

MARCH/APRIL 2018

ENGINEERING DIMENSIONS

ENGINEERING THE FUTURE OF HEALTHCARE

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ENGINEERING DIMENSIONS



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PEO CONTACTS

PUBLICATIONS STAFF

Director, communications

David Smith
416-840-1061
dsmith@peo.on.ca

Editor

Nicole Axworthy
416-840-1093
naxworthy@peo.on.ca

Associate editor

Michael Mastromatteo
416-840-1098
mmastromatteo@peo.on.ca

Associate editor

Marika Bigongiari
416-840-1062
mbigongiari@peo.on.ca

Senior graphic designer

Stephanie Katchmar
416-840-1063
skatchmar@peo.on.ca

Graphic designer

Cindy Reichle
416-840-1067
creichle@peo.on.ca

Manager, communications

Duff McCutcheon
416-840-1068
dmccutcheon@peo.on.ca

Digital communications coordinator

Emilia Di Luca
647-259-2271
ediluca@peo.on.ca

ADVERTISING SALES

Manager, sales

Beth Kukkonen
bkukkonen@dvtail.com
Dovetail Communications
30 East Beaver Creek Road
Suite 202
Richmond Hill, ON L4B 1J2
Tel: 905-886-6640
Fax: 905-886-6615

EXECUTIVE

Interim registrar

Johnny Zuccon, P.Eng., FEC
416-840-1102
registrar@peo.on.ca

Senior executive assistant

Becky St. Jean
416-840-1104
bstjean@peo.on.ca

LICENSING AND REGISTRATION

Deputy registrar, licensing and registration

Michael Price, MBA, P.Eng., FEC
416-840-1060
mprice@peo.on.ca

Manager, admissions

Moody Farag, P.Eng.
416-840-1055
mfarag@peo.on.ca

Manager, registration

Faris Georgis, P.Eng.
416-840-1056
fgeorgis@peo.on.ca

Manager, licensure

Pauline Lebel, P.Eng.
416-840-1049
plebel@peo.on.ca

Supervisor, examinations

Anna Carinci Lio
416-840-1095
acarincilio@peo.on.ca

REGULATORY COMPLIANCE

Deputy registrar, regulatory compliance

Linda Latham, P.Eng.
416-840-1076
llatham@peo.on.ca

Manager, enforcement

Cliff Knox, MBA, P.Eng.
416-840-1074
cknox@peo.on.ca

Manager, complaints and investigations

Ken Slack, P.Eng.
416-840-1118
kslack@peo.on.ca

TRIBUNALS AND REGULATORY AFFAIRS

Deputy registrar, tribunals and regulatory affairs

Johnny Zuccon, P.Eng., FEC
416-840-1081
jzuccon@peo.on.ca

Director, policy and professional affairs

Bernard Ennis, P.Eng.
416-840-1079
bennis@peo.on.ca

Manager, tribunals

Salvatore Guerriero, P.Eng., LLM
416-840-1080
sguerriero@peo.on.ca

Manager, policy

Jordan Max
416-840-1065
jmax@peo.on.ca

Manager, standards and practice

José Vera, P.Eng., MEPP
647-259-2268
jvera@peo.on.ca

CORPORATE SERVICES

Chief administrative officer

Scott Clark, B.Comm, LLB, FEC (Hon)
416-840-1126
sclark@peo.on.ca

Manager, government liaison programs

Jeannette Chau, MBA, P.Eng.
647-259-2262
jchau@peo.on.ca

Manager, engineering intern programs

Tracey Caruana, P.Eng.
416-840-1107
tcaruana@peo.on.ca

Director, people development

Fern Gonçalves, CHRL
416-840-1106
fgoncalves@peo.on.ca

Manager, secretariat

Ralph Martin
416-840-1115
rmartin@peo.on.ca

Manager, chapters

Matthew Ng, MBA, P.Eng.
416-840-1117
mng@peo.on.ca

FINANCE

Director, finance

Chetan Mehta, MS, MBA
416-840-1084
cmehta@peo.on.ca

Manager, financial services and procurement

Peter Cowherd, CPA, CMA
416-840-1090
pcowherd@peo.on.ca

INFORMATION TECHNOLOGY

Director, information technology

Michelle Wehrle
416-840-1111
mwehrle@peo.on.ca

Manager, information technology

Doria Manico-Daka
416-840-1109
dmanico-daka@peo.on.ca

Senior IT project manager

Paula Habas
416-840-1108
phabas@peo.on.ca

PEO COUNCIL

Officers

President

Bob Dony, PhD, P.Eng., FIEE, FEC
bdony@peo.on.ca

Past president

George Comrie, MEng, P.Eng.,
CMC, FEC
gcomrie@peo.on.ca

President-elect

David Brown, P.Eng., BDS, C.E.T.
dbrown@peo.on.ca

Vice president (elected)

Nancy Hill, P.Eng., LLB, FEC, FCAE
nhill@peo.on.ca

Vice president (appointed)

Marilyn Spink, P.Eng.
mspink@peo.on.ca

Executive Members

Christian Bellini, P.Eng., FEC
cbellini@peo.on.ca

Warren Turnbull, P.Eng.

wturnbull@peo.on.ca

Councillors

Councillors-at-large

Christian Bellini, P.Eng., FEC
cbellini@peo.on.ca

Roydon A. Fraser, PhD, P.Eng., FEC
rafraser@uwaterloo.ca

Kelly Reid, P.Eng., IACCM CCMP
kreid@peo.on.ca

Northern Region councillors

Michael Wesa, P.Eng., FEC
mwesa@peo.on.ca

Dan Preley, P.Eng.
dpreley@peo.on.ca

Eastern Region councillors

Guy Boone, P.Eng., FEC
gboone@peo.on.ca

Ishwar Bhatia, MEng, P.Eng.
ibhatia@peo.on.ca

East Central Region councillors

Noubar Takessian, P.Eng., FEC
ntakessian@peo.on.ca

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

thomas.chong3@gmail.com

Western Region councillors

Gary Houghton, P.Eng., FEC
ghoughton@peo.on.ca

Lola Mireya Hidalgo, P.Eng., PMP
lhidalgo@peo.on.ca

West Central Region councillors

Danny Chui, P.Eng., FEC
dchui@peo.on.ca

Warren Turnbull, P.Eng.
wturnbull@peo.on.ca

Deputy registrar-in-council appointees

Michael Chan, P.Eng.
mchan@peo.on.ca

Lorne Cutler, MBA, P.Eng.
lcutler@peo.on.ca

Qadira C. Jackson Kouakou,
BA, BSW, LLB

qjackson@peo.on.ca

Tim Kirkby, P.Eng., FEC
tkirkby@peo.on.ca

Lew Lederman, QC
llederman@peo.on.ca

Iretomiwa Olukiyesi, P.Eng.
iolukiyesi@peo.on.ca

Nadine Rush, C.E.T.
nrush@peo.on.ca

Marilyn Spink, P.Eng.
mspink@peo.on.ca

Engineers Canada Directors

Annette Bergeron, P.Eng., FEC
abergeron@peo.on.ca

David Brown, P.Eng., BDS, C.E.T.
dbrown@peo.on.ca

Danny Chui, P.Eng., FEC
dchui@peo.on.ca

Chris D. Roney, P.Eng., BDS, FEC
cronney@peo.on.ca

Rakesh K. Shreewastav, P.Eng.,
AVS, FEC
rshreewastav@peo.on.ca

GOOD DESIGN IS GOOD MEDICINE

By Nicole Axworthy

ENGINEERING DIMENSIONS

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Address all communications to The Editor, *Engineering Dimensions*, PEO, 40 Sheppard Avenue West, Suite 101, Toronto, ON M2N 6K9. Tel: 416-840-1093, 800-339-3716.

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Contact: Marika Bigongiari, 416-840-1062, mbigongiari@peo.on.ca

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The physical environment of a hospital room, like the one on our cover, is now considered an integral part of a patient's healing process.

Multiple medical studies have shown that single-patient rooms, noise-absorbing floors and ceilings, exposure to natural light and reduction in overhead announcements encourage rest—and help patients get home sooner.

In this sense, engineers in the healthcare sector play an important role in providing patient care. They are sought after to help bridge traditional engineering skills with medical applications. They work hand in hand with medical professionals to provide a wide variety of healthcare solutions, from designing smarter facilities—right down to engineering layouts that reduce the risk of surgeons bumping elbows in the operating room—to developing diagnostic tools and rehabilitative treatments and implementing and maintaining the vast amount of system support required for modern medicine.

In "Expanding influence of engineers in healthcare infrastructure" (p. 50), Michael Mastromatteo covers the creation of Canadian Standards Association Z8000, the first comprehensive standard for planning and designing hospitals and other healthcare facilities, and engineers' involvement in the integrated design and construction of new hospital buildings and maintenance of existing infrastructure.

An excellent example of a new, state-of-the-art hospital is the Humber River Hospital in the northwest area of Toronto, Ontario, where our cover image was shot. As Marika Bigongiari explains in "Lean, green and digital" (p. 54), all aspects of this totally digital hospital relied on the expertise of engineers, from implementing aggressive sustainability and digital infrastructure goals to controlling acoustics within noisy inpatient units.

Of course, healthcare engineers are also behind many of the most modern, groundbreaking medical techniques and therapeutic devices. Starting on page 60, you'll learn about four Ontario P.Engs who are revolutionizing the way hospitals care for children with disabilities.

This issue also covers important changes to the *Professional Engineers Act*, which stem from the 2012 Algo Centre Mall collapse in Elliot Lake, Ontario. Find out what these changes mean for PEO's licence holders starting on page 25.

In the news section, we also include a summary of the annual Mercer OSPE National Engineering Compensation Survey. If you're a member of the Ontario Society of Professional Engineers, you can have free access to the full report. If you aren't, this summary is the next best thing and a must-read for engineers and employers of engineers—especially those of the millennial generation (p. 10).

Finally, our Order of Honour (OOH) gala is fast approaching. On April 20, PEO will induct 13 more individuals into the OOH, an honorary society that recognizes outstanding service to the engineering profession. For more on this year's inductees, see page 16. [e](#)



THIS ISSUE The engineering profession's contributions to medicine have been well documented, but a story that still needs telling is the steady emergence of healthcare engineering. This issue looks at the impact of engineering on the design, construction and sustainability of new "smart" hospitals as well as the profession's work in the redevelopment and optimization of existing healthcare infrastructure—all with a view to obtaining better health outcomes.

ADAPTING TO NEW REALITIES

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



Since this is my last President's Message column, it is tempting to use this space to reflect on the past year in office. It has been an incredible year for me and I have been honoured to serve the profession as your president during the past Council year.

In addition to the various accomplishments of Council, my greatest satisfaction has been attending the various PEO events during the year and meeting so many incredible professional engineers—especially the new generation—across this great province of ours. My only regret is seeing the departure of our registrar, Gerard McDonald, P.Eng., as he moves on to the position of CEO of Engineers Canada (see "PEO registrar to take on top role at Engineers Canada," *Engineering Dimensions*, January/February 2018, p. 20). As I wrote to Council on receiving his notice, I remarked that a good leader is one who leaves an organization stronger than when he or she arrived. Under Gerard's tenure, I truly believe this to be the case for PEO. While his replacement will have big shoes to fill, he has laid the groundwork for his successor's success. I wish him well in his new position and look forward to his continued service to the profession.

While it is tempting to look back, it is precisely because of the inspiring young engineers I have met over the year that we must keep our gaze firmly fixed on the future. As we are entering what some are calling the Fourth Industrial Revolution, we must face the challenges of adapting the profession to its new realities.

While the roots of our profession go back centuries, even millennia, the beginning of what we recognize as the regulated engineering profession of today finds its origin in the First Industrial Revolution of the 18th and 19th centuries—picture the steam locomotive, steel, textile mills, milling machines. Thermodynamics and the strengths of materials, topics familiar to all classical engineers, provided the solid foundation to engineer the big creations of the day. By the late 19th century, the next revolution was emerging fuelled by the advances of the first. It was the world of the automobile, petroleum, electrification, the light bulb. Electrical engineering came into its own, as did chemical engineering and its foundations of unit operations, and the emergence of manufacturing and industrial engineering as separate disciplines.

By the end of the Second World War, the seeds of the Third Industrial Revolution—the Digital Age—were being planted. The culmination is the computer, the integrated circuit, software, information and communications technology, the Internet. It is our world, right now.

Just as the first revolution laid the groundwork for the second, the third revolution has built the foundation for an emerging Fourth Industrial Revolution. In his article "The Fourth Industrial Revolution: What it means, how to respond" (www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond), Klaus Schwab, founder and executive chairman of the World Economic Forum, writes: "We stand on the brink of a technological revolution that will fundamentally alter the way we live, work and relate to one another. In its scale, scope and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society."

So, what is this Fourth Industrial Revolution? Think self-driving cars, artificial intelligence, the Internet of things, 3-D printing, nanotechnology, quantum computing. It is fuelled by the billions of people seamlessly connected by their ubiquitous mobile devices and with access to the world's knowledge at their fingertips. Schwab goes on to say: "There are three reasons why today's transformations represent not merely a prolongation of the Third Industrial Revolution but rather the arrival of a fourth and distinct one: velocity, scope and systems impact. The speed of current breakthroughs has no historical precedent. When compared with previous industrial revolutions, the fourth is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country. And the breadth and depth of these changes herald the transformation of entire systems of production, management and governance."

We as engineers see ourselves as the masters of technological innovation. We have been the driving force behind the first three revolutions—and this fourth one will be no different. Even at the University of Guelph, where I work, I see the passion of the students around me, eager to embrace the opportunities of this brave new world. As a profession, we are at the forefront of this technological transformation. Right here at home, in Ontario, this revolution is fomenting.

I had the opportunity to visit General Motors' (GM) new Canadian Technical Centre in Markham, Ontario during its open house in January. (Full disclosure: my daughter, Lynn, works there in the Active Safety and Autonomous Diagnostics group.) This is the new global centre for GM's autonomous vehicle development and this work was relocated from Michigan to right here in Ontario. When I hear complaints about the perceived shortcomings of our profession, I gladly point to the establishment of this centre as proof of our world-class engineering expertise in this province. The vision and technological innovations they are working on are truly transformative. And the vibe in the building was awesome: there was a swarm of millennials and not a single "snowflake" in sight!

Other such centres of disruptive innovation, large and small, are popping up all over the province. And our universities are also in play. For example, the new Vector Institute associated with the University of Toronto, headed up by Geoffrey Hinton—who also happened to be the external examiner for my doctoral thesis a while back—is a globally-recognized centre for ground-breaking research into artificial intelligence.

But with this revolution comes fundamental change. We already see the beginnings of this. The sharing, or peer economy, is taking hold. We almost take for granted Uber and Airbnb. And Amazon, ironically, is revitalizing the ancient institution of the postal service—at least in the short term, until the delivery drones arrive!

While engineers revel in the technological marvels we are creating around us, we cannot ignore the effects on society that such disruption inevitably entails. Will income inequality continue to widen? It may be true that engineers, as members of the technological elite, will be winners in the new world order. But at what cost? Already, notions of employment and business models have changed. Engineering used to be the stable profession, with expectations of career-long employment in manufacturing, public infrastructure and utilities, or consulting. Now, so many students I hear talk of entrepreneurial aspirations. They do not expect, nor even have a desire, to work at a single company for their entire career—that’s so 20th century! Nimble and agile are the words of today.

So, how does this accelerating pace of change impact us as the engineering regulator? Our roots go back to an era where the rate of technological change occurred on a much different time scale. Innovation happened over decades, not years or even months. For example, during the First Industrial Revolution, factories were designed around a central—usually steam powered—belt system to deliver power to individual machines on the production floor. Electrification obviated the need for such a centrally delivered mechanical system. However, it took decades for manufacturing to fully switch to a task-oriented production model that took advantage of the new flexibility of individual electrical motors.

This slower pace of change allowed us time to study an issue and craft regulations deliberately and methodically. Schwab writes, “The whole process was designed to be linear and mechanistic, following a strict ‘top down’ approach.” Our regulatory framework is built around taking responsibility for sober, methodical calculations—forces, beam loading, strength of materials, energy, mass balances, stability. These are very much concepts from the first two revolutions. And we are trying to adapt to the third—what is the equivalent calculation to prove that the control software of a nuclear power station will work as designed? But, for the fourth, how do we prove correctness for a safety-critical system controlled by a deep learning neural network when the algorithm itself creates its own performance characteristics?

Schwab cautions that our current approaches to developing regulatory frameworks are simply obsolete: “Given



HOW DOES THIS ACCELERATING PACE OF CHANGE IMPACT US AS THE ENGINEERING REGULATOR? OUR ROOTS GO BACK TO AN ERA WHERE THE RATE OF TECHNOLOGICAL CHANGE OCCURRED ON A MUCH DIFFERENT TIME SCALE. INNOVATION HAPPENED OVER DECADES, NOT YEARS OR EVEN MONTHS.

the Fourth Industrial Revolution’s rapid pace of change and broad impacts, legislators and regulators are being challenged to an unprecedented degree and for the most part are proving unable to cope.

“How, then, can they preserve the interest of the consumers and the public at large while continuing to support innovation and technological development? By embracing ‘agile’ governance, just as the private sector has increasingly adopted agile responses to software development and business operations more generally. This means regulators must continuously adapt to a new, fast-changing environment, reinventing themselves so they can truly understand what it is they are regulating.”

Sobering words indeed. However, I believe that we have an ace up our sleeve. PEO is an organization that is completely aligned with one of the key components of the Fourth Industrial Revolution: the open source movement. As a self-governing profession, we can draw on the expertise of our over 85,000 members to crowd source our path forward. As long as we maintain the confidence of the people of Ontario, on whose behalf we govern the profession and who have entrusted us with the privilege of self-regulation, we can face these challenges and design the next iteration of ourselves. But it will take the ingenuity of all the members of the profession, from us senior engineers to the newly licenced. Given our profession’s track record in driving innovation, I am convinced that we will use these skills to move us forward, for a stronger profession. [e](#)

LONG-SERVING DEPUTY APPOINTED AS PEO'S INTERIM REGISTRAR

By Michael Mastromatteo



Johnny Zuccon, P.Eng., FEC, was named PEO's acting registrar as of February 7.

PEO has appointed long-serving employee Johnny Zuccon, P.Eng., FEC, as interim registrar effective February 7.

Zuccon, deputy registrar of tribunals and regulatory affairs, has been with PEO since 1995 and has acquired extensive administrative and executive experience over that time.

Zuccon took over for departing Registrar Gerard McDonald, P.Eng., who, in late December 2017, announced he was leaving PEO to become chief executive officer of Engineers Canada in Ottawa, Ontario. McDonald assumed the Engineers Canada duties on February 12.

"Anytime there is a change at the top, the primary concern is the impact to the organization's operations. I'm going to leverage on my long tenure at PEO to help facilitate a seamless transition. I'm confident that our dedicated staff will continue to deliver on our responsibilities and work collectively to move the agenda forward," Zuccon says.

Zuccon will serve on an interim basis until a permanent registrar is appointed and takes office. PEO will soon open an executive search for a new registrar, a recruitment that is expected to take several months.

BUILDING SAFETY INSPECTION REGIME STILL COMING INTO FOCUS

By Michael Mastromatteo

Nearly six years after the fatal Algo Centre Mall roof collapse in Elliot Lake, Ontario, PEO is still actively monitoring changes to Ontario's building safety regulatory regime.

The most recent development took place in December 2017 with passage of the province's Bill 177, which, while omnibus in nature, included changes to the *Professional Engineers Act* (PEA) and the *Ontario Building Code Act* that relate directly to recommendations from the Commission of Inquiry into the Elliot Lake disaster (see p. 25).

As reported in the January/February 2018 issue of *Engineering Dimensions*, building safety changes contained in Bill 177 include giving PEO authority to establish a continuing education program and to publish additional information about practitioners' disciplinary history publicly on its online licence holder directory. Other Bill 177 changes affirmed PEO's continuing jurisdiction over members whose licence has been suspended or revoked.

Some of the regulatory gaps identified in the Elliot Lake Commission of Inquiry centred on identifying practitioners' areas of specialization (e.g. structural engineering) and the lack of public information about practitioners' disciplinary cases.

Bill 177 also contains at least some of the recommendations put forward by the Building Safety Technical Advisory Panel (BSTAP), an Ontario Ministry of Housing group developing a timetable for the province to review the structural condition of existing buildings.

Established in March 2015 following the recommendation from the Elliot Lake Commission of Inquiry, BSTAP was tasked with providing advice on enhancing the safety of existing buildings in Ontario. The BSTAP included a number of structural engineering specialists in its makeup, although none represented PEO in the deliberations.

In its executive summary, BSTAP members suggest its recommendations, if adopted, "provide a robust and progressive standard for the mandatory periodic assessments of existing buildings, based upon their likelihood of posing a risk to public safety."

Although Bill 177 stopped short of endorsing all recommendations of the Elliot Lake inquiry and the BSTAP, it is seen as an enhancement of PEO's transparency, accountability and effectiveness in regulating engineering, particularly in the building inspection and structural safety area.

Meanwhile, the Engineers, Architects and Building Officials (EABO), a joint body of engineers and architects, in its October 2017 meeting, passed a motion asking that PEO and the Ontario Association of Architects work jointly to develop guidelines for the anticipated changes to the building code arising from the Bélanger recommendations. Recommendation 1.27 of the Bélanger commission reads: "For the construction of any buildings requiring the services of more than one professional consultant, either a professional engineer or an architect should be designated by the owner or the owner's agent as the prime consultant to perform the roles and responsibilities of that position, as defined by one or the other or both PEO and the Ontario Association of Architects (OAA)."

INQUEST SMALL COMFORT TO P.ENGs CONCERNED ABOUT REGULATORY SHORTCOMINGS

By Michael Mastromatteo

A PEO member with extensive expertise investigating building collapses and structural failures is only partially relieved with news of a coroner's inquest into the June 16, 2012 Radiohead concert stage scaffolding tower collapse.

Ralph Southward, P.Eng., principal of Hamilton-based Southward Consultants Limited, investigated the June 2012 Algo Centre Mall roof collapse in Elliot Lake, Ontario, and the Radiohead concert stage scaffold tower collapse at Downsview Park in Toronto, Ontario, both of which resulted in fatalities and triggered considerable media and public attention, to assist the civil actions that arose because of the failures.

Southward has also assisted PEO and its Discipline Committee with the investigation of several structural issues, as well as investigations by the Ministry of Labour.

Concerns intensified last September when Ontario Court Justice Ann Nelson stayed charges against all defendants in the Radiohead incident, on grounds the case had taken too much time and had violated the rights of the defendants to a timely trial. Radiohead band's drum technician, 33-year-old Scott Johnson, was working on the Downsview Park stage when the towers supporting the suspended temporary roof system collapsed. He was killed when crushed by the falling debris. Southward and others have asserted that staying the charges did nothing for the Johnson family, the public at large or the engineering profession.

While Southward is not presently permitted to discuss specific details of his civil-side investigations of the Downsview Park scaffolding collapse, he is troubled that the alleged negligent actions of an engineer could have caused the collapse, and were effectively dismissed without any consequences by the legal system.

"Quite frankly, there was a lot that should have come out [in the Radiohead trial] and should have been

learned by the engineering community, and the fact that the charges have been stayed, to me is nothing short of criminal, really, and I don't know what we can do about it," Southward said in an interview with *Engineering Dimensions*.

The consulting engineer is concerned that the type of accident at the Radiohead concert could very well occur again, unless engineers and others involved in public safety are allowed to speak out.

"The results of the Radiohead case haven't served the public at all," Southward says. "That collapse could have killed more people. And what have we learned? It has now been approximately six years since the collapse and the question still remains: What has the engineering community learned to prevent that type of collapse from occurring again?"

On November 29, 2017, Roger Skinner, regional supervising coroner for central region, Toronto west office, announced that an inquest will be held to examine the events surrounding Johnson's death. The inquest jury may make recommendations aimed at preventing similar deaths. Calling an inquest is of some consolation to Southward and other engineers.

Southward began designing scaffold systems more than 40 years ago, and has previously investigated three scaffolding failures, each involving fatalities. He is concerned that previous coroner's inquests and recommendations were still not able to prevent the Radiohead tragedy.

PEO officials contend the engineering profession has responded appropriately to the Elliot Lake and Radiohead incidents, primarily by instituting a professional development program for members and by working to release more information about practitioners' discipline records. In addition, any investigations undertaken by PEO proceed independently of the court system.

continued on p. 10

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continued from p. 9

The regulator is always looking to tighten up its enforcement and investigation powers under the *Professional Engineers Act* and, in December, a number of act changes were approved by the government.

Some of the recent legislative changes form the province's response to the report of the Elliot Lake Commission of Inquiry, which investigated the causes of the Algo Centre Mall collapse and made recommendations for improving building safety and structural inspection guidelines.

A key act change includes providing PEO with continuing jurisdiction over suspended or revoked members. This lack of authority hindered PEO from disciplining revoked engineer Robert Wood in the Elliot Lake matter.

ATTRACTING AND RETAINING THE WORKFORCE OF THE FUTURE

By Mark Bowling

Across all sectors of the economy, employers have had to adapt to the workforce's shifting demographics and changing employee preferences. Today, as millennials begin to supplant baby boomers as the largest workforce generation, what should employers do to ensure they're attracting and retaining the talent they need to succeed?

To help answer this question, Mercer and the Ontario Society of Professional Engineers (OSPE) have worked in partnership to produce the 2017 Mercer OSPE National Engineering Compensation Survey. With a legacy of over 60 years, the survey is a powerful tool for understanding compensation for a range of engineering specialties across six levels of responsibility.

In Ontario specifically, this year's survey included data from 183 companies, representing more than 11,000 engineers. Improvements in the Canadian economy allowed for base pay rates to rise modestly for engineers in 2017 versus 2016. When Mercer looked across the companies that provided data to the survey in Ontario over five of the last six years, engineers in professional positions (levels A to C) saw increases between 2.5 and 4 per cent, and greater than the Consumer Price Index of 1.2 per cent. However, economists project that the economy will slow over the coming years and that 2 per cent GDP growth will be the new normal. What other mechanisms will organizations that employ engineers be able to leverage to attract and retain talent?

INCENTIVES

As we look to incentives as a way to entice employees into the profession, we notice that pay is heavily weighted to guaranteed pay or base salary, especially in Ontario (see Figures 1 and 2). And how does this stack up against the market at large? When referencing the robust 2017 Canada Mercer Benchmark Database, made up of data from almost 800 organizations, we see the short-term incentive package for engineers falls short, especially at the more junior levels. In the general market, professionals on average receive short-term incentives of approximately 11 per cent of their base salary, higher than the comparative levels of engineers in the 2017 Mercer OSPE National Engineering Compensation Survey. Outside of pay, what should companies consider in order to stay ahead of changing market dynamics?

continued on p. 12

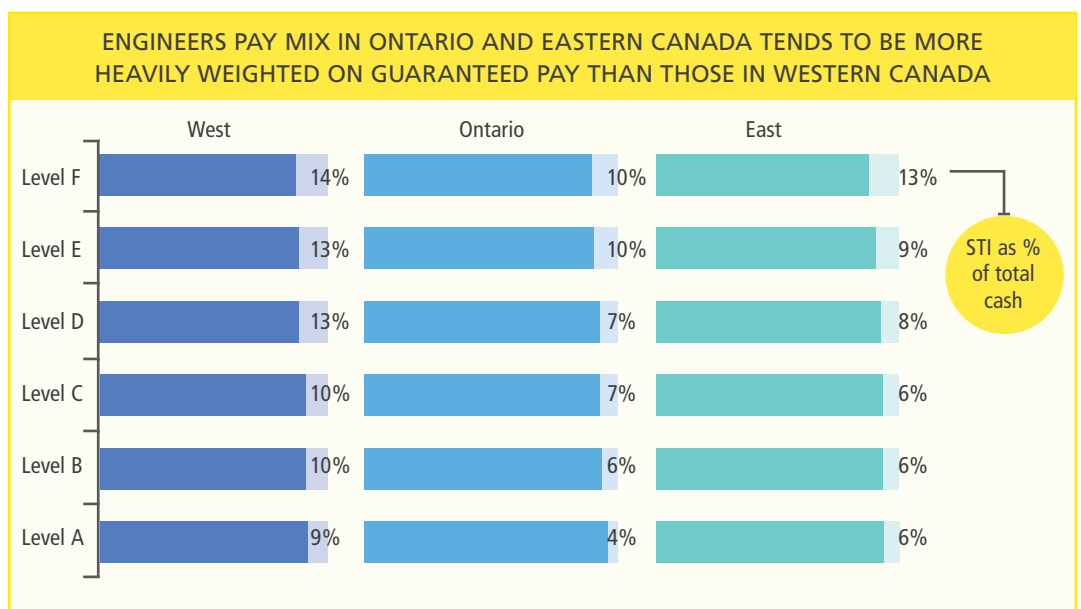


Figure 1: Pay mix of total cash compensation by Canadian region



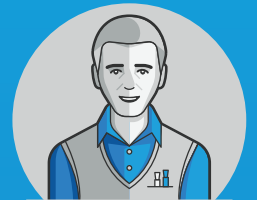
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A CHANGING WORKFORCE

As baby boomers retire, we continue to see the millennial generation increase their ranks within companies in the Mercer OSPE National Engineering Compensation Survey (see Figure 3). How will this impact the work environment and arrangements between company and employee?

What is clear is that employees are seeking more flexible and personalized work arrangements. Globalization and technology are making the world smaller as well as shaping employees' expectations of when and how they want to work. It is important to understand what is most valued by employees in our changing workforce. Based on findings from Mercer's 2017 Global Talent Trends Study, 55 per cent of employees want their company to offer more flexible work options to help create work/life balance. This is interesting, considering that almost 35 per cent of organizations that provided turnover data within the 2017 Mercer OSPE National Engineering Compensation Survey indicated that work/life balance issues were a ratio-

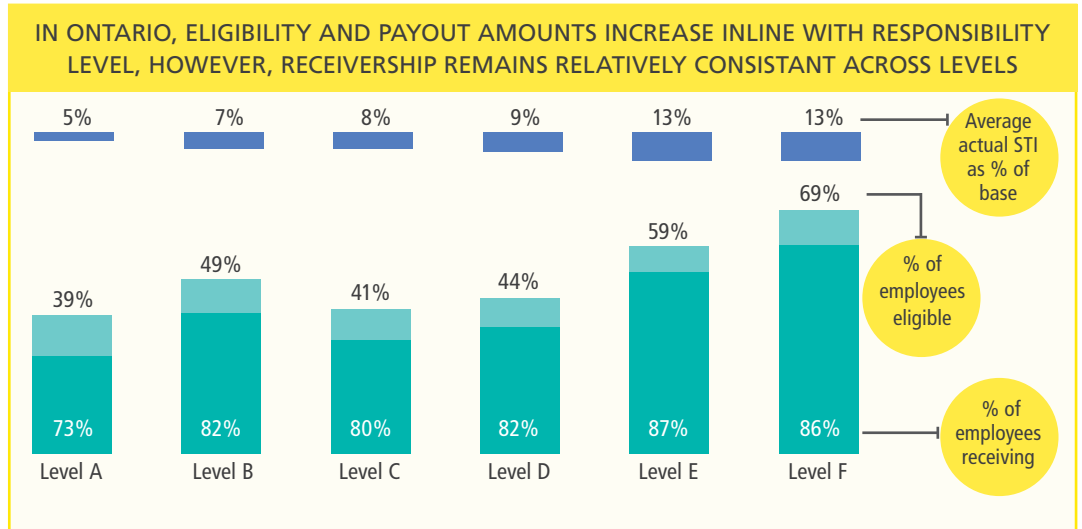


Figure 2: Short-term incentive eligibility, receivership and as a per cent of base salary in Ontario

nale for voluntary turnover, which impacts the professional levels more significantly.

Considering the findings above, how are companies adapting and creating this much sought-after flexible work culture? Fifty-seven per cent of companies in Canada have workforce flexibility policies in place, but only 30 per cent say it is a core part of their value proposition. Additionally, approximately one in three companies offer flexible work arrangements only on an ad-hoc basis. Employees were also asked about their experiences with flexible working in practice. Employees in Canada generally note support from their managers and from their colleagues. However, one in three employees in Canada reported they requested a flexible work arrangement in the past and were turned down, and half expressed concern that working part-time or remotely would negatively impact their opportunities for promotion. Progress is certainly being made, but possibly not fast enough for employees. What are the biggest priorities when determining where to work and create a lasting career? After taking pay out of the equation, the ask is clear: more time off or more flexible ways to spread their time off, as well as working fewer hours for less pay (see Figure 4).

How will your company adapt to the workforce of the future?

The Mercer OSPE National Engineering Compensation Survey helps establish meaningful criteria for engineering pay levels for the benefit of both engineers and employers of engineers. Compensation and workforce met-

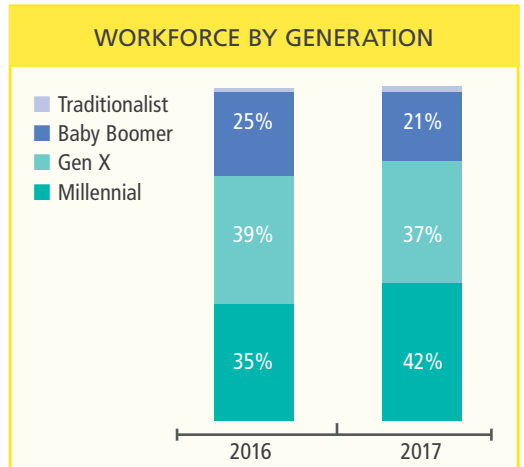


Figure 3: Generational mix in Ontario

rics data for over 24,000 engineers nationally across six engineering responsibility levels and 14 job types were collected from 242 organizations in both the private and public sector. The survey results are available in PDF and in an online format through Mercer WIN, allowing employers to assess their organization's competitive position and analyze market data. The design and implementation of the survey was overseen by an advisory committee comprised of representatives from industry as well as the engineering and human resources communities. The committee ensures that the survey remains a current and reliable resource on compensation for engineers across Canada. Employers can order the 2017 Mercer OSPE National

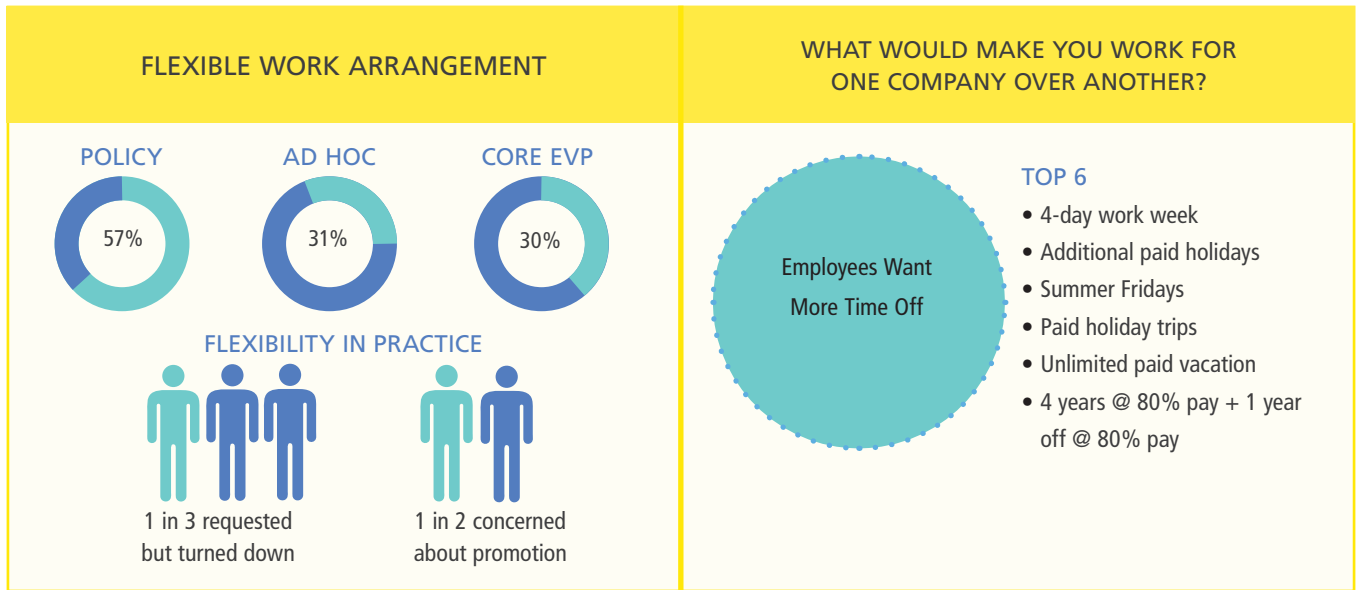


Figure 4: Workplace flexibility findings for Canada from Mercer's 2017 Global Talent Trends Study

Engineering Compensation Survey by contacting Mercer at imercer.com/engineering, 800-333-3070, or info.services@mercer.com. OSPE members can access a complimentary copy of the member market compensation summary online at www.ospe.on.ca.

Mark Bowling is a senior associate in Mercer's Career Information Solutions business.

BITS & PIECES

MARCH 1

The Ontario legislature approved an Ontario Society of Professional Engineers-initiated motion to declare March 1 Professional Engineers Day in Ontario. Granville Anderson, MPP (Durham), presented the motion, which was passed unanimously. Engineering is the first profession to be recognized with an official day by the legislative assembly of Ontario.

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FORMER PEO DEPUTY REGISTRAR TAKES OVER CONSULTING ENGINEERS ROLE

By Michael Mastromatteo



Bruce Matthews, P.Eng., former deputy registrar at PEO, is the new chief executive officer of CEO.

Former PEO deputy registrar Bruce Matthews, P.Eng., has been appointed to the chief executive officer position for Ontario's consulting engineers' organization.

In a February 2 announcement, Consulting Engineers of Ontario (CEO) Chair Rex Meadley, P.Eng., said Matthews will head up the 200-member organization effective February 26.

Matthews served as deputy registrar of regulatory compliance at PEO until September

2010, before taking on a deputy registrar position at the Real Estate Council of Ontario. He has also worked with the Ontario College of Trades and as an Ontario representative on the Council on Licensure, Enforcement and Regulation, an international organization supporting self-regulated professions.

Since leaving PEO, Matthews has added to his knowledge and expertise about effective regulation, and how self-governing professions cope with increasing expectations for accountability, transparency and putting the public interest ahead of members' interests.

Matthews takes over the position from Barry Steinberg, P.Eng., C.E.T., who left the organization in early February. It's expected Matthews will continue with the implementation of CEO's strategic plan, with its focus on advocacy and member engagement. Matthews will also have responsibility for the day-to-day management of the association's operations.

"Bruce Matthews brings with him a good understanding of the environment within which our members provide services along with impressive leadership skills," Meadley says. "We look forward to working with him to achieve the vision he has for our association."

First licensed as a professional engineer in 1990, his engineering experience includes staff and leadership roles at Atomic Energy of Canada, the Canadian Imperial Bank of Commerce, BGM Human Factors Engineering and the Ford Motor Company. He holds a bachelor of applied science in systems design engineering from the University of Waterloo and a certificate in building science from the University of Toronto.

"I'm honoured to have been selected as the next chief executive officer at CEO," Matthews told *Engineering Dimensions*. "I'm fortunate to be taking up the reins of a well-established, strong organization with a clear mandate and well-defined strategy. I look forward to building on the successes of Barry Steinberg and the board of directors to ensure CEO remains at the forefront as it represents member interests and addresses member issues."

Matthews says his 10 years at PEO in the regulatory compliance sector will be especially useful in his new role with the consulting engineers: "We regularly retained consulting engineering firms from a broad range of engineering disciplines to provide opinions and testimony in support of complaint investigations and discipline prosecutions."

"I am particularly enthusiastic about taking on this role as it provides an opportunity to shape public policy and the public/government perception of the consulting engineering sector," Matthews says. "It's a chance to promote consistency, fairness and reasonableness in procurement processes involving consulting engineers and to manage stakeholder expectations. I see a great opportunity for growth and enhancing the value proposition for member firms."

BITS & PIECES

The One, a new mixed-use tower under construction in Toronto's Yorkville neighborhood, will be the tallest skyscraper in Canada at 306.3 metres and 85 storeys. Employing a hybrid exoskeleton system, the tower is engineered to be six times as strong as a typical high-rise.



The record for the farthest building relocation by means of beams and dollies is 1650 kilometres, achieved by Warkentin Building Movers, Inc. in Athabasca, Alberta, in 2006. The 1400-square-foot (130.06-square-metre) house was delivered in one piece after a 40-hour drive.

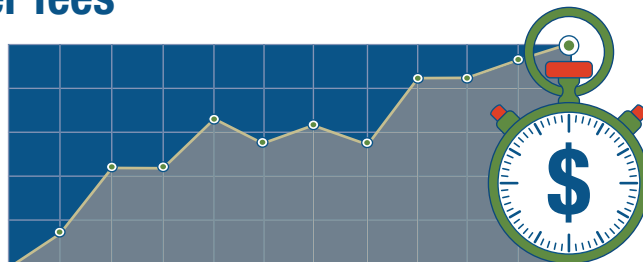
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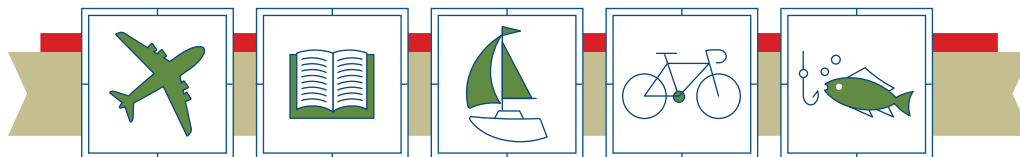
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PEO HONOURS 13 THROUGH 2018 ORDER OF HONOUR AWARDS

By Nicole Axworthy

This year, PEO will induct one Companion, six Officers and six Members into its Order of Honour. The Order is an honorary society that recognizes professional engineers and others who have rendered outstanding service to the engineering profession in Ontario, primarily through the association. The honourees will be recognized at a ceremony on Friday, April 20, held in conjunction with PEO's annual general meeting in Toronto, Ontario.

COMPANION

Christopher D. Roney, P.Eng., IntPE, BDS, FEC, FCAE, UE, will be inducted as a Companion. He has been an active PEO volunteer for over two decades, serving on Council, and as a Council representative to external organizations. He has been a member and chair of PEO committees and task forces, including the Executive Committee, Elliot Lake Advisory Committee and the Continuing Professional Development, Competency and Quality Assurance Task Force. The hands-on work he has contributed on these committees has led to many strategic and governance policy changes over the years. PEO Council elected Roney to the Engineers Canada board in 2009, and he was later elected president in 2016. He has served on, or chaired, some 14 Engineers Canada national task forces and committees during his time there, in addition to PEO commitments.

OFFICERS

John Bray, MAsc, P.Eng., FEC, will be inducted as an Officer. As a 17-year volunteer on PEO's Complaints Committee, Bray has lent both his time and his tremendous professional knowledge to investigating and considering complaints made regarding the actions and conduct of PEO licence and certificate of authorization holders. A civil engineer with almost five decades of senior-level environmental engineering experience in the public and private sectors, his knowledge of civil engineering and regulations concerning water resources in Ontario was invaluable to the committee during his volunteer service from 2001 to 2017. In addition to his 17 years on the Complaints Committee, Bray served as a PEO volunteer over a four-year period on the Code of Ethics Task Force, which was a key period in the modernization of the profession's overall culture.

David Filer, P.Eng., FEC, will be inducted as an Officer. He has been an active PEO volunteer for over 25 years. Filer began volunteering with PEO when he served on the Employment Practices and Women in Engineering committees. He later joined the Complaints Committee. His knowledge of engineering in HVAC (heating, ventilation and air conditioning) design and mechanical building services has been extremely valuable to the committee members. Filer has always been willing to share best practices and serve as a mentor to new committee members. Throughout his volunteer career he has always offered to take on extra work when his committees have faced high work volumes and pressure. Regardless of complexity, Filer always treats every file with respect and professionalism.

Santosh Gupta, PhD, ME, P.Eng., FEC, will be inducted as an Officer. Since retirement, he has been serving on PEO Council, several PEO committees, the Scarborough Chapter, the Ontario Society of Professional Engineers (OSPE) and Engineers Canada's accreditation teams. Within the Scarborough Chapter, Santosh has served as a director, vice chair and chair of the Government Liaison Program Committee. In addition to assisting with chapter activities, he has promoted the value and importance of licensure by delivering seminars and talks on PEO's licensing process to many organizations. Gupta also served on PEO Council for over 11 years where he fostered a collegial environment, supported OSPE in advocacy initiatives, promoted women in engineering by securing funding for the Women in Engineering Advisory Committee, and supported mentorship programs to help engineering interns and international engineering graduates prepare for licensure. He has also made significant contributions to the Experience Requirements, Discipline, Finance, Audit, Regional Councillors and Awards committees.

Rishi Kumar, P.Eng., PMP, CMC, GSC, FEC, will be inducted as an Officer. He is a dedicated volunteer who supports PEO at both the chapter and committee levels. Since joining the Mississauga Chapter executive, he has worked continuously as chair of the Mentoring Committee to raise its profile and establish a strong link between the chapter and newcomers. His chapter functions also include chairing and serving on the Scholarship, Awards, Mentoring, Privacy and Bylaw, and Environmental committees. Kumar oversees the chapter's scholarship program for high school students going into undergraduate engineering programs at Ontario universities. He also developed programs that connect experienced licensed professionals with engineering interns. Kumar has also served on PEO's Experience Requirements, Discipline, and Equity and Diversity committees. As a member of the tribunal panel, he has participated in discipline hearings to help resolve complaints against PEO licence and certificate of authorization holders.

Changiz Sadr, P.Eng., FEC, TOGAF, CISSP, will be inducted as an Officer. He was inducted as a Member in 2011 for his contributions chairing the Willowdale-Thornhill Chapter and service on PEO's Experience Requirements Committee and the Emerging Disciplines Task Force for Communications Infrastructure Engineering group. A telecommunications engineering graduate of the Telecom Faculty of Tehran, Sadr began volunteering for the profession through the Canadian Society of Iranian Engineers and Architects (Mohandes) in 1995. Since joining the Order of Honour, his volunteer service to PEO has expanded to sitting on PEO Council from 2013 to 2017, serving two terms as East Central Region councillor. He also chaired the Regional Councillors Committee from 2015 to 2017. Since 2011, he has served on the

Audit, Finance, Discipline and Executive committees. He also served as PEO liaison on the Ontario Association of Certified Engineering Technicians and Technologists' (OACETT) Council from 2013 to 2017.

Jeanette M. Southwood, P.Eng., FEC, FCAE, LLD (hc), IntPE, will be inducted as an Officer. A long-time volunteer with multiple organizations, Southwood has provided leadership and demonstrated an exceptional commitment to the profession. Her PEO volunteer service started on the Willowdale-Thornhill Chapter executive, where she created and chaired the Government Interface Committee, served as secretary, chaired the Newsletter Committee, and served on the chapter's Certificate Presentation and Events committees. Later, as chair of PEO's Awards Committee, she continued to improve the nomination, documentation and selection processes. In the greater engineering community, Southwood has volunteered her time on the University of Toronto department of chemical engineering and applied chemistry board of advisors, Consulting Engineers Ontario Member Services Committee, Ontario Environment Industry Association Board, Canadian Brownfields Network Board, Ryerson University Engineering and Architectural Science Dean's Advisory Council, and the Energy and Environment Sector Advisory Board of the Ontario Centres of Excellence.

MEMBERS

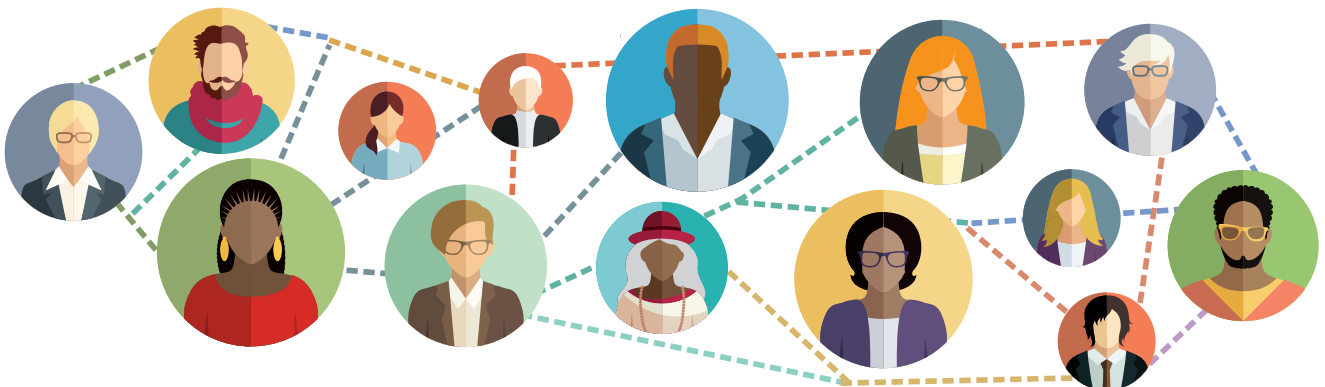
Galal Abdelmessih, P.Eng., FEC, PMP, will be inducted as a Member. Abdelmessih has provided leadership as a PEO committee and chapter volunteer, including more than 10 years of service as an Experience Requirements Committee member and as a volunteer with PEO's Mississauga Chapter. During his years serving the Mississauga Chapter, Abdelmessih led various committees focusing on education, licensure assistance, Government Liaison Program and others. One of his most significant accomplishments was organizing the EIT Committee to deliver events for engineering interns. Regardless of the initiative, he demonstrates leadership by encouraging new volunteers to work with him in organizing events. As a long-time P.Eng., Abdelmessih has a great deal of historical knowledge of the profession and a long-term perspective, always believing in being true to PEO's core values: accountability, respect, integrity, professionalism and teamwork.

Andrew Dowie, P.Eng., FEC, will be inducted as a Member. Dowie was the first recipient of the G. Gordon M. Sterling Engineering Intern Award, presented in 2010. Since then, he has served the profession by volunteering on the Sterling Award Subcommittee as well as the PEO Windsor-Essex Chapter, which he joined in 2006 and chaired in 2013 and 2014. One of his many chapter volunteer positions included service as Government Liaison Program chair, where he represented his chapter at various galas, conferences and luncheons with politicians. Dowie also worked closely with PEO to create its first annual Candidate College, recruiting politicians to discuss the importance of having engineers run for office and how to run a successful campaign. His notable volunteer activities include serving as a long-time leader with Scouts Canada and serving as a judge at the Windsor Regional Science, Technology and Engineering Fair and the Canada Wide Science Fair in Windsor.

continued on p. 18

*PEO and National Volunteer Week
celebrate the value of volunteering April 15-21, 2018*

Thank you to all our devoted volunteers—councillors, committee and task force members, and PEO chapter volunteers—for building confidence, competence, connection and community within Ontario's engineering profession. Your continuous support is appreciated and valued.



continued from p. 17

Derek Van Ee, P.Eng., FEC, will be inducted as a Member. For the past 15 years, he has been an active volunteer with PEO's Lake Ontario Chapter, serving as vice chair, chair and past chair. He has been a steady and guiding force, providing support, history and knowledge, and empowering new board directors and volunteers. He was instrumental in setting up joint PEO and OSPE events to promote engineering. Van Ee is behind many small initiatives that greatly improved his chapter's function: he developed the chapter website into a useful tool for the executive and members, organized a group email list for chapter executives to communicate and plan events and meetings and created the chapter newsletter template. He also initiated the Durham Popsicle Bridge Competition in 2006 and has grown the event into a signature National Engineering Month event that is jointly hosted by the Lake Ontario Chapter and the OACETT Durham Chapter.

Georg Kralik, P.Eng., FEC, will be inducted as a Member. He has been a long-time volunteer with PEO's North Toronto and West Toronto chapters, serving as chair, vice chair and committee coordinator, and on chapter committees related to licence presentation ceremonies, women in engineering, the annual Engineering Innovation Forum and the Engineer-in-Residence (EIR) program. He has served as an EIR volunteer to a Grade 8 class at Cedarvale Community School and, as a long-time FIRST Robotics competition judge, Kralik encourages high school students to explore new approaches to solving problems. As vice chair of the chapter's Women in Engineering Committee, he championed the inclusion of women in the profession. He has served as an exemplary leader and mentor to female students interested in pursuing a career in engineering while supporting and encouraging efforts to increase gender diversity within the profession.

Lisa MacCumber, P.Eng., will be inducted as a Member. MacCumber has volunteered extensively with PEO, OSPE and the engineering profession throughout her career. Her volunteer work with PEO's Mississauga Chapter—including stints as chair, secretary and director—has fostered networking and community building with engineers and engineering graduates. She has chaired chapter committees with a focus on the environment and women in engineering, served on PEO's Chapter Leaders Conference Organizing Committee for 2014 and 2015, and has participated on OSPE's Women in Engineering Advocacy Committee since 2009. Her other commitments to the community include volunteering with Habitat for Humanity and Engineers

Without Borders. As a mentor, she actively recruits female engineers and pairs ideal matches with students' needs.

Stela Stevandic, P.Eng., FEC, PPM, will be inducted as a Member. For the past 10 years, she has been an active PEO volunteer, supporting PEO's London Chapter as well as PEO's Repeal of the Industrial Exception Task Force. Stevandic has started and chaired many committees for the London Chapter, including the Government Liaison Program, Athletics, and Women in Engineering committees. She also helped organize chapter town hall meetings for 2011 provincial election candidates, created a partnership with the Project Management Institute for local events, and developed a PEO partnership with the London Chamber of Commerce. Stevandic reinstated a local Athletics competition in partnership with the Grand River Chapter and Western University, which is now organized on an annual basis. Through these competitions, she raises awareness of professional engineering and encourages young students to consider a career in engineering.

PEO ANNOUNCES RECIPIENT OF 2018 G. GORDON M. STERLING ENGINEERING INTERN AWARD

Michael Burdett, EIT, plant engineer (EIT), Digital Specialty Chemicals, has been named this year's recipient of the G. Gordon M. Sterling Engineering Intern Award. An enthusiastic and versatile leader with an ability to inspire those around him to act as one, Burdett is known for providing a vision of the future and always coming through on deliverables. Burdett applied for the G. Gordon M. Sterling Engineering Intern Award because he values the opportunity to receive formal leadership training and become a more effective contributor to his profession.

Since graduating in 2014, he has already utilized his technical skills to solve problems in his professional work. As a PEO volunteer, he is presently leading or assisting in nearly every project with PEO's Etobicoke Chapter. In addition to his commitment of time and effort, Burdett brings passion to his volunteer work, whether it is organizing Engineering Idol competitions in high schools or creating the agenda for the Government Liaison Program.

At work, his dedication to process safety management is a great example of his leadership. Passionate about the cause, Burdett educates himself, his operators and his team about safety and is patient in helping others understand why safety matters. He is continually looking for improvements and, through involvement in many safety organizations, helps effect change in safety policy and attitudes.

Burdett is a highly engaged community activist outside PEO, being involved with many charitable organizations, such as Road to Hockey to Conquer Cancer and the Daily Bread Food Bank.

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



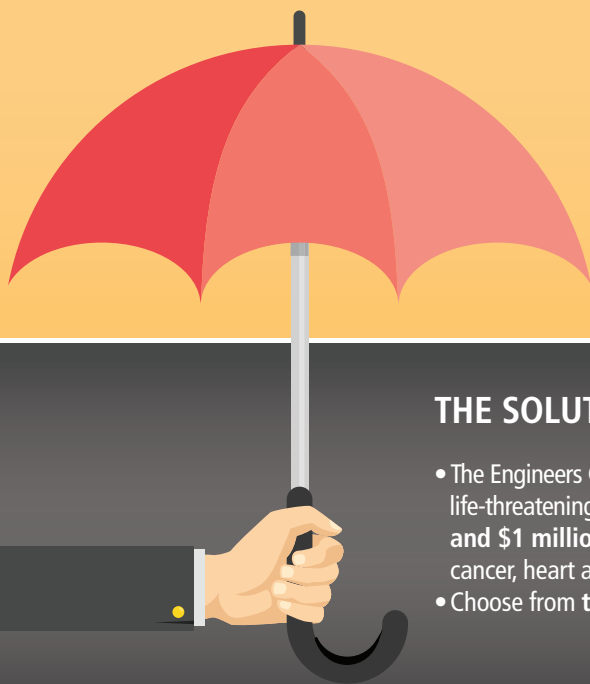
FACTS CANADIANS NEED TO KNOW ABOUT CRITICAL ILLNESS.



Thanks to medical advances, Canadians are more and more confident about surviving a critical illness. However, many still remain unprepared for the financial impact of such a diagnosis. The Engineers Canada-sponsored Critical Illness Plan can help if the unexpected occurs to you or a family member. Consider the facts below, and ask yourself: Are you financially prepared?

THE RISK OF CRITICAL ILLNESS.

- **1 in 2 Canadians** will develop cancer in their lifetime.¹
- **206,200 Canadians** were diagnosed with cancer in 2017.¹
- About **9 in 10 Canadians** already have at least one risk factor for heart disease and stroke. In Canada:
 - o there is 1 heart attack every 7 minutes.²
 - o there are 62,000 strokes every year.³



SURVIVING A CRITICAL ILLNESS.

- **About 60%** is the 5-year net survival rate for people diagnosed with cancer, but it varies widely by the type of cancer.¹
- **2.4 million Canadians** are currently living with the effects of heart disease.⁴
- **400,000 Canadians** are currently living with the effects of stroke.⁵

UNDERSTANDING THE FINANCIAL IMPACT OF HAVING A CRITICAL ILLNESS.

- Cancer accounts for **\$586 million** in indirect costs from loss of productivity or premature death.¹
- More than **400,000 Canadians** live with long-term disability from stroke. Recovery can take months or years, even for milder strokes, and many people never fully recover.⁵

THE SOLUTION: HOW CRITICAL ILLNESS INSURANCE CAN HELP.

- The Engineers Canada-sponsored Critical Illness Plan **pays a lump sum** upon diagnosis of a covered life-threatening condition. You and your spouse may apply for benefit amounts **between \$25,000 and \$1 million** to help meet the costs associated with surviving a serious illness, such as cancer, heart attack or stroke.
- Choose from **two types of coverage**:
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¹Canadian Cancer Society, 2017. <http://www.cancer.ca/~media/cancer.ca/CW/publications/Canadian%20Cancer%20Statistics/Canadian-Cancer-Statistics-2017-EN.pdf>

²Heart and Stroke Foundation of Canada, 2017. <http://www.heartandstroke.ca/what-we-do/media-centre/news-releases/media-opportunity-the-canadian-cardiovascular-congress>

³Heart and Stroke Foundation of Canada, 2017. <http://www.heartandstroke.ca/what-we-do/media-centre/news-releases/help-wanted-needs-not-being-met-for-canadians-living-with-stroke>


⁴Public Health Agency of Canada, 2016. <https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/heart-disease-maladies-coeur-eng.pdf>

⁵Heart and Stroke Foundation of Canada, 2017. http://www.strokebestpractices.ca/wp-content/uploads/2017/06/HS_StrokeReport2017_EN.pdf

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CREATIVE INNOVATION A POPULAR THEME AT NORTH BAY CHAPTER EVENT

By Michael Mastromatteo

The positive disruption brought on by innovators dominated discussion January 26 at the annual Professional Engineers' Day Symposium in North Bay, Ontario.

Organized by PEO's North Bay Chapter and the Ontario Association of Certified Engineering Technicians and Technologists (OACETT), the event will soon mark its half-century of engineering and technology exhibition.

The theme for the 2018 symposium was "innovation and mavericks."

Karin Pratte, P.Eng., vice chair of the North Bay Chapter and head of the symposium organizing committee, says nearly 100 engineers, technicians and technologists took in this year's event.

"Innovators and mavericks were well represented in the presentations by companies such as Cementation, Hardline Solutions and Metric Aid," Pratte told *Engineering Dimensions*. "Cementation discussed its award-winning injection hoisting technology and speaker Alun Price Jones, named 'the innovator' in *CIM Magazine's* 2017 Names to Know, spoke of his brilliant idea and how it is now becoming a reality."

Cementation's injection hoisting system incorporates several existing technologies to move ore from deep mine excavations to the surface using a continuous, slurry-filled pipeline loop.

In addition to the Cementation exhibit, there were presentations surrounding entrepreneurship and funding opportunities, which tied in nicely with the theme, Pratte adds.

CIM Magazine, published by the Canadian Institute of Mining, Metallurgy and Petroleum, focuses primarily on trends and technology in the extraction industry.

David Jackowski, P.Eng., current chair of the North Bay Chapter, served as host and emcee for some of the day's activities.

Among the guests bringing greetings were MP Anthony Rota (Nipissing-Timiskaming), North Bay Mayor Al McDonald, Ontario Society of Professional Engineers President and Chair Jonathan Hack, P.Eng., OACETT President-elect Kim Pickett, C.E.T., and PEO President-elect David Brown, P.Eng., BDS, C.E.T.

Outgoing PEO Registrar Gerard McDonald, P.Eng., also attended the symposium and made a brief presentation on the engineering regulator's 2018-2020 Strategic Plan.

"Overall it was a very successful event for the local chapter," Pratte says.



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HOW PRACTITIONERS CAN PREVENT CONFLICTING OBLIGATIONS

By José Vera, P.Eng., MEPP

Consider this: a practitioner designs a structural frame for a site where corrosion resistance is needed and therefore specifies galvanized steel elements. Instead, the client selects plain steel components, which are less expensive but more susceptible to corrosion. The practitioner is dismayed to discover that the agreement allows the client to overrule the practitioner's material specifications and is concerned that stress corrosion cracking will lead to structural failure and consequently unsafe working conditions. On one hand, the practitioner has a statutory obligation to make reasonable provision for the safeguarding of life, health or property. On the other hand, the agreement appears to conflict with this obligation by allowing the client to overrule the practitioner's professional judgment on a matter involving safety. How should the practitioner handle this situation? Or better yet, how can practitioners avert these situations in the first place? This article provides some key insights into this and other situations where practitioners might be faced with conflicting obligations.

STATUTORY OBLIGATIONS AND CONTRACTUAL AGREEMENTS

All too often, PEO's practice advisory team receives phone calls from practitioners who have been placed in a position where complying with their statutory obligations becomes a challenge. It should not be this way, since frequently the root cause of these problems are agreements and/or scopes of services that did not take into consideration the practitioner's statutory obligations. Practitioners can help prevent these issues from occurring in the first place by communicating their statutory obligations to clients early and clearly.

Practitioners have several statutory obligations, outlined in the *Professional Engineers Act* and its regulations. These obligations need to be considered when drafting agreements and scopes of services, otherwise potential conflicts can ensue when inconsistencies are found between the practitioner's statutory obligations and their contractual ones included in agreements and scopes of services. Three common scenarios involving conflicting obligations, which are frequently reported to PEO's practice advisory team, are examined below.

REPORTING SITUATIONS THAT MAY ENDANGER SAFETY

The practitioner's obligation to correct or report a situation that may endanger safety or the welfare of the public is found in section 72(2)(c) of Regulation 941/90 under the *Professional Engineers Act*:

For the purposes of the act and this regulation, "professional misconduct" means,...

(c) failure to act to correct or report a situation that the practitioner believes may endanger the safety or the welfare of the public

This statutory obligation commonly referred to as the duty to report should be clearly communicated to clients. Below are some key points that both clients and engineers should consider when discussing the duty to report.

First, both clients and practitioners should know that this obligation applies to practitioners as defined as "holder of a licence, a temporary licence, a provisional licence, a limited licence or a

certificate of authorization (C of A)." In plain terms, this obligation applies not only to engineers but also to engineering firms holding a C of A. Therefore, the engineering firm that enters into a contract with the client has the same duty to report that engineers do.

Second, clients and practitioners should be aware that the duty to report is covered extensively in the PEO guideline *Professional Engineering Practice*, available at www.peo.on.ca/index.php/ci_id/22127/la_id/1.htm. This guideline is a valuable resource not only for practitioners but also clients who want to learn more about the statutory obligations of engineers. Further, this guideline makes a distinction between the duty to report and whistleblowing, which only applies to extreme situations involving the duty to report.

Thirdly, it is in the interest of clients to avoid placing practitioners in a situation where in the practitioner's view the only moral option is to blow the whistle, since whistleblowing should only be a last resort. After all, clients and practitioners should be able to address safety concerns early enough to not require involvement from authorities. Consequently, agreements between clients and engineering firms should be consistent with the practitioner's duty to report, in order to prevent extreme circumstances from arising in the first place. Below are some best practices on achieving this objective:

- Clients and practitioners should agree on a clear communications protocol for reporting situations that, in the view of the practitioner, may endanger the safety or welfare of the public;
- The responsibilities of both the client and the practitioner when addressing such situations should be clearly outlined;
- Agreements and scopes of services should not only be consistent with the duty to report but should also be consistent with other statutory obligations;
- Both clients and practitioners should collaborate when drafting agreements and scopes of services; and
- Both clients and practitioners should seek the advice of their own legal counsel when drafting agreements.

Last but not least, practitioners should explain to clients that the duty to report not only benefits the public but also benefits the client by making

them aware of unsafe situations that may present a serious liability to them.

OVERRULING PROFESSIONAL ENGINEERING JUDGMENT

Practitioners have a statutory obligation to clearly present the consequences expected from a proposed deviation from their engineering work, if their professional judgment is overruled by a non-technical authority (refer to 72(2)(f) of Regulation 941/90). Recall the earlier example where a practitioner designs a structural frame and specified galvanized steel, but the client selected plain steel, which is less costly but prone to corrosion. In this situation, the practitioner must clearly present the consequences of utilizing plain steel elements, such as potential corrosion causing structural failure, among other things.

Practitioners should not be held accountable for deviations to their engineering work that they did not recommend or give the go-ahead to. Consequently, agreements and scopes of services should note the client assumes full responsibility for proposed deviations to engineering work and their consequences, should they overrule the professional judgment of the practitioner. Furthermore, it is prudent for practitioners to recommend that the client obtain a second professional engineering opinion before making any final decisions. Finally, in the event of an unresolved disagreement, practitioners can propose the client engage another practitioner to perform a technical review of the original practitioner's engineering work. In that vein, the PEO guideline *Professional Engineers Reviewing Work Prepared by Another Professional Engineer* (available at www.peo.on.ca/index.php/ci_id/22122/la_id/1.htm) is quite helpful.

Clients may prefer to rely on engineering work that has undergone a technical review. Consequently, in order to dissuade situations where the client believes it necessary to overrule the practitioner's engineering judgment, a more proactive approach would be to always include a technical review of the practitioner's engineering work in agreements and scopes of services, and thereby prevent these problematic situations from arising in the first place.

USE OF SEAL SHOULD NOT BE A CONTRACTUAL OBLIGATION

The use of the engineer's seal is a statutory obligation found in section 53 of Regulation 941/90. In very general terms, engineers have an obliga-

tion to seal professional engineering work they either prepared or thoroughly reviewed. The PEO guideline *Use of the Professional Engineer's Seal* (available at www.peo.on.ca/index.php/ci_id/22148/la_id/1.htm) covers this obligation in great detail.

Unfortunately, too frequently agreements include language where engineers are required to seal specific documents. Not only is wording of this kind completely unnecessary, since the use of the seal is already a statutory obligation, it can give rise to conflicts if engineers are not authorized to seal the specified documents, such as when they did not prepare or thoroughly review the documents. A contractual obligation to the contrary presents a serious conflict to engineers.

To avoid these potential conflicts, agreements and scopes of services should leave out any mention of the seal. Rather, agreements and scopes of services should focus on what work the practitioner is responsible for. For example, the following wording is problematic on its face: "the engineer shall seal the as-built drawings prepared by the contractor...." As-built drawings not prepared or thoroughly reviewed by the engineer cannot be sealed in the first place. On the other hand, the following wording does not conflict with the use of the seal statutory obligation: "the engineer shall perform an onsite visit for verification of existing and as-constructed conditions, and shall prepare and provide record drawings...." This avoids mention of the seal and focuses on the work that needs to be completed.

It is in the interest of practitioners to avoid being placed in a position where their contractual obligations conflict with their statutory ones. Early discussions and collaboration, clear agreements and scopes of services as well as technical reviews are all tools to avoid potentially costly and risky situations. More work documenting what has been agreed to with the client in the beginning can help prevent problems in the long run. It is far less expensive to retain legal counsel for drafting agreements than retaining them for court.

Finally, PEO's practice advisory team is available by email at practice-standards@peo.on.ca and is happy to hear from practitioners looking to prevent conflicting obligations from arising. **e**

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

CONTINUOUS LEARNING THROUGH PEAK

By Arden Heerah, P.Eng.

Members of the engineering community recognize the value of their expertise to clients, employers and the public, so they appreciate the importance of not only being competent engineers but also publicizing their efforts to remain so. PEO's Practice Evaluation and Knowledge (PEAK) program encourages PEO licence holders to engage in continuous learning and provides them with the opportunity to promote their commitment to doing so.

In today's modern world, continuous learning happens in a remarkably wide range of forms. It can take place in the work environment but it frequently happens off the clock, too. Since continuous learning is intended to supplement or reinforce existing knowledge, it differs from simply practising and applying existing knowledge.

In a traditional sense, continuous learning involves continuing education in organized classroom sessions where an instructor both provides information and assesses whether the student has understood it. This form of learning includes distance-learning opportunities that employ technologies that facilitate remote access but remain opportunities through which the student is examined by the instructor.

Other forms of learning take place in less formal scenarios. For example, self-education is when an engineer reads books, manuals, codes, technical articles and papers, regulations and standards. Other types of informal learning include attending seminars or webinars, participating in lunch-and-learn sessions, and attending vendor workshops highlighting the engineering features of products and the engineering involved in the design and manufacture. Informal learning also includes training sessions on programs and tools and their application to engineering projects, participating in certain mentorship arrangements, engaging in peer group discussions and attending industry-led presentations and tours.

Forms of learning do not end there. In disseminating technical information to the engineering community, committees, presenters and writers are sure to impart knowledge through their research, findings, techniques and lessons learned: both presenter and attendee learn through the experience.

The PEAK program recognizes all these continuous learning activities. Through the annual reporting element of the program, practising PEO licence holders can inform PEO of the activities they have completed that maintain or update their engineering knowledge. In fact, the PEAK program was developed to provide licence holders with an easy online reporting system. Using drop-down menus, the user selects from three categories for the tagging of continuing knowledge activities: formal education, informal education and contributions to knowledge. When a licence holder reports completed activities, PEO will make this fact publicly available in the practitioner directory. This element of the program works as a platform that helps licence holders reflect on and track their continuous learning efforts while informing the public when the licence holder reports those efforts to PEO. These features of the element speak to PEO's commitment to safeguarding the public interest with respect to the practice of professional engineering and professional transparency in Ontario.

Another unique feature of the PEAK program is that it allows practising PEO licence holders to craft personalized learning plans to meet their own needs and circumstances. This means they can distribute their PEAK activity hours across as many of the three categories of technical activities recognized by the program as they like.

Some examples to help identify activities that count towards your PEAK activity hours:

RECOGNIZED by the PEAK program	NOT RECOGNIZED
<ul style="list-style-type: none"> • Passed a class on engineering design methodologies • Completed a course on software simulation strategies • Passed a course for an industrial sector certification 	<ul style="list-style-type: none"> • Practising hours • Project management and scheduling • Time management • Business management • Fiscal management • Non-engineering communications • Leadership • Public speaking • Coaching techniques • Etiquette • Organizing skills • Equity, equality and diversity
<ul style="list-style-type: none"> • Read a publication on changes to codes, standards or regulations • Attended employer's lunch-and-learn on methods of analysis and design • Attended a seminar or webinar on communicating engineering information • Attended a vendor's workshop on the engineering features of their products • Attended a workshop on managing engineering activities involving supervising engineers and incorporating codes, standards and best practices • Attended a chapter-organized event on design applications 	
<ul style="list-style-type: none"> • Developed a guideline or standard on industry best practices • Delivered a seminar on engineering lessons learned • Delivered a webinar on preparing and reviewing engineering documents • Provided technical mentoring to interns or colleagues 	

It's important to note PEO does not endorse any provider of continuing knowledge activities and it does not validate or accredit any continuing knowledge activity. Licence holders should determine which activities have content that is relevant to them and are sufficiently technical to maintain or update their engineering skills.

To learn more about the PEAK program, visit peopeak.ca. For additional support from PEO, the PEAK program team is available by email at peoPEAK@peo.on.ca and by phone at 416-224-1100, ext. 1123. [e](#)

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

March 2018

MARCH 22

Sustainability Summit, London, England
events.economist.com/events-conferences/emea/sustainability-summit-2018

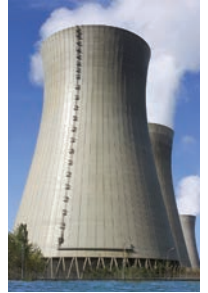


MARCH 23-25

ASME E-Fest West, Pomona, CA
efests.asme.org

MARCH 27-28

International SMR and Advanced Reactor Summit, Atlanta, GA
nuclearenergyinsider.com/international-smr-advanced-reactor



April 2018

APRIL 3-5

Symposium on Elevated Temperature Applications of Materials for Fossil, Nuclear and Petrochemical Industries, Seattle, WA, asme.org



APRIL 4-6

Mach 2018 Conference, Annapolis, MD
machconference.org

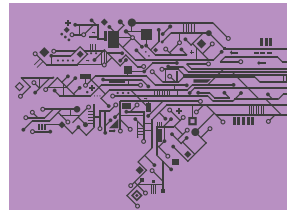
APRIL 13-15

ASME E-Fest East, Pennsylvania, PA
efests.asme.org



APRIL 14

All About STEM, Detroit, MI
eventbrite.com/e/all-about-stem-tickets-38976284115?aff=es2



APRIL 22-25

Global Congress on Process Safety, Orlando, FL
aiche.org/ccps/conferences/global-congress-on-process-safety/2018



APRIL 14-18

SPE Improved Oil Recovery Conference, Tulsa, OK
speior.org

APRIL 18-20

Mari Tech 2018 Conference, Victoria, BC
mt18.ca

APRIL 18-21

Joint Rail Conference, Pittsburgh, PA
asme.org/events/joint-rail-conference

APRIL 25-26

Smart Water Systems Conference, London, England
smi-online.co.uk/utility/uk/smart-water-systems



APRIL 30-MAY 3

Offshore Technology Conference 2018, Houston, TX
2018.otcnet.org

APRIL 23-26

12th Annual IEEE International Systems Conference, Vancouver, BC
ieeesyscon.org

APRIL 23-26

WasteExpo, Las Vegas, NV
wasteexpo.com

APRIL 28

International Women's Conference, Detroit, MI
eventbrite.com/e/international-womens-conference-iwc2018-the-girls-mental-health-day-registration-40146685818?aff=es2



May 2018

MAY 9-10

National Center for Defense Manufacturing and Machining Summit 2018, Blairsville, PA
ncdmmsummit.org



MAY 13-16

Canadian Conference on Electrical and Computer Engineering 2018, Québec City, QC
ccece2018.org

MAY 15-17

Hazards 28 Conference, Edinburgh, Scotland
icheme.org/hazards28

PUBLIC SAFETY, TRANSPARENCY AND GOVERNANCE IMPROVEMENTS UNDER THE *PROFESSIONAL ENGINEERS ACT*

By Jordan Max and Leah Price

For the past three years, PEO has worked with the Ministry of the Attorney General to identify changes to the *Professional Engineers Act* necessary to improve public safety protection and transparency with respect to the practice of professional engineering in Ontario, stemming from the 2012 Algo Centre Mall collapse in Elliot Lake, Ontario. These act changes were made in Schedule 34 of Bill 177, the *Stronger, Fairer Ontario (Budget Measures) Act, 2017*, which was passed by the Ontario Legislative Assembly on December 14, 2017 and came into effect the same day. The policy intents for these changes were approved by Council on February 5, 2016, June 24, 2016, and September 23, 2016, and the final wording for the changes was accepted by PEO's Legislation Committee on September 8, 2017.

What are these changes and what do they mean for PEO's licence holders?

1. Continuing jurisdiction over members or holders of licences or certificates of authorization (Cs of A) that have been revoked [sections 5(2), 22(1), 22.1(new)]

This public safety protection measure ensures PEO has jurisdiction over conduct during licensure, even if the licence or C of A is revoked before the complaint is received by PEO. This is in line with other professional regulatory legislation, such as the *Regulated Health Professions Act* and the *Chartered Accountants Act, 2010*. Robert Wood had inspected the Algo Centre Mall a few weeks before it collapsed. A Registrar's Investigation led to a complaint being made to PEO. However, his licence was revoked for unrelated reasons before the complaint was made. PEO's Discipline Committee decided it did not have jurisdiction to deal with the professional misconduct charges against Wood arising from the Algo Centre Mall roof collapse, since his licence had been revoked before the complaint was filed. PEO always had jurisdiction over conduct during licensure despite resignation or cancellation. The amendments add jurisdiction over revoked members and holders, and clarifies continuing jurisdiction over suspended members and holders.

2. The power to make regulations for continuing education [section 7(1) paragraph 27]

One of Commissioner Paul Bélanger's recommendations on the Elliot Lake Commission of Inquiry was for PEO to institute a mandatory continuing professional education program for all professional engineers. The *Professional Engineers Act* did not provide authority for PEO to create regulations to deal with enforcement of mandatory requirements—the act only referred to "providing for continuing education of members" (P.Eng. licence holders only).

This change provides Council with the authority to make regulations under the act governing the continuing education of holders of temporary licences, provisional licences and limited licences as well as of members, including sanctions for non-compliance.

It is important to note that there are no operational or policy changes or impacts on licence holders at this time from this change, and no regulation changes are forthcoming. Participation in PEO's Practice Evaluation and Knowledge (PEAK) program is still voluntary, and Council will be reviewing the program in June 2018 to determine its direction.

3. A reduced threshold for members' confirmation of a bylaw passed by Council [section 8(3)]

Subsection 8(3) of the act was amended to change how bylaws pertaining to PEO's administrative and domestic affairs passed by Council may be confirmed. In 2010, under the *Open for Business Act* changes, the bylaw confirmation threshold was raised to a majority of the members (PEO has over 85,000 members), which has proven to be unworkable.

Council continues to be able to decide if any bylaw change it passes needs to be confirmed by a vote of the members. Currently, section 59 of By-Law No. 1 requires that changes to the annual fees for licence holders must be confirmed by the members. The only difference is the threshold level, which returns to the pre-2010 level of the majority of the members voting on the bylaw change.

4. Giving the registrar power to issue a Notice of Proposal to suspend or revoke [sections 14(2), 15(8)(c), 18(2)(c), 19(1),(7),(7.1)(new),(16)]

Before the recent amendments, the registrar had power to issue a Notice of Proposal to suspend or revoke a C of A or a temporary, provisional or limited licence, but not a membership. This gap has now been filled, and the registrar's power now extends to all types of licences and authorization under the act. This public safety protection measure allows the registrar to issue a Notice of Proposal to suspend or revoke the licence of all types of licence holders and C of A holders where:

- "the registrar is of the opinion, on reasonable and probable grounds,
- (a) that the past conduct of the applicant for or the holder of the licence affords grounds for the belief that the applicant or holder will not engage in the practice of professional engineering in accordance with the law and with honesty and integrity;
 - (b) that the holder of the licence does not meet the requirements or the qualifications for the issuance of the licence set out in the regulations; or

- (c) that there has been a breach of a term, condition or limitation of the licence.”

If you are given a Notice of Proposal to suspend or revoke under this section, you have the right to challenge it by requesting a hearing by the Registration Committee within 30 days. The Registration Committee has the power to uphold or to reject the registrar’s proposal to suspend or revoke, or to impose conditions, terms or limitations on the licence or C of A. If you do not make a request to the Registration Committee for a hearing within 30 days of receiving the notice, the licence or C of A will be suspended or revoked as proposed.

5. Allowing Discipline Committee decisions to be added to the register (online licence holder directory) [sections 21(1)(para.3.1)(new), (4)(new)]

This transparency measure will provide a history of any discipline information concerning a licence holder, regardless of whether the licence holder was found guilty or not guilty, to the public via PEO’s website. Prospective clients may use the information on the register to validate the information provided by those offering professional engineering services to the public, or to avoid hiring someone without a licence or whose licence has been suspended. It will also allow licence holders who were found not guilty to demonstrate those findings to their current and prospective clients.

6. Removing the requirement for elected councillors to serve on Discipline Committee hearing panels [section 27(5)(a)]

Under the act, disciplinary hearing panels are composed of different types of members of the Discipline Committee, including an elected member of Council. Since the demands of an elected councillor from other committees make it difficult for them to commit to participating on hearing panels, the requirement to have them on a panel is being removed to expedite the formation of discipline hearing panels. Elected councillors (if available) can still participate on disciplinary hearing panels. This change was originally recommended by PEO’s Complaints and Discipline Task Force in 2011.

7. Allowing public access to Discipline Committee hearing evidence and transcripts [sections 30(5),(5.1,5.2)(new)]

This transparency measure will expand the scope of available documentary evidence and transcripts for discipline hearings to persons or

organizations other than the involved parties, such as the media, members of the public or other professional associations. Non-parties will be able to request (and pay for) copies of documents filed as exhibits and hearings transcripts, which are currently usually only produced upon request by one of the parties. Documentary evidence that is excluded by the discipline hearing panel due to public safety or financial or personal matters under section 30 (4.1) of the *Professional Engineers Act* will continue to be excluded from public disclosure.

8. Giving authority to the registrar to release information to other authorities [section 38 (1.1)(new)]

This safety measure will enable the registrar to forward information that comes to his or her attention—where there is a public safety concern—to the appropriate regulatory organization for further investigation or actions under that organization’s jurisdiction. These organizations could include federal, provincial or municipal governments (or their departments, ministries, special purpose bodies, agencies, boards or commissions) or the Ontario Provincial Police or local police services. The net effect would be greater public safety, since PEO does not have the power to take immediate steps to rectify or avert an imminent public safety issue, while other regulatory authorities do have such powers. This provision would also protect the registrar from prosecution under section 38(3) of the *Professional Engineers Act*, where he or she has disclosed such information for this purpose. **e**

Jordan Max is manager of policy and Leah Price is counsel for regulatory compliance at PEO.

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DECISIONS 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 GHOLAMREZA SEKHAVATI, P.ENG., a member of the Association of Professional Engineers of Ontario, and GHOLAMREZA SEKHAVATI O/A RE-CON CONSULTING, a holder of a certificate of authorization.

The panel of the Discipline Committee met to hear this matter on July 24, 2017 at the Association of Professional Engineers of Ontario (the association) at Toronto.

THE ALLEGATIONS

The association alleged that Gholamreza Sekhavati, P.Eng. (Sekhavati), and Gholamreza Sekhavati o/a Re-Con Consulting (Re-Con) were guilty of professional misconduct as follows:

- a. Signing and sealing structural drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that failed to meet the standard of a reasonable and prudent practitioner, amounting to professional misconduct as defined by section 72(2)(a) of Regulation 941.
- b. Signing and sealing structural drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that failed to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work, amounting to professional misconduct as defined by section 72(2)(b) of Regulation 941.
- c. Signing and sealing structural drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that failed to make reasonable provision or complying with applicable standards and/or codes, amounting to professional misconduct as defined by section 72(2)(d) of Regulation 941.
- d. Signing and sealing structural drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that were prepared in an unprofessional manner, amount-

ing to professional misconduct as defined by section 72(2)(j) of Regulation 941.

AGREED STATEMENT OF FACTS

Counsel for the association advised the panel that agreement had been reached with Sekhavati and Re-Con (collectively, the respondents) on the facts, and introduced an Agreed Statement of Facts, which provides as follows:

1. Sekhavati is a professional engineer licensed pursuant to the *Professional Engineers Act* (the act).
2. Re-Con is an unincorporated sole proprietorship and a certificate of authorization holder. Sekhavati is the principal of Re-Con, and is the person designated under section 47 of Regulation 941 under the act as assuming responsibility for the professional engineering services provided by Re-Con. All of the structural drawings referred to below were signed and sealed by Sekhavati, and referred to Re-Con in the title block.
3. The complainant, Brett Forestell (Forestell), is the deputy chief building official, engineering & development services department, City of Belleville, Ontario. The complaint was made on February 5, 2014, and was accompanied by a letter, which referred to s. 8(9) of the *Building Code Act*.
4. Prior to November 2013, Rajinder Chaku of the architectural firm Rajinder Chaku Architect Inc. (RCA) retained Re-Con to provide structural drawings related to the proposed construction of a new hotel and retail space located at 245 North Front St., Belleville, Ontario.
5. On or about November 21, 2013, RCA submitted to the city of Belleville (city) an Application for a Permit to Construct a new hotel located at 245 North Front St., Belleville, Ontario.

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

6. On or about December 18, 2013, RCA submitted to the city an Application for a Permit to Construct a single storey retail use building (the retail building) at the same city address.
7. Both permit applications included Commitments to General Review for structural engineering signed by Sekhavati, and each attached structural design drawings signed and sealed by Sekhavati on October 10, 2013.
8. Forestell issued a permit application review letter dated January 30, 2014, in connection with the retail building. The letter listed 35 separate deficiencies in the drawings submitted with the Application for a Permit. Of these, the items numbered 19 to 29 related to Sekhavati's work. Attached as Schedule A [to the Agreed Statement of Facts] is a copy of this letter. RCA provided a response to this letter on April 29, 2014, which response included revised structural drawings signed and sealed by Sekhavati on April 24, 2014. No further steps have been taken to date by the owner to pursue the retail building, and no further drawings have been prepared.
9. Forestell issued a permit application review letter dated February 7, 2014, in connection with the proposed hotel (the hotel). This letter listed 74 separate deficiencies in the drawings and other materials submitted with the Application for a Permit. Of these, items numbered 47 to 51 related to Sekhavati's work. Attached as Schedule B [to the Agreed Statement of Facts] is a copy of this letter.
10. Forestell sent further permit application review letters to RCA dated: May 9, 2014, June 9, 2014, September 11, 2014, November 6, 2014, February 17, 2015, March 30, 2015, and April 27, 2015, all of which related to drawings that had been revised and re-submitted by RCA in connection with the hotel. In each case, Forestell identified either new or continuing deficiencies in the signed and sealed structural drawings of Sekhavati and Re-Con that prevented the issuance of a building permit. Attached as Schedule C [to the Agreed Statement of Facts] is a chart showing the structural issues raised in these permit application review letters.
11. With regard to the hotel only, all of the issues identified by Forestell in the review letters referred to above were eventually rectified, and a Building Permit for the hotel was finally issued on August 25, 2015. Construction of the hotel commenced on or about September 2015.
12. The association retained Daria Khachi, P.Eng., as an independent expert, to review the respondent's work. Mr. Khachi prepared a report dated August 2, 2016 (the first report), a copy of which (without appendices) is attached [to the Agreed Statement of Facts] as Schedule D. The first report identified additional structural design deficiencies, over and above the issues that had been identified by Forestell, and also commented on the many iterations of the structural drawings. Mr. Khachi concluded:

“Acknowledging that numerous submissions were provided to the building department with ample time in between to complete coordination of work between all disciplines, and to complete proper peer review and quality assurance checks, I would respectfully conclude that the design of G. Sekhavati, P.Eng., and Re-Con Consulting are inconsistent with generally accepted standards in the field of professional engineering.

Besides coordination issues, we have also identified design deficiencies that were not identified by the city's deputy chief building official in the correspondence I have reviewed. These items as noted in my report are critical and need to be reviewed by the engineer of record and rectified. As these deficiencies are a building code violation and a potential risk to public safety, a proper design would be expected of a reasonable and prudent practitioner.”
13. Mr. Khachi provided a further report (the second report) by a letter dated April 7, 2017. The second report commented on additional information and drawings provided to the association by counsel for the respondents. A copy of this second report is attached [to the Agreed Statement of Facts] as Schedule E.
14. For the purposes of this proceeding, the association and the respondents accept as correct the findings, opinions and conclusions contained in the first and second reports. The respondents admit that they failed to meet the minimum acceptable standard for engineering work of this type, and that they failed to maintain the standards that a reasonable and prudent practitioner would maintain in the circumstances.
15. The respondents obtained a report from Ralph Balbaa, P.Eng., dated June 12, 2017 (the responding report), which referred to

even more drawings, and responded to several of the issues raised by Mr. Khachi. A copy of the responding report is attached [to the Agreed Statement of Facts] as Schedule F.

16. The parties agree that, as of the final set of drawings reviewed by Misters Khachi and Balbaa, the final structural design deficiencies identified by Mr. Khachi have still *not* been rectified:
 - a. All of the deficiencies in the retail building drawings dated April 24, 2014. As mentioned above, no further steps have been taken to date by the owner and RCA to pursue the retail building, and, as a result, no further revised drawings have been prepared.
 - b. Number 1 in the first report, namely “Structural drawing SOI (Notes and Specifications), revision per City Notice June 2014. The noted roof live load of 1.5 kPa specified on sheet SOI is incorrect and too low for the roof design of the hotel building.” The respondents state that the roof live load used by Lake Scugog Lumber Inc. (the timber fabricator) to design the roof as built is 3.01 kPa, which is twice as much as required by the building code.
 - c. 6(b) in the first report namely “On sheet SOI,” the Stair Section 1/S03 and Elevator Section 2/S03 specify lintel angles L-4x4x1/4 above the door openings. These are different than the lintel angles specified on the lintel schedule on sheets S03 and S04 (L4x3x1/4 noted). Furthermore, different lintel angles are specified on the lintel schedule on sheet SOS (L3x3x1/4 noted). The respondents state that this is an organizational issue, not a safety one.
 - d. The issue raised by Mr. Khachi on page 7 of the second report (Safety Harness Anchorage) namely “Reference: Structural drawing SK09 with engineer seal dated November 11, 2015, labelled ‘Safety Harness Anchorage.’ The detail on this sheet refers to a ‘safety’ item. The *Occupational Health and Safety Act* has stringent requirements for the supports of life lines and other safety tie-backs. Although this may not be a code violation (since not enough information has been provided on this sheet), as an engineer who notices the words ‘safety harness’ on these drawings, I am concerned that a ½ inch diameter mechanical bolt fastened to an unspecified masonry wall (is the block wall hollow or solid?) could potentially be a dangerous detail. Sekhavati should review the details on this sheet and ensure these details comply with the requirements of the *Occupational Health and Safety Act*.” The respondents agree that this detail was inadequate, but state that this was a temporary tie-back used during construction only.
 - e. In addition, a review by Mr. Khachi of drawings titled “As Built,” signed and sealed by Sekhavati on December 18, 2015, disclosed that the W310x52 steel beam above the main floor of the hotel along gridline 5, between grids C and D, is severely underdesigned. Attached [to the Agreed Statement of Facts] as Schedule G is an email from counsel for PEO to counsel for the respondents, notifying him of the problem, and requesting immediate rectification. The respondents acknowledge that this design is flawed. However, the respondents state that the actual built opening is only 11 feet, and a revised shorter beam has been substituted for the beam reviewed by Mr. Khachi. The shorter beam is adequate.
17. By reason of the aforesaid, the association and the respondents agree that Gholamreza Sekhavati, P.Eng., and Gholamreza Sekhavati o/a Re-Con Consulting are guilty of professional misconduct as follows:
 - a. Signing and sealing structural drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that failed to meet the standard of a reasonable and prudent practitioner, amounting to professional misconduct as defined by section 72(2)(a) of Regulation 941.
 - b. Signing and sealing structural drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that failed to make reasonable provision or complying with applicable standards and/or codes, amounting to professional misconduct as defined by section 72(2)(d) of Regulation 941.
 - c. Signing and sealing structural drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that were prepared in an unprofessional manner, amounting to professional misconduct as defined by section 72(2)(j) of Regulation 941.

ADDITIONAL EVIDENCE

As requested by the panel, counsel for the association also provided the panel with a copy of the complaint form filed February 14, 2014.

PLEA BY MEMBER AND HOLDER

Gholamreza Sekhavati, P.Eng., and Gholamreza Sekhavati o/a Re-Con Consulting admitted to all allegations as set out

in paragraph 17 of the Agreed Statement of Facts. The panel conducted a plea inquiry and was satisfied that the member and holder's admissions were voluntary, informed and unequivocal.

DECISION

The panel considered the Agreed Statement of Facts and finds that the facts support a finding of professional misconduct and, in particular, that Gholamreza Sekhavati, P.Eng., and Gholamreza Sekhavati o/a Re-Con Consulting committed acts of professional misconduct as set out in paragraphs 7, 8, 10 and 16 of the Agreed Statement of Facts, in that they:

- a. Signed and sealed drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that failed to meet the standard of a reasonable and prudent practitioner, amounting to professional misconduct as defined by section 72(2)(a) of Regulation 941.
- b. Signed and sealed drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that failed to make reasonable provision or complying with applicable standards and/or codes, amounting to professional misconduct as defined by section 72(2)(d) of Regulation 941;
- c. Signed and sealed drawings related to two proposed buildings located at 245 North Front Street in Belleville, Ontario that were prepared in an unprofessional manner, amounting to professional misconduct as defined by section 72(2)(j) of Regulation 941;

Counsel for the association advised that the association was not calling any evidence with respect to the allegation of professional misconduct set out in subparagraph (b) of the Statement of Allegations. Gholamreza Sekhavati, P.Eng., and Gholamreza Sekhavati o/a Re-Con Consulting are, therefore, found to be not guilty with respect to that allegation.

PENALTY

Counsel for the association advised the panel that a Joint Submission as to Penalty and Costs had been agreed upon. The joint submission provides as follows:

- a. Pursuant to section 28(4)(f) of the act, Sekhavati and Re-Con shall be reprimanded, and the fact of the reprimand shall be recorded on the register permanently.
- b. Pursuant to section 28(4)(b) of the act, Sekhavati's licence and Re-Con's certificate of authorization shall be suspended for a period of two (2) weeks, commencing on a date to be agreed, such date to be no later than three (3) weeks after the date of the Discipline Committee's decision.
- c. Pursuant to sections 28(4)(j) and 28(5) of the act, the finding and order of the Discipline Committee shall be

published in summary form in the Professional Engineers Ontario's (PEO's) official publication, with reference to names.

- d. Pursuant to section 28(4)(d) of the act, it shall be a term or condition on Sekhavati's licence that he shall, within fourteen (14) months from July 24, 2017, successfully complete PEO's Advanced Structural Analysis (16-CIV-B1) and Advanced Structural Design (16-CIV-B2) examinations.
- e. Pursuant to sections 28(4)(b) and (k) of the act, in the event Sekhavati does not successfully complete the examinations set out in (d), his licence shall be suspended pending successful completion of the examinations.
- f. Pursuant to section 28(4)(e) of the act, there shall be an order requiring the respondents to provide to the registrar, for review by PEO's expert at the respondents' expense, a full set of actual as-built structural drawings of the hotel, and further requiring the respondents to inform the owner, the architect, and the city of any public safety concerns identified by PEO's expert as a result of such review. The fees payable by the respondents for PEO's expert's review shall not exceed \$3,000.
- g. There shall be no order as to costs.

The Joint Submission as to Penalty and Costs included that the respondents had independent legal advice, or had the opportunity to obtain independent legal advice, with respect to the penalty set out above.

The association and the respondents agreed, at the hearing, that the two-week suspension would start on July 31, 2017. The panel noted that, under section 28(4) of the act, the panel only had the power to suspend a licence for up to two years, not indefinitely. The association and the respondents agreed that the respondents will provide the association with the as-built drawings on or before August 24, 2017.

PENALTY DECISION

The panel determined that the penalties and costs set out in the joint submission were appropriate as they fell within a reasonable range of acceptability, taking into account the following items:

- a. Protection of the public interest;
- b. Remediation of Sekhavati;
- c. Maintenance of the reputation of the profession in the eyes of the public;
- d. General deterrence; and
- e. Specific deterrence.

The panel concluded that the proposed penalty and costs are reasonable and in the public interest. Sekhavati has co-operated with the association and, by agreeing to the facts and a proposed penalty, has accepted responsibility for his actions and has avoided unnecessary expense to the association.

The panel orders:

- a. Pursuant to section 28(4)(f) of the act, that Sekhavati and Re-Con shall be reprimanded, and the fact of the reprimand shall be recorded on the register permanently.
- b. Pursuant to section 28(4)(b) of the act, that Sekhavati's licence and Re-Con's certificate of authorization shall be suspended for a period of two (2) weeks starting on July 31, 2017.
- c. Pursuant to sections 28(4)(j) and 28(5) of the act, that the finding and the order of the Discipline Committee shall be published in summary form in PEO's official publication, with reference to names.
- d. Pursuant to section (28(4)(d) of the act, that it shall be a term or condition on Sekhavati's licence that he shall, within fourteen (14) months from July 24, 2017, successfully complete PEO's Advanced Structural Analysis (16-CIV-B1) and Advanced Structural Design (16-CIV-B2) examinations.
- e. Pursuant to sections 28(4)(b) and (k) of the act, that in the event Sekhavati does not successfully complete the examinations set out in the preceding subparagraph, his licence shall be suspended for up to the maximum period prescribed by section 28(4) of the act, pending successful completion of the examinations.
- f. Pursuant to section 28(4)(e) of the act, that the respondents provide to the registrar, for review by the association's expert at the respondent's

expense on or before August 24, 2017, a full set of actual as-built structural drawings of the hotel and, further, that the respondents inform the owner, the architect, and the city of any public safety concerns identified by the association's expert as a result of such review. The fees payable by the respondents for the association's expert review shall not exceed \$3,000.

ADDITIONAL NOTE

Counsel for the association undertook to provide the city with copies of the first and second reports.

Jag Mohan, P.Eng., signed this Decision and Reasons for the decision as chair of this discipline panel and on behalf of the members of the discipline panel: Ishwar Bhatia, P.Eng., David Germain, J.D., Glenn Richardson, P.Eng., and Michael Wesa, P.Eng.

SUMMARY OF FINDING AND ORDER OF THE DISCIPLINE COMMITTEE

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.

This matter came on for hearing before a panel of the Discipline Committee on September 16 and 17, 2015 at the offices of the Association of Professional Engineers of Ontario in Toronto. The association was represented by Leah Price. Gerard J. Van Iterson, P.Eng. (the member), and 694470 Ontario Ltd. O/A Unicon Engineering (the holder) were represented by Alex Flesias.

The member pled guilty to three counts of professional misconduct arising out of a letter, which he had signed and sealed on the holder's letterhead. The letter had been provided to the City of Guelph's building office. The letter had been the subject of a complaint to the Association of Professional Engineers of Ontario made by Jeremy Laur, a building inspector for the City of Guelph. As part of an agreed statement of facts filed by the parties, the member admitted that: he did not carry out an inspection referred to in the letter or prepare or check the letter; he signed and sealed the letter at the request of the coordinator of the project, who had retained him; and he had no training or experience in the area of structural engineering.

The panel of the Discipline Committee hearing the matter found the member and the holder guilty of professional misconduct on the basis of the admissions. The parties submitted a joint submission as to penalty. The Discipline Committee was concerned about the penalty jointly submitted and sought submissions.

The panel was satisfied with three of the four penalties submitted by the parties. The committee was not satisfied with the parties' submission that the member and holder should be reprimanded, and that the fact of the reprimand should be recorded on the register for a period of one year. The Discipline Committee panel determined that the recording of the reprimand on the register for one year was not sufficient. The panel concluded that the public

interest was not served by having the reprimand expunged from the register after a period of one year and that it should remain on the register indefinitely.

The panel determined that the member's actions, in affixing his signature and seal to the letter in question without carrying out the inspection referred to in the letter that he did not prepare or check, and in signing and sealing it at the request of the person who retained him, struck at the very heart of the integrity of the profession and placed the public at risk.

In 1982, Van Iterson had been convicted of signing an application for renewal of a certificate of authorization, and of affixing his seal to drawings not made by him or under his personal supervision for three separate building projects. Although the panel appreciated that he was so convicted in the past, the panel concluded that repetition of the same offence strikes at the heart of the integrity of the profession and so overrides the consideration that he should be treated as a first offender on the basis of the length of time between offences. The panel additionally concluded that if the offence is serious enough to result in a reprimand being placed in the register, it should remain indefinitely.

The panel directed that:

- a. Pursuant to s. 28(4) of the *Professional Engineers Act*, the member and holder shall be reprimanded, and the fact of the reprimand shall be recorded on the register for an indefinite period;
- b. The finding and order of the Discipline Committee shall be published in summary form together with the names of the member and holder;
- c. It shall be a term, condition or limitation on the member's licence that he shall engage in the practice of professional engineering only in the following areas: (i) mechanical engineering; and (ii) environmental engineering, limited to the area of environmental assessments and site remediations, in accordance with the applicable standards and guidelines promulgated by the Ministry of Environment; and
- d. In the event that the member demonstrates his competence in electrical engineering, either through an interview with two (2) electrical engineering members of the Experience Requirements Committee (who shall provide a report to the deputy registrar, regulatory compliance, stating whether or not such competence was demonstrated by the member), or by successfully passing the

Association of Professional Engineers of Ontario examination 98-Elec-87 (Power Systems Engineering), the term, condition or limitation set out in subparagraph (c) above shall be amended to add electrical engineering as subparagraph (iii) thereof.

The written Decision and Reasons were dated August 31, 2017, and were signed by Richard Austin as the chair of the panel on behalf of himself and panel members Santosh Gupta, P.Eng., and Charles Kidd, P.Eng. Panel member Ravi Gupta, P.Eng., dissented in respect of the penalty. Previous panel chair Kenneth Serdula, P.Eng., passed away before the Decision and Reasons were concluded and Richard Austin chaired the panel subsequently.

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 PEO v. JASON W. BRASSEUR, P.ENG., a member of the Association of Professional Engineers of Ontario.

The panel of the Discipline Committee met to hear this matter on October 13, 2016 at the Association of Professional Engineers of Ontario at Toronto.

The notice of hearing was issued on September 22, 2016. The decision of the Complaints Committee to refer the matter, dated March 21, 2016, including the Statement of Allegations as referred and a Registrar's Certificate attesting that the member's licence issued December 3, 1997 was current, were filed with the panel.

OVERVIEW

In July 2009, the town of Parry Sound awarded a fixed price (\$3,184,948 + GST) contract to Samson Management and Solutions Ltd. for renovations to the Bobby Orr Community Centre. The contract included a Request for Change (RFC) process for work beyond the scope of the contract. Work on the contract commenced in August 2009.

Steenhof Building Services Group was retained by the town to supervise the project and administer the contract. In March 2010, an employee of Steenhof discovered apparent discrepancies in an RFC submitted by Samson in that a subcontractor's stipulated quote was different from the quote provided by the subcontractor to the general contractor, Samson. Subsequent investigation showed a number of other irregularities and the town terminated the contract.

The member was the sole officer and director of Samson, a general contracting company incorporated in 1999. Samson specialized in open

tender public construction projects and did not hold a certificate of authorization under the act. The member directly caused to be prepared all RFCs submitted by Samson.

As a result of a police investigation, the member was charged on September 29, 2010 with 32 counts of fraud and use of forged documents. Samson was also charged with 16 counts of fraud and attempted fraud for the same occurrences. Negotiations between the crown prosecutor and the defendant's legal counsel pursued and on September 6, 2011 and the Ontario Court of Justice found Samson guilty of attempted fraud according to section 24(1) and section 380(1) of the Criminal Code of Canada. The charges against the member were withdrawn.

Samson was ordered to reimburse the town \$873.65, the actual amount of the fraudulent benefit, and pay a fine totalling \$5,000.

THE ALLEGATIONS

The Statement of Allegations against Jason W. Brasseur, P.Eng., as referred by the Complaints Committee, was dated March 21, 2016.

AGREED STATEMENT OF FACTS

Counsel for the association advised the panel that agreement had been reached on the facts and introduced an Agreed Statement of Facts, which provides as follows:

1. At all material times, the respondent, Jason Brasseur, P.Eng. (Brasseur), was a professional engineer licensed pursuant to the *Professional Engineers Act*.
2. At all material times, Brasseur was the sole officer and director of Samson Management and Solutions Ltd. (Samson), a general contracting company specializing in open tender public construction projects. Samson did not hold a certificate of authorization. A Corporation Profile Report for Samson, dated February 11, 2016, was attached to the Agreed Statement of Facts.
3. In or about July 2009, the Town of Parry Sound (the town) awarded a fixed-price contract to Samson to conduct renovations to the Bobby Orr Community Centre. Work under the contract commenced in or about August 2009.

4. Under the arrangement in place under the contract, Samson was required to submit Requests for Change (RFCs) to the town's contract administrator in the event it sought additional payments. These RFCs were required to be accompanied by supporting documentation, including quotations or invoices for the work from Samson's subcontractor(s). Brasseur directly caused to be prepared all RFCs submitted by Samson.
5. The town retained Steenhof Building Services Group (Steenhof) to supervise the project on behalf of the town. Among other things, Steenhof was responsible for reviewing the RFCs submitted by Samson.
6. In or about early March 2010, Gerald Slavish, an employee of Steenhof, discovered a discrepancy in connection with one of Samson's RFCs. Revised RFC#61 contained a price regarding welding work by Seguin Welding. Slavish requested clarification from Brasseur, who provided him with a purported quote on Seguin Welding letterhead. It was subsequently determined that the quote was false and the quote letter was forged. An unsigned affidavit from Slavish, which describes how he found out about the forgery, was attached to the Agreed Statement of Facts.
7. Subsequent investigation showed that a number of other quotes and/or invoices were false and/or forged. The town terminated the contract.
8. The fraudulent documents were prepared at Brasseur's direction. Brasseur admits that he put forward to the town as "costs," amounts he knew were fictitious and inflated, and that he knew fraudulent documents were being prepared and provided to the town as "quotes" or "invoices." Among the fraudulent documents were the following:
 - a) on or about March 1, 2010, Samson submitted a Request for Change that included purported costs of approximately \$13,612.00, with a supporting quotation on what appeared to be "Seguin Welding" letterhead, which quotation was fabricated;
 - b) on or about March 10, 2010, Samson submitted a Request for Change that included purported costs of approximately \$2420.00, with a supporting quotation on what appeared to be "Ray White Masonry" letterhead, which quotation was fabricated;
 - c) on or about March 10, 2010, Samson submitted a Request for Change that included purported costs of \$200.00, with a supporting quotation on what appeared to be "Seguin Welding" letterhead, which quotation was fabricated;
 - d) on or about March 11, 2010, Samson submitted a revised Request for Change that included purported costs of \$12,250.80, with a supporting quotation on what appeared to be "Seguin Welding" letterhead, which quotation was fabricated; and
- e) on or about April 5, 2010, Samson submitted a Request for Change that included purported costs of \$730.00, with a supporting quotation on what appeared to be "Ray White Masonry" letterhead, which quotation was fabricated.
9. Brasseur was charged on or about September 29, 2010, with 32 counts of fraud and use of forged documents, contrary to sections 380(1) and 368 (1)(a) of the Criminal Code. A copy of the information sworn against Brasseur was attached to the Agreed Statement of Facts. As a result of negotiations between the Crown and counsel for Brasseur, Samson agreed to plead guilty to 16 counts of fraud and attempted fraud, and the charges against Brasseur were withdrawn. The information in connection with the charges to which Samson pleaded guilty, a copy of the transcript of the court hearing, which took place on September 6, 2011, at which the plea was accepted and Samson was found guilty and a copy of the Certificate of Conviction were attached to the Agreed Statement of Facts.
10. Based on these facts, it is agreed that Brasseur is guilty of professional misconduct as follows:
 - a) In or about March 2010 and April 2010, in the course of carrying out a contract, Brasseur directly caused to be prepared, false or fabricated subcontractor quotations in an attempt to defraud the Town of Parry Sound, amounting to professional misconduct as defined by s. 72(2)(j) of Regulation 941;
 - b) Brasseur was the sole officer and director of a company, Samson Management Solutions Ltd., that was convicted on or about September 6, 2011 of 16 counts of fraud committed against a client in the course of carrying out a contract, amounting to professional misconduct as defined by s. 72(2)(j) of Regulation 941.

PLEA BY MEMBER

Jason Brasseur, P.Eng., admitted to the allegations set out in the Agreed Statement of Facts and stated that he had solicited and received legal counsel independently. The panel conducted a plea inquiry and was satisfied that the member's admission was voluntary, informed and unequivocal.

DECISION

The panel considered the Agreed Statement of Facts and finds that the facts support a finding of professional misconduct pursuant to section 28(2)(b) of the act by contravening section 72(2)(j) of Regulation 941.

REASONS FOR DECISION

Section 72(2)(j) of Regulation 941 defines professional misconduct as "conduct or an act relevant to the practice of professional engineering that, having regard to all the circumstances, would reasonably be regarded by the engineering profession as disgraceful, dishonorable or unprofessional."

As set out in the Agreed Statement of Facts, a) In or about March, 2010 and April 2010, in the course of carrying out a contract, Brasseur directly caused to be prepared, false or fabricated subcontractor quotations in an attempt to defraud the Town of Parry Sound, amounting to professional misconduct as defined by s. 72(2)(j) of Regulation 941; b) Brasseur was the sole officer and director of a company, Samson Management Solutions Ltd., that was convicted on or about September 6, 2011 of 16 counts of fraud committed against a client in the course of carrying out a contract, amounting to professional misconduct as defined by s. 72(2)(j) of Regulation 941.

The panel accepted that the parties had reached agreement on fact in good faith and with access to legal counsel. The monetary amount was relatively small, however, the fraud did involve public funds. The profession requires a high level of integrity and the conduct of the member was inappropriate and unacceptable to that standard.

PENALTY

Counsel for the association advised the panel that a Joint Submission as to Penalty had been agreed upon and dated October 11, 2016.

The association considers fraud a serious offence and provided precedents to support the proposed five-month licence suspension. Two Discipline Committee decisions (PEO vs Bedard – June 2003 and PEO vs Kalaycioglu – February 2009) entailed fraud

and resulted in revocation of licence. In May 2016, an appeal by Gagnon of an 18-month suspension ordered in Quebec was denied. In each case, complex fraud schemes resulted in significant loss to others over a sustained period of time.

The association also referred to the Ontario court finding that Samson had altered or falsely created subcontractor's quotes. The presiding judge accepted that although \$22,512 worth of quotes had been falsely submitted, not all of the work had been approved and/or completed. The amount falsely claimed and actually paid was only \$873.65, small in comparison to the total value of the contract. The company was found guilty, paid the fine and reimbursed the town.

Mitigating factors in the proposed penalty were the small monetary value of the fraudulent actions and that the contract was terminated prior to completion as a result. Both the company and the member had suffered severe adverse effects through the resolution process. Furthermore, the member co-operated with the association in resolving agreement on fact and a joint submission on penalty.

The member confirmed that resolution had been a complex and stressful process over six years. A number of factors have affected the outcome and Samson was effectively bankrupt. The member accepts the proposed penalty as fair.

PENALTY DECISION

The panel accepted the Joint Submission as to Penalty and accordingly ordered:

- a) Pursuant to s. 28(4)(f) of the *Professional Engineers Act*, Brasseur shall be reprimanded, and the fact of the reprimand shall be recorded on the register for a period of two (2) years;
- b) Pursuant to s. 28(4)(b) of the *Professional Engineers Act*, Brasseur's licence shall be suspended for a period of five (5) months, commencing on the day the penalty decision is pronounced by the Discipline Committee;
- c) Pursuant to s. 28(4)(h) of the *Professional Engineers Act*, Brasseur shall, within forty-five (45) days of the day the penalty decision is pronounced by the Discipline Committee, pay a fine in the amount of two thousand, five hundred dollars (\$2500) to the minister of finance; and
- d) The finding and order of the Discipline Committee shall be published in summary form under s. 28(4)(i) and 28(5) of the *Professional Engineers Act*, with reference to names.
- e) There shall be no order as to costs.

REASONS FOR DECISION ON PENALTY

The panel considered the penalty significant, but appropriate under the circumstances. The member committed fraudulent acts in the operation of his company. Such misconduct cannot be tolerated by the profession. However, the panel saw no evidence of personal gain as the motive. Furthermore, there was no indication in the submissions that the member would be unable or unwilling to serve the public in a professional manner in future.

The panel considered the precedent decisions provided and decided that the proposed penalty provides an appropriate balance of severity and compassion. The five-month suspension, the fine and the two-year registration of the reprimand are severe enough to send a message that maintains the reputation of the profession in the eyes of the public and provides a general deterrent to such misconduct. However, these are not so severe as to ignore that

the member was co-operative, showed remorse and already suffered the collateral loss of his business.

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

REPRIMAND

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

SUMMARY OF DECISION AND REASONS

In the matter of the Association of Professional Engineers of Ontario v. ANTERO M. GOMES, P.ENG., a member of the Association of Professional Engineers of Ontario, and the certificate of authorization holder.

The association was represented by Leah Price, the respondents were represented by Ryan Breedon, and Sean McFarling acted as independent legal counsel for the panel.

This matter came before a panel of the Discipline Committee of the Association of Professional Engineers of Ontario (PEO) for hearing on November 2, 2015 in Toronto.

COMPLAINTS COMMITTEE REFERRAL AND STATEMENT OF ALLEGATIONS

The Complaints Committee of Professional Engineers Ontario referred the matter to the Discipline Committee on May 25, 2015, the Notice of Hearing was issued on September 30, 2015 and the Statement of Allegations referred by the Complaints Committee was dated May 14, 2015 (under cover notice dated May 25, 2015).

The allegations against Antero M. Gomes, P.Eng. (Gomes or the member) and the holder are that they are guilty of professional misconduct as defined in the *Professional Engineers Act* pursuant to s.72 (2)(a), (b), (d) and (j) of Regulation 941, for sealing an engineering opinion that failed to recommend an adequate safeguarding barrier over the in-feed conveyor on a shrink wrapper machine and that failed to recommend certain required hard-wired, or equivalent, interlocks as safety features on shrink wrapper machines.

AGREED STATEMENT OF FACTS

Counsel for the association advised the panel that an agreement had been reached on the facts and that no witnesses would be called. The Agreed Statement of Facts included the following material facts:

a. The respondent, Antero M. Gomes, P.Eng. (Gomes), is a professional engineer licensed pursuant to the *Professional Engineers Act* (the act).

- b. Gomes was first licensed in 1986, and has practised continuously as a professional engineer since that time. Since 2006, he has practised exclusively in the area of safety engineering.
- c. Gomes was, at all material times, the member of the association designated by the holder under section 47 of Regulation 941 under the act as assuming responsibility for the professional engineering services provided by the holder.
- d. Between February 2009 and March 2010, Gomes stamped three Pre-Start Health and Safety Reviews (PSRs) for McCormick Canada (McCormick) reporting on his review of three shrink wrapper machines that had been newly installed by McCormick at its facility in London, Ontario. It was stated in the PSRs that the safety of the equipment had been assessed "...in accordance with... The *Occupational Health and Safety Act*, specifically Reg. 851... and [a]pplicable clauses from the Ontario Fire Code 1997 and the Ontario Building Code 2006" and that CSA standard CSA-Z432-04 "Safeguarding of Machinery" was taken into consideration.
- e. The first sealed PSR (related to the review of the Line 21 shrink wrapper machine) provided a single specific recommendation for safety compliance, namely, that McCormick modify the existing emergency stop buttons on the equipment.

- f. The second sealed PSW (related to the review of Line 24 EDL shrink wrapper machine) concluded that the machine was considered “sufficiently similar enough to the original” shrink wrapper such that all findings in the previous report could be applied to the new machine.
- g. The third sealed PSR (related to the review of Line 2 shrink wrapper machine) made a single specific recommendation that McCormick install signage by the machine to provide awareness of certain hazards. Gomes also made general recommendations that McCormick provide appropriate training for the use of the machinery, appropriate testing of the devices, as well as the installation of “energy-isolating devices that are capable of controlling and/or dissipating hazardous energy.”
- h. In/about July or August 2013, an employee of McCormick reached through the tunnel guard into the Line 2 shrink wrapper while it was powered. This tripped a sensor for the servo-powered pusher, pushing the employee’s forearm against a rail inside the machine resulting in a broken arm, which then required surgery.
- i. As a result of the injury, McCormick shut down the Line 2 shrink wrapper, and installed an extension to the tunnel guard to prevent reoccurrence of the event.
- j. Following receipt of the complaint, the association retained Thomas L. Norton, P.Eng., as an independent expert. His report identified the following key errors/omissions, which he said should have been noted in the PSRs:
 - a) The tunnel guard over the in-feed conveyor of the Line 2 shrink wrapper was too short, was inadequate to prevent contact with the machine, contrary to R.R.O. 1990, Reg. 851, s. 24, and did not comply with the “minimum distance from hazard” parameters found in Table 3 of CSA-Z432-04.
 - b) The power to the Collation Pusher Servo Motor of the Line 2 shrink wrapper was not interrupted in a hardwired manner, constituting a non-compliance as per section 5 and section 8 of CSA-Z432-04.
 - c) The emergency stops of the Line 2 shrink wrapper were not hardwired to override all other machine controls as required by CSA-Z432-04, section 7.17.1.1.
 - d) The power to the Flight Bar Motors of the Line 21 and Line 24 shrink wrappers were not interrupted in a hardwired manner to interrupt power to the drive enable terminal, and to the load side of the drive, in accordance with section 8 of CSA-Z432-04.
- k. The respondents admitted that the contents of, and the conclusions in, the independent expert’s report were correct, and further admitted that they made the errors/omissions referred to above. The respondents admitted that, in so doing, they:
 - a) failed to maintain the standards that a reasonable and prudent practitioner would maintain in the circumstances;
 - b) failed to make reasonable provision for the safeguarding of the health of persons who might be, and indeed were, affected by the work for which they were responsible; and
 - c) failed to make reasonable provision for complying with applicable regulations, and standards, and in particular, with R.R.O. 1990 Reg. 851 and CSA Standard Z432-04.
- l. After PEO communicated the complaint to Gomes and the holder, Gomes responded to PEO acknowledging the errors and omissions contained in the PSRs and noting that the holder had adopted additional review procedures to ensure that this did not occur again. Gomes also informed PEO of eight education programs that he had completed to improve his skills. In addition, Gomes noted that he had applied for the Certified Health & Safety Consultant designation from the Canadian Society of Safety Engineering, which will require him to complete six courses offered by the CSSE over the next six years.

MEMBER AND HOLDER’S GUILTY PLEA

Counsel for the member and holder advised that his clients had no objection or comments on the Agreed Statement of Facts. The member pled guilty to all the allegations of professional misconduct set out therein. The panel conducted a plea inquiry and was satisfied that the member’s and holder’s admission was voluntary, informed and unequivocal.

DECISION AND REASONS

The panel considered the Agreed Statement of Facts and the submissions and agreement of the parties, and found the agreed facts support a finding of professional misconduct against the member and the holder as set out in the Statement of Allegations.

JOINT SUBMISSION AS TO PENALTY AND COSTS

Counsel for the association advised the panel that a Joint Submission as to Penalty and Costs had been agreed upon and that Gomes and the holder had independent legal advice/opportunity to obtain independent legal advice.

Counsel for the association submitted that the purposes of penalty are served in this matter in that Gomes has demonstrated specific steps were taken to

ensure there would be no recurrence, the suspension demonstrates to PEO members that quality control is important, and that PEO takes the matter seriously given that there was an injury as a result of the matter. Counsel for the association stated that steps were taken in 2013 by the member to put in place quality control measures within his practice before the complaint was registered.

Counsel for the member concurred with counsel for the association on mitigating factors stating that McCormick did not find any other problems with the machines and as such it was considered to be an isolated case. Counsel for the member stated that there was very little risk of a re-offense; the member has continued with his continuing education program and has new quality assurance measures in place and untaken by the holder. He also stated that the conduct of the member shows responsiveness and acceptance of responsibility by all subsequent actions prior to and following the filing of the complaint.

PENALTY DECISION

The panel accepted the Joint Submission as to Penalty and concluded that the proposed penalty is reasonable and in the public interest. The member and holder co-operated with the association and by

agreeing to the facts and proposed penalty, have accepted responsibility for their actions and avoided unnecessary expense to the association.

Accordingly, the panel ordered:

- a. Pursuant to s. 28(4)(f) of the act, Gomes shall be reprimanded, and the fact of the reprimand shall be recorded on the register for a period of eight (8) months;
- b. Pursuant to s. 28(4)(f) of the act, the holder shall receive an oral reprimand and the fact of the reprimand shall not be recorded on the register;
- c. Pursuant to s. 28(4)(b) of the act, Gomes' licence shall be suspended for a period of one (1) week, commencing on December 13, 2015;
- d. The finding and order of the Discipline Committee shall be published in summary form under s. 28(4)(i) of the act (the summary). The summary shall be published with reference to Gomes' name but without reference to the holder's name; and
- e. There shall be no order as to costs.

REPRIMAND

Following the member's and holder's waiving their right to appeal, the panel administered the reprimand immediately following the conclusion of the hearing.

The Decision and Reasons was signed on March 22, 2016 by panel chair Anne Poschmann, P.Eng., on behalf of the members of the Discipline panel: Santosh Gupta, P.Eng., Rebecca Huang, LLB, LLM, Patrick Quinn, P.Eng., and Rob Willson, P.Eng.

WOODBRIIDGE AREA CONTRACTOR FINED \$5,000 FOR UNAUTHORIZED USE OF A PROFESSIONAL ENGINEER'S SEAL

On September 15, 2017, Dole Contracting Inc. of Woodbridge, Ontario, was convicted of breaching the *Professional Engineers Act* by the Ontario Court of Justice and fined \$5,000 for use of a professional engineer's seal.

Dole was retained as the contractor for a building retrofit in Toronto in April 2015, and was working under the supervision of the project architect. As part of the project, Dole was responsible for the demolition of a non-loadbearing cinder block partition wall. Dole was required to install temporary shoring, for which a professional engineer was needed to prepare drawings and review its installation. The partition wall was demolished without temporary shoring or the involvement of a professional engineer.

A Dole employee submitted two letters to the project architect stating the temporary shoring had been installed and had been reviewed by a professional engineer. These letters bore a professional engineer's seal without the affected professional engineer's knowledge or consent.

Dole was convicted of two offences relating to use of the seal.

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

SUMMARY OF DECISION AND REASONS

Association of Professional Engineers Ontario and
HENRY J JANSEN, P.ENG., and 2154512 ONTARIO INC.
o/a CRITERIUM-JANSEN ENGINEERS

A panel of the Discipline Committee met to hear this matter on September 20, 2017 at the offices of the Association of Professional Engineers of Ontario (the association) at Toronto.

The association had alleged that Henry J. Jansen, P.Eng. (Jansen), and 2154512 Ontario Inc. o/a Criterium-Jansen Engineers (CJE) were guilty of professional misconduct in a number of respects. Counsel for the association advised the panel that agreement had been reached with Jansen and CJE (collectively, the parties) on the facts, which included admissions on most of the allegations of professional misconduct, but that the association would not be presenting evidence to support one of the allegations.

AGREED STATEMENT OF FACTS

According to the Agreed Statement of Facts, Jansen and CJE were retained by the owner of a building in Dundalk, Ontario to perform a site inspection pertaining to the structural integrity of the foundation sill plate and the floor framing on the first and second floors of the building. The owner had been ordered by the chief building official of the Township of Southgate, Ontario, who had inspected the building, to obtain an engineer's report regarding necessary repairs.

Jansen inspected the building, and delivered to the owner a signed and sealed "Site Inspection Report." Jansen's report stated, among other things, that "based on visible evidence and our analysis, we find the flooring framing in the building to be serviceable, presenting no immediate structural concern."

Both Jansen's inspection and report fell below the standard of a reasonable and prudent engineer. Jansen failed to properly inspect the premises, and failed to identify structural deficiencies in the building that posed a danger to persons and property.

The owner submitted Jansen's report to the chief building official, who rejected its conclusions. The town issued an unsafe building order in relation to the building. A few months later, the building's west wall partially collapsed. The town issued an "emergency order concerning immediate danger" and ordered that barriers be erected immediately.

PEO obtained an independent expert report which concluded, among other things:

- Jansen ought to have required that the floors and roof be shored immediately and that a comprehensive evaluation of the safety and serviceability of the building be done; and

- a reasonable and prudent engineer would have considered, not just the visible sag and decay or deformation, but the possible implications of not attending to the underlying problems of moisture infiltration, decay and sag in the structural components. The practitioner would also recommend any temporary measures necessary to safeguard the structure against ongoing deterioration or collapse.

For the purposes of this proceeding, Jansen and CJE accepted as correct the findings, opinions and conclusions contained in the expert report. Jansen and CJE admitted that they failed to meet the minimum acceptable standard for engineering work of this type and that they failed to maintain the standards that a reasonable and prudent practitioner would maintain in the circumstances.

The parties agreed that Jansen and CJE were guilty of professional misconduct as follows:

- Conducting a building inspection in a manner that failed to meet the standard of a reasonable and prudent practitioner;
- Conducting a building inspection in a manner that failed to make reasonable provision for complying with applicable standards and/or codes;
- Signing and sealing a building inspection report that failed to meet the standard of a reasonable and prudent practitioner;
- Signing and sealing a building inspection report that failed to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work;
- Signing and sealing a building inspection report that failed to make reasonable provision for complying with applicable standards and/or codes;
- Undertaking work in a manner that would reasonably be regarded by the engineering profession as unprofessional.

The Agreed Statement of Facts also made reference to a number of courses and examinations that Jansen had taken or planned to take.

The panel conducted a plea inquiry and was satisfied that Jansen and CJE's admissions of professional misconduct were voluntary, informed and unequivocal.

DECISION AND REASONS—PROFESSIONAL MISCONDUCT

The panel considered the Agreed Statement of Facts and accepted the guilty plea as set out above. The panel also accepted the findings and conclusions of the expert report that support the admission by Jansen and CJE and the guilty plea in this case. The panel therefore found Jansen and CJE guilty of professional misconduct as set out in paragraph 14 of the Agreed Statement of Facts.

DECISION—PENALTY AND COSTS

The parties presented a Joint Submission on Penalty and Costs. After a question from the panel, the parties agreed to a clarification to one of the proposed terms. The panel accepted the Joint Submission and ordered:

- a. Jansen and CJE shall be reprimanded, and the fact of the reprimand shall be recorded on the register for a period of one (1) year;
- b. Jansen's licence shall be suspended for a period of two weeks commencing on the date of the Discipline Committee's decision, which is September 20, 2017;
- c. the finding and order of the Discipline Committee shall be published in summary form in PEO's official publication with reference to names;
- d. it shall be a term or condition on Jansen's licence that he shall, within fourteen (14) months of the Discipline Committee's decision, successfully complete PEO's Advanced Structural Analysis (16-CIV-B1) and Advanced Structural Design (16-CIV-B2) examinations;
- e. in the event Jansen does not successfully complete the examinations set out in subparagraph (d), his licence shall be suspended up to the maximum period prescribed by section 28(4) of the *Professional Engineers Act*, pending successful completion of the examinations;
- f. a restriction shall be placed upon Jansen's licence prohibiting him from practicing structural engineering unless and until he passes the examinations set out in subparagraph (d); and
- g. a restriction shall be placed upon CJE's certificate of authorization, prohibiting it from practising structural engineering unless and until Jansen passes the examinations set out in subparagraph (d), or unless and until another holder of a licence is designated by CJE pursuant to section 17 of the *Professional Engineers Act* as the person responsible for the professional engineering services provided by CJE, whichever comes first.

REASONS FOR DECISION—PENALTY AND COSTS

The panel determined that the penalties and costs set out in the joint submission were appropriate as they fell within a reasonable range of acceptability, taking into account the following items:

- a. Protection of the public interest;
- b. Remediation of Jansen;
- c. Maintenance of the reputation of the profession in the eyes of the public;
- d. General deterrence; and
- e. Specific deterrence.

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

ADDITIONAL NOTE

Counsel for the association undertook to provide the town with a copy of the expert report.

Ishwar Bhatia, P.Eng., signed this Decision and Reasons for the decision as chair of this discipline panel and on behalf of the members of the discipline panel: James Amson, P. Eng., Robert Dony, P. Eng., Leigh Lampert, LLB, and Glenn Richardson, P.Eng.

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., a holder of a certificate of authorization.

This matter came on for hearing before a panel of the Discipline Committee on November 23, 2011 at the Association of Professional Engineers of Ontario (the association) at Toronto.

THE ALLEGATIONS

The allegations against Gerard J. Van Iterson, P.Eng., and 694470 Ontario Ltd. (collectively referred to as Van Iterson), as stated in the Statement of Allegations dated June 10, 2011, are that they are guilty of professional misconduct committed as provided by subsection 28(2) (b) of the *Professional Engineers Act* (the act) by issuing a Phase II Environmental Site Report (the report) that was deficient. Specifically, the allegations were that their action contravened the following subsections of Ontario Regulation 941, R.R.O 1990:

- a. Subsection 72(2)(a), that they were negligent.
- b. Subsection 72(2)(d), that they failed to make responsible provisions for complying with applicable statutes, regulations, codes, bylaws and rules in connection with work undertaken by or under their responsibility.
- c. Subsection 72(2)(j), that 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, dishonourable or unprofessional.

MOTION FOR WITHDRAWAL

The parties jointly requested leave to withdraw the allegations against Van Iterson. The association outlined the sequence of events that lead up to the hearing, including getting an expert's opinion on Van Iterson's actions. The expert's opinion was that Van Iterson's report, the key evidence in the matter, met the standard of the profession. The association, therefore, concluded that there was no reasonable prospect of a finding of professional misconduct against Van Iterson and that, proceeding with the matter, was not in the public interest, not in the interest of the member, and not in the interest of justice.

The association submitted that the Discipline Committee has the power to grant the request under sections 4.1 and 23(1) of the *Statutory Powers Procedures Act*, R.S.O. 1990, Chapter S.22 (the SPPA). These sections, provided for convenience, are as follows:

- 4.1 If the parties consent, a proceeding may be disposed of by a decision of the tribunal given without a hearing, unless another act or a regulation that applies to the proceeding provides otherwise.
- 23.(1) A tribunal may make such orders or give such directions in proceedings before it as it considers proper to prevent abuse of its processes.

The association pointed out that, under subsections 24(1)(a) and 24(5) of the *Professional Engineers Act*, R.S.O. 1990, Chapter P.28 (the act), a member has a limited right to respond to a complaint made against them that is put before the Complaints Committee. The association compared this to the proceedings in a matter that is referred to the Discipline Committee where a member has the full scope of natural justice available to them to respond to the allegations referred to it regarding the member's conduct.

The association submitted that, to proceed with a hearing, would be an unnecessary expense, would not serve the interest of transparency, and would be a sham of a process.

The association noted that, in *Leggett v. LSBC*, the court accepted that an allegation could be withdrawn and, in *British Columbia (Police Complaint Commission) v. Vancouver (City) Police Department* (2003 B.C.J. 279), the British Columbia Supreme Court found that it was the role of the police complaints commissioner to determine whether the public interest will be served by a termination of a hearing.

The association noted that the reasons in *Chuang v. Royal College of Dental Surgeons of Ontario*, [2006] O.J. No. 2300 included that, "How it can be corrupt on the part of a prosecutor, qua the accused, to withdraw a charge is beyond me."

The association stated that it does not have evidence to support the allegations due to a change in circumstances.

The panel received advice from its independent legal counsel on the record that it is up to the panel to determine whether the word "shall" in section 28(1) of the act is mandatory or directory. This section, provided here for convenience, is as follows:

- 28.(1) The Discipline Committee shall,
- (a) when so directed by the Council, the Executive Committee or the Complaints Committee, hear and determine allegations of professional misconduct or incompetence against a member of the association or a holder of a certificate of authorization, a temporary licence, a provisional licence or a limited licence;
 - (b) hear and determine matters referred to it under section 24, 27 or 37; and
 - (c) perform such other duties as are assigned to it by the Council.

The panel decided not to grant the motion for leave to withdraw the allegations.

The panel is of the view that section 4.1 of the SPPA does not apply in this case since a hearing had already started in this matter in accordance with section 28 of the act.

The panel found that section 23(1) of the SPPA does not apply in this case since, completing the hearing, would not be an abuse of process in this case.

The panel interpreted section 28 as mandatory in this matter.

The panel took note of the fact that the prosecutor function under the act was split between the association and the Complaints Committee, and that the Complaints Committee is charged with considering the public interest when it decides to refer a matter to the Discipline Committee. In the absence of a revocation of this direction, the test for deciding to not proceed with a hearing is very high.

HEARING ON THE MATTER

The panel accepted the Statement of Allegations as the only evidence in this matter. In the absence of any evidence upon which to make any findings of fact, the panel dismissed the allegations.

SUBMISSION AS TO COSTS AND PUBLICATIONS

The panel will accept written submissions from the parties as to costs, and a submission from the defendants as to publication, within 10 working days from the date of this decision. Unless the parties object, the panel will consider and rule on these submissions in writing.

Submissions are to be sent to the panel chair, c/o the Tribunals Office (Room 206), Professional Engineers Ontario, 40 Sheppard Avenue West, Suite 101, Toronto, Ontario, M2N 6K9.

Aubrey Friedman, P.Eng., signed this Decision and Reasons for the decision as chair of this discipline panel and on behalf of the members of the discipline panel: James Amson, P.Eng., Paul Ballantyne, P.Eng., Richard Hilton, P.Eng., and Glenn Richardson, P.Eng.

DECISION ON COSTS AND PUBLICATION

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., a holder of a certificate of authorization.

This matter came for hearing before a panel of the Discipline Committee on November 23, 2011 at the Association of Professional Engineers of Ontario (the association) in Toronto, Ontario. As part of the Decision and Reasons issued January 18, 2013, the panel stated it would accept written submissions from the parties as to costs, and a submission from the defendants as to publication, within 10 working days from the date of this decision.

No submission was received from the defendants on either costs or publication.

A submission was received from the association stating that, in their view, costs payable to the defendants are not warranted in the circumstances of this case.

In light of the facts of the case, the absence of any submission by the defendants and the submission by the association with respect to costs, the panel orders that no costs be awarded to the defendants. As for publication, the panel orders that the Decisions and Reasons dated January 18, 2013 and this Decision on Costs and Publication be published in the Gazette with names.

Aubrey Friedman, P.Eng., signed this Decision on Costs and Publication as chair of this discipline panel and on behalf of the members of the discipline panel: James Amson, P.Eng., Paul Ballantyne, P.Eng., Richard Hilton, P.Eng., and Glenn Richardson, P.Eng.

BY-LAW NO. 1 AMENDED

On February 2, 2018, to implement the change to the *Professional Engineers Act* passed in 2010 under the *Open for Business Act* to transfer Council's power to set fees from making regulations to passing bylaws, Council approved changes to By-Law No. 1 to set fees and to update various references. The bylaw changes are a straight clause-for-clause addition of existing fees in regulation to the bylaw, without changing amounts, and do not affect PEO policy concerning fees and processes. These changes became effective immediately upon Council approval. The requirement for paying fees for a regulatory purpose remains in Regulation 941. To view By-Law No. 1, as amended, visit www.peo.on.ca.

Chapters

5. Revoked
9. If a chapter shall be dissolved or shall cease to exist for any other reason or shall be declared inactive by the Council, all assets of that chapter, unless otherwise directed by the Council, shall revert to the association and shall be delivered over by the governing body of the chapter to the director, finance of the association forthwith on demand.

Officials and Employees

34. The registrar, any deputy registrars, the director, finance and such other officials as may be appointed by the Council under Section 3(8) of the Act shall have such duties as the Council may determine from time to time and shall hold office in accordance with the terms of any contract of service between the association and such official approved by the Council or in the absence of such contract shall hold office at the pleasure of the Council.

Other Organizations

38. The Council may authorize participation by the association in the activities of the Engineers Canada as a constituent association thereof, the Ontario Society of Professional Engineers, or other organizations with functions that are not inconsistent with and are complementary to those of the association.

Fees General

39. (1) Unless otherwise stated, fees including applicable taxes shall be paid on the date specified by the Council.

Licence Fees

- (2) An applicant for a licence shall pay an application fee of \$300.
- (3) A person whose application for a licence has been accepted shall pay a registration fee of \$250.

- (4) Subject to Section 39(5), a holder of a licence shall pay an annual fee of \$220 payable upon registration and on or before each anniversary of registration.
- (5) Every Life Member is exempt from the requirement to pay the annual fee referred to in Section 39(4).

Limited Licence Fees

- (6) An applicant for a limited licence shall pay an application fee of \$300.
- (7) A person whose application for a limited licence has been accepted shall pay a registration fee of \$250.
- (8) A holder of a limited licence shall pay an annual fee of \$220 payable upon registration and on or before each anniversary of registration. However, a former holder of the engineering technology class of limited licence class is not required to pay an additional fee for reissuing the engineering technology class of limited licence.

Provisional Licence Fees

- (9) An applicant for a licence who is issued a provisional licence shall pay a registration fee of \$250.

Temporary Licence Fees

- (10) An applicant for a temporary licence shall pay an application fee of \$650.

Engineering Intern Fees

- (11) An applicant for a licence shall pay a fee of \$75 upon becoming an engineering intern and shall pay an annual fee of \$75 on or before each anniversary of becoming an engineering intern.

Reinstatement Fees

- (12) A member who resigned from the association shall pay the following fees before their licence may be reinstated:
- a. a reinstatement fee of \$230;
 - b. the fees owing by the person to the association at the time the member resigned, if any; and
 - c. the fees payable for the current year and, if at the time of resignation the member's annual fee was reduced in accordance with Section 39(14) (Fee Remission), the member shall pay a reduced annual fee of \$55.
- (13) A person whose licence or limited licence was cancelled for non-payment of fees shall pay the following fees before their licence or limited licence may be reinstated:
- a. the fees owing by the person to the association at the time the licence or limited licence was cancelled;
 - b. the annual fee payable for the current year and, if at the time of cancellation the person's annual fee was reduced in accordance with Section 39(14) (Fee Remission), the person shall pay a reduced annual fee of \$55; and
 - c. subject to Section d, a reinstatement fee of,
 - i. \$50, if the payments referred to in paragraphs (a) and (b) are made in full within 90 days after the cancellation,
 - ii. \$230, if the payments referred to in paragraphs (a) and (b) are made in full more than 90 days and within two years after the cancellation, and

- iii. \$460, if the payments referred to in paragraphs (a) and (b) are made in full more than two years after the cancellation;

- d. If the person's fees were reduced in accordance with Section 39(14) (Fee Remission) at the time the licence or limited licence was cancelled, the reinstatement fee referred to in paragraph (c) is as follows:
 - i. \$50, if the payments referred to in paragraphs (a) and (b) are made in full within two years after the cancellation, and
 - ii. \$460, if the payments referred to in paragraphs (a) and (b) are made in full more than two years after the cancellation.

Fee Remission

- (14) The Registrar shall reduce part of the annual fee, to the amount set out in Section 39(15) of a holder of a licence or a limited licence who meets the conditions of Section 41.1 of Regulation 941.
- (15) The reduced annual fee referred to in Section 39(14) is \$55.00 for licence holders and limited licence holders.
- (16) If a person no longer meets the requirements of Section 41.1 of Regulation 941, the person shall immediately pay the following fees:
- a. any fees owed to the association;
 - b. the difference, if any, between the amount required to be paid by the licence or limited licence holder as an annual fee for the current year and the amount required to be paid as an annual fee for a person who pays a reduced fee in accordance with Section 39(15) for that year; and
 - c. a fee of \$50.00.

Consulting Engineer Fees

- (17) A person who applies for designation or re-designation as a consulting engineer shall pay an application fee of \$220.
- (18) A person who applies for permission to use the term "consulting engineers" shall pay an application fee of \$45.
- (19) A consulting engineer shall pay a registration fee of \$220 for each five year period of designation.

Certificate of Authorization Fees

- (20) A person who applies for a certificate of authorization shall pay an application fee of \$330.
- (21) A holder of a certificate of authorization shall pay:

- a. an annual fee of \$330 payable upon acceptance of the application and on or before each anniversary of the acceptance; and
- b. for each replaced certificate of authorization, a fee of \$50.

Examination Fees

- (22) A person shall pay the following fees in relation to examinations, which are non-refundable except for the fee set out in Section e.:
- a. To write or rewrite the Professional Practice Examination, \$165;
 - b. To write the first licensing examination other than the Professional Practice Examination, \$580;
 - c. To write or rewrite any other licensing examination other than the Professional Practice Examination, \$165;
 - d. Upon submission of a thesis, \$300; and
 - e. To write each examination required in support of an application for designation as a consulting engineer, \$165.

Seal Fees

- (23) A person shall pay the following fees for the issuance of a seal:
- a. \$25 for a rubber seal; and
 - b. \$68 for a metal seal.

Application of Funds and Administration of Property

40. (a) payment of all expenses incurred in connection with duties imposed on the association under the Act, including expenses in connection with applications for licences, recording of engineering interns, applications for temporary or limited licences, granting of certificates of authorization, maintaining of registers by the registrar, hearings under the Act and appeals therefrom, and proceedings with respect to offences under the Act;
41. All money received by or on behalf of the association shall be deposited in the name of the association in one or more chartered banks or trust companies designated by the Council. All payments from the funds of the association shall be authorized by the most senior person in the department or the division of the association from whose budget the funds are being paid. Where the most senior person in the department or division of the association is not available, he or she, or failing that, the registrar, may designate another person to authorize payments. The payments shall be processed by the director, finance or his or her designate.
43. All shares and securities owned by the association shall be registered in the name of the association and shall be lodged with a chartered bank or trust company or in a safety deposit box subject to access only by the president, the president-elect or the past president accompanied by the director, finance or such person as shall be authorized by the Council.

45. (a) Subject to Section 8(1) and subject to Section 45(b), deeds, transfers, contracts and other instruments requiring the signature of the association may be signed by one of the president, president-elect, or the past president and either the registrar or the director, finance.
- (b) deeds, transfers, contracts and other instruments requiring the signature of the association and which have an aggregate expenditure there under of less than \$20,000 may be signed by any two of the registrar; director, finance; deputy registrar, licensing and registration; deputy registrar, standards and tribunals; deputy registrar, regulatory compliance; director, communications; chief administrative officer; or director, information and technology services.

Financial Statements

51. The Council shall lay before each Annual Meeting of the members a financial statement prepared in accordance with generally accepted accounting principles for the previous fiscal year of the association (made up of a balance sheet as at the end of such fiscal year and statements of revenue and expenditure and changes in net asset for such fiscal year) together with the report of the association's auditors on the financial statement. The financial statement with (a summary of) the auditor's report shall be published in the official publication of the association after its approval by the Council.

Seal and Other Insignia

54. The seal of the association shall be of such design as approved by Council and, when used on official documents, shall be authenticated by the signature of the president, the president-elect or the past president and the registrar or the treasurer. A printed facsimile of the seal may be used to designate official pronouncements or decisions of Council when such is authorized by the registrar.

Amendments to Regulations and By-Laws

58. In accordance with section 8(3) of the Act, Council shall determine the manner in which a by-law is to be confirmed by a majority of the members of the association who vote on the by-law.

PUBLICATIONS ORDER FORM

	\$	No.	Total
The Professional Engineers Act, R.S.O. 1990, Chapter P.28	N/C		
Ontario Regulation 941/90	N/C		
Ontario Regulation 260/08	N/C		
By-Law No. 1	N/C		
Practice Guidelines			
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NEW RIDINGS FOR THE 2018 PROVINCIAL ELECTION: WHAT IT MEANS FOR PEO CHAPTERS

By Jeannette Chau, P.Eng.

PEO's Government Liaison Committee is hard at work preparing for this spring's provincial election. This will be the first provincial election contested under the new riding boundaries, which have been adjusted to reflect population shifts. The number of electoral ridings will increase from 107 to 124 for the election on June 7.

In anticipation of this, the new ridings have been assigned to PEO chapters based on their geographical location. In cases where the riding overlaps the boundaries of more than one chapter, the riding has been assigned to the chapter where the largest percentage of the riding resides.

The new assignments have been sent to all chapter GLP chairs and have been posted on the Government Liaison Program page of PEO's website at www.peo.on.ca/index.php/ci_id/26722/la_id/1.htm.

Look for more information about the June 7 election in the next issue of *Engineering Dimensions*, where we will be profiling engineers who are running for the election. If you know of any professional engineers who will be running in the upcoming election, please let us know by emailing PEO Manager of Government Liaison Programs Jeannette Chau, P.Eng., at jchau@peo.on.ca.

Make sure to mark your calendars now and plan to visit your local polling station on Thursday, June 7. If you are not currently registered to vote, getting on the list is quick and easy at www.elections.on.ca.

The following are the electoral ridings assigned to each PEO chapter:

PEO EASTERN REGION

Algonquin Chapter:

- Renfrew-Nipissing-Pembroke

Kingston Chapter:

- Lanark-Frontenac-Kingston
- Kingston and the Islands

Ottawa Chapter:

- Carleton
- Orléans
- Kanata-Carleton
- Nepean
- Ottawa-Vanier
- Ottawa Centre
- Ottawa South
- Ottawa West-Nepean



IN ANTICIPATION OF THIS, THE NEW RIDINGS HAVE BEEN ASSIGNED TO PEO CHAPTERS BASED ON THEIR GEOGRAPHICAL LOCATION.

Peterborough Chapter:

- Haliburton-Kawartha Lakes-Brock
- Peterborough-Kawartha

Quinte Chapter:

- Bay of Quinte
- Northumberland-Peterborough South
- Hastings-Lennox and Addington

Thousand Islands Chapter:

- Leeds-Grenville-Thousand Islands and Rideau Lakes

Upper Canada Chapter:

- Glengarry-Prescott-Russell
- Stormont-Dundas-South Glengarry

PEO EAST CENTRAL REGION

East Toronto Chapter:

- Don Valley East
- Don Valley West
- Beaches-East York
- Toronto-Centre
- Toronto-Danforth
- Spadina-Fort York

Lake Ontario Chapter:

- Durham
- Oshawa
- Whitby
- Pickering-Uxbridge
- Ajax

Scarborough Chapter:

- Scarborough-Agincourt
- Scarborough North
- Scarborough-Rouge Park
- Scarborough Centre
- Scarborough-Guildwood
- Scarborough Southwest

Simcoe-Muskoka Chapter:

- Barrie-Springwater-Oro-Medonte
- Barrie-Innisfil
- Parry Sound-Muskoka
- Simcoe-Grey
- Simcoe North

Willowdale-Thornhill Chapter:

- Thornhill
- Willowdale
- Don Valley North

York Chapter:

- King-Vaughn
- Markham-Thornhill
- Markham-Stouffville
- Markham-Unionville
- Vaughan-Woodbridge
- Newmarket-Aurora
- York-Simcoe
- Aurora-Oak Ridges-Richmond Hill
- Richmond Hill

PEO NORTHERN REGION**Algoma Chapter:**

- Algoma-Manitoulin
- Sault Ste. Marie

Lake-of-the-Woods Chapter:

- Kenora-Rainy River

Lakehead Chapter:

- Kiiwetinoong
- Thunder Bay-Atikokan
- Thunder Bay-Superior North

North Bay Chapter:

- Nipissing

Porcupine-Kapuskasing Chapter:

- Mushkegowuk-James Bay
- Timmins

Sudbury Chapter:

- Nickel Belt
- Sudbury

Timiskaming Chapter:

- Timiskaming-Cochrane

PEO WESTERN REGION**Brantford Chapter:**

- Brantford-Brant
- Haldimand-Norfolk

Chatham-Kent Chapter:

- Chatham-Kent-Leamington

Georgian Bay Chapter:

- Bruce-Grey-Owen Sound
- Huron-Bruce

Grand River Chapter:

- Cambridge
- Kitchener South-Hespeler
- Waterloo
- Wellington-Halton Hills
- Guelph
- Kitchener Centre
- Kitchener-Conestoga

Hamilton Chapter:

- Flamborough-Glanbrook
- Hamilton Mountain
- Hamilton East-Stoney Creek
- Hamilton West-Ancaster-Dundas
- Hamilton Centre
- Burlington

Lambton Chapter:

- Sarnia-Lambton
- Lambton-Kent-Middlesex

London Chapter:

- Elgin-Middlesex-London
- London-Fanshawe
- London North Centre
- London West
- Perth-Wellington
- Oxford

Niagara Chapter:

- Niagara West
- Niagara Centre
- Niagara Falls
- St. Catharines

Windsor-Essex Chapter:

- Essex
- Windsor-Tecumseh
- Windsor West

PEO WEST CENTRAL REGION**Brampton Chapter:**

- Brampton East
- Brampton North
- Brampton South
- Brampton West
- Dufferin-Caledon

Etobicoke Chapter:

- Etobicoke Centre

Kingsway Chapter:

- Etobicoke-Lakeshore

Mississauga Chapter:

- Mississauga Centre
- Mississauga-Erin Mills
- Mississauga East-Cooksville
- Mississauga Lakeshore
- Mississauga-Streetsville
- Mississauga-Malton

Oakville Chapter:

- Milton
- Oakville-North-Burlington
- Oakville

Toronto Humber Chapter:

- Humber River-Black Creek
- Etobicoke North
- York Centre

West Toronto Chapter:

- University-Rosedale
- Davenport
- Eglinton-Lawrence
- York South-Weston
- Toronto-St. Paul's
- Parkdale-High Park

For questions, please contact
Manager of Government Liaison
Programs Jeannette Chau, P.Eng.,
at jchau@peo.on.ca. [e](https://www.peo.on.ca)

HELPING SLEEP APNEA SUFFERERS GET THEIR 40 WINKS

A healthcare-focused professional engineer has created an at-home kit that can help diagnose this serious sleep condition.

By Sharon Aschaiek

Getting a good night's sleep can be a struggle for the approximately 3 per cent of Canadians with obstructive sleep apnea (OSA), but it's also elusive for the many more who have the condition but don't know it. The answer to better diagnosing this medical condition and bringing faster relief to sufferers may be an engineering innovation led by healthcare engineer Geoff Fernie, PhD, P.Eng.

With OSA, pauses or "apneas" of up to 30 seconds occur multiple times during sleep. Left untreated, it can decrease concentration and memory, cause depression, stroke and heart attacks, and contribute to car and workplace accidents. The Canadian Sleep Society reports the disorder is present in up to 62 per cent of the elderly, while the American Sleep Apnea Association estimates 80 per cent of cases are undiagnosed. The reason may be the cumbersome testing process: staying overnight at a sleep lab connected to multiple medical sensors. Other factors are the often-long wait time for a publicly funded test, and the approximately \$500 fee for a private test.

About seven years ago, Fernie, a senior scientist at Toronto Rehabilitation Institute (TRI), was asked by the Ministry of Health and Long-Term Care to develop an at-home sleep apnea test. Together with Douglas Bradley, MD, director of TRI's Sleep Research Laboratories, and Hisham Alshaer, MD, PhD, a physician and scientist at TRI, Fernie created BresDX, a single-user, multiple-use sleep test that is portable, comfortable and easy to use. Advanced software, a microphone and an accelerometer capture two critical data types: breathing sounds, including the precise frequencies of snoring; and head position and movements, which is useful since side sleeping is better for OSA sufferers. The BresDX can also deduce whether a breathing pause is due to an obstruction or the brain forgetting to tell the person to breathe. As important is the device's design: a lightweight, mostly plastic headpiece, it sits comfortably over the nose and mouth, has no cables or wires, and is simple to operate.

"There is a massive amount of sophisticated software in this device, it's quite clever," says Fernie, TRI's Creaghan family chair in prevention and healthcare technologies, and a multi-appointed faculty member at the University of Toronto. "It also has a really comfortable frame, which makes testing a much easier process."

The BresDX's development was supported by the MaRS Discovery District's EXCITE program, which helps health technology innovators validate their product's efficacy before bringing it to market. The process involved conducting three clinical trials, which produced data that helped with addressing engineering issues, such as ensuring the device would still operate even if the user pushed the on/off button again, and finding a microphone and SD card that would flawlessly capture data. The data on the SD card is



Geoff Fernie, PhD, P.Eng., a senior scientist at Toronto Rehabilitation Institute, led the development of an at-home sleep apnea test.

BresDX is a single-user, multiple-use sleep test that is portable, comfortable and easy to use.


what users send to BresDX company Bresotec, which produces a sleep study report for the user's physician. EXCITE provided an evidence package to help facilitate BresDX's regulatory approval by Health Canada. This year, the Ministry of Health and Long-Term Care is expected to launch a two-year pilot project in which the BresDX will be available for free to 6000 Ontarians at up to 25 clinics. The device is also now available for purchase directly from Bresotec at a cost of \$250.

Applying his engineering expertise to advance human health became a priority for Fernie in the summer of 1966, while, as a University of Sussex mechanical engineering undergraduate, he volunteered at Chailey Heritage School for children with complex disabilities. He helped fit prosthetics onto "thalidomide kids" who were missing limbs, but they didn't quite fit or work well, and he realized his purpose as an engineer. After completing his PhD in bioengineering at the University of Strathclyde in Scotland, he moved to Canada and worked with amputees at West Park Healthcare Centre in Toronto, and established an orthotics and prosthetics training program at George Brown College. In his previous role as director of the Centre for Studies in Aging at Sunnybrook and Women's College Health Sciences Centre, and at TRI, he has developed various innovations—for which he has 22 patents—to prevent injury and disease, such as an artificial spinal disc, non-slip winter footwear and a powered wheelchair with extraordinary manoeuvrability. Last year, Fernie was inducted into the Order of Canada for his significant contributions to the field of rehabilitation engineering.

"Solving common problems of the injured and elderly aren't attractive to a lot of people," Fernie says. "But too many people are suffering and someone needs to care. As an engineer, I can provide them with useful solutions." **e**

BY MICHAEL MASTROMATTEO

EXPANDING INFLUENCE OF **ENGINEERS IN HEALTHCARE** INFRASTRUCTURE



HEALTHCARE SECTOR ENGINEERS ARE
LOOKING TO IMPROVED PATIENT OUTCOMES
AS THE NEXT MEASURE OF THEIR EFFORTS
TO DESIGN SMARTER FACILITIES.



Previous *Engineering Dimensions* treatments of the links between engineering and healthcare have focused primarily on such areas as digitalized medical records, biomedical engineering advances, fine-tuning and precision enhancements of surgical devices, and the process system applications to patient scheduling and wait-time reduction.

Each of these themes in their own way emphasize the vital interplay between engineering and medicine and the importance of technology in helping medical practitioners better respond to patients' needs.

Expanding on the mutual benefits of engineering and medicine, the concept of the "engineered hospital" becomes especially relevant given the number of constraints involved in healthcare design, and the policy considerations in controlling spiralling costs of healthcare in Ontario. And, while elected leaders talk of the value of evidence-based policy making, the need for engineers in the healthcare sector to buttress their designs and recommendations with hard evidence grows even more acute.

Advancing the symbiotic relationship between engineering and the healthcare sector is recent research showing that improved design and patient environments lead to better health outcomes in hospital settings. The notion has been emphasized in part by the 400-page Canadian Standards Association (CSA) Z8000 Health Care Facilities Standard. Launched in 2011, the CSA Z8000 is considered the first comprehensive standard for the planning and design of hospitals and other healthcare facilities. In general, CSA health-related standards are reviewed and updated every five to 10 years.

CSA Z8000 also incorporates several existing CSA technical standards for healthcare facilities, such as standards for HVAC, lighting and commissioning. CSA Z8000, however, is the first document to be all-encompassing, and its influence on engineers in the healthcare sector has been profound.

"Before now, there was no common national standard for the design and construction of hospitals and other healthcare facilities," the CSA notes. "Each healthcare facility building project undertaken in Canada has relied on the knowledge and resources available to the architects and consultants engaged. This standard sets out requirements and addresses concerns specific to healthcare facilities, beyond what is contained in building codes and guidelines. The new standard provides a cohesive, nationally recognized baseline for healthcare facility design and construction/renovation."

Engineers and other professionals working with the standard focus not only on safety and efficiency but also on the impacts of the physical environment and even ambient air quality on the healthcare outcome. Using available knowledge in evidence-based design as outlined in the standard, engineers and other players in the healthcare sector can establish an environment that promotes positive health outcomes, quicker recovery, a reduction in medical errors and the recruitment and retention of valued caregivers.

Gordon Burrill, P.Eng. (New Brunswick), was vice chair of the technical subcommittee that helped produce the Z8000 regulation.

The current president of Teegor Consulting in Fredericton, NB, Burrill has more than 30 years' experience in the healthcare engineering field. Teegor is best described as healthcare engineering codes and standards specialists. "We typically act as a technical resource for hospital engineering departments at all stages of a hospital's life cycle, from planning to design to construction to operations and maintenance," Burrill told *Engineering Dimensions*.

IMPACT OF DESIGN

Burrill cites the Z8000 standard as a clear manifestation of the profession's expanding influence in the wider healthcare sector. While engineering input in the past concentrated primarily on oversight of hospital equipment, operations and processes, it has come to take on greater prominence in facilities management, refurbishing existing infrastructure and smart integrated design and construction of new hospital buildings.

"I believe there is a great opportunity to engineer away some of the risks associated with healthcare," Burrill says. "I have worked with a couple of healthcare organizations that have brought in the industrial engineering expertise to look at process management and, as a result of doing that, have improved healthcare delivery efficiencies and significantly reduced patient risk elements. The human factors elements, too, are getting more attention where, through analysis, we've been able to eliminate some of the 'hot spots' in buildings—places where clinical people bump elbows in the operating room, for instance. By engineering the layout of the operating room, you start to eliminate some of those collision points. And every collision point and every crossover between clean and dirty supplies [for example] is a risk spot for healthcare delivery."

Another engineer with an intense healthcare focus, and who helped prepare the CSA Z8000 standard, is Michael Keen, P.Eng., executive director, chief planning and redevelopment officer at St. Michael's Hospital in Toronto, Ontario.

St. Michael's is about to amalgamate its operations with two other Toronto-area institutions, St. Joseph's Health Centre and Providence Health Care, which will bring more facility redevelopment work under Keen's auspices.

Keen was chair of the 33-person national committee that formulated the new standard. He says one of the standard's most noteworthy features is its requirement for single-patient rooms, especially to curb acquired infections for patients coming in for treatment.

Single-patient rooms have been found to help cut down on the spread of infections in hospitals, which is a common problem, Keen says. According to CSA, 220,000 people every year acquire infections while visiting or staying in healthcare facilities in Canada.

"The standard we have put in place is an attempt to provide a better environment for patient care to happen [and] to enhance efficiency, safety and other physical environment issues but there certainly is a demand out there in the industry for evidence when it comes to these standards," Keen told *Engineering Dimensions*. "One of the things that came in when we did Z8000 was to move to 100 per cent single-patient room for in-patients, and that is a real departure. Many of our facilities in Canada maybe averaged 20 per cent single-patient rooms. We did a research project last year at CSA that we are just in the process of finalizing. What we are finding is that the design aspect has had a huge impact on reducing the number of hospital acquired infections."

Keen is pleased to note that hospital acquired infections seem to be on the decline since the Z8000 standard was released. "There is another area that I think we need to continue to work as engineers in healthcare and that's in doing studies on the impact of design, and process design for that matter, on the outcomes for patients," Keen adds. "We can study what works and what doesn't work and how can we translate what does work into our future designs."

Much of Keen's healthcare-related engineering work involves older hospital infrastructure that often must be retrofitted to comply with modernized standards. It's similar in a way to the work of engineer Lisa Nagel, P.Eng., manager, infrastructure renewal at the University Health Network (UHN), an organization overseeing the operations for four Toronto area teaching hospitals.

"The renewal we deal with involves reviewing the building systems, electrical, mechanical and the entire building envelope," says Nagel.

Nagel, who worked for 16 years in healthcare design at HH Angus in Toronto prior to joining the UHN, says a key work area for healthcare engineers today involves planning to determine when infrastructure will reach the end of its useful service life and require replacement in order to continue to serve patients' needs into the future.

Clearly, an overwhelming constraint for healthcare engineers dealing with infrastructure renewal is the cost factor, Nagel adds. "You often make a lot of sacrifices to get a new building erected but once a building is up people will celebrate having their new facilities," she says. "But our department must also make sure we're not neglecting our existing facilities to ensure they are getting the proper care, maintenance and cost-effective utilization they deserve."

NEW BUILDS

As some engineers ply their trade in getting more value out of existing healthcare infrastructure, others are devoting their mindset to maximizing the benefits of new builds. And while the entire field of healthcare engineering isn't new, it has become an increasingly important business development area for consulting engineers.

As one example, Kevin Cassidy, P.Eng., national lead of healthcare engineering at WSP Engineering in Markham, Ontario, has been involved in several hospital new build and redevelopment projects over his career.

Cassidy has observed a trend towards involving more ambulatory and community based healthcare out of hospitals and into the home and community. In order to support this, he says, hospital building infrastructure is going to need to accommodate new communication technologies and allow patients to access information from their homes and local clinics. Properly engineered systems will enable this communication between the home and the hospital.

A related trend is that hospitals in Canada are getting smarter by integrating building systems with clinical systems. This allows the buildings to react automatically to the needs of the staff and patients and seamlessly transfer information between departments and caregivers.

"I think as much as we like to think that engineering is very logical—step A, step B—when we are dealing with hospitals there are still some basic steps to follow but you get the whole emotional, people side of things, which isn't as predictable as some of the other steps," Cassidy says.

Cassidy is especially excited about the engineering enhancements to the new Humber River Hospital in Toronto (see p. 54), and the yet-to-be complete Mackenzie Vaughan Hospital northwest of Toronto. Humber River Hospital is celebrated as North America's first fully digital hospital, while

Mackenzie Vaughan, scheduled to open in 2020, will be the first Canadian hospital to feature fully integrated smart technology systems and medical devices to enable maximum information exchange.

"Maybe I'm biased but I can't think of a [hospital] building type where the social impact of the decisions we make is more apparent," Cassidy says. "There is a big sense of accomplishment when you see the positive social impact you can make and, at the same time, you are cognizant that these are some of the most vulnerable people in our society who really depend on what we are doing."

Cassidy says with increased concerns about the costs of healthcare and the innovative ways to secure funding for its new infrastructure, the influence of engineers at the early design stage is taking on even greater importance. "I think what you are seeing now is a trend where people are very cognizant of the things that we can do to lower healthcare costs, improve outcomes, have people stay home instead of coming into the hospital, and what we are doing behind the walls has just as much impact," he says. "Now what we are doing is gathering the data proving that this approach is working, and we are seeing some of the research science and the engineering overlap."

Cassidy anticipates ongoing and intensified data collection by engineers to improve the physical environment in healthcare institutions. "What we would really like to see is global scale data collection," Cassidy explains. "Let's start collecting all the data. We're at a point where we have sensors and ways to measure light output, temperature in your room, air changes, etc. Now we are becoming sophisticated enough that we can gather that data, look at it and work with our hospitals to see, for example, if a change of two degrees in a room means recovery from a flu will be this much faster, and we are starting to pull that data."

A HOLISTIC APPROACH

Given the emphasis on engineers working in healthcare settings, it's no surprise that an organization aimed at fostering the development of non-MD healthcare professionals would have special insights into the healthcare engineering niche.

Roger Holliss, P.Eng., director of engineering at St. Mary's General Hospital in Kitchener, Ontario, is vice president of the Canadian Healthcare Engineering Society's (CHES) board of directors.

"CHES's mission is to assist its membership in being able to provide the best healthcare environment possible, both from an ongoing/operational perspective and from a design and proactive perspective," Holliss says.

Holliss's interest in healthcare engineering and questions about the engineered hospital naturally flow from his work at St. Mary's and because of his long-time involvement with CHES.

"I initially joined CHES as a means of developing my healthcare network and to speed up my learning curve relative to learning the particulars of running, maintaining and building hospitals instead of warehouses and printing plants," Holliss says. "Over the years, I got to be pretty good at engineering within healthcare to the point where I could start helping others as much as I got help from other members. These last few years, I find myself being able to substantially help other hospital facility managers in improving the quality of their healthcare facilities to the point where, both provincially and nationally, people would approach me to consider running for CHES offices."

While holding the P.Eng. licence isn't a membership requirement of CHES, Holliss believes it's important for the organization to support all members whose work approximates that of professional engineers, especially as it can lead to better health outcomes.

But, as an engineer with extensive experience in healthcare settings, Holliss is still eager to promote the ongoing engineering contributions to hospital design and healthcare. At the same time,

Holliss believes Ontario's healthcare system needs to be more proactive and assertive in bringing the best engineering it has to offer to its operations.


"I think there are lots of contributors to this," Holliss says. "The systems and equipment within these infrastructure systems have constantly become more technically complicated over the years. As such, the skill set required by facility managers to optimize hospitals has evolved beyond being just the subject matter expert on certain systems or equipment to more of a holistic systems mentality. Therefore, the historic succession-planning strategy of internally promoting the boiler person or plumber to a facility management role isn't as appropriate today as previously."

Holliss adds that when this internal promotion strategy is coupled with inadequate training—both generic and building management—it puts the new facility managers in a tough position to be successful. "Senior hospital managers are starting to see now that they need to augment their tradespersons' skill set with formally educated people for the purposes of efficiently managing these very complex facilities," Holliss says.

Whatever the credentials and experience of professionals in healthcare settings, there's little doubt today that engineers remain poised for new inroads. In some ways, improved health outcomes has become a challenging, difficult-to-satisfy constraint that will continue to inspire engineers grappling with the many complexities of designing, building and maintaining today's health institutions.

Says Gordon Burrill of Teegor: "We are delivering a service and we are performing a function, and there are efficiencies and inefficiencies in however you do that. When I look at the Canadian healthcare system, people will say there is not enough money in healthcare, but we have lots of money in the Canadian healthcare system and our challenge is that we are not getting it channeled in the most effective manner."

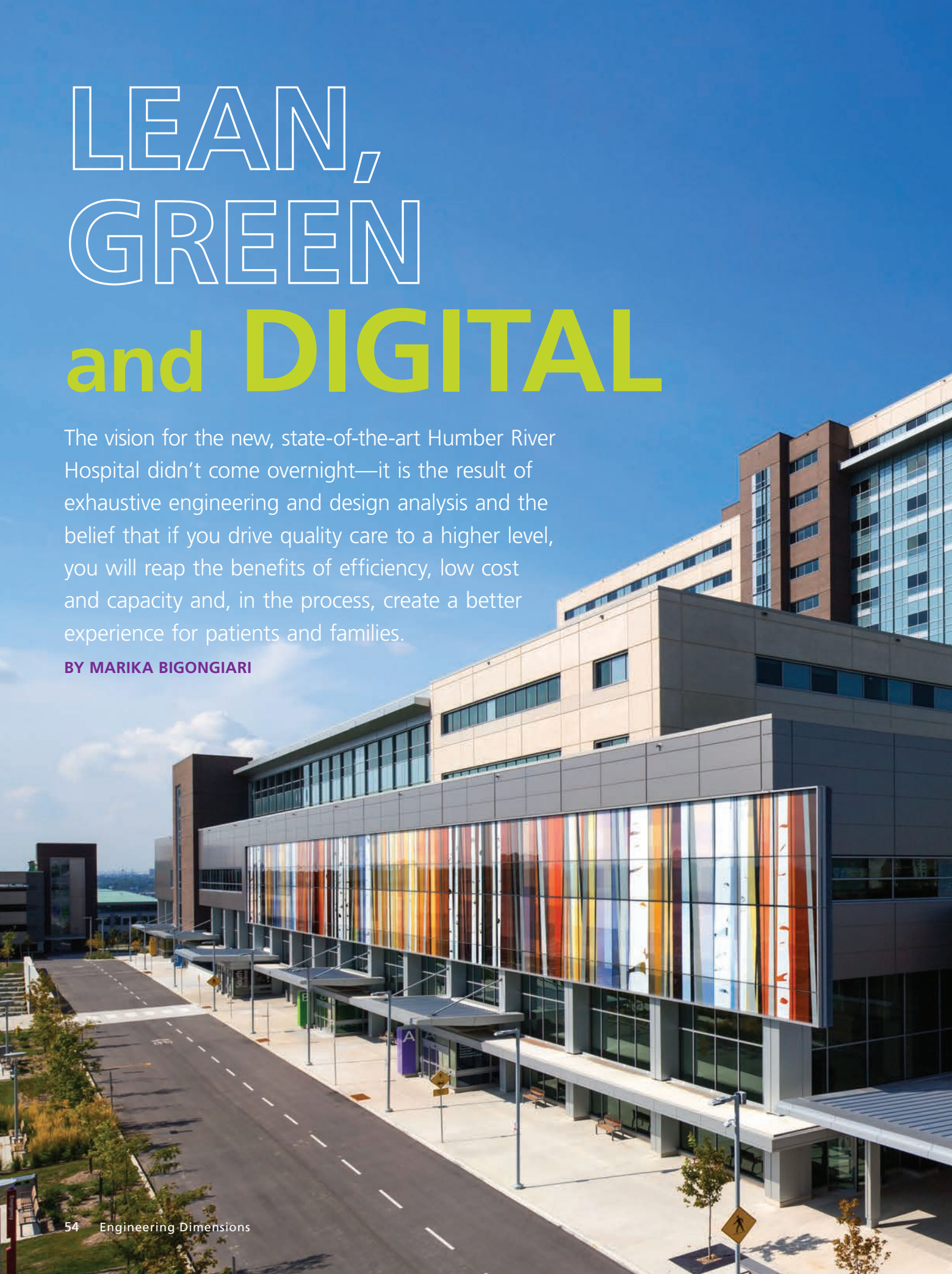
Despite political and policy differences that impact the allotment of resources to healthcare facilities across Canada, engineers within the sector are optimistic they are up to the battle.

"Even better is a healthcare sector environment that can continually improve to help provide better outcomes," says Kevin Cassidy of WSP. "I believe that if you can create an environment that cannot only integrate with clinical systems but also provide environmental monitoring data, you can adjust the environment over time to support clinical modalities and ultimately improve clinical outcomes." 

LEAN, GREEN and DIGITAL

The vision for the new, state-of-the-art Humber River Hospital didn't come overnight—it is the result of exhaustive engineering and design analysis and the belief that if you drive quality care to a higher level, you will reap the benefits of efficiency, low cost and capacity and, in the process, create a better experience for patients and families.

BY MARIKA BIGONGIARI





If you've ever experienced being in the hospital—as a patient or as a loved one—you know what a challenge it can be to find any kind of serenity in a place where the aim is healing. Look around the fray of your standard emergency department and a universal expression is evident on the sea of faces: worry, concern and discomfort.

The newly built Humber River Hospital (HRH), which opened its doors in October 2015, is about as far from the emergency department you know as you can get. Its spaces are airy and light-filled, its façade shiny and colourful. But let's not judge this book by its cover—the substance is in the pages.

A STRONG VISION

When the decision was made for HRH to move from three smaller sites to a sprawling single site, which required building a new state-of-the-art facility on the old Ontario Ministry of Transportation land in northwest Toronto, the redevelopment team analyzed its operational history and looked at how other hospitals worked, with an eye towards determining what it would take to reduce costs, improve efficiency, increase capacity and offer a better patient experience. The team especially wanted to learn how they could convert anything that might otherwise be wasted dollars into patient care. "We worked extensively with GE Healthcare on LEAN



Humber River Hospital's digital pill-picker at work.

processes in each of our previous hospitals to understand what drove us back," explains Barbara Collins, president and chief executive officer of HRH, who led the redevelopment team.

Moving to a much larger, 1.8-million-square-foot building—80 per cent of which would be single-patient rooms—meant they needed to figure out how to tackle operations without tripling their budget. Before the design of the hospital was even completed, the team trudged through a mountain of work to determine how design and technology might save them money that they could convert for use in the hospital.

To make their vision come to life, HRH enlisted the expertise of renowned architectural firm HOK, a global design, architecture, engineering and planning firm with a breathtaking portfolio. Jeff Churchill, a vice president and architect at HOK, acted as their advocate throughout the design process. "As a PPP (public-private partnership) process, we developed project-specific output specifications, we developed the main organizational moves of the hospital on the site, and we developed basic integral design principles, such as the portals of care (which reduce the need to travel long

distances) and a lot of the planning that went into the hospital," explains Churchill.

Reflecting on what needs to be considered when approaching a project of HRH's magnitude, Churchill muses: "We were lucky to have a client who had a strong and committed vision, which turned out to be a very simple idea about lean, green and digital—and each of those aspects we innovated as much as we possibly could, within accepted tolerances of the client and the risk. And what we came out with was a synergy between those three pieces."

SUSTAINABILITY GOALS

One of HOK's biggest responsibilities was manifesting HRH's sustainability goals—and, as the compliance architects, HOK set the vision for what those targets would be. Working closely with an energy modeler, they looked at each individual system, eventually coming up with the most cost-effective, long-term solution while getting the biggest energy cost-savings attainable.

The goal, across the board, was to make it as energy efficient as possible. One of the challenges was meeting HRH's mandate for 100 per cent fresh air, which meant air could not be recirculated. To accomplish this, HOK used classic, tried and true engineering strategies. "We didn't want to do anything that was cutting-edge or over and above what basic engineering strategies would be," says Churchill. "We stuck to good engineering practices and good design practices to show how this target could be made."

Churchill explains that by implementing the strategies outlined in HOK's vision and project output specifications, coupled with the aggressive Toronto Green Standard—going beyond green roofs, fresh air and recycled water—achieving LEED Gold status was an inevitability. It ultimately made them 40.1 per cent more energy efficient than any other hospital in North America. And it was achieved without sacrificing any of the things HRH wanted, like intelligent lighting systems, room temperature and chromatic glass that can be controlled both by the patient and centrally according to time of day and seasonality, a digital pill-picker, automatic guided vehicles (AGVs) and snow-melt systems around the sidewalks so people don't trip when they go outside in the winter.

The green aspect of HRH's vision was a key factor in making its patient experience unique. Churchill says this was one of their top priorities from the beginning: "There's a lot of technology implemented into this building...and some of this technology the patients will never see but it's all in service of creating a better environment and enabling better care of the patient."

Features such as integrated bedside terminals and monitors with access to patient care records and diagnostics, instant charting beside the bed, the ability to scan the barcodes of medications or connect with family and friends online and order food or entertainment all enhance the hospital experience. Some of it is simply about streamlining communications and tasks. Nurses are outfitted with personal devices, enabling patients to make simple requests without the need for a nurse to make multiple trips. "Patients can communicate directly

with their nurse, who may be on another part of the floor, and ask them for that blanket or that ice and she doesn't have to walk back and forth," Churchill explains. Simple changes like this save time and reduce distractions, enabling healthcare workers to focus on front-line care, a key aim of the hospital.

INNOVATIVE NOISE CONTROL

With the patient experience top of mind, the layout of the rooms and units was designed to reduce the sounds that often disturb patients, including carefully looking at the acoustical performance of floors, door seals, and back-to-back headwalls. The fact that 80 per cent of the patient rooms are singles is conducive not just to avoiding the spread of germs but also to helping reduce noise.

"There's an incredible amount of noise on a patient unit," Churchill points out. "When you're sick, you want to rest and you want peace and you want quiet—and, of course, from room to room patient noises can be very distracting, or family noises from the adjacent room, or noises from the nurse call station or collaboration that the nurses are doing."

Churchill's team addressed these issues by implementing team rooms for nurses to meet in and placing family areas deep into patient rooms—family members are permitted to visit 24/7—so discussions aren't happening near open doors. Other accommodations, such as cushioning the receiving ends of the pneumatic tubes that deliver samples and medicines, and routing HVAC services through corridors and not overtop patient rooms, further minimize environmental noise. HOK worked closely with Aerocoustics Engineering Limited, a firm specializing in innovations in acoustics, vibration and noise control. No opportunity was missed to create a quieter, more peaceful atmosphere.

"Traditional hospitals have been studied and have been found to be one of the worst acoustical environments from a healing perspective, and many studies have shown that the noise levels in hospitals have a direct link to the time it takes for somebody to heal," explains Payam Ashtiani, P.Eng., principal at Aerocoustics. In addition to contending with traditional noise, the hospital was built beside Highway 401, Canada's busiest thoroughfare. Ashtiani's team tackled environmental noise by using acoustic models to predict sound impinging on the structure and investigated materials that could be used on the façade to mitigate sound penetrating through.

HRH's mandate for natural light presented a challenge the team addressed by looking closely at window construction, all while ensuring that with every material introduced, be it glass or cinder



One of the many airy, light-filled spaces at Humber River Hospital.

block, the sound level experience inside met the intended specifications according to the model.

To create a livable environment amid the bustle of a busy hospital, the needs of its inhabitants were considered paramount by all parties, and this included addressing the integration of technology. Collins explains: "Our purpose for being here is to provide high-quality, safe patient care, and to focus on what the patient and family need. So, we took that very seriously in our design, in the patient having control over their environment, and in the fact that you can always have more people interact with patients—what you can't do is waste those resources delivering supplies, doing things that could be automated. You need to automate to move the resources to the front line. That was our philosophy."

In the spirit of that philosophy, HRH employs the use of AGVs—robotic sentries that buzz about the space, politely asking those who block their path to step aside as they gather dirty linens and deliver supplies. It was up to Ashtiani and his team to balance the needs of patients and staff while incorporating the volume of technology that goes into delivering an all-digital hospital—ensuring, for example, the noise from any rattling bins the AGVs might be carrying, or even their wheels, was such that if they moved past a patient's room the patient wasn't interrupted by the sound of them whirring by. "That was really the challenging part of this project: to ensure that we were taking care of all the pieces of digital equipment," says Ashtiani. "Anyone who has a cellphone knows what it's like when

you get notifications and buzzing and beeping from your devices trying to get your attention. So, what the system that was developed here aims to do is to minimize the distraction to the patient and reduce the communication going on between staff. That might sound counterintuitive but the concept is that you send the communication to the people who find it relevant as opposed to the traditional PA system where they're saying, 'code blue' and 'code red' and everybody hears it, and probably one per cent of the staff needs to use that information. And so, because all the staff here have personal devices, the notifications get sent to them directly."

Ashtiani explains that acoustical engineering is more than just eliminating noise—it's about making a space conducive to the sound experience it's meant for. That means ensuring a classroom is conducive to understanding speech, a movie theatre dampens all sound except the film, a concert hall reverberates with music, and a hospital is quiet. "Controlling sound is about making sure the acoustic landscape of the space matches with the intent," he says. "The soundscape of any area that we as humans are in has a profound effect on how we interpret that space."

DIGITAL INFRASTRUCTURE

HRH holds the distinction of being North America's first all-digital hospital, and the digital aspect is key to what has been achieved in terms of improving

patient experience and patient care. Peter Bak, chief information officer at HRH, says the hospital's digital vision is reflected in its design: "When we looked at the vision of digital and what that really means, we went beyond the clinical delivery, and we went into the entire building as a digital infrastructure, and the benefits that you reap from doing that."

Bak characterizes digital hospitals by four themes: electronic information, mobile and connected, patient empowerment and systems automation. He expands on how the electronic component—with a stress on actionable information and how that drives efficiencies, workflows and quality improvements—lays the framework for the rest: "In healthcare, many people will naturally think of patient-related information such as vital signs, monitors, the patient chart and that kind of stuff, but what we recognized was that, when we think of actionable data, it should be every single piece of information that is flowing in this building."

That means the lighting systems, elevators, HVAC systems, doors and even the chromatic glass windows are all electronic and actionable. And indeed, every single piece of mechanical-electrical equipment in the building is on an interoperable network and IP-based—something Bak says is key: "As a result, we have visibility to all our building mechanical-electrical systems, and the value of that is that it allows us to fine-tune and optimize the performance of the building with specific emphasis on energy consumption."

A NEW COMMAND CENTRE

Two years into operation, the hospital continues to innovate, implementing a new command centre just a few months ago—an innovation born out of the need to solve a very real problem. Bak explains: "In our current system, and this is true of many nations, hospital capacities are under pressure continually, and that is because we have growing populations, aging populations, and it's the aging population piece that impacts the acute centre more greatly than the younger populations."

Having reached full capacity within just four months of opening HRH's doors—despite being expected to grow into full capacity over a period of five years—they needed to come up with a solution to address the strain.

"The objective of the command centre is to drive greater efficiencies and greater quality of care—the delivery of care—and, in so doing, the premise is that you create increased capacity in your operation and you also reduce cost," says Bak. He points out the inefficiency of hospitals, not as a critique, but as a fact due to their size and com-

Humber River is known as North America's first fully-digital hospital.





A single-patient room at Humber River Hospital, where 80 per cent of rooms are built for single patients.



An automatic guided vehicle, or AGV, delivers supplies within the hospital.

plexity, saying it all comes down to visibility: “We absolutely see how having that visibility and being able to reprioritize work leads to greater efficiency and greater capacity.”

Bak stresses it’s not that people are doing bad work and the command centre fixes it but, rather, the command centre enables the work to get done more efficiently and in priority sequence. It’s about bringing what he refers to as “meaningful visibility” to operations and optimizing patient flow: the in and out of patients.

Bak offers the example of a porter who gets a task to deliver a patient from one part of the hospital to another. That porter is unaware that there’s another patient ready for discharge waiting to be taken downstairs, and that—freeing up

a bed—is a higher priority than moving the other patient from one unit to another. “They don’t see that visibility. But now the command centre presents that to you,” he says.

Using predictive analytics, the command centre can also determine where resources will be needed in the days ahead based on normal patterns of practice and activity in the organization, allowing them to plan more effectively. It takes full advantage of the digital environment, where information can be pulled from multiple sources, enabling key people to see what’s happening, work together and fix any flow problems that occur. “Even if you save a half a day for every patient in terms of flow, you start to expand your capacity without increasing costs,” says Barbara Collins.

Another way the command centre drives quality is by aggregating information that can predict what might happen to a patient. It provides a type of visibility above what the human eye can achieve alone. “Ideally, you’d want to know a patient is on their way to a cardiac arrest and intervene before the event actually happens,” Bak explains. The command centre uses algorithms that, with the collection of data such as vital signs and bloodwork, can give an early warning that a patient may have a cardiac arrest in the next few hours. This gives staff the opportunity to take pre-emptive measures and stop the attack from happening.

Another example is sepsis. In this instance, algorithms detect the potential for an infection to occur. Collins explains: “Sepsis is a blood infection, and we know that once a diagnosis of sepsis is made, the patient will do much better if antibiotics are given within 45 minutes of the diagnosis. So, we have a system now that will say ‘sepsis diagnosis, 30 minutes, antibiotic not yet administered, let’s intervene and get that antibiotic into the patient.’” Better outcomes like these, which translate into avoiding unnecessary care, not only benefit the patient, they contribute to increased capacity and reduced operating costs.

Says Bak: “What we were very strong proponents of, and we are absolute believers of, is if you drive quality care to a much, much higher level, you’re going to reap the benefits of efficiency, low cost and capacity—and all three of those things is what every hospital wants.” **e**

IMPROVING HEALTHCARE ONE TOOL AT A TIME

BY NATALYA ANDERSON



Engineers are essential to the high-tech world of healthcare, from developing new diagnostic tools and rehabilitative treatments to maintaining and improving the vast amount of system support required for modern medicine. In paediatric medicine, in particular, four Ontario engineers are revolutionizing the way hospitals care for children with disabilities.

As healthcare engineers develop tools to open new worlds for kids with disabilities who might, at times, feel isolated or unable to participate in childhood activities, there are four Ontario engineers who are also discovering a new love for the surprising ways in which their work can help people.

“There is no question that helping children is always a great reward as a biomedical engineer,” says Mario Ramirez, P.Eng., director of medical engineering at the Hospital for Sick Children (Sick Kids) in Toronto, Ontario. “It is sad to see somebody suffering, especially a little one. It is also very rewarding to see how resilient they are. And then, to see the biomedical engineering that we are applying in the hospital is helping them to come out healthy—sometimes still with some problems—still growing and advancing and they can do things on their own.”

Ramirez brings 35 years of experience to his field, with a history of applying his skills at St. Michael's Hospital in Toronto and the IWK Health Centre (originally named the Izaak Walton Killam Hospital for Children between construction in 1967 and opening in 1970, and then informally nicknamed the IWK) in Halifax, Nova Scotia, before moving to Sick Kids 15 years ago.

"Specifically, at Sick Kids, what medical engineering—we call it medical engineering; some people call it clinical engineering—does, is we are really responsible for all the technology that is applied to patient care," says Ramirez. "This could be a physiological monitor; it could also be an ultrasound machine or an MRI or CT scanner."

Ramirez's team assists in the selection and acquisition of the technology for the hospital and the machine repair and maintenance they might require through the useful equipment life.

"A clinician is then able to perform the care they need to—not only now but for the next five to 10 years," he adds. "So, for example, we help the clinicians in developing the technical specifications for imaging systems they are going to use—whether it's an MRI or a CT scanner or any other imaging system. We understand and relay clinical needs into technical needs so we can propose those to manufacturing companies. And then we help them through the process of comparing and developing technical evaluations on the equipment."

The work is the difference between safe and unsafe equipment used to evaluate the medical condition of children ranging from newborn, infancy to adolescence, and the goal is to acquire machines and software that can be upgraded and used for up to a decade. Once it is a permanent fixture in the hospital, Ramirez's team is responsible for all repair and maintenance of the equipment. Overseeing its efficacy is essential in paediatrics, as children are not only in vulnerable positions, but they are also growing and changing rapidly.

"We may have to deal with a baby who is 500 grams, up to a boy or a girl who is 17 or 18 years old," says Ramirez. "So, we have to have the equipment that can treat that population. But, in particular, we face challenges with the smaller patients. In imaging and x-rays, we're trying to make sure that we are not exposing the children to x-rays more than needed because radiation can damage a baby later on. We are always advocating for the little ones. They need the care."

GIVING CHILDREN A VOICE

It's not simply the structuring and maintaining of ultrasound equipment that makes up an engineer's contribution to paediatric care. At Holland Bloorview Kids Rehabilitation Hospital in Toronto, engineers like Tom Chau, PhD, P.Eng.,

Elaine Biddiss, PhD, P.Eng., and Jan Andrysek, PhD, P.Eng., are creating new tools for children with physical disabilities and developmental delays.

"We have created a whole suite of technologies, many of which are now accessible to clients and families," says Chau, vice president of research at Holland Bloorview Kids Rehabilitation Hospital, director of the Bloorview Research Institute, Raymond Chang Foundation chair in access innovations, and professor at the Institute of Biomaterials and Biomedical Engineering, University of Toronto. "They're basically technologies that provide children access to their environment, access to communication, access to computers, through a means other than speech and gestures. The challenge with the population that my lab is working with is that these kids don't have functional speech, and they don't have functional movements. If you're not able to speak, and you're not able to move, how do you communicate with your family, your peers, your teachers, everybody in your environment?"

One such creation is The Hummer, a computing device that allows a child with cerebral palsy or other neurological delays to communicate through the vibration of their vocal folds.

"Swallowing, coughing, moving your head, etc., generate different types of vibrations of the vocal folds," says Chau, who won an Ontario Professional Engineers Award in the Young Engineer category in 2005 for his innovative research. "It's easy to vibrate your vocal folds. You just have to hum, or try to hum. What we found early on is that for most of the kids who couldn't sustain an audible sound, they could still hum. That's how this technology started. We built it around one child, and once that solution was developed, we quickly found that there were many other kids who had that same ability. Now we have several dozen kids who use that as their primary access pathway. They're able to use the computer at school, surf the Internet, operate devices in their environment, simply by humming."

Additionally, Chau and his team are working on Blink Switch, through which children who are completely paralyzed, save for the ability to blink, can communicate through a headband sensor, and Snap Switch, which employs sensors on a child whose only reliable motor ability is a snap. With all three devices, the sensors must be able to distinguish a deliberate hum, blink or snap from an involuntary muscle movement.

"The engineering design principles and problem solving come into play on many, many aspects of this problem and its solution," explains Chau. "First of all, it comes into play with the instrumentation—being able to harness non-invasively these electrical and optical signals requires technical knowhow. We have to be able to filter out all kinds of noise. The body and brain are inherently noisy. The resting brain is incredibly active. We develop the algorithms to teach the computer how to recognize these different types of brain patterns. And these brain patterns are individual. All of that requires engineering technical skills, not limited to one genre of engineering. I've applied skills from electrical and computing engineering—those would be the obvious ones—but I've also had students from mechanical, chemical, and even civil engineering work with us."

EVOLUTION OF VIDEO GAME THERAPY

The importance of applying multidisciplinary engineering skills to the uniqueness of each child is something Elaine Biddiss, PhD, P.Eng., brings to her work daily.

"Each child is their own person with their own therapy needs and personality," says Biddiss, scientist, Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital, and assistant professor at the Institute of Biomaterials and Biomedical Engineering, University of Toronto. "When you know exactly who you're designing for, then the challenge of an engineer is fairly straightforward, but when you're trying to design one system that can accommodate hugely different users, there are greater challenges."



Elaine Biddis, PhD, P.Eng. (far right), and her team have created mixed reality video game therapy for children with cerebral palsy, brain injuries and developmental delays. Photo: Holland Bloorview Kids Rehabilitation Hospital/William Suarez

With her team of researchers, Biddis has created mixed reality video game therapy for children with cerebral palsy, brain injuries and developmental delays. She says the evolution of this genre of therapy finds its roots in neuroplasticity.

“For brain plasticity you need four key ingredients: repetition, increasing challenge, feedback and reward for when you achieve something within the process,” explains Biddis. “That’s why our team was so interested in video games. Video games provide a great framework for all four ingredients. That creates a nice environment in the brain for neuroplasticity and forming new motor pathways. We’ve seen that neuroplasticity can occur through video games, with seeing patients’ new motor skills and through brain imaging.”

One such game, *Botley’s Bootle Blast*, aims to meet a child’s therapy goal. The game involves a story about a robot named Botley who creates a mini-robot called a Bootle to help him with his daily chores. When Botley sees how well the Bootle works, he replicates the mini-robot. But he replicates too many, and Botley asks the player to help him collect all of the Bootles by playing mini-games. These mini-games target specific therapy movements. Using Microsoft Kinect, the game applies a sensor that includes a video camera, a microphone array and a depth sensor. By tracking the skeleton of a person moving in front of it, the device follows body movements. Biddis and her team also develop techniques to enable children to interact with tangible objects within the virtual world. This helps to ensure that the video game play translates to real-world function. Mini-games within each child’s virtual world are tailored to their specific needs. A range of movement is calibrated to further target a patient’s therapy requirements, and the games are multiplayer so that children can play with each other and develop their socialization with children of various abilities.

“One thing that distinguishes how we apply our engineering skills here is that it is so interdisciplinary,” says Biddis. “A child is not just solving equations. We’re also considering the psychology of children.”

Consulting with patients and their families has been an integral part of what Biddis finds rewarding about her work: “We keep circling back to the kids as well. They consult and contribute to the design.”

DURABLE AND AFFORDABLE PROSTHESES

Also at Holland Bloorview is Jan Andrysek, PhD, P.Eng., whose team focuses primarily on children with amputations. A mechanical engineer by background, Andrysek has been developing prostheses that can work with a child’s body and allow them to interact more comfortably in their environment.

“We try to come up with better ways for these prostheses to work,” says Andrysek, scientist, Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital, and assistant professor and associate director, professional programs at the Institute of Biomaterials and Biomedical Engineering, University of Toronto. “We prototype and build them. We do a lot of clinical testing. We try to come up with more functional, more durable and more affordable devices. That’s one area where our research has had the most impact. We also try to develop better rehabilitation techniques with children who have amputations.”

A significant project Andrysek’s team is developing is called the Biofeedback Project, a system through which a child with a prosthetic limb can track how they are walking. It then determines whether the child could potentially do more with their range of movement.

“It will help promote good walking patterns and good, healthy movement within the body,” explains Andrysek, who won an Ontario Professional Engineers Award in the Research and Development category in 2017. “We’re still fairly early on in the process. We’ve developed some initial prototypes and are in the process of setting up a study. We’ve applied for funding to do additional studying with children.”



Jan Andrysek, PhD, P.Eng., holds one of his prosthetic knee innovations, which can work with a child’s body and allow them to interact more comfortably in their environment. Photo: Holland Bloorview Kids Rehabilitation Hospital/William Suarez

Last year, Andrysek's team also created a paediatric prosthetic hand for infants, working closely with a two-year-old girl and her family. The team aimed to develop a custom hand that the child could take into her home environment, and the project was a great success.

Backed by his team's prosthetic achievements, Andrysek co-founded LegWorks, a startup that aims to bring some of these technologies—most prominently a prosthetic knee—to the public.

"We have a global mission," says Andrysek. "We're in about 25 developed, some developing, countries, and our company is our way of getting us to the people. We're focusing on working with non-profits and NGOs to bring affordable technologies to low-income countries and low-income individuals. So, we have a two-tiered mission. And now, as part of my work at Holland Bloorview, I'm working on the very small kid's version of that knee. It was an invention that occurred in our lab, and then, throughout the years, we developed the technologies using clinical trials in a lot of places around the world. We got to the place where we wanted to commercialize it, so I ended up co-founding LegWorks. I'm not only the co-founder, but I'm also the chief technical officer."

While Ramirez, Chau, Biddiss and Andrysek are adamant that their clinical partners are keen on continuing to develop their innovations through scientific research, financial backing is a constant obstacle.

"We'd love to continue on," says Andrysek. "It's challenging due to lack of funding."

It's a challenge facing all scientific researchers in Canada. An astonishing report, helmed by former University of Toronto president David Naylor, suggests that as much as \$1.3 billion in funding is needed for science programs and research projects in Canada. In December 2017, the federal government started considering the implications—since Canada is lagging other developed countries in its science investments—when academic researchers began a campaign to convince political leaders to implement significant structural and operational improvements to how finances are distributed to academic trials.

PRIORITIES IN RESEARCH AND FUNDING

The concept of one baby step forward, two giant adult steps back, is not new to Ramirez.

"What I've seen is advances that have been able to help smaller and smaller children to be treated," explains Ramirez. "The challenge that we encounter at the hospital is that a lot of funding is mostly for adults. Companies tend to develop a lot of things for whatever they're going to sell ...the majority of what they're going to sell is for adults. When we're looking for the equipment we have to push the companies to make sure they think about paediatrics. When we think about paediatrics we talk about sometimes two-year-old children, and a little bit older. But also, there are neonatal babies."

Ramirez says more money could mean endless possibilities for paediatric medical engineering, pointing to recent in-womb surgeries by Mount Sinai Hospital and Sick Kids that have changed the course of physical development for babies.



Tom Chau, PhD, P.Eng., has developed devices that allow children with disabilities to communicate in various ways. Photo: Holland Bloorview Kids Rehabilitation Hospital/Christina Gopic

"This in-womb surgery at Mount Sinai points to the future," says Ramirez. "We need to develop the technology that will allow clinicians to continue these types of surgeries on very, very small babies. Clinicians could be able to correct issues within the womb. And then, when the baby is born, we may still need to take care of them with further surgeries. We need new imaging systems, good robotic surgical instruments, that will allow the clinicians and the surgeons to continue to care for those patients so that they can continue to grow and evolve to be healthy individuals for the future."

These engineers each express the idea that children with disabilities are not looked at as a priority for research and funding because they are a rare or small demographic, but if the government only sees science as dollars and cents, they're missing society's broader picture.

"In some ways it's a niche population, but I don't know how many people have been fully educated in terms of the needs of these children and what goes on in their lives," adds Andrysek. "Awareness is a part of it. If we don't provide a child with good therapy, good care, then we know that over time they will not function very well or be able to do some of the physical tasks that they want to do. They'll also develop [other physical] problems. The challenge is for them to get that therapy. The goal is to bring that hospital care into the child's home environment over longer periods of time." **e**

P.ENGs HONOURED WITH PRESTIGIOUS AWARDS

By Marika Bigongiari



University of Toronto Professor Milica Radisic, PhD, P.Eng., has been awarded the 2017 Steacie Prize. Photo: Caz Zvyatkauskas

Milica Radisic, PhD, P.Eng., professor of engineering at the University of Toronto, has been awarded the 2017 Steacie Prize for her work in tissue engineering. The Steacie Prize is named for E.W.R. Steacie, a physical chemist and former president of the National Research Council of Canada who championed young people in the sciences and blazed a trail for the pursuit of science in Canada. The prize is awarded annually to a young scientist or engineer who has made a notable contribution to Canadian research. As the Canada research chair in functional cardiovascular tissue engineering, Radisic has made life-changing advances in the field, developing new methods for growing human tissue in the lab. She was the first in the world to use electrical impulses and uniquely designed bioreactors, guiding isolated heart cells to assemble into a remarkable beating structure—tissues that are already being used to test drugs for side-effects. She and her team recently developed a unique injectable tissue patch with the potential to eliminate the need for invasive transplant surgeries and created the AngioChip, a 3-D, vascularized piece of heart tissue that, phenomenally, beats in real time (see “Welcoming innovation,” *Engineering Dimensions*, September/October 2017, p. 36).

Radisic has received numerous notable sciences and engineering awards, including the Canadian Society for Chemical Engineering Hatch Innovation Award, the Ontario Profes-

sional Engineers Awards’ Engineering Medal in the Young Engineer category and the Engineers Canada Young Engineer Achievement Award. “Professor Milica Radisic is revolutionizing the field of cardiovascular tissue engineering and the impact of her research is extraordinary,” says Cristina Amon, P.Eng., dean of the faculty of applied science and engineering at the University of Toronto. “She is most deserving of her continued recognition as one of Canada’s most talented young engineering researchers.”

The Women’s Executive Network (WXN) announced its Canada’s Most Powerful Women Top 100 list for 2017, which includes Ontario engineers Jeannette Southwood, P.Eng., FEC, and Nancy Hill, P.Eng., LLB, FEC. Southwood is vice president, strategy and partnerships at Engineers Canada. Prior to joining Engineers Canada in November 2015, she was the first female visible minority principal at Golder Associates, a global firm of more than 8000 around the world. Hill is founding partner, Hill & Schumacher Professional Corp., and a sought-after speaker, a leading expert in her field and an avid volunteer in the engineering profession. The WXN is a Canadian organization dedicated to the advancement and recognition of women in management, executive, professional and board roles.

University of Toronto Engineering Professor Tom Chau, PhD, P.Eng., and his research team were awarded the Governor General Meritorious Service Decoration (Civil Division)—a decoration that recognizes Canadians for exceptional deeds that bring honour to the country. Chau and



Tom Chau, PhD, P.Eng., who was awarded the Governor General Meritorious Service Decoration (Civil Division), stands with Governor General of Canada Julie Payette, ing. Photo: MCpl Vincent Carboneau, Rideau Hall, OSGG

his team of interdisciplinary researchers from the Holland Bloorview Kids Rehabilitation Hospital, which includes Pierre Duez, P.Eng., were recognized for their creation of the Virtual Music Instrument (VMI). Governor General of Canada Julie Payette, ing., presented the honour to the team during a recent ceremony at Rideau Hall in Ottawa. VMI was developed by Chau and his team in 2003 to create an opportunity for children with disabilities to play music without the need to hold or

manipulate an instrument. The technology, which helps individuals with disabilities express themselves through the benefits of music therapy, results in increased self-esteem and a sense of personal accomplishment. VMI has already improved the lives of children and families worldwide. Created by Queen Elizabeth II, the Meritorious Service Decorations recognize Canadians for exceptional deeds judged to bring honour to Canada.

They are an important part of the Canadian Honours System, highlighting remarkable achievements that improve quality of life on a large scale.

Chau also received the Order of Ontario. He is vice president of research at Holland Bloorview Kids Rehabilitation Hospital, director of the Bloorview Research Institute, and a professor at the Institute of Biomaterials and Biomedical Engineering at the University of Toronto. The Order is the highest honour in the province, reserved for Ontarians whose excellence has left a legacy in the province, Canada and beyond. Members of the Order are a collective of Ontario's finest citizens, whose contributions have shaped, and continue to shape, the province's history and place in Canada. Chau adds these latest honours to an extensive list of accolades recognizing his contributions to pediatric rehabilitation, including the Queen Elizabeth II Diamond Jubilee Medal (2012) and a Da Vinci Award for adaptive and assistive technology from the US National Multiple Sclerosis Society (2009).

Professor Brenda McCabe, PhD, P.Eng., has been elected a fellow of the Engineering Institute of Canada (EIC). Each year a select number



University of Toronto Professor Brenda McCabe, PhD, P.Eng., has been elected a fellow of the Engineering Institute of Canada. Photo: University of Toronto Engineering

of engineers nationwide are chosen by EIC for this honour in recognition of exceptional contributions to engineering in Canada. Known as a leader and mentor in the engineering community, McCabe has served as vice dean of graduate studies at the University of Toronto as well as chair and acting dean of the univer-

sity's department of civil engineering. She was also vice president of the Canadian Society for Civil Engineering (CSCE) and chair of its construction division. McCabe is the recipient of numerous prestigious awards, including the Senior Women Academic Administrators of Canada Recognition Award and the University of Toronto Joan E. Foley Quality of Student Experience Award. She is also a fellow of the Canadian Society for Civil Engineering and received the CSCE Award of Excellence in 2005. "Professor Brenda McCabe has made exceptional contributions to the faculty and to her professional community as an engineer, educator and academic leader," says Cristina Amon. "On behalf of our faculty, heartfelt congratulations on this well-deserved recognition."

The national not-for-profit organization Mitacs is saluting 150 future-shaping researchers from across Canada who represent a wide range of academic disciplines and reflect Canada's spirit of diversity, creativity and innovation. "For Canada's sesquicentennial, we're showcasing 150 Mitacs researchers whose dedication and vision have impacted our past and will inspire our future," says Alejandro Adem, Mitacs CEO and scientific direc-



Arash Lashkari, P.Eng., has been named to Mitacs 150.

tor. Among the 150 innovators named is Arash Lashkari, PhD, P.Eng., a research associate with the Canadian Institute for Cybersecurity at the University of New Brunswick (UNB) and a member of UNB's faculty of computer science. Lashkari has more than 20 years of experience developing technology that detects and protects against cyberattacks, malware and the dark web. He is currently

building databases of malware for anti-virus software developers to use for testing purposes, ensuring their products and firewalls can withstand attacks. "These are researchers whose ingenuity and dedicated pursuit of innovation is inspiring, and I congratulate them for this well-deserved national recognition," says University of New Brunswick President Eddy Campbell. "At UNB, where we conduct about 70 per cent of publicly funded research in the province, we're proud of our record of innovation, the impact it is making, and the people who make it happen."

CALL FOR ENTRIES

Entries open on March 27, 2018 for the James Dyson Award, which aims to inspire the next generation of design engineers. The award is given to a product design that solves a problem, has a significant and practical purpose, is commercially viable and designed with sustainability in mind. The international competition is open to product design, industrial design and engineering university students or graduates within the past four years. National winners are awarded \$2,500, international runners up receive \$6,000, and a \$40,000 award goes to the student or student team representing the international winner, plus \$6,000 for their university department. To read more about the award, visit www.jamesdysonaward.org. [e](#)

NOTICE OF ANNUAL GENERAL MEETING

In accordance with section 20 of By-Law No. 1, which relates to the administrative affairs of PEO, the 2018 Annual General Meeting (AGM) of the Association of Professional Engineers of Ontario will be held on Saturday, April 21, 2018, commencing at 8:30 a.m. at the Westin Harbour Castle Hotel, 1 Harbour Square, Toronto. No registration is required.

As noted in section 17 of By-Law No. 1, the AGM of PEO is held for the following purposes: to lay before members the reports of the Council and committees of the association; to inform members of matters relating to the affairs of the association; and to ascertain the views of the members present at the meeting on matters relating to the affairs of the association. Officers of PEO and other members of both the outgoing and incoming Councils will be in attendance to hear such views and to answer questions. PEO President Bob Dony, PhD, P.Eng., FIEE, FEC, will preside and present his annual report to the AGM. The president-elect, officers and councillors for the 2018-2019 term will take office at the meeting.

PROCESS FOR MAKING SUBMISSIONS TO THE 2018 AGM

Submissions by members at PEO's AGM are a vehicle for members in attendance to express their views on matters relating to the affairs of the association, but are not bind-

ing on Council. A member submission should clearly describe the issue being addressed and indicate how it advances the objects of the *Professional Engineers Act*, which define the mandate and responsibilities of PEO. To ensure member submissions receive proper consideration at the AGM, members must submit typed submissions to Interim Registrar Johnny Zuccon, P.Eng., FEC, by no later than 4:00 p.m., Friday, April 6, 2018. Submissions must be signed by the mover and seconder, either of whom must be present at the meeting. Submissions will only be accepted by email to agmsubmissions@peo.on.ca. A guidance document on the content and format of submissions is available from the AGM page of the PEO website at www.peo.on.ca. Submissions received by the April 6, 2018 deadline will be published on the AGM page of the PEO website and included as part of the registration package.

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

[Johnny Zuccon, P.Eng., FEC, Interim Registrar](#)

PROCEDURES FOR ADDRESSING SUBMISSIONS AT 2018 AGM

DURING THE MEETING

PEO's 2018 AGM will be conducted on Saturday, April 21 from 8:30 a.m. to 12:30 p.m. and continue, if necessary, from 2:30 p.m. to 3:00 p.m. Consideration of member submissions will begin at approximately 9:30 a.m. Submissions will be published on PEO's website before the meeting and included in members' registration packages.

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

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

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

FOLLOWING THE MEETING

Member submissions will be referred to the 2018-2019 Executive Committee or Council to consider whether to initiate any action on them. The mover or seconder will be invited to address the submission in detail at the meeting at which the submission is to be considered.

All submissions to the 2018 AGM will be considered during the 2018-2019 year, and their disposition reported to Council and at the 2019 AGM.

Disposition of submissions to the 2018 AGM will be published on the PEO website and updated periodically, if necessary. Progress on 2018 submissions will also be published in *Engineering Dimensions* following the 2019 AGM. **e**

COUNCIL APPROVES *ENGINEERING DIMENSIONS'* RETURN TO DIGITAL

516TH MEETING, FEBRUARY 2, 2018

By Nicole Axworthy

At its February meeting, Council approved a motion to return *Engineering Dimensions* magazine back to the digital edition as the default setting, to save money, be environmentally responsible and modernize PEO's communications.

A digital version of *Engineering Dimensions* was introduced in 2008 as an option for PEO members who don't want to receive a hard copy of the magazine. In July 2012, Council approved making the digital edition the default option for all licence holders and engineering interns, unless they request the hard copy, as part of a "going paperless" initiative. However, at its September 2015 meeting, Council approved a return to the hard copy as default based on reader surveys that indicated the digital edition was not likely as well read as the hard copy.

At its February 2018 meeting, Council approved reverting the magazine back to the digital edition as default due to recent reader surveys and statistics, as well as budgetary concerns. The change will occur with the July/August 2018 issue of *Engineering Dimensions*.

If a member prefers to receive a hard copy of the magazine, they can change their subscription preference in the member portal of PEO's website (<https://secure.peo.on.ca/ebusiness/home>) at any time. Subscription preference options will also be included in each member's annual licence renewal process.

BYLAW CHANGES

Council has approved changes to By-Law No. 1 to establish fee amounts currently contained in Regulation 941, and various updated references, to take effect immediately.

With the legislature's recent passage of changes to section 8(3) of the *Professional Engineers Act* (PEA) to return the bylaw confirmation threshold to its pre-2010 level of majority of members voting, Council was asked to proclaim changes to the PEA it had requested and which were passed in 2010 under the *Open for Business Act*. These proclamations to revoke section 7(1)25 and to proclaim changes to section 8(1)16 of the PEA transfer Council's authority to set fees from regulation-making to passing bylaws. This required Council to amend Regulation 941 to remove all prescribed fees and to refer instead to fees as specified in the bylaw at the same time as setting all fees and their payment timing in By-Law No. 1.

The changes are a straight clause-for-clause addition of existing fees in regulation to the bylaw, without changing amounts. PEO has not increased its fees since 2009 and, although it may wish to do so in the future to keep pace with inflation and the costs of administering its regulation mandate in the PEA, PEO has not made plans to raise fees at this time.

The bylaw changes can be found starting on page 43 of this issue, and the updated bylaw in full can be found on PEO's website at www.peo.on.ca/index.php/ci_id/24008/la_id/1.htm.

ORGANIZATIONAL RESILIENCE PLAN

At its February meeting, Council approved a Proposal for Organizational Resilience and Succession Planning at PEO and a budget of \$350,000 (\$300,000 in operations and \$50,000 in capital), and \$600,000 annually thereafter to fund the proposal.

Organizational resilience refers to an organization's ability to survive and thrive in challenging conditions. Recent experiences at PEO have highlighted the need to examine its organizational resilience. There is concern that the organization doesn't have enough resilience to effectively deal with unexpected challenges, such as long-term staff absences and volume surges in the application or complaints processes. An additional concern is the inability of the organization to effectively plan for succession to key management positions.

As part of this motion, a recruitment exercise will be launched to identify potential candidates for a P.Eng. Officer Development Program to hire five mid-career-level professional engineers with a view to giving them broad organizational exposure to address immediate resiliency issues as well as anticipated succession needs. The target for having the program fully staffed is July 1, 2018. Accommodations for the new hires will be fitted up and a standardized training program will be developed.

NEW GUIDELINE APPROVED

Council has approved publication of the new practice guideline *Assuming Responsibility and Supervising Engineering Work*, a draft of which was approved by PEO's Professional Standards Committee in November 2017. The purpose of the guideline is to define best practices for engineers who assume responsibility for professional engineering work of unlicensed persons, and for engineers who supervise engineering services in consideration of the PEA. The published guideline is expected to be available this summer. For more information on PEO's practice guidelines and performance standards, visit www.peo.on.ca/index.php/ci_id/30386/la_id/1.htm. [e](#)

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Thanks for focusing on women

Katelin Dzijacky, P.Eng.,
South Porcupine, ON

Thanks for putting the focus on women in engineering in the current issue (January/February 2018) of *Engineering Dimensions*. As a woman and mechanical engineer, I thoroughly enjoyed reading about the experiences of the women in "Rallying to change the ratio" (p. 30). I can relate to their experiences, and it's important that others gain an understanding of the perspective of women in a male-dominated profession. The women featured in "25 outstanding female engineers" (p. 36) truly are outstanding! I would love to see more articles about women engineers in upcoming issues of *Engineering Dimensions*. I will be sharing this magazine with as many colleagues and peers as I can! Thank you!

Self-regulation— a privilege not a right

Amin Mali, P.Eng.,
North York, ON

The privilege of self-regulation for all self-regulating bodies comes with a high level of responsibility to serve and protect the public. For example, Professional Engineers Ontario for engineers, Law Society of Upper Canada for lawyers, and College of Physicians and Surgeons for doctors.

To preserve this privilege, it is essential for the members of a self-regulating profession to hold themselves to a higher standard than anyone would, always act in such a way that they are part of a compliance regime, and report any misconduct promptly and voluntarily.

Failing to fulfill the regulatory mandate, a body risks losing the privilege to self-regulate. The following are examples in which the government has revoked the privilege of self-regulation from professionals:

March 2017—Tarion new home warranty corporation loses its responsibility to regulate the province's homebuilders. Citing conflict of

There is a climate crisis

Gord Campbell, P.Eng.,
London, ON

I am a proponent that there is a climate crisis that is significantly intensified by human activity, based on the scientific consensus. But humans seem unable to accept the scientific evidence and to implement adequate and effective strategies to combat this insidious menace. Lost in the Letters debating the credibility/urgency of climate change is the original article by Michael Mastromatteo ("Environmental concerns coaxing new levels of input from P.Engs," *Engineering Dimensions*, May/June 2017, p. 40), who mentions that the 2010 *Professional Engineers Act* added the word "environment" to the list of things to be safeguarded by the engineering profession (p. 42). As engineers, all of us are stewards of the environment. The article quotes Tom Markowitz, P.Eng., of PEO's West Toronto Chapter and current chair of its long-standing Environment Committee: "governments are not listening to engineers enough" and Mastromatteo emphasizes that "practitioners now and in the future will be required to communicate their expertise and their solutions more forcefully" (p. 45). So, beyond publishing letters and abiding by our code of practice, what are we engineering practitioners prepared to do?

interest issues, the Ontario government will create a standalone home builder regulator, separate from the warranty provider.

July 2016—The Quebec government places the province's Ordre des ingénieurs du Québec under trusteeship because of an internal crisis in the professional body and being unable to fulfill its primary responsibility of protecting the public.

June 2016—British Columbia puts an end to real estate self-regulation since it has failed to protect the public from illegal practices and has lost the public's confidence in its ability to police itself.

Regarding public welfare as paramount, it is essential for members of each self-regulating body and they need to have a broad mindset of public interest. Concurrently, education of individual members about the importance and benefits of self-regulating, and its difference from advocacy, is the key to preserving this privilege.

Having public trust is an indispensable factor in self-regulating. It is essential for members to fully understand the Code of Ethics and its purpose and be aware of disciplinary actions resulting from any professional misconduct (breach of the code).

A major impediment to this public trust is adjudication by members of the profession. Lawyers judging lawyers, doctors judging doctors, and even former police officers investigating police officers creates a conflict between protecting the public and protecting a profession's reputation.

In conclusion, having an independent panel of professionals to prevent any conflict of interest would be very effective, as the profession tends to avoid disciplinary actions against its own members.

Women in engineering—a mixed message

Steven Adema, P.Eng.,
Guelph, ON

Having been married to a female P.Eng. for almost 20 years, I can attest that there are gender biases in the workplace. We also have several young female engineers working (at Tacoma) in structural consulting—a male-dominated field—and I see their struggles. It is real. However, I am strongly opposed to people establishing targets such as 30 by 30 (“Navigating the glass obstacle course,” *Engineering Dimensions*, January/February 2018, p. 6). I have nothing against working on marketing strategies, etc., that promote engineering as a field for young women (high school) to explore. What I fear is that people begin to use these programs to select candidates based on gender rather than merit (you can also apply this to minorities). I sincerely hope that anyone reading this 30 by 30 message carefully consider the implications and

have an open-book approach so that their decisions are based on merit alone. We all need to be cognitive of our internal biases and be able to justify our decisions. But, when it really matters, are you passing over better candidates simply to meet a gender mandate? Think of a male university applicant who finds out they were on the wrong side of a selection process because of programs like this. What makes one person better than another? Gender? Race? I sincerely hope not. Please use the same criteria applied to everyone.

Opposed to PEAK and programs like it

Rahmat Ushaksaraei, P.Eng.,
Mississauga, ON

It is very interesting to see that to justify an unpopular program by their own statistic, i.e. 33 per cent of eligible licence holders are actually participating, in the article titled “PEAK program team responding to first wave of user input” published on page 8 of the November/December 2017 issue of the official PEO magazine (*Engineering Dimensions*), one falsely claims that “Even PEAK-resistant licence holders want to participate, if only so their statuses are shown as ‘complete’ on their online profile.”

While respecting the opinions of the ones in favour of the program, along with many other like-minded colleagues, I would remain totally opposed to PEAK and PEAK-type programs,

proven to be a failure in other disciplines, and am disturbed by the fact that someone speaks falsely on my behalf. Additionally, the low level of participation in the PEAK program along with the continually low level of participation in the standard voting process are indicative symptoms of larger challenges that PEO has been facing for a long time in convincing licence holders of its ability to introduce strategic visions and pragmatic approaches that truly represent the engineers and engineering profession in the modern era.

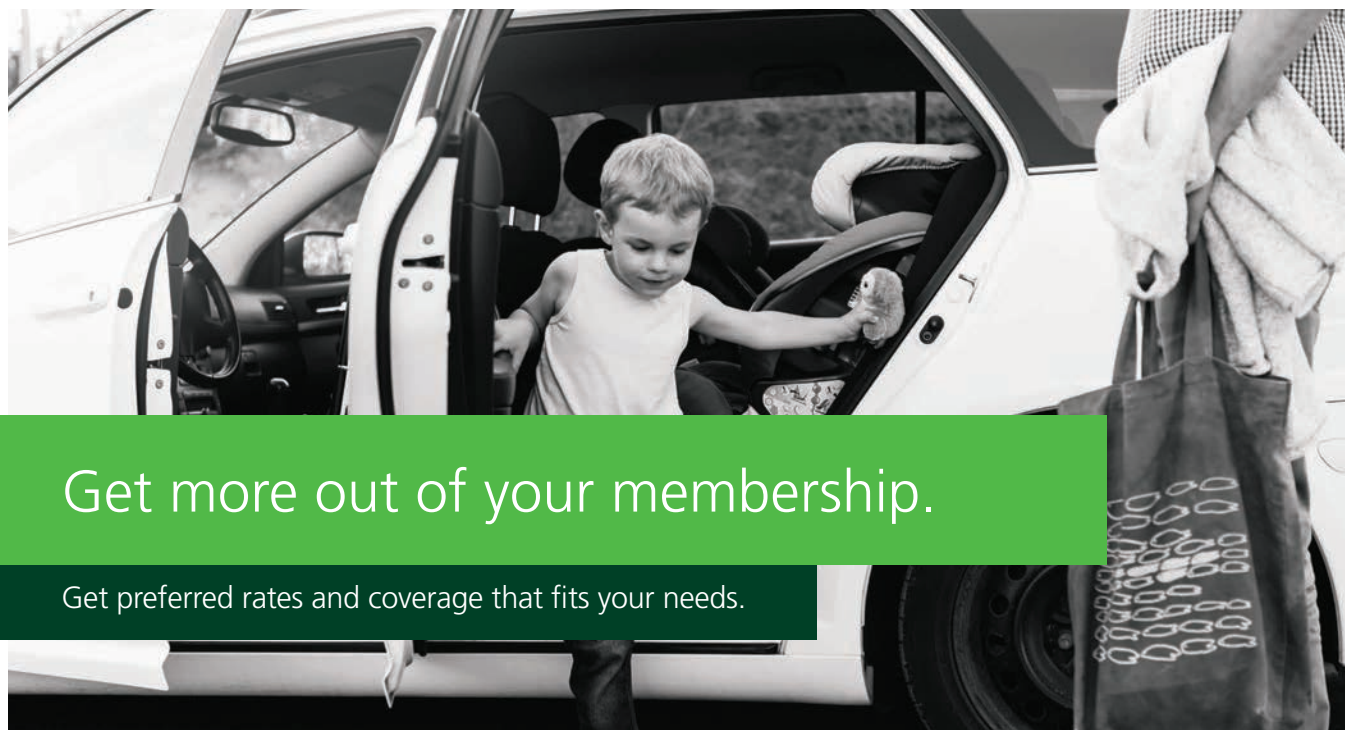
So, although one would have hoped that PEO chose the wise path of putting the PEAK program to vote among all licence holders rather than blindly implementing it, it is my firm belief that, at the end, even though PEO may choose to impose it as a mandatory requirement, it will only further confirm the need for a major organizational overhaul of PEO to meet the demands of the 21st century.



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