syncrude Canada Ltd., he founded a highly successful Aboriginal relations program. The award is presented to a Canadian who has personally contributed, through his or her professional and voluntary commitments, to building bridges between Aboriginal people and Canada's business community. The recipient of the award is selected by a jury of Aboriginal and non-Aboriginal business leaders.

Professors Molly Shoichet, PhD, LEL, Milos Popovic, PhD, P.Eng., and Andreas Mandelis, PhD, LEL, from the University of Toronto were named three of the university's 10 Inventors of the Year, which recognizes inventions that have the potential to improve our quality of life. Shoichet's nomination stems from three inventions for her work with polymers for

Cristina Amon, P.Eng., and Javad Mostaghimi, PhD, P.Eng., were awarded the 75th Anniversary Medal of the American Society of Mechanical Engineers heat transfer division.

Molly Shoichet, PhD, LEL, has been recognized as one of 10 Inventors of the Year by the University of Toronto.

R. Kerry Rowe, PhD, P.Eng., has been elected a fellow of the Royal Society in the UK.

drug delivery and regeneration. Popovic is being honoured for neuroprosthetic systems, which are devices designed to help restore or replace functions of the human nervous system when it has been damaged. Mandelis and his team are recognized for their diagnostic device for the detection and monitoring of tooth decay. The resultant company, Quantum Dental Technologies, has led to the commercialization of the Canary System.

Doug Hooton, PhD, P.Eng., professor, civil engineering, University of Toronto, was presented the Frank E. Richart Award by the American Society for Testing and Materials. Hooton has long been recognized as a leading figure in engineering research and leadership, currently serving as NSERC/CAC industrial research chair in durable and sustainable concrete. The Richart award is presented once every three years and recognizes meritorious contributions to the society in research and standardization with concrete and concrete aggregates.

David Plant, PhD, P.Eng., professor, department of electrical and computer engineering, McGill University, is one of six recipients of the Killam Research Fellowships for 2013. The goal of Plant's project is to improve the fibre optic networks that are the backbone of the Internet. His research will concentrate on fibre optic transmission and silicon-photonic transceiver arrays. The Killam fellowships provide $70,000 a year for two years to each project. They enable researchers to be released from teaching and administrative duties so they can pursue independent research. The primary purpose is to support advanced education and research at five Canadian universities and the Canada Council for the Arts.

R. Kerry Rowe, PhD, P.Eng., professor, department of civil engineering, Queen's University, has been elected a fellow of the Royal Society in the United Kingdom. Rowe was only one of four Canadians, and the world's only civil engineer, elected to the prestigious institution in 2013. He was described by the Royal Society as one of the most distinguished civil engineers of his generation.

Adel Sedra, PhD, P.Eng., received an honorary doctor of science degree from the University of Victoria. His citation noted that he is a gifted scholar, teacher, university administrator and advocate for engineering research and education. As dean of engineering at the University of Waterloo from 2003 to 2012, Sedra played a leading role in establishing the first overseas Canadian university campus, the University of Waterloo's United Arab Emirates campus, offering multiple undergraduate programs. He also supervised more than 60 graduate students and is the holder of three patents, author of more than 60 refereed journal papers and the co-author of three books.

CALL FOR NOMINATIONS

The Ontario Wood *WORKS!* awards program is accepting nominations for its 13th annual awards. The program recognizes people and organizations dedicated to pioneering and preserving the use of wood in Ontario. Submission forms are available at www.woodworksawards.com. The deadline for submissions is Friday, September 20, 2013. Σ

SUMMARY OF DECISION AND REASONS

In the matter of a hearing under the *Professional Engineers Act*, R.S.O. 1990, c. P.28; and in the matter of a complaint regarding the conduct of SIRAJUL B. MOFAK-KHARUL IQBAL, P.ENG., a member of the Association of Professional Engineers of Ontario and IQBAL & ASSOCIATES ENGINEERING, a holder of a Certificate of Authorization issued by the Association of Professional Engineers of Ontario.

This matter was brought forward for a hearing before a panel of the Discipline Committee on May 3, 2013, at the Association of Professional Engineers of Ontario (the association) in Toronto.

BACKGROUND

The hearing arose as a result of the member and holder having inspected a number of single-family dwellings and having subsequently signed and sealed letters to the effect that the member found these buildings to be in general compliance with the Ontario Fire Code.

On the basis of a review by an independent fire safety engineering expert, it was alleged that the member and holder conducted themselves improperly. The expert was asked to review the Iqbal reports as well as the actions and conduct of Iqbal and Iqbal & Associates Engineering (IAE) and concluded that there were, in fact, several deficiencies in the buildings and significant omissions in Iqbal's statements of compliance with the Ontario Fire Code as issued for these single-family dwellings. The fire safety expert also concluded that Iqbal and IAE did not meet the acceptable standard of practice for engineering work related to the general review of the safety condition of single-family dwelling houses.

AGREED FACTS

The parties presented an Agreed Statement of Facts, setting out that:

- Iqbal is a professional engineer licensed pursuant to the *Professional Engineers Act*.

- IAE is an unincorporated sole proprietorship and a Certificate of Authorization holder. Iqbal was at all material times the contact engineer responsible for the professional engineering services provided under the Certificate of Authorization.

- In or about early April 2010, Iqbal conducted an inspection of a single-family dwelling at 420 Rutherford Road North in Brampton, Ontario, which had been renovated following damage by illegal marijuana cultivation operations. The purpose of Iqbal's inspection was to determine whether the renovated building complied with the fire code. Iqbal also signed and sealed a letter to the City of Brampton dated April 11, 2010, confirming that the Rutherford Road North building had been found "in general conformance with the Ontario Fire Codes [sic]."

- On April 11, 2010, Mourad Mourad, P.Eng., an engineer with Professional Home and Building Inspectors, produced a structural review report of the Rutherford Road North building. The report identified several deficiencies in the building, including the following: (a) a door between the garage and house was very short, not insulated, and was missing an auto-closer; (b) a second-floor stairway railing was loose; and (c) the power was disconnected in the house.

- On June 10, 2010, Iqbal conducted an inspection at a separate single-family dwelling at 171 Edenbrook Hill Drive in Brampton, Ontario. As with the Rutherford Road North building, Iqbal sent a letter addressed to the City of Brampton confirming that the Edenbrook Hill Drive building had been found "in general conformance with the Ontario Fire Code."

- Brian Maltby is the fire protection division chief for the City of Brampton, Ontario. As fire chief, Maltby reviewed Iqbal's reports for

the buildings at Rutherford Road North and Edenbrook Hill Drive, as well as Mourad's report. He noted that Mourad had observed Ontario Fire Code and Building Code violations in the Rutherford Road North building that Iqbal had not identified. He also noted that the power at the building was disconnected at the time of Iqbal's report. Maltby then discovered that the power had also been disconnected at the Edenbrook Hill Drive building at the time of Iqbal's inspection of that property. Maltby filed a complaint with PEO on August 11, 2010.

- PEO retained John Roberts, P.Eng., an independent expert, to review the actions and conduct of the respondents. Roberts provided a report dated February 17, 2012. Roberts concluded, among other things, that there were significant omissions in Iqbal's statement of compliance issued for the single-family dwellings at 171 Edenbrook Hill Drive and 420 Rutherford Road North. Specifically, the letters did not identify the lack of electricity available at the time of the general reviews and the consequences: it was not possible to verify operation of the smoke alarms and the CO detectors without power to the units.

Roberts further concluded that Iqbal did not meet the acceptable standard of practice for engineering work related to the general review of the condition of a single-family dwelling house.

By reason of the facts set out above, it was alleged that the member and holder were guilty of professional misconduct as defined in section 28(2)(a) of the act. The member and holder pled guilty to these charges in the Agreed Statement of Facts.

ADMISSIONS

(a) As per the Agreed Statement of Facts, Iqbal and IAE accept and have agreed in writing that they are guilty of professional misconduct as defined in the *Professional Engineers Act*.
(b) Iqbal and IAE admit that their conduct in this matter constitutes professional misconduct as defined by the *Professional Engineers Act*, section 28(2) and Regulation 941, sections 72(2)(a), 72(2)(b), 72(2)(c), 72(2)(d) and 72(2)(j).

PLEA OF THE MEMBER AND HOLDER

The member and holder admitted and pled guilty to the allegations in the Agreed Statement of Facts.

The panel conducted a plea inquiry and was satisfied that the member's and holder's admissions were voluntary, informed and unequivocal. The engineer and holder also freely admitted and fully accepted that their conduct in this matter constituted professional misconduct as defined by the *Professional Engineers Act*, section 28(2) and Regulation 941, sections 72(2)(a),(b),(c),(d) and (j).

DECISION AND REASONS

The panel considered the Agreed Statement of Facts and the parties' submissions. The panel found that the agreed facts supported a finding of professional misconduct contrary to section 28(2) of the *Professional Engineers Act*. In particular, the panel determined that the member and holder were guilty of misconduct, as admitted, under the following sections of Regulation 941 made under the act:

- SUBSECTION 72(2)(A): negligence as defined in subsection 72(1), namely an act or omission in the carrying out of the work of a practitioner that constitutes a failure to maintain the standards that a reasonable and prudent practitioner would maintain in the circumstances;

- SUBSECTION 72(2)(B): failure to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work for which the practitioner is responsible;

- SUBSECTION 72(2)(C): failure to act to correct or report a situation that the practitioner believes may endanger the safety or welfare of the public;

- SUBSECTION 72(2)(D): failure to make responsible provision for complying with applicable statutes, regulations, standards, codes, bylaws and rules in connection with work being undertaken by or under the responsibility of the practitioner; and

- SUBSECTION 72(2)(J): conduct or an act relevant to the practice of professional engineering that, having regard to all of the circumstances, would reasonably be regarded by the engineering profession as unprofessional.

PENALTY DECISION

The parties filed a joint submission as to penalty. The panel accepted the joint submission and accordingly ordered:

1. Pursuant to s. 28(4)(f) of the act, Iqbal and IAE shall be orally reprimanded and the fact of the reprimand shall be recorded on the register for a period of one year;

2. Pursuant to s. 28(4)(b) of the act, Iqbal's licence shall be suspended for a period of five days commencing the day of 2013-05-04;

3. Pursuant to s. 28(4)(d) of the act, it shall be a term, condition or limitation on the licence of

Iqbal that he shall successfully complete PEO's professional practice exam (PPE), within one year of the date of hearing of this matter, failing which his licence shall be suspended pending successful completion of the PPE.

4. Pursuant to s. 28(4)(i) of the act, the finding and order of the Discipline Committee shall be published in summary form, including reference to names; and

5. On agreement by the parties, the panel made no order with respect to costs.

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

REPRIMAND

Following the member's and holder's waiver of their right to appeal, the panel administered the oral reprimand immediately after the hearing.

The written summary of the Decision and Reasons was signed by Jim Lucey, P.Eng., as chair on behalf of the other members of the discipline panel: Tim Benson, P.Eng., Ishwar Bhatia, P.Eng., Evelyn Spence, LGA, and Michael Wesa, P.Eng.

SUMMARY OF DECISION AND REASONS

In the matter of a hearing under the *Professional Engineers Act*, R.S.O. 1990, c. P.28; and in the matter of a complaint regarding the conduct of GERARD J. VAN ITERSON, P.ENG., a member of the Association of Professional Engineers of Ontario and 694470 ONTARIO LTD. o/a UNICON ENGINEERING, a holder of a Certificate of Authorization issued by the Association of Professional Engineers of Ontario.

This matter was brought forward for a hearing before a panel of the Discipline Committee on May 3, 2013, at the Association of Professional Engineers of Ontario (the association) in Toronto.

BACKGROUND

The hearing arose as a result of the member and holder having signed and sealed an environmental assessment report, which was alleged to have been deficient in numerous respects and did not meet minimum industry standards or the minimum standard of practice for engineering work of this kind.

ADMISSIONS

The parties reached agreement on the facts and filed an Agreed Statement of Facts (ASF). For summary purposes, the essential facts of these admissions are as follows:

1. A report titled "Phase I and II Environmental Site Assessment" (ESA) was signed by Van Iterson on or about February 22, 2010, and to which Van Iterson affixed his seal pursuant to sections 52 and 53 of the act as the qualified person required by sections 26 and 33.3 of Ontario Regulation 153/04, as amended, under the *Environmental Protection Act*, RSO 1990, c E-19 (qualified person).

2. As the qualified person, Van Iterson took responsibility for the work documented in the report as a professional engineer.

3. The report stated that its terms of reference for the Phase I Environmental Site Assessment were prepared in general accordance with CSA Standard Z768-01 and that the Phase II Environmental Site Assessment was conducted under the guidance of CSA Standard Z769-00 and in accordance with Part XV.1 of the *Environmental Protection Act*, O. Reg. 153/04, as amended.

(a) The report was deficient in numerous respects and did not meet minimum industry standards, nor did it meet the minimum standard of practice for engineering work of this kind; and

(b) The report failed to meet the requirements of the *Environmental Protection Act* and its regulation *Records of Site Condition–Part XV.1 of the Act*, O. Reg. 153/04.

By reason of the facts set out above, it was alleged that the member and holder were guilty of professional misconduct as defined in section 28(2)(a) of the act. The member and holder pled guilty to these charges in the ASF.

PLEA OF THE MEMBER AND HOLDER

The member and holder admitted the allegations as outlined in the ASF.

The panel conducted a plea inquiry and was satisfied that the member's and holder's admissions were voluntary, informed and unequivocal. The engineer and holder also admitted and fully accepted that their conduct in this matter constituted professional misconduct as defined by the *Professional Engineers Act*, section 28(2) and Regulation 941, sections 72(2)(a),(b),(d) and (j).

DECISION AND REASONS

The panel considered the Agreed Statement of Facts and the submissions of the parties and found that the agreed facts supported a finding of professional misconduct contrary to section 28(2) of the *Professional Engineers Act*. The panel thus found the member and holder guilty of professional misconduct under the following sections of Regulation 941 made under the act:

(a) SUBSECTION 72(2)(A): they were negligent;

(b) SUBSECTION 72(2)(B): they failed to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work for which they were responsible;

(c) SUBSECTION 72(2)(D): they failed to make responsible provisions for complying with applicable statutes, regulations, standards, codes, bylaws and rules in connection with work being undertaken by or under their responsibility; and

(d) SUBSECTION 72(2)(J): they engaged in conduct or performed an act, relevant to the practice of professional engineering that, having regard to all the circumstances, would reasonably be regarded by the engineering profession as disgraceful, or unprofessional.

PENALTY DECISION

The parties filed a Joint Submission as to Penalty. The panel accepted the joint submission and accordingly ordered:

1. Pursuant to s. 28(4)(f) of the act, Van Iterson and Unicon shall be reprimanded, and the fact of the reprimand shall be recorded on the register for a period of six months;
2. The finding and order of the Discipline Committee shall be published in summary form under s. 28(4)(i) of the act, with names;
3. Within one year of the decision of the Discipline Committee, Van Iterson shall successfully complete the professional practice examination (PPE), failing which Van Iterson's licence shall be suspended until such time as he successfully passes the PPE; and
4. There shall be no order with respect to costs.

The panel concluded that the proposed penalty is reasonable in all the circumstances.

When considered in its totality, it achieves an equitable balance by recognizing both the protection of the public and fairness also to the member and holder, giving them the opportunity to demonstrate their ability to be professionally rehabilitated. The panel made special note of the fact that Van Iterson and Unicon had fully co-operated with the inquiry throughout and by agreeing to the facts and a proposed penalty have accepted responsibility for their actions and avoided unnecessary expense to the association.

REPRIMAND

Following the member's waiver of his right to appeal, the panel administered the oral reprimand immediately after the hearing.

The written summary of the Decision and Reasons was signed by Jim Lucey, P.Eng., as chair on behalf of the other members of the discipline panel: Tim Benson, P.Eng., Ishwar Bhatia, P.Eng., Evelyn Spence, LLB, and Michael Wesa, P.Eng.

LEADERLESS INTO IRRELEVANCY

By Patrick Quinn, PhD (Hon.), P.Eng., FEC

ONE IN 12 "professional" engineers voted in recent elections for the governors of our profession. If engineers find PEO irrelevant, it begs the question of our status with the public.

The fact is many organizations like PEO, conceived almost 100 years ago and empowered by legislation, have failed to renew themselves adequately in a world changing faster than they appear to be able to adapt. Events indicate that PEO, in recent years of internal governance strife, has failed to devote enough of its positive energies to the needs of the times. The submission to the Algo Mall inquiry is a litany of what has been needed, but not done.

Last year, then President Adams, P.Eng., FEC, sought a judicial review, in the face of what he and many others saw as a questionable exercise of council's power in choosing to accept Michael Hogan's [PhD, P.Eng.] resignation and not his rescinding of that resignation (an option apparently exercised by an earlier council in the case of a previous councillor), thereby effectively removing from council an elected councillor-at-large. Hogan has paid PEO $31,000 after he and Adams were held accountable for $60,000 of PEO's some $200,000 costs in fighting the review. Council is now legally pursuing Adams, who has decades of service to PEO, and who has just been elected president-elect for a third time by members fully aware of the action he took on their behalf and who, as the act permits, can and should be indemnified against legal costs for actions taken in good faith on behalf of the association.

A group on council have, in recent years, successfully appropriated power from the office of the president, have taken away the members' rights to confirm major policies and, because of the voting effects of lieutenant governor appointees (LGAs), have rendered the electoral process impotent. With 12 of 28 voting members on council LGAs, they constitute a bloc, which has, if the rest of council is divided, the balance of power. As part of the appropriation of power, a concept of the president as merely an equal among equals has become a means of blocking the agendas on which presidents run.

Like an orchestra without a conductor, with its musicians playing their individual interpretations of the composer's score, council has become dissonant and ineffective, and protection of the public and the well-being of the profession have been compromised.

There are realities around 21st century society, professionalism, and regulatory processes that need to be accepted if PEO is to be relevant. At one time, a consulting engineer could and would stop work on a construction site if he or she was dissatisfied, period. Some years ago at a construction site meeting, I raised the issue of a particular site safety shortcoming. The contractor chairing the meeting told me directly to eff off. At the Algo Mall enquiry, we heard how an engineer modified his report at the "request" of the owner. At the end of the day, power positions triumph in modern business and the engineer today is rarely in a power position. PEO officially recognized this in its submission to the Algo Mall inquiry, where it seeks additional regulations to redress this imbalance.

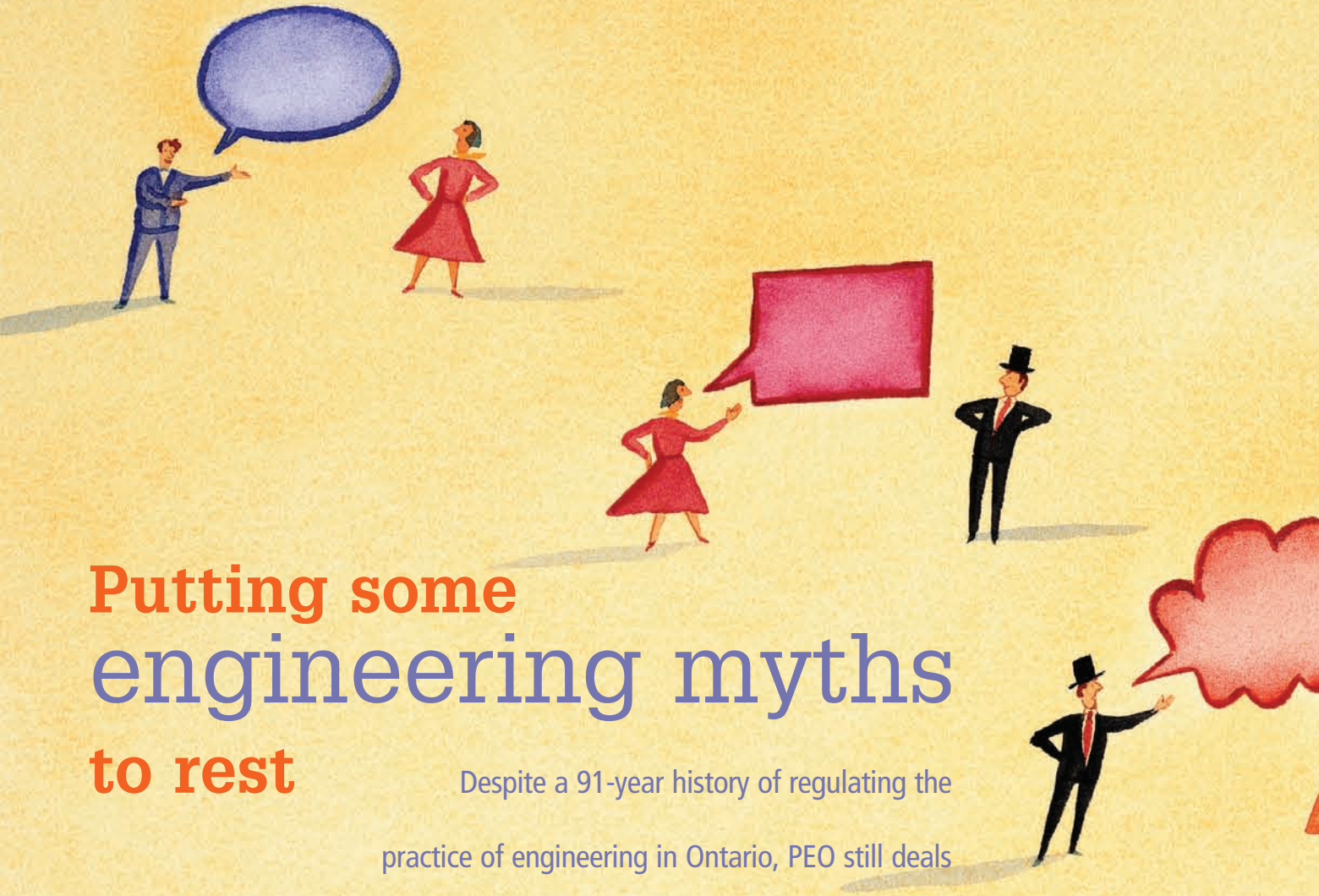
PEO, as a regulator, is impotent against many traits in the business world of engineering, as was/is the Ordre des ingénieurs du Québec (OIQ), where widespread corruption has been found in our profession. It is questionable if professional regulation can ever eradicate criminal activity, although the OIQ is suggesting act changes to promote more ethical behaviour.

But having a leadership voice is still a powerful instrument for change, and that is why leadership, which is not a group talent, depends so much on individuals with ideals, vision, integrity and conviction. Change or transformation comes from individual leadership. John Steinbeck, a great student of the human condition, said it simply. Modified slightly for our time, he wrote: "Our species is the only creative species, and it only has one creative instrument, the individual mind and spirit of a *person*. Nothing was ever created by two *persons*. There are no good collaborations, whether in music, in art, in poetry, in mathematics, in philosophy. Once the miracle of creation has taken place, the group can build and extend it, but the group never invents anything. The preciousness lies in the lonely mind."

When council rejects the leadership of an elected president, it loses the preciousness that can transform our regulatory process in a changed world, and it condemns us to a struggle for power that negates the possibility of transformation. If self-regulation means the membership empowers by election, the usurping of that leadership, that authority, particularly by government appointees, is destructive of self-regulation and bound to ensure our further loss of power in society and irrelevance to our members. Reality, like leadership, has to be recognized and accepted.

In an era where self-regulation is not seen as altruism and, where to continue, PEO will be judged on its performance in protecting the public, the throttling of leadership and the lack of effective governance can no longer be ignored. PEO is already eleven-twelfths of the way to permanent irrelevancy. The public and our profession deserve more. Σ

Patrick Quinn, PhD (Hon.), P.Eng., FEC, is a two-time PEO president.



Putting some engineering myths to rest

Despite a 91-year history of regulating the practice of engineering in Ontario, PEO still deals with misconceptions about how the *Professional Engineers Act* and regulations apply. It's time to re-examine some of these engineering myths.

By Michael Mastromatteo

One of the definitions of the word myth is the uncritical acceptance of the veracity of a story or series of anecdotes. While a myth is a useful concept in the development of legends and literature, it doesn't fit so well when applied to such a technically precise profession as engineering.

But when it comes to administering a public statute and establishing a framework for the self-regulation of a senior profession, it's almost inevitable that a few myths might creep into the picture.

PEO's discipline, enforcement and professional standards departments have uncovered areas of misconception that are problematic. Some of these myths can be described as assumptions that, if acted upon, could lead to a practitioner becoming the subject of complaints, investigation and possible disciplinary action.

This is why PEO has both a professional affairs function, and enforcement and compliance hotlines, to field questions about practice-related situations and dispel myths, rumours and other bits of misinformation disseminated by way of routine interaction among practitioners.

These are some of the most commonly held misconceptions among the public and practitioners alike.

MYTH: ONTARIO PROFESSIONAL ENGINEERS PAY HIGHER LICENCE FEES THAN OTHER CANADIAN ENGINEERS.

Ontario engineers pay $220 (plus applicable taxes) annually for their licences, which is the lowest annual fee of all Canadian engineering regulators. And, this fee has remained unchanged for the past five years. The highest fees are paid by professional engineers in Prince Edward Island and Saskatchewan, who pay $450 annually. Annual licence fees in the other provinces and territories range from $240 to $350.

Ontario engineers also pay much less to practise their professions than many other professionals who are self-regulated. The Law Society of Upper Canada charges its lawyer members over $2,000 each year, while physicians in Ontario submit annual fees of $1,550 to the College of Physicians and Surgeons of Ontario. The Institute of Chartered Accountants of Ontario charges its members more than $1,000 a year.

MYTH: PEO'S ACADEMIC REQUIREMENTS FOR LICENCE APPLICANTS DISCRIMINATE IN FAVOUR OF CANADIAN ENGINEERING GRADUATES.

What may be contributing to this myth is that if an applicant received their degree by successfully completing an accredited Canadian university engineering program, the academic requirements for the P.Eng. licence are recognized by council as meeting the requirements for licensure.

If an applicant received a degree from an engineering program that has not been accredited by the Canadian Engineering Accreditation Board (CEAB), his or her bachelor's degree will be assessed against the CEAB criteria in the relevant engineering discipline by PEO's Academic Requirement's Committee, lengthening the time it takes to determine that they have met the academic requirements for licensing.

Barna Szabados, P.Eng., chair of PEO's Academic Requirements Committee, says many applicants think that a European degree, in particular, is automatically accepted as meeting the academic requirements for licensing. But it's not that simple. In general, applicants who do not hold a degree from a Canadian university engineering program accredited by the CEAB will be assigned an examination program. If they have more than five years of experience, they may be referred to a panel of volunteer engineers who are members of PEO's Experience Requirements Committee, who will, through an interview, determine if all or part of the examination program can be waived. Approximately two-thirds of internationally trained applicants satisfy PEO's academic requirements without having to write technical exams.

More information on PEO's licensing process requirements can be found in PEO's *Licensing Guide and Application for Licence*.

MYTH: APPLICANTS' ONE YEAR OF CANADIAN EXPERIENCE HAS TO BE OBTAINED IN ONTARIO (IF APPLYING TO PEO FOR A LICENCE).

PEO's Experience Requirements Committee volunteers indicate that many applicants are under the impression that the requirement for one year of Canadian experience for the P.Eng. must be obtained in Ontario. In fact, an applicant can get work experience in any Canadian province as long as it is under the supervision of a licensed professional engineer.

For more information, refer to the *Guide to the Required Experience for Licensing as a Professional Engineer in Ontario*, available at www.peo.on.ca/index.php/ci_id/22929/la_id/1.htm.

MYTH: THE GENERIC NATURE OF THE P.ENG. LICENCE ENABLES THE HOLDER TO UNDERTAKE ANY KIND OF ENGINEERING WORK.

Technically, this is true. But it is also professional misconduct for a practitioner to undertake "work the practitioner is not competent to perform by virtue of the practitioner's training and experience" (section 72(2)(h), Regulation 941). There is an element of self-policing here in that members are required to accept only work for which they have the required knowledge and experience, or for which they can acquire such knowledge in a reasonable amount of time.

MYTH: A TEMPORARY, LIMITED OR PROVISIONAL LICENCE CONFERS THE SAME RIGHT TO PRACTISE AS A FULL LICENCE.

A limited licence is normally issued to engineering technologists or scientists who are employees and who, by virtue of many years of specialized experience, have demonstrated competence in a specific aspect of professional engineering.

The professional engineering services the holder of a limited licence may perform are defined, described and restricted in terms of function, product and application. Restrictions to the scope of professional practice are imposed in terms of these three elements.

A provisional licence can be issued to an applicant who has met all the requirements for licensing as a professional engineer except the required 12 months' work experience under a Canadian (not just Ontario) professional engineer [section 14(7) of the *Professional Engineers Act* (PEA)]. A provisional licence holder may practise professional engineering only under the supervision of a licensed engineer, and may not issue a final drawing, specification, plan, report or other documentation unless the supervising engineer also signs it and affixes his or her seal.

PEO's temporary licence is issued on a project and discipline basis for a maximum of 12 months from approval. Temporary licences are generally issued to engineers licensed in the United States working on a project in Ontario. They may also be issued to internationally trained engineers who have wide recognition in the field of practice related to the work to be undertaken under the temporary licence. Such practitioners are often required to work in collaboration with an Ontario engineer.

Three sources of further information include licence application forms, the *Limited Licence Application Guide*, and the *Provisional Licence Guide*, which are available at www.peo.on.ca/index.php?ci_id=2072&la_id=1.

MYTH: AS LONG AS I DON'T SEAL ANYTHING I DON'T NEED PEO'S CERTIFICATE OF AUTHORIZATION (C OF A).

This is incorrect. A C of A is required by any engineering company or individual offering services to the public (i.e. anyone other than the engineer's employer), regardless of whether an engineer seals any documents related to a project.

The C of A was created in 1969 and extended to sole practitioners in 1984. Regulations to enable approved changes to make the C of A more transparent and affordable for sole-practitioner enterprises are working their way through the legislation-making process.

Part of the reason for the C of A being extended to sole practitioners was so PEO could enforce a government regulation requiring all those providing engineering services to the public to hold professional liability insurance.

Implementation of that requirement was postponed by government for several years and eventually amended to enable C of A holders not to carry insurance as long as they disclose their non-insured status to clients, and have the client affirm the disclosure.

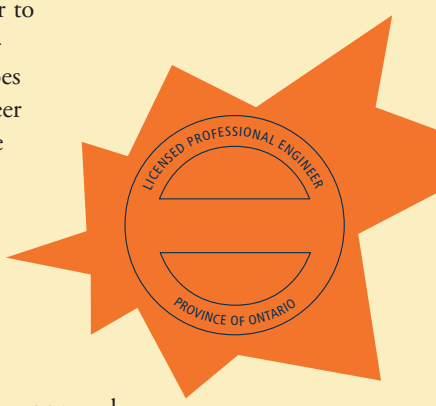
As well, engineers often believe that if their competitor doesn't have a C of A, they don't need one either. Again, this is incorrect. A certificate is required to offer or provide professional engineering services to the public, period. If your competitor doesn't hold a C of A, they might be offering or providing services illegally.

MYTH: YOU HAVE TO BE A LICENSED ENGINEER TO OBTAIN A C OF A.

Brian MacEwen, P.Eng., PEO's manager, registration, says that while many know a P.Eng. licence is required to practise professional engineering, they often don't know a C of A is also required to offer professional engineering services to the public.

What may be surprising to some is that almost anyone can obtain a C of A to offer professional engineering services to the public–even if they themselves do not hold a P.Eng. licence–provided they have at least one professional engineer in the firm who agrees to assume responsibility for the engineering services offered.

MYTH: IF I DON'T SEAL ANYTHING, I'M NOT LIABLE FOR THE WORK.



Failure of an engineer to sign and seal an engineering document does not relieve the engineer of legal liability, since sealing documents has nothing to do with the question of liability for negligence. Engineers are liable because they prepared the documents, or because they approved them, not because they signed or sealed them.

As is indicated in PEO's *Use of the Professional Engineer's Seal* guideline, the seal is an indication of who is taking professional responsibility for the work. That engineer is the person who will be held accountable by the professional body if something goes wrong.

Also, use of the seal is not optional. Failing to seal a document or drawing provided as part of service to the public is a violation of the PEA and would be considered to be an act of professional misconduct.

The guideline for the use of the seal also clarifies the common misconception that only the holder of a C of A is entitled to seal documents. This is untrue. There is no connection between the C of A and a seal. The right and obligation to use a seal are conferred by the P.Eng. licence.

The rule of thumb is simple: Don't use the seal if you didn't have anything to do with the work itself.

PEO's guideline on the use of the seal is available from the PEO website at www.peo.on.ca/index.php/ci_id/22148/la_id/1.htm.

MYTH: I'M THE DESIGN ENGINEER FOR A BUILDING. THE CLIENT HAS TO LET ME DO THE GENERAL REVIEW.

General reviews of building projects are a generally misunderstood area of practice. Some members have suggested that as "design engineer," they are automatically required to do a general review. On the other hand, some clients assume a design engineer is obliged to do a general review of a project. In fact, the design and general review are separate practice items and do not need to be subsumed into a single contract. It is the responsibility of the general review engineer to review the construction and to report on any observed breaches of the building permit documents or the building code. General review engineers are not responsible for quality assurance on behalf of either the client or the contractor.

Engineers taking on design projects should always ask clients how they intend to handle the general review of the building, to clarify whether they need to include this in their scope of services.

For more information, refer to *Professional Engineers Reviewing Work Prepared by Another Professional Engineer* (2011), available at www.peo.on.ca/index.php/ci_id/22122/la_id/1.htm.

MYTH: GENERAL REVIEW ENGINEERS HAVE TO REVIEW THE DESIGN OF A BUILDING.

The responsibilities of these two engineers are quite different. Design engineers retain responsibility for the design. Review engineers are responsible only for judging general conformity of a completed work with the design documents. A general review doesn't require a reviewing engineer to check the validity and accuracy of the plans. A general "conforming opinion" is a judgment by a reviewing engineer that the standard of work performed by the contractor fulfills the requirements of the plans that were the basis for issuing a building permit.

Unless they are also the designers of the work, general review engineers are not responsible for the engineering associated with the plans and specifications prepared for the work.

For more information, refer to *Professional Engineers Reviewing Work Prepared by Another Professional Engineer* (2011).

MYTH: GENERAL REVIEW ENGINEERS ARE RESPONSIBLE FOR CONTRACT ADMINISTRATION.

While the Ontario Building Code requires the owner to retain an engineer to perform general review, there is no legal requirement compelling an owner to hire one to provide contract administration. The owner can simply allow the contractor to construct the building with little or no oversight. In this case, the owner will rely on the contractor to abide by the contract and to provide the building that the owner expected and the engineer designed. However, many engineers who are retained to perform general review immediately assume the role of the owner's agent on the project and take on all the responsibilities of contract administration, including resolving contract disputes, doing payment certifications, and attending job site meetings. Engineers should recognize the difference between general review and contract administration and assume only the role and responsibilities negotiated with the client.

For projects where a review engineer is doing both the general review of construction required by the Ontario Building Code and the site review, including contract administration, for the owner, the review engineer is responsible for making design changes, when necessary. In such cases, the review engineer takes responsibility for these design changes and any impact they have on the other components of the completed project.

MYTH: THE ENGINEER I HIRED LISTED CONTRACTORS' DEFICIENCIES AFTER COMPLETING THE GENERAL REVIEW. HE HAS TO COME BACK TO FIX THEM.

Deficiency reports also lead to confusion in understanding the responsibilities of engineers and PEO's jurisdiction over them. Some clients believe PEO can force a design engineer to come back to make sure deficiencies listed by the engineer doing general review of the work are corrected.

Design engineers retain responsibility for their designs. Review engineers are responsible only for making judgments and opinions regarding general conformity of the completed work with the design documents accepted by the building department. Essentially, the general review is a confirmation that the building being constructed is identical to the agreement between the owner and the municipality. Neither engineer is responsible for the work of contractors, fabricators or manufacturers.

Among the responsibilities of the review engineer is to report in writing to the chief building official, the client and the contractor on the progress of the work and on any observed non-conformance issues and how they are being rectified, after each site visit.

Since the review engineer is acting on behalf of the public, the client can't define the scope of work involved. An engineer's work is defined in O.Reg. 260/08. Where a client suggests limiting the number of site visits, the review engineer should inform the client it is the engineer's responsibility to determine how many visits are required to properly observe the work.

For more information, refer to *Professional Engineers Providing General Review of Construction as Required by the Ontario Building Code,* available at www.peo.on.ca/index.php/ci_id/16158/la_id/1.htm.

MYTH: I DON'T NEED INSURANCE TO PRACTISE ENGINEERING.

Although only 2 per cent of questions in PEO's practice advice database involve insurance matters, this issue can be considered a lingering myth area for the profession. Johnny Zuccon, P.Eng., PEO's deputy registrar, tribunals and regulatory affairs, says: "On the issue of insurance, many believe that C of A holders are not required to carry insurance. The truth is the opposite. The PEA at section 34 is specific and provides for regulations to set out the insurance requirements. It is clearly a statutory requirement to hold insurance, but through regulations, there is a limited option to declare to the recipient of the services that the holder does not carry insurance."

As well, section 74 of Regulation 941 provides in subsection (1) minimum coverage requirements for professional liability insurance for C of A holders. Insurers operating in Ontario will issue policies in accordance with the requirements.

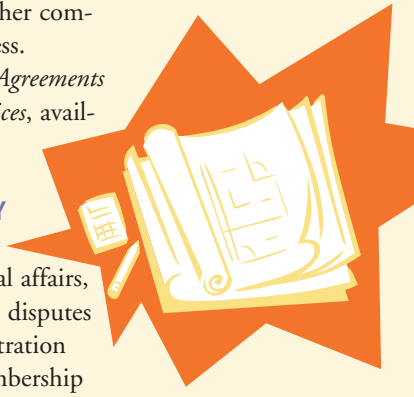
MYTH: MY CLIENT CAN'T USE MY SEALED DRAWINGS BECAUSE THE CLIENT HASN'T PAID FOR THEM.

There is nothing in the PEA or regulations that address a client's non-payment for sealed drawings or documents. PEO recommends that practitioners get contracts from clients that clearly indicate the scope of projects and payment terms. The guideline for *Professional Engineering Practice*, one of the most comprehensive of PEO's publications, says written contracts should specify fees and expenses to be charged to the client, as well as provide a schedule for completion of various phases of the work, including deliverables and payment of all fees.

The guideline also suggests that conflicts and poor business relations can expose a practitioner to a complaint of professional misconduct. For more information, refer to the guideline at www.peo.on.ca/index.php/ci_id/22127/la_id/1.htm.

Engineers who haven't been paid for sealed drawings or other components of their work should look to the civil courts for redress.

More information can be found in the publication *Use of Agreements between Clients and Engineers for Professional Engineering Services*, available at www.peo.on.ca/index.php/ci_id/22146/la_id/1.htm.



MYTH: PEO WILL HELP ME IN A DISPUTE I HAVE WITH MY EMPLOYER OR CLIENT.

Bernard Ennis, P.Eng., PEO's director, policy and professional affairs, says some engineers call regarding employment or contractual disputes and assume that PEO offers legal advice or some kind of arbitration service as a benefit of membership. In reality, the annual membership fee allows practitioners to maintain their licences and for PEO to do its ongoing work of regulating professional engineering practice, licensing practitioners and enforcing the PEA's licensing and C of A requirements. It is not intended to provide members with services other than advice on complying with the PEA and its regulations.

MYTH: WE'RE TAKING OVER A PROJECT FROM ANOTHER FIRM SO WE HAVE TO LET THEM KNOW WE'RE ON THE PROJECT NOW.

Essentially, this is simply a professional courtesy. The PEA imposes no duties or obligations on practitioners taking on projects after other practitioners have been terminated. There is also no requirement for the second practitioner to get permission from the first practitioner to take over a project. The PEA says the second practitioner need only obtain the client's assurance that the first practitioner has been let go. It is up to the client to advise the first party of termination.

An engineer is advised not to begin any work until advised that the first party has been terminated.

MYTH: I CAN'T TAKE OVER A PROJECT FROM ANOTHER FIRM IF MY CLIENT HASN'T PAID THE OTHER ENGINEERS.

Taking over a project for a client from another engineer has nothing to do with the previous engineer-client relationship and any contractual disputes they may have had. Furthermore, the PEA does not contain an obligation to ensure that the prior engineering firm was paid.

MYTH: ONLY CIVIL ENGINEERS ARE DISCIPLINED BY PEO.

This is one of the most persistent misconceptions, according to Linda Latham, P.Eng., PEO's deputy registrar, regulatory compliance. In fact, an engineer from any discipline is equally likely to be disciplined.

MYTH: THE INDUSTRIAL EXCEPTION APPLIES TO ALL MANUFACTURING.

Latham is also deeply concerned about the misunderstanding surrounding the so-called industrial exception and its "wide interpretation" within the industrial and manufacturing sectors.

Added to the PEA in 1984, the exception (section 12(3)(a) of the act) permits non-licensed employees to do professional engineering work in relation to machinery or equipment used to produce a product for their employer in their employer's facility. Ontario is the only province in Canada with a full machinery exception in its engineering act.

With the passage into law of the Ontario government's *Open for Business Act* in October 2010, section 12(3)(a) was repealed, with proclamation of the repeal into effect scheduled for a future date to enable PEO to work with industry to ease the transition. Early this year, PEO was informed that the government had set a proclamation date of March 1 for the repeal. In late February, however, the government extended the proclamation date to September 1, and in June, the province cancelled the September 1 proclamation date and has yet to set a new date.

"It's a myth that the industrial exception applies to any and all acts of engineering in a manufacturing environment or industrial setting," Latham says. "The exception is narrow and applies only to engineering work that a business performs on its own production equipment."

MYTH: COMPLYING WITH THE *PROFESSIONAL ENGINEERS ACT* ONCE THE REPEAL COMES INTO FORCE WILL BE VERY COSTLY FOR MANUFACTURERS.

The manufacturing sector in Ontario generates $270 billion in GDP. The cost of licensing the 4000 individuals that PEO estimates will need to be licensed will be $1.6 million in the first year. PEO is offering a 42 per cent discount on the usual $715 rate for new licences, thereby investing an estimated $1.2 million in worker safety in Ontario.

MYTH: BUSINESSES WERE NOT SUFFICIENTLY CONSULTED ABOUT THE REPEAL OF THE INDUSTRIAL EXCEPTION.

Public consultations on the contents of the *Open for Business Act, 2010*, started in 2008. The Canadian Manufacturers and Exporters, the Canadian Federation of Independent Business, and the Ontario Forest Industries Association all participated in those consultations.

Between 2010 and 2013, PEO has been actively promoting tools for compliance, offering briefings for companies and industry associations, and providing assistance and flexibility with compliance. In total, PEO has:

- made contact with 450 companies;
- held 35 workshops;
- held 19 open houses for manufacturers; and
- contacted 108 industry associations and labour groups.

In addition, numerous industry publications, including *Engineering Dimensions,* have published detailed articles on the subject for the past five years. For further information, visit PEO's repeal website page at www.peo.on.ca/index.php?ci_id=2259&la_id=1.

MYTH: ONTARIO MANUFACTURERS GAIN A COMPETITIVE ADVANTAGE AND SAVE MONEY BY HAVING THE EXCEPTION IN PLACE IN ONTARIO.

Reducing workplace injury is in the public interest and can save businesses money. According to the Ontario Workplace Safety and Insurance Board, the average cost of a workplace injury claim for 2010 was estimated at over $19,000. The associated costs for a workplace injury could total three to 10 times that amount. The cost of licensing 4000 individuals to protect workers in Ontario is far less than the cost of a workplace injury or fatality. The accident and fatality rate, on a per capita basis, in the manufacturing sector is higher in Ontario than in other provinces.

For more information, consult *Repeal of Industrial Exception to Licence* (January 2013) on PEO's repeal page, www.peo.on.ca.

MYTH: PROFESSIONAL ENGINEERS ARE NOT ALLOWED TO JOIN UNIONS.

Another myth holds that engineers are not permitted to belong to unions (which once was the case but changed in 1971 with amendments to the *Ontario Labour Relations Act*), or that union membership absolves engineers from adhering to standards of the profession.

In reality, the PEA is silent on the effect of union membership on practitioners' professional obligations, meaning P.Engs in unions are expected to maintain their professional conduct. There are no exceptions to the requirements for licence holders to fulfill their professional obligations, regardless of the conditions under which they negotiate their remuneration.

MYTH: VIOLATIONS OF THE CODE OF ETHICS MUST BE PROFESSIONAL MISCONDUCT.

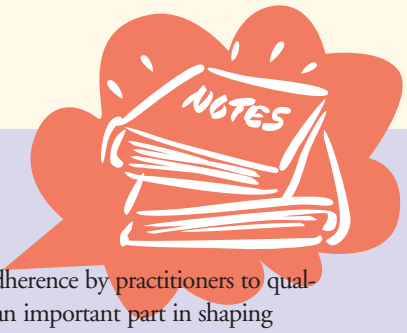
There is a perception that any violation of the Code of Ethics constitutes professional misconduct, and is subject to discipline. In fact, an act that is *solely* a breach of the Code of Ethics (section 77 of Regulation 941) is expressly excluded from the definition of professional misconduct in section 72 of Regulation 941.

However, many behaviours that breach the Code of Ethics have parallels in the definition of professional misconduct and so could be the subject of a complaint and eventually referral to a discipline hearing. And even breaches solely of the Code of Ethics may be found to have violated section 72(2)(j) of the regulation if they are egregious enough to "reasonably be regarded by the engineering profession as disgraceful, dishonourable, or unprofessional."

For example, an engineer communicating orally or in writing once in the heat of the moment in a disrespectful or inappropriate manner might not be considered to be misconduct, but a pattern of such communication or communication that constitutes harassment or violates human rights legislation could well be seen as professional misconduct.

As well, practitioners should not feel they are immune from PEO's complaints and discipline processes just because they are not practising professional engineering.

Two sources to consult regarding this issue are the guideline for P*rofessional Engineering Practice*, and *Making a Complaint*, which is available at www.peo.on.ca/index.php/ci_id/16523/la_id/1.htm.



MYTH: PEO WILL PROVIDE ME WITH TECHNICAL ADVICE.

Ennis says some practitioners expect PEO to provide them with technical advice. However, PEO's expertise is confined to matters of licencing, discipline and enforcement, so PEO can only make recommendations about the proper role of engineers.

"Some members expect PEO to give technical advice and make recommendations about design," Ennis says. "We do not. Instead, we publish practice standards and guidelines." The standards and guidelines relate to how engineers are expected to carry out their duties as professionals.

MYTH: PEO WRITES TECHNICAL STANDARDS.

Over the years, PEO has developed some 30 professional practice guidelines and fewer than a handful of practice standards, which some members assume are akin to technical standards developed by the Canadian Standards Association. PEO writes engineering practice standards, that is, standards describing the criteria for assessing the quality of a professional service.

Zuccon says that as administrator of a self-regulating profession, PEO is responsible for regulating the practice of professional engineering by ensuring practitioners conform to generally recognized norms of professional practice. "It is universally recognized that adherence by practitioners to quality standards for professional services plays an important part in shaping both the role and the image of the profession in Ontario," Zuccon says. "To ensure this can be done, the *Professional Engineers Act* gives PEO council the authority to establish, develop and maintain standards of practice that must be adhered to by all competent practitioners under its jurisdiction."

MYTH: PEO SHOULD BE DOING SOMETHING ABOUT THE GARDINER EXPRESSWAY.

Sometimes PEO is asked what it is doing to remedy unsafe infrastructure, such as the crumbling Gardiner Expressway in Toronto. Unfortunately, there is little that PEO can do directly. The regulator has no authority to order remedial action by anyone, including democratically elected bodies, such as Toronto city council, which have their own responsibilities to safeguard public interests.

PEO can make policy position statements on any matter, indirectly. However, it must make these statements with discretion since membership in the association is not voluntary and members have many diverse opinions on how to deal with public policy matters. Individual members are able to voice their opinions on these matters through the Ontario Centre for Engineering and Public Policy. More information about the centre is available at members.peo.on.ca/index.cfm/ci_id/31427/la_id/1.html.

MYTH: PEO WILL HELP ME DECIDE WHICH ENGINEERING OPINION IS RIGHT.

Sometimes consumers come across two engineers with differing opinions on a specific matter. The consumer might turn to PEO to ask which engineer's opinion is the better one. However, PEO is not a technical or engineering organization, and does not have expertise in engineering. The PEO guideline *Professional Engineers Reviewing Work Prepared by Another Professional Engineer* says if two professionals disagree, a client can choose the option that is more acceptable to the client's requirements. It's akin, Ennis says, to getting a second opinion on a medical question, and then asking the College of Physicians and Surgeons of Ontario to determine which doctor's opinion is correct. The ultimate decision must be made by the consumer.

MYTH: PEO CAN TELL ME IF THE ENGINEER I'VE HIRED IS QUALIFIED IN A PARTICULAR AREA OF ENGINEERING.

PEO occasionally gets calls from clients or the general public about a practitioner's expertise in structural, electrical or some other branch of engineering. Other than referring these callers to the PEO membership directory so the person can confirm the engineer is licensed, the regulator has no authority to vouch for special expertise or the additional qualifications of any member. Callers are informed of the engineer's duty to provide only those services for which the engineer is competent. Callers are also reminded that, like all consumers, they can request references and should do research before selecting a professional who will meet their needs.

MYTH: I'M THE CLIENT AND I'M ENTITLED TO SEE THE CALCULATIONS AND PRELIMINARY DOCUMENTS OF MY PROJECT. AFTER ALL, I PAID FOR THEM.

Some consumers believe they should be able to view calculations, preliminary documents and even CAD files during the course of a project. The truth is that clients are entitled to see only final documents, and not fundamental or in-process work.

More information can be found in the publication *Use of Agreements between Clients and Engineers for Professional Engineering Services*.

MYTH: WE PAID THE ENGINEER AND THEY HAVEN'T DELIVERED THE WORK. PEO CAN GET OUR MONEY BACK.

Some clients of engineers assume PEO can help them get their money back if they believe an engineer hasn't done what was expected. Some also assume PEO can crack the whip on behalf of clients of slow-acting engineers who haven't produced documents, reports or other material in the agreed timeframe.

However, unless it's an issue of misconduct or malpractice, PEO does not get involved in such situations, leaving the courts to settle disputes between clients and practitioners.

PEO also cannot prosecute to recover money lost by clients.

The key is for both practitioner and client to opt for contracts that spell out responsibilities, timeframes, fees and the like.

For more information, refer to the publication *Use of Agreements between Clients and Engineers for Professional Engineering Services*.

MYTH: AS AN ENGINEER, I HAVE A DUTY TO REPORT ANYTHING I THINK IS DANGEROUS.

With a tradition of watching over civil, mechanical and electrical infrastructure, engineers are associated with a duty to public safety and protection.

However, according to the guideline for *Professional Engineering Practice*, "the duty to report isn't intended to make professional engineers full-time guardians of the public interest, responsible for pointing out all of society's faults. Instead, they are expected to report only on those issues that come to their attention during the course of their professional practice. And, unless engineers have the appropriate authority to make changes, or order work, their duty is only to report, not to solve the problem."

For more information, *A Professional Engineer's Duty to Report* is available at www.peo.on.ca/index.php/ci_id/16158/la_id/1.htm.

Although the professional duty to report is limited, engineers should not feel this limits their rights as a person, citizen or employee to expect dangerous conditions to be eliminated. An engineer employed in a manufacturing plant who notices an unsafe condition should follow the duty to report procedures identified by PEO. But if the management does not respond to the engineer's professional approach, the engineer should recognize that he or she is also an employee and can follow the same procedures available to any employee under the *Occupational Health and Safety Act*. Similarly, an engineer with knowledge of traffic engineering who is concerned about the safety of a crossing that his or her children use on the way to school does not need to deal with this as a duty to report issue. Instead, act as any citizen would and make it a political issue. Although your engineering knowledge makes you more aware of certain public safety issues, it isn't necessary to handle the problem as an engineering matter. We all have many roles and there are different responsibilities and actions available for each role.

MYTH: PEO HAS A DUTY TO PROTECT THE PUBLIC.

PEO's responsibility is only to regulate professional engineering practice and govern practitioners to serve and protect the public interest. This involves all of PEO's core functions: licensing, enforcement, professional practice, complaints and discipline.

"The issue of PEO directly protecting the public, in my view, is erroneous when you consider that PEO is a creature of the statute [the PEA] and, in that act, PEO does not have such broad authority," says Zuccon. "It may be a stretch to suggest that, in essence, PEO is in the business of public safety as it applies to the practice of professional engineering by licence holders. Since PEO cannot, in reality, practise professional engineering, it cannot protect the public's safety directly. Rather, PEO is charged with prudential regulation of its practitioners."

Zuccon suggests PEO, as an administrative body, self-regulates the practice through regulations or regulatory instruments, and governs its members. This, however, is not directly to protect the public, but rather to ensure the public interest is served and protected by ensuring unsuitable individuals do not get licensed.

Zuccon believes the myth about PEO protecting public safety is related to how the principal object of the association has been read or portrayed over the years. He also suggests a close reading of the PEA and its associated regulations would help clarify the issue of PEO and the public interest.

The act spells out the principal object of the regulator, which is simply to regulate the practice of professional engineering and govern its members… "in order that the public interest may be served and protected." As such, PEO does not have a mandate to protect the public, but rather has a mandate in carrying out its principal object to satisfy the Ontario government that the public interest is being served.

"It is the licence holders who practise professional engineering and, in carrying out their tasks, must keep paramount the public welfare first and foremost," he added.

"This obligation may sound very close to the notion of protecting the public, but it needs to be qualified to acts of engineering."

MYTH: AN IRON RING MAKES YOU AN ENGINEER.

Members of the public tend to believe that wearing an iron ring means the wearer is an engineer. In fact, it only means the wearer is a graduate of a Canadian engineering program. The iron ring, a symbolic part of the Ritual of the Calling of an Engineer, helps remind engineering graduates of the social significance of their profession and its role in safeguarding the public interest. Each of the 26 "camps" that conduct iron ring ceremonies through various Canadian universities make clear the ring itself does not designate a professional engineer. Only the provincial and territorial engineering regulatory bodies have that authority.

Adding to the confusion is that some professionals, such as architects, also wear a ring to demonstrate their graduation from an accredited program.

The iron ring is central to another long-standing myth, namely that the iron for the manufacture of the rings is taken from the twisted remains of the Quebec Bridge, which collapsed and fell into the St. Lawrence River in 1907. While the story is compelling, it just isn't true. For information on the iron ring, visit www.ironring.ca.

JUST ASK US

When in doubt about the accuracy of information about PEO or professional practice, it may be useful to review PEO's professional practice guidelines and standards, since many of them have been developed in response to questions and concerns brought forth by members in the course of their regular engineering practice.

What kinds of questions are fielded by PEO's practice advisory function? To get an understanding of where to devote resources to develop materials to guide practitioners and the public, PEO's professional affairs section has compiled questions received into a database. The numbers reveal that about one in five questions concerns the use of an engineer's seal, while 7 per cent of questions involve the C of A. The following accounts for 41 per cent. The remaining 32 per cent consist of miscellaneous questions:

- licensing–6 per cent;
- contracts–5 per cent;
- peer review–5 per cent;
- practice of engineering–5 per cent;
- jurisdiction–4 per cent;
- titles–4 per cent;
- duty to report–3 per cent;
- general review of construction–3 per cent;
- conflict of interest–2 per cent;
- enforcement–2 per cent; and
- insurance–2 per cent.

Besides a call to PEO, practitioners can consult other resources to get to the heart of practically every regulatory matter and, perhaps, to explode a few myths for themselves.

One of these is the annual *Questions and Answers on PEO Operations*, published each spring in time for the annual general meeting. This publication can offer valuable insights into the regulator's use of member fees and other resources.

Other resources are the Frequently Asked Questions pages of the Forms and Publications section of PEO's website at www.peo.on.ca/index.php?ci_id=1797&la_id=1.

Finally, there are the 30 professional practice guidelines and a handful of professional standards PEO has developed to help practitioners deal with the considerations of everyday practice. Often these publications have come about to fill a perceived information gap, or to address unusual or unprecedented situations encountered by practitioners in the field.

Ennis recommends that every engineer become especially familiar with two crucial guidelines: *Professional Engineering Practice*, and *Use of the Engineer's Seal*. PEO's professional practice guidelines (available at www.peo.on.ca) help engineers and the public become familiar with the roles, obligations, responsibilities and laws (external, as well as obligations under the *Professional Engineers Act* and regulations 941/90 and 260/08) imposed on practitioners.

For instance, the Ontario Building Code requires a professional engineer to provide general review of construction in certain situations, and Regulation 260 contains the practice standard, having force of law, for general review of construction by a professional engineer as required under the building code. Yet few practitioners appear to know what general review entails and tend to confuse it with contract administration and project management. As a result, practitioners may be providing some services to clients under a mistaken interpretation of what the law requires. Alternatively, practitioners may agree to provide a service without comprehending the liabilities that go with it.

PEO PRACTICE STANDARDS AND INFORMATION GUIDES

- *The Professional Engineers Act*, R.S.O. 1990, Chapter P.28
- *Ontario Regulation 941/90*
- *Ontario Regulation 260/08* (practice standards)
- *By-Law No.1.* A by-law relating to the administrative and domestic affairs of the Association of Professional Engineers of Ontario. (Rev. June 2013)
- *Guide to Required Experience for Licensing*
- *Limited Licence Application Guide*
- *Pregraduation Experience Record Guide*
- *A Professional Engineer's Duty to Report* (2007)
- *Reinstatement Requirements Guide* (2010)
- *Repeal of Industrial Exception to Licence* (2011)
- *Rights and Obligations as an Applicant* (registration hearing process)

PRACTICE GUIDELINES

General–Engineer

- *Professional Engineering Practice* (2012)
- *Guideline on Human Rights in Professional Practice* (2009)
- *Professional Engineers Guide to Running for Public Office*
- *Professional Engineers Reviewing Work Prepared by Another Professional Engineer* (2011)

Use of Seal

- *Use of Professional Engineer's Seal* (2008)

Legal/discipline

- *Making a Complaint: A Public Information Guide* (2011)
- *The Professional Engineer as an Expert Witness* (2011)

Fees/contractual

- *Guideline for Selection of Engineering Services* (1998)
- *Letter to Purchasers/Clients and Letter to Engineers*

- *Professional Engineers Acting as Independent Contractors* (2001)
- *Professional Engineers Acting as Contract Employees* (2001)
- *Professional Engineers Providing Project Management Services* (1991)
- *Use of Agreements between Clients and Engineers for Professional Engineering Services (including a sample agreement)*
- *Agreement for Professional Consulting Services–Between the Prime Consultant and the Subconsultant* (1993)

Communications
- *Professional Engineers Providing Communication Services* (1993)

Construction/building
- *Professional Engineers Providing General Review of Construction as Required by the Ontario Building Code*
- *Professional Engineers Providing Structural Engineering Services In Buildings* (Rev. 1998)
- *Professional Engineers Providing Commissioning Work in Buildings*
- *Professional Engineers Providing Land Development/ Redevelopment Engineering Services*
- *Professional Engineers Providing Mechanical and Electrical Engineering Services In Buildings*
- *Professional Engineers Providing Professional Services in Building Projects using Manufacturer-Designed Systems and Components*
- *Professional Engineers–Temporary Works* (1993)
- *Professional Engineers Providing Services for Demolition of Buildings and other Structures* (2011)

Transport/roads/municipal
- *Transportation and Traffic Engineering*
- *Professional Engineers Providing Services with Respect to Road, Bridges and Associated Facilities*
- *Engineering Services to Municipalities (*Rev. 1998)

Software/computers
- *The Use of Computer Software Tools by Professional Engineers and the Development of Computer Software Affecting Public Safety and Welfare* (1993)
- *Professional Engineers Using Software-Based Engineering Tools* (2011)

Mechanical/Electrical/Industrial
- *Professional Engineers Providing Reports for Pre-Start Health and Safety Reviews* (2001)

Geotechnical/Environmental
- *Professional Engineers Providing Services in Environmental Site Assessment, Remediation and Management* (1996)
- *Professional Engineers Providing Geotechnical Engineering Services*
- *Professional Engineers Providing Reports on Mineral Properties* (2002)
- *Services of the Engineer Acting Under the Drainage Act*
- *Professional Engineers Providing Services in Solid Waste Management*
- *Professional Engineers Providing Acoustical Engineering Services in Land-Use Planning*

CLIMATE CHANGE, SUSTAINABLE INFRASTRUCTURE AND THE CHALLENGES FACING ENGINEERS

By Kean Birch, PhD, and Dalton Wudrich

ONTARIO CENTRE FOR ENGINEERING AND PUBLIC POLICY

WITH THE CONTINUING failure of international efforts to come to an agreement about climate change mitigation, it's becoming clear that we will likely face increasing climate uncertainty through the coming years. According to the economist Lord Nicholas Stern, professor at the London School of Economics and Political Science, we have to take "strong action now" in order "to avoid the worst impacts of climate change" (Stern). This means we have to be forward-thinking when it comes to core infrastructure (e.g. bridges, roads, energy distribution, water, buildings, etc.) because what we are building now will be with us for the next half-century or more. As a result, our construction activities today have a direct bearing on our ability not only to mitigate, but also to adapt to, the impacts of climate change in the future. This is a particular challenge for engineers, since they are at the forefront of this effort and currently do not feel they have the necessary skills or knowledge to react professionally to climate change within their jobs (CSA Group, 2012). We have to consider the future now or risk locking ourselves into inadequate or inappropriate infrastructure in the future.

INTEGRATING CLIMATE CHANGE INTO INFRASTRUCTURE

Our arguments are not new, by any means. Others have made similar claims about the urgency with which we need to consider how climate change is integrated into infrastructure. This includes a new alliance called Engineering the Future in the United Kingdom (www.engineeringthefuture.co.uk), as well as closer to home with Engineers Canada's Public Infrastructure Engineering Vulnerability Committee (PIEVC) (www.pievc.ca). What we want to emphasize here–in line with these groups and others like Infrastructure Canada–is that climate change has to be integrated into all stages of building and facility life cycles, from design to renewal. We can see evidence of such integration already taking place in things ranging from "sustainability" standards and certification schemes through to government policies and capital investments. On the one hand, there are a range of new building codes–like LEED and the recently closed ecoENERGY, for example–focusing on energy and resource efficiency, all of which have become increasingly popular in recent years (Holtforster and Nielsen). On the other hand, the consideration of the impacts of climate change on infrastructure has been incorporated into the Ontario Ministry of Energy and Infrastructure's capital planning instructions and the provincial government's new 10-year Capital Infrastructure Plan (Ontario Ministry of the Environment). The future of infrastructure is tied up with these integration efforts.

SUSTAINABLE INFRASTRUCTURE? MORE THAN JUST BRICKS AND MORTAR

When it comes to the future of infrastructure, there are a number of socio-technical considerations we have to bear in mind. First, it tends to

be built with a long lifespan in mind, which includes maintenance plans and predictions about load or usage based on current or past experience. Second, it is an enormous capital responsibility for government, and one that has been increasingly shifted downwards from federal to municipal levels. Finally, it is an ongoing cost since infrastructure necessitates continual renewal and maintenance. These all have important implications for the development of sustainable infrastructure. For example, weather changes are likely to change load or usage levels, shifting stress and pressure levels; the fiscal limitations of municipal or local governments are likely to impinge on the introduction of innovative designs and new practices; and changing weather patterns could lead to more frequent renewal costs, especially where infrastructure has not been designed to be adaptable to changing weather. Long-term planning is very much needed to mitigate short-term political and market pressures.

Infrastructure is increasingly being planned, developed and built as "sustainable infrastructure," with increased focus on resilience, adaptability and social relevance. The last point is critical; sustainable infrastructure is a social *and* technical system–or socio-technical system–and not simply a physical artifact. Promoting sustainable infrastructure, therefore, requires that we think about the broader social and political context, alongside the economic and physical aspects of infrastructure. When thinking about this social side of infrastructure, it is important to recognize that the success of sustainable infrastructure is very much tied up with things like social expectations and behaviour (e.g. car usage, housing density), political decision making (e.g. the fragmentation of infrastructure responsibilities) and economic pressures (e.g. developer profits). There are very real risks associated with ignoring these social issues, especially as they have a direct impact on infrastructure. For example, it would be pointless to promote public transit at the same time as promoting increased suburbanization and car dependence.

THE CHALLENGE FOR ENGINEERS

It would seem obvious that key to the success of any long-term planning and development of infrastructure is the need to rethink engineering practices, standards and education–and, again, this has to happen now. To some extent it is happening with the PIEVC, which is establishing a protocol for assessing infrastructure vulnerabilities (PIEVC). However, while the concept of sustainable infrastructure may sound like a good idea (or maybe not), it is noticeable that engineers in Canada often take on responsibilities for addressing climate change without adequate support. According to a recent survey carried out for Engineers Canada, many engineers think that climate change is already affecting their practices but that they lack the knowledge to address the impacts of climate change properly (CSA Group, 2012). This means thinking beyond mitigation by integrating adaptation techniques into infrastructure design–the latter is perhaps even more critical for engineers since the former is unlikely to happen without significant political impetus and behaviour change.

Engineering practices are changing but they need to change further over the next few years. Uncertain weather patterns mean that seasonal precipitation levels, sea and river levels, melting permafrost and water shortages are going to be difficult to predict and will be significantly different from our current or past experience. It might be increasingly important to plan, design and build infrastructure that is flexible, by which we mean easily adaptable to changing climates. New forms of modular design might be necessary, as might the use of building materials with low carbon footprints. Obviously, engineers are constrained by the existing buildings codes and standards when it comes to integrating environmental issues, so these have to change with engineering practices. There have already been attempts to outline efficiency standards for buildings (e.g. LEED), as mentioned, but there are also more general attempts by the Canadian Standards Association (CSA) and others to outline sustainable infrastructure standards; the CSA runs a course for engineers on this topic, in partnership with the Federation of Canadian Municipalities (CSA Group). Future engineering standards will need to cover a range of issues relating to engineering practices, as well as building materials, location decisions, risk assessments, service levels and life spans, waste generation, energy efficiency and so on. While it is likely that federal, provincial or municipal governments will need to take a lead on pushing for engineering standards, engineers, through their associations, can also influence standards, codes and protocols that apply to them. Finally, changing engineering practices and standards will require changes to the training and education of engineers. There will need to be coordination between engineering associations and engineering schools as sustainable design, planning and development are promoted.

FOCUSING ON THE FUTURE

To understand these pressing issues, we are working with Professional Engineers Ontario's Ontario Centre for Engineering and Public Policy as part of a research project called "Work in a Warming World" (www.workinawarmingworld.yorku.ca). It is a Community-University Research Alliance project, funded by the Social Science and Humanities Research Council and partner organizations, that focuses on how different job sectors are responding to the challenges presented by climate change.

As part of this broader project, we are looking at the implications of climate change to engineers in Ontario and further afield. Our aims are to explore whether, and in what ways, climate change priorities are being integrated into infrastructure planning and development in Ontario, especially in terms of the role of engineers in the life cycle of infrastructure. We are interested in several key questions: What is the impact of climate change on infrastructure planning and development? How is climate change integrated into infrastructure planning and development? Are there barriers to the integration of climate change into infrastructure planning and development? And, what are the implications of this integration for the engineering profession?

Should you have any comments on our project, please feel free to contact us. We are always looking for constructive feedback.

Kean Birch, PhD, is an assistant professor in the department of social science at York University, and Dalton Wudrich is a graduate student in the faculty of environmental studies at York.

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THE ROLE OF PROFESSIONAL ENGINEERS IN MAINTAINING THE POLICY OF MUNICIPAL WATER FLUORIDATION IN ONTARIO

By Gerald W. Cooper, MBA, P.Eng., Vladimir Gagachev, P.Eng., and Chris Gupta, P.Eng.

FLUORIDATION IS THE controlled addition of hazardous and inherently contaminated industrial fluoride chemicals into a municipal drinking water system (Brenntag Canada Inc.). The chemicals are not for water treatment assuring potability, but for human treatment assuring increased fluoride intake for the purported purpose of controlling tooth decay.

In 1957, the Supreme Court of Canada ruled that this added fluoride is medication for a special health purpose and the law then did not allow the use of municipal water supplies for this intent and delivery (Supreme Court of Canada).

To this day, no provincial law–not the *Safe Drinking Water Act*, *Public Health Act* or the *Fluoridation Act*–authorizes the use of public drinking water to deliver any substance meant to treat or prevent disease when consumed. This fact alone calls for an immediate review of PEO's current policy (or lack thereof) that enables and condones municipal water fluoridation in Ontario on the basis of reports from professional engineers.

Historically, the operations managers and professional staff of large metropolitan drinking water systems in Ontario were often mechanical, electrical and/or chemical engineers. It takes engineering expertise to build systems that remove contaminants and pathogens from source water and make safe, high-quality, municipal drinking water and then install a post-disinfection fluoridation system in the treatment plant (Canadians Opposed to Fluoridation). The fluoridation station must be contained, ventilated and separated from the filtration and disinfection area due to hazardous and corrosive vapour from the most frequently used fluoridation

agent, hydrofluorosilicic acid (HFSA), which can compromise the health and cognitive acuity of staff and the mechanical function of equipment for disinfection and potability (Centers for Disease Control and Prevention, US Department of Health and Human Services).

Fluoridation and disinfection were often seen as one goal. Consequently, 70 per cent of Ontario's people received artificially fluoridated municipal water by the 1980s. This portion has recently declined due to a number of community councils deciding not to start or continue fluoridation of their drinking water systems.

When the idea of "certified operators" became a reality as a result of Walkerton, treatment plant operators took on greater responsibility and, now, liability. Today, most engineers involved in the design of drinking water quality and distribution are administrators and consultants but are not liable as overall responsible operators.

This has important implications for the continuation of fluoridation in Ontario.

Under Ontario's *Safe Drinking Water Act*, municipal councillors can be held personally liable for decisions that lead to infractions of the act (Ontario Ministry of the Environment). As explained on page 8 of *Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils*:

"You are not expected to be an expert in the areas of drinking water treatment and distribution. Section 19 allows for a person to rely in good faith on a report of an engineer…." (Drinking Water Ontario)

An engineer's report is assumed to be accurate on technical data from applied science and free of bias. Safety is established and doubt erased by calculation, not faith. For water potability measures, this is the case. However, fluoridation has historically been recommended to municipal councils on a tautological basis rather than an empirical, evidence-based one.

Scientific reports made available to the province (Ontario Ministry of Health) and City of Toronto (Azarpazhooh) from Canada and beyond show that fluoridation is ineffective as a dental health program and unnecessary as a means of providing fluoride to consumers.

The application of engineering principles reveals that fluoridation with HFSA is unwise, uneconomic, unsafe and unethical in terms of water quality and system performance. The Quebec association of water quality professionals takes this position (Réseau Environnement). Ontario water quality professionals have also spoken out (Van Caulart, Thomas).

THE CHEMICAL

The material safety data sheet (MSDS) reveals that HFSA is extremely hazardous and toxic. Manufacturers' shipment assays show it to be inherently contaminated with arsenic at 25 to 90 mg/L and other toxins. HFSA does not meet its own certification to Standard 60 by the National Sanitation Foundation International (NSFI) due to lack of toxicological data, as admitted by NSFI officials giving testimony under oath. Although dilution samples meet standards, dilution of HFSA's contaminants in drinking water is no defense under Ontario law (Ontario Ministry of the Environment). As well, upon being added to drinking water at water treatment plants, HFSA produces hydrogen fluoride (HF) gas, which is both corrosive to plant equipment and toxic to humans and other life forms in the environment.

HFSA is being used as medication contrary to manufacturers' specifications, and is not specified for use as a disinfection or potability agent or distribution system conditioner. Furthermore, in the MSDSs, manufacturers typically disown any liability for such usage.

Citizens rely on elected councillors, who rely on engineers, who assume public health officials have independent proof that the fluoridation materials meet human safety requirements, specification for use and certification standards, and do not degrade water quality. However, despite recommendations from all levels of government and health regulatory officials that HFSA *should* be verified as meeting certification standards for safety and health claims efficacy, certification has *not* been verified. No force of law is applied to correct this.

The councils of Hamilton and the Region of Peel voted in 2012 to request that HFSA be regulated by Health Canada as a drug to provide public reassurance that Canada's highest health authority has scientifically determined that it is safe and effective for the specific health purpose claimed for it. However, Health Canada has declined to regulate HFSA.

Thus, it is apparently now up to a professional engineer to tell a municipal council whether HFSA is a certified health product, a potability treatment or a contaminant in drinking water. In an October 2011 report for the town of Lakeshore in Windsor-Essex, John Kehoe, P.Eng., accurately stated, "Fluoridation is a process that does not contribute to the municipality's objective of providing safe drinking water." Consequently, Windsor passed a five-year moratorium on fluoridation in January 2013.

DOSE AND SAFETY

Dosage of fluoride from drinking water is calculated as concentration multiplied by volume of water consumed for each unit of body weight. One litre of fluoridated water provides

the same dose of 0.6 milligrams to Toronto Mayor Rob Ford as to a small infant who consumes it in formula. Sodium fluoride supplements of 0.25 milligrams are not approved as safe for infants and Health Canada recommends against fluoride supplements for infants. Safety of the highly variable chronic fluoride dosage from water fluoridation with HFSA has not been established by toxicological and pharmacological methods. Toxicity from fluoridated water depends on the vulnerability of the consumers of drinking water, not the fluoride level. The primary variable, water intake, cannot be controlled.

Health Canada states that fluoride is not a nutrient, but has set adequate intake (AI) of fluoride for infants from ages birth to six months at 0.01 mg a day, the amount from mother's milk. This intake is reached from one tablespoon of water fluoridated at 0.6 mg/l. Infants fed formula reconstituted with fluoridated tap water typically consume at least 50 tablespoons, grossly exceeding the AI.

Infants are most at risk for the long-term developmental endocrine-disrupting effects of daily overdose on brain and teeth (National Research Council). Fluoride in tap water used to mix infant formula is the primary cause of dental fluorosis (Fluoride Action Network), an irreversible scarring of tooth enamel seen in permanent front teeth at about age 7 (Fluoride Action Network). Dental fluorosis now affects 40 per cent of children raised in the fully fluoridated greater Toronto-Hamilton area but is downplayed as cosmetic and justifiable by Ontario's public health officials. American dental and pediatric authorities have now advised that fluoridated water should not be used to mix formula for infants under six months of age but such Canadian associations have not done so.

AMERICAN DENTAL AND PEDIATRIC AUTHORITIES HAVE NOW ADVISED THAT FLUORIDATED WATER SHOULD NOT BE USED TO MIX FORMULA FOR INFANTS UNDER SIX MONTHS OF AGE BUT SUCH CANADIAN ASSOCIATIONS HAVE NOT DONE SO.

WATER QUALITY

HFSA dissociates to release free fluoride anion but can form silicate oligomers, HF and other fluoride compounds inside the system in reaction with potability treatment chemicals (Urbanksy). Interaction of dissociated silicofluorides with chloramine, source water chemistry and distribution systems has resulted in leached lead in residential tap water exceeding Ontario's regulatory standard of 10 ppb. When Thunder Bay's chartered chemist conducted research (Vukmanich), he confirmed published findings that HFSA addition would increase lead in tap water (Maas et al.). Thunder Bay council proceeded to reject fluoridation.

ENVIRONMENT

Every litre of HFSA pumped into the water treatment plant becomes fluoride pollution of the downstream environment in the Great Lakes and St. Lawrence River that reduces availability of free calcium to freshwater organisms. This was reported in April 2011 by Toronto's Medical Officer of Health to range from 0.12 to 0.17 mg/l in Toronto harbour. The MSDS warns that HFSA is environmentally harmful. In tertiary municipal effluent, the fluoride level averages 0.6 mg/l, exceeding the Canadian Water Quality Guideline of 0.12 mg/l and *Species At Risk Act* limit.

However, even if HFSA were regulated, approved, free of arsenic and other co-contaminants, and harmless to infants and the ecosystem; even if it did not cause dental fluorosis; and even if it were an essential nutrient or effective drug, it would still be unethical to deceive the public into consuming it as a medication and disease treatment without their full and informed consent (Service Ontario).

The material fact is that a fixed rate of fluoridation of a drinking water system results in

a fixed rate of fluoride pollution of the ecosystem. Even though done "in good faith," it results in variable, incalculable fluoride overdose to vulnerable consumers. This should not be any engineer's professional or ethical legacy.

PEO, in its ongoing quest to be recognized as an informed and conscientious source of public policy advice to the Ontario government and in its oversight role of the conduct of its members, should immediately develop a policy to remind its members of the limits of their professional licences in providing reports to municipal councils that assume evidence of safety, efficacy for cavity prevention and proof of certified standards for HFSA that do not exist. PEO should guide members so they do not allow the misuse of their expertise or reputation in producing and delivering the safest, highest-quality municipal drinking water in Canada. Σ

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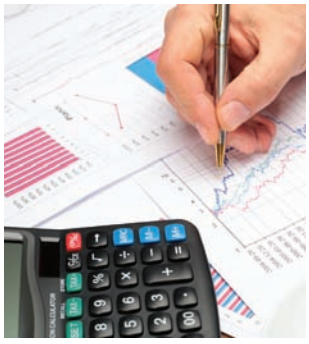

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TAKING THE LEAD ON CLIMATE CHANGE

I am troubled by the number of engineers who persist in denying climate science. Multiple independent surveys have found that 97 per cent of climate scientists (i.e. scientists from any field who publish papers about the climate) are in agreement that humans are causing global warming. This conclusion has been endorsed by all national academies of science, from the United States to the Vatican. To contradict this consensus implies that scientists are guilty of either pervasive incompetence or global conspiracy. Either option is absurd.

The conspiracy theorists have utterly failed to provide any evidence for their allegation. Their best effort, the "climategate" emails, was reviewed by multi-disciplinary panels of academics and found innocent. Out of this massive trove of hacked emails, a thorough search for incriminating quotes found nothing but a few offhanded comments. Even those had to be presented out of context in order to create the appearance of impropriety. If this is a conspiracy, you have to wonder how it maintains tighter security than the US government.

The other view–that the world's scientists need to be rescued from a collective delusion–is incredibly arrogant. Frank Gue's letter in the July/August issue ("Climate change and PEO," p. 62) brags about our BScs before declaring that global warming has ceased and other nonsense. Aside from ignoring the warming of the deep oceans, he dismisses the work of PhDs with decades of experience studying the climate. Credentials do not prove that someone is right, but academic work does merit a careful review before it is denigrated. And yet I find engineers scoffing at the IPCC reports while refusing to read them–engineers who trust angry blogs over peer-reviewed journals. At best, they affirm an undue faith in obscure scientists who have been unable to gather any peer support for their fringe views. This is not critical thinking; this is the conceit of crackpots.

No engineered by-product, not even nuclear waste, has the potential to cause as much harm to the public as greenhouse gases. This has to trigger our Code of Ethics. Contrarians may privately support the Flat Earth Society if they wish, but not in a professional capacity. When we identify ourselves as professionals and provide advice to the public, it must be based on the best available science. Any engineer who publicly opposes climate science should be called to explain themselves before PEO's Discipline Committee.

I would even argue that engineers have an ethical obligation to refuse work on systems of fossil combustion. We should be walking away from natural gas plants and putting our skills to use in hydroelectric projects. We should stop specifying boilers or furnaces for buildings, and insist on passive heating and cooling, supplemented by heat pumps. We should declare internal combustion engines obsolete and design electric cars instead. We need to study that hydrogen-powered B-57 jet designed by our American colleagues in 1956, and stun the world by proposing a new line of carbon-neutral airliners. Our Code of Ethics demands that we take leadership of this progress.

Yannick Trottier, P.Eng.,
Mississauga, ON

A COMPLICATED PROBLEM

I and other professionals, who have devoted years in being educated and practising our profession in climate change, are continuously left to read or listen to individuals provide their "view" on the subject. But this time, I found myself needing to reply to a letter published on page 62 of the July/August issue of *Engineering Dimensions* ("Climate change and PEO").

The author of the letter keeps referring to periods of the Earth's history when CO_2 levels were many times higher than today and how the Earth had average temperatures almost double digits higher than now. Science is able to provide us such information that these points in the Earth's history did exist. Life may have been flushing at these times, but the author seems to be missing the biggest reason for the threat of climate change today. It is not the absolute number of CO_2 parts per million in the atmosphere and temperature of the Earth that is unprecedented in the planet's history, it is the *rate* at which these values are increasing that is of greatest concern to those professionals who understand the science. Whether it be plants or animals on the ground or in water (including humans), they have the ability to react and adapt to what the Earth provides as a home. However, this is true when such changes as 2 C occur over a long period of time (thousands of years) and not relatively instantaneously as we are in the middle of exhibiting (fewer than hundreds of years).

The points used by this author reflect a lack of scientific knowledge on the subject as they address the incorrect issue of today's climate change problem. If the author of the letter had read the reports produced by the IPCC, which stem from work by leading international scientists, he would recognize the fundamental failings in his arguments to cast aside some of the thresholds of 400 ppm and 2 C that have been communicated for decades now.

I need to address the connection that the author tries to make between economic struggles in Europe and efforts for the development of a low-carbon society. The investment by nations like Germany and Denmark has led to great economic gains in these countries that have historically, and continue to be, leaders of innovation. This is reinforced by the countless state-of-the-art manufacturing facilities I see firsthand on my trips to the continent as they develop leading technology that is exported to the entire world. It seems that nations like Japan, the United States, the United Kingdom and developing countries like China and South Africa have taken notice and are making growing investments at this time in technologies that lead to greater energy efficiency and clean energy development.

The author is definitely correct with one point in his letter–that those professional engineers with knowledge in a subject should try to make their voices be heard and to help others understand best what can be a complicated problem.

Livio Nichilo, P.Eng., Toronto, ON

WHY THE FUSS?

Three letters in the March/April, May/June and July/August issues are disturbing for attitudes about anthropogenic climate change (ACC) because of collective vitriol, unsupported statements, falsehoods and irrelevancy. ACC is real. The associated sciences are robust, self-correcting and ongoing, as with any scientific discipline. Engineers need to become properly informed. Don't expect officials to stand up, saying: "Right, the science is settled beyond an absolute shadow of a doubt." Science has never–and will never–operate like that, as engineers know.

If you think ACC is a "hoax," "fraud," "big lie," "conspiracy" (claims already made), be skeptical and ask yourself some questions:

1. Who made the claim? (Climate scientist? Layperson/friend? Contrarian?);
2. What organization is behind the claim? (Does it fund dissemination of the claim?);
3. Where do I go to verify the claim?;
4. When was the claim made? (Is it currently valid? Is it already scientifically refuted?);
5. Why would any individual/organization spread this claim?;
6. Is the claim relevant to the science or merely a distraction?;
7. Is it logical that humanity can absently pollute Earth's essentially closed system without consequences?;
8. Is it realistic a large number of scientists, representing many subdisciplines and across many organizations/countries/cultures, have colluded to lie to the public and political leaders about our changing climate?; and
9. Do you have the requisite knowledge to refute the vast majority of climate scientists?

After looking extensively into the matter, I am now comfortable accepting that:

1. Earth's incredibly complex climate system responds to changes imposed on it by "nature" *and* humanity;
2. Radiative forcing is causing Earth's average temperature to increase overall (non-linear): this century's first decade is the warmest on record and second place falls to last century's last decade;
3. The role of CO_2 is sound, having been initially developed nearly two centuries ago;
4. Atmospheric CO_2 is increasing (~2 ppm per year), mostly due to our burning fossil fuels, based on carbon isotopes;
5. CO_2 and H_2O vapour are major greenhouse gases: CO_2 is a forcing agent and H_2O is not–their roles are different;
6. CO_2 is a pollutant;
7. There is feedback involving positive and negative forcing agents: these can counterbalance one another (e.g. CO_2 versus aerosols);
8. Ocean levels are rising (~3 mm per year) mainly due to expansion of water from warming; but also from increased melting of land-based ice caps/glaciers;
9. Ocean acidity is increasing because of more dissolved CO_2;
10. Arctic sea ice is dramatically decreasing;
11. Antarctic land ice is decreasing at an accelerating rate but sea ice is increasing;
12. Changes in solar output do not explain the magnitude of Earth's warming; and
13. There is scientific consensus for ACC, not unanimity.

There are reliable and unreliable sources and key differences between a "skeptic" and "denier." Confusion mainly comes from getting incorrect/inconsistent information. To back up my statements, I provide below a link to a list of Internet sources and books, which have been invaluable in covering the issues in more detail. Don't shoot the messengers. https://docs.google.com/document/d/1Vk4_M3giD9evOJJ9LJPYj04DDYcEgL5-79qkERLf53Y/pub.

Tom L. Muir, P.Eng., Sudbury, ON

CORRECTION

In our July/August 2013 issue, we neglected to include Thomas Chong, P.Eng., FEC, in our AGM coverage of PEO's recently elected councillors. Chong is the elected vice president of council for the 2013-2014 term.

We also incorrectly reported that Pierre Lortie, ing., succeeded Richard Marceau, PhD, P.Eng., as president of the Canadian Academy of Engineering (CAE) for 2013. In fact, Marceau was re-elected for a second, one-year term as CAE president.

[LETTERS]

TIME FOR CHANGE

After reading through the July/August 2013 *Engineering Dimensions*, it affirmed the adage that the more things change, the more they stay the same. More to the point, in spite of all of the changes that we have been witness to since we were first licensed almost a quarter of a century ago, the issue of low voter turnout resurfaces time and again. Even in the current issue, it appears in the News and Commentary section (p. 12), where outgoing President Denis Dixon [P.Eng.] refers to it as one of the "additional challenges," in the Featured Articles section (p. 33), where new President Annette Bergeron [P.Eng.] will "work to improve" it in the future through analysis of formal licence survey results, and in the Letters section ("Election reruns," p. 61), where David Moffat [P.Eng.] wonders if voter indifference is due to "no difference" between the limited set of re-circulated nominees. Of the three, Engineer Moffat may be closest to the mark with his witty, tongue-in-cheek letter pondering change.

In March 1999, we carried out a demographic analysis of the PEO membership to determine its significance to the practice of professional engineering in Ontario. This was reported to PEO's Task Force on Admissions, Complaints, Discipline and Enforcement (ACDE), and referenced in the September 24, 1999 ACDE Task Force Report. What we found back then is that, of the entire membership, only about one-quarter to one-third actually need a licence by virtue of where they work or what they do. The rest choose to be members for what we imagine is the cachet of membership.

Herein lies the problem: Since they get it or maintain it only for status, for almost all of them, nothing PEO does will ever really affect them. If almost three-quarters of the members do not need a licence, is it little wonder that there is a general apathy with respect to anything to do with PEO, or that the vast majority do not vote? Why would they bother? With this in mind, the voter turnout can be viewed in a totally different light. Yes, only 8.5 per cent of the entire membership voted. But this represents 34 per cent of the members who require a licence (8.5 ÷ 25 x 100).

Over the years, many have opined that the PEO brand is diluted. We agree, but in our view it is PEO itself that is responsible for the dilution and all of the problems that it brings. We agree with Engineer Moffat: It is indeed time for change, but in our view it is time for real change, one that goes further–much further–one that reaches all the way to the core of the engineering profession itself. In the same way that an engineer working for the government will not be granted a consulting engineer designation by PEO by virtue of the fact that he or she is not providing consulting engineering services to the public, PEO should stop granting licences to those who neither need it nor will ever use it. In our view, it is only then that PEO will gain the respect of the public and, more importantly, be able to properly police its members in the interest of the public.

Livia Mattacchione, P.Eng., and Angelo Mattacchione, P.Eng., BDS, North York, ON

Letters to the editor are welcomed, but should 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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