

# THE VOICE

OF ONTARIO'S ENGINEERS

OSPE Releases Indoor Air Quality Recommendations

Mandatory CPD for Engineers Coming in 2023

DECEMBER 2022

## BENCHMARKING 2022: ENGINEERING COMMUNITY SNAPSHOT REVEALS PROFESSION IN TRANSITION



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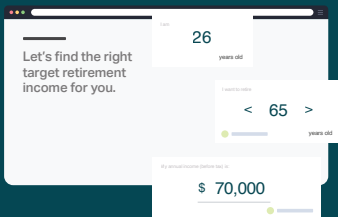
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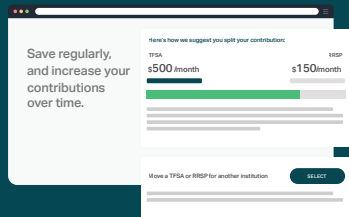
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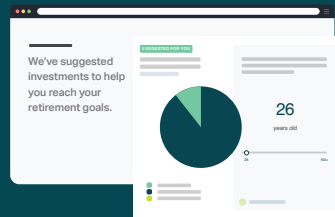
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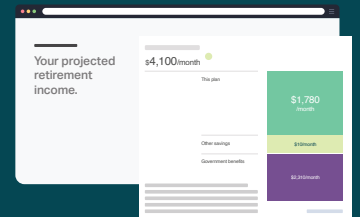
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## Retirement readiness

Your plan displays your retirement income sources, so you can track your progress.



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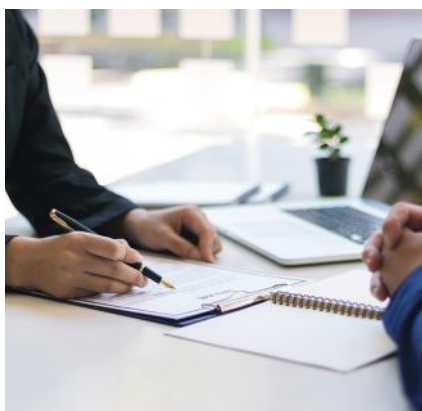
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# With your tremendous will and talent, we will move forward.

As I round out the first half of my term as your Chair and President, I reflect on how much has changed in the last six months. We are still defining what our post-pandemic lives look like and if you are like me, you've had to struggle to reintegrate in-person events as well as a return to daily commutes, all within a new and awkward hybrid work world.

Our OSPE events have been similar. This fall brought back our in-person **Engineering Conference** and the **OPEA Gala** as well as a continuation of the online member events that you've grown to love. As chair of the OSPE Board of Directors, I have been making the rounds this fall. The world seems to be finding a new normal and I have been delighted to attend several events in-person, representing the Association.

The highlight of this busy fall has definitely been a visit to Ottawa to attend **#EngCon**. There are pictures from the event in the magazine, but an image can only do so much in terms of capturing the true spirit of the event. I am so very proud of OSPE for creating an opportunity where members of the engineering community can learn and be inspired. I am also overjoyed at our ability to lead conversations that "need to be had."

Every time I have the opportunity to engage a live audience, I take the opportunity to share with them how OSPE is making a difference to the Engineering Community on a daily basis by anchoring our efforts in the principles of our Strategic Plan.

**Engineers Lead** – I firmly believe that engineers are uniquely trained to lead. Every one of you has deep analytic capabilities to identify problems, find root causes, and devise solutions through data-supported decisions. At this year's EngCon, I saw leadership in all its forms, from panelists tackling tough issues with compassion, to attendees passionate about making society better with technology whilst protecting our privacy and the values of democracy we hold dear. I see it as well in the member volunteers who have dedicated so much of their energy to task forces, devising guidelines and presenting at the conference. OSPE has provided you a platform and I want to thank all of you for stepping up and taking the chance to lead.

**Engineers Grow** – One of OSPE's strongest commitments is to the ongoing professional development of the engineering community. We have been leading this charge for years resulting in the creation of the **Engineering Academy**. The Engineering Academy is designed to help engineers find the most relevant

*In our last issue (June 2022), the article titled Role of Sight Distance: Making Mixed Autonomous and Human-Driven Vehicles Operate Safely was published without crediting the authors. The following should have been recognized for their contributions: Prof. Said Easa, Ph.D.; Azam Alaei, M.Eng.; Harsheev Desai, M.Eng.; Yang Ma, M.S. and Lee Weissling, Ph.D.*

# THE VOICE

OF ONTARIO'S ENGINEERS

**PUBLISHER**

Sandro Perruzza

**EDITORS**

Neil Lamont    Baijul Shukla    Matt Wiesenfeld

**CONTRIBUTORS**

Mark Abbott, P.Eng.	Jordan Lewis-Morden
Philip Asare	Sara Mehraban
Christa Bedwin	Emily Moore, P.Eng.
Nick Burgwin, P.Eng.	John O'Grady
MacKenzie Campbell	Glenda Singh
Paola Cetares	Beatrice Sze, P.Eng., JD
Zubair Hossain, P.Eng.	Peter Waisanen, P.Eng.
Mazlina Khan	Judith Wright
Pavithra Kugarajah, EIT	Laura Yu, P.Eng.

**DESIGN AND PRODUCTION**

Lia Forgione  
Sasha Moroz  
Dovetail Communications

**ADVERTISING INQUIRIES**

Jason Di Tommaso, Strategic Partners  
jditommaso@ospe.on.ca    613-986-1437  
Jamie Gerson, P.Eng., Corporate Solutions  
jgerson@ospe.on.ca    647-515-5281

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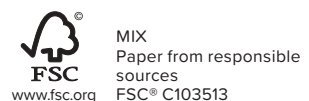
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# With 2023 nearly upon us I am very excited about where the industry is going.

training at all stages of their career. As a life-long learner myself, I have embarked on my first course through the Academy; a certificate in Digital Transformation delivered by WatSPEED at the University of Waterloo. This course has stretched me as an engineer to think broadly about the digital technologies that are reshaping all industries and what their impact on employees and society will be. This course has helped me make concrete plans for my professional work managing the technology that delivers higher-education credentials. I have also met and discussed technology introduction, digital advances and their impacts with many co-learners who work in government, manufacturing, building construction, finance, information technology and many more. This course is a great way for any engineer to begin deepening their understanding of the 4th Industrial Revolution and develop strategies for your organization and career. This is only one of the many courses available to you through your membership at OSPE.

For those of you who are Professional Engineers, the Engineering Academy is your resource to help you meet your CPD (continuing professional development) requirements as the mandatory reporting starts January 2023.

**Engineers Care** – We continue to work towards a profession that cares about how our actions affect each other as well as public safety. This is why we focus on equity, diversity and inclusion (EDI). Engineers strive for equity in the way we treat one another, diversity in who is at the table, and inclusion in that we all

feel like we belong at the table. Through our work in EDI, we aim to help you as an individual, the engineering community, and our regulator integrate practices that will make the engineering profession one that truly cares. Regulatory bodies across Canada have developed guiding principles for their licence holders to abide by in their professional practice that reflect the regulatory body's values. The Engineers and Geoscientists of British Columbia (EGBC) released a thoughtful set of guidelines for licence holders and firms to inspire equitable action towards an inclusive corporate culture. OSPE is urging PEO to formulate an official EDI guiding document that reflects our provincial population with tangible actions for engineers.

EngCon is the leading conference for equity, diversity and inclusion for the engineering community. The EDI track this year tackled the issues head-on. The conference panels this year spoke to the intersection of EDI with the UN Global Sustainability Goals, accessibility policy, and inclusive design in workspaces.


**Engineers Prosper** – OSPE is here to ensure the contributions of the engineering profession don't go unnoticed. Sandro and team have been working hard this fall ensuring OSPE is at the table for important conversations around indoor air quality, quality design and procurement in construction, and energy transmission and distribution. I am proud of the work coming out of the task forces that members volunteer on and am grateful for all your contributions.

With 2023 nearly upon us I am very

excited about where the industry is going. Although I know there are many challenges ahead, I am also confident in our ability to come together as an engineering community and with your tremendous will and talent, we will move forward.

I am a little sad that this is the final time I will be addressing you in the pages of The Voice. My experience as OSPE Chair has confirmed for me that the best way to effect change is to get active.

Next year, I challenge all of you to stretch your learning through the Engineering Academy, network and find people with complimentary passions at our events, and create action in your community and workplace.

See you in 2023. 



Dr. Marilyn Powers, P.Eng.  
President & Chair  
Ontario Society of Professional Engineers

# We must be vigilant in making sure that the development and deployment of technology are done with a commitment to equity and fairness.

With the year ending, I hope you are looking back positively on 2022. For OSPE and the engineering community, it has been one of great transition as we returned to offices and got back to resuming operations.

Last month OPSE hosted our largest events of the year – the **Engineering Conference** and the annual **Ontario Professional Engineers Awards Gala**. These events could not be more different, yet they are significantly linked.

At #EngCon we saw more than 2000 guests, both in-person and online, come together for a day of learning and inspiration. At the conference, we announced the launch of **Ontario's Engineering Community in Transition**, a research report examining how you, members of the engineering community, feel about your place within it today, and what that means for tomorrow.

In this issue of *The Voice*, there are several articles emanating from that report, examining our industry from every dimension. After you read them, I hope you will download the report and engage the Society with how you think we should respond. The issues we are facing thanks to disruption in the industry are going to require collaboration from all stakeholders. There are no easy solutions, just lots of opportunities to build the more diverse and inclusive engineering industry that we need.

While the Conference and the Report challenged us all to think about the future, our annual Awards Gala was an important reminder of the rich tradition and impact of engineers, and how national and indeed global leaders reside here in Ontario. We know there are changes we need to see in our industry, and at the same time, it is important to celebrate the ground-breaking achievements that engineers have made and will continue to make.

Technology is ever more present as we tackle truly global challenges. At the same time, we must be vigilant in making sure that the development and deployment of

technology are done with a commitment to equity and fairness. Of course, tools are never inherently biased, but it is the responsibility of all people, and especially engineers, to examine the impact of new technology, including through the important lens of equity, diversity, and inclusion. The pace of disruption in our world is accelerating and we need to assure that we are not creating potentially newer and deeper challenges by not listening to all qualified voices.

It has always been the responsibility of the engineer to seek solutions that are not only evidence-based but are sensible when factoring in the very real impacts on human safety, the environment, and prosperity. The best way to achieve that is through lifelong professional learning. The world moves so quickly and we need both a culture and requirements that ensure Ontario's engineers are in step with best practices.

For many years, OSPE has encouraged PEO to implement mandatory continuing professional development (CPD) and within a few weeks of this issue's publication, they will have launched an expansion of their PEAK Program, requiring engineers to actively update and upgrade their skills and knowledge on an annual basis.

Lastly, as a final reflection on 2022, I want to remind all of our members of our ongoing commitment to serve your interests. Throughout the year OSPE has been active on several advocacy fronts, advising the government where appropriate, and critiquing it when policy appears to fall short.

To make this process even more impactful, we have overhauled our advocacy program to focus on what we think are the most critical areas – Climate Crisis, Research and Innovation, Sustainable Cities, Energy, and Equity, Diversity, and Inclusion. All of these groups need more input and more leadership as we wrestle with how to best move our province forward safely, and smartly. In 2023 please consider

getting involved.

2022 was another fascinating year. Getting back to the beginning of my thoughts, I am excited about the return of in-person events and seeing more of you in-person in the months and years to come. The year also saw the return of the Conservative Government, enabling us to continue down several paths of advocacy that have been started in the past. I am encouraged by OSPE's historical success in this area and look forward to positive updates in the future.

As a final thought, reflecting on what we observed in our Benchmarking Report, I remind you that we are in a period of great transition in our industry. Where engineers work, how they work, and how they add value are being challenged.

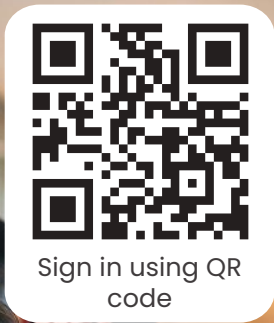
Understanding the root causes and designing the right actions is no easy task but we know that we are stronger together and that OSPE, more than ever, can help construct a prosperous future for its members and the engineering community.

I look forward to seeing you and hearing from you in 2023. 



Sandro Perruzza  
Chief Executive Officer  
Ontario Society of Professional Engineers

*Sandro Perruzza*



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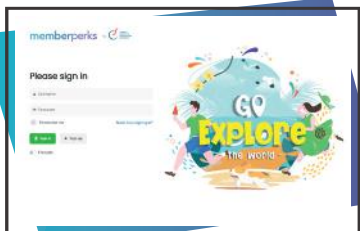


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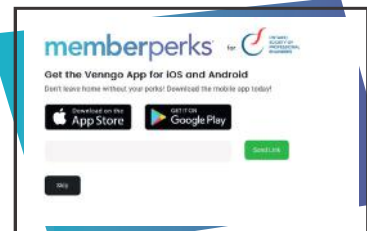
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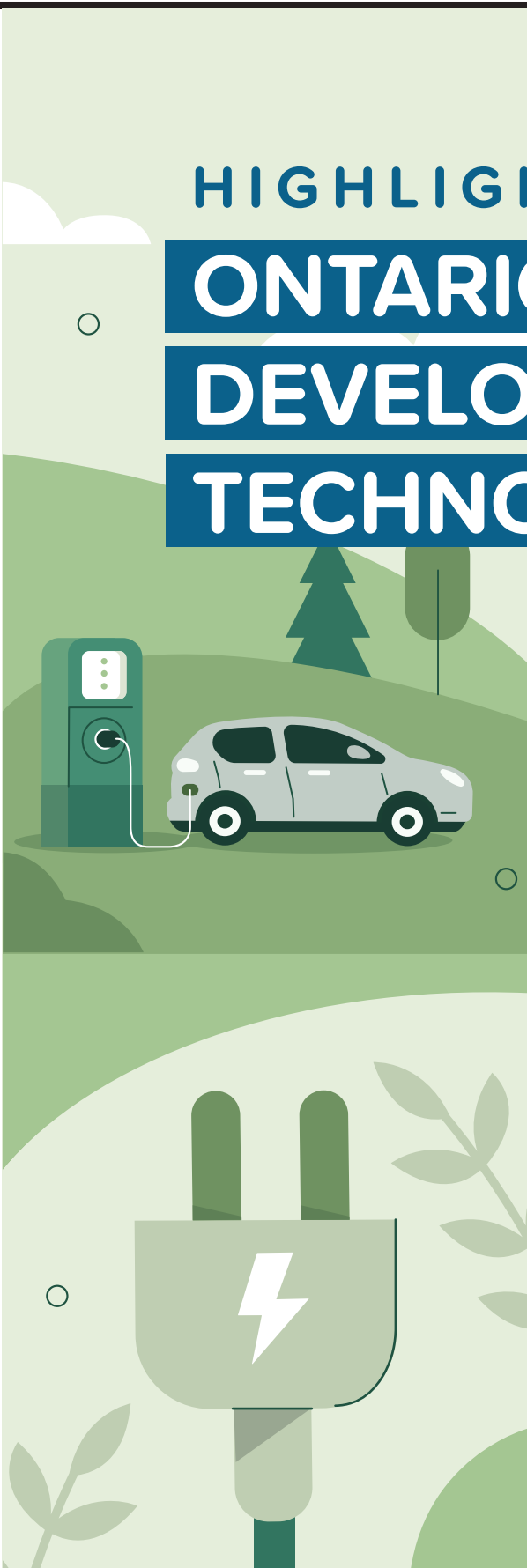
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# HIGHLIGHTING

# ONTARIO ENGINEERS

# DEVELOPING CLEAN

# TECHNOLOGY



Nick Burgwin, P.Eng., Beatrice Sze, P.Eng., Laura Yu, P.Eng.  
*The authors are members of OSPE's Research and Innovation Task Force*

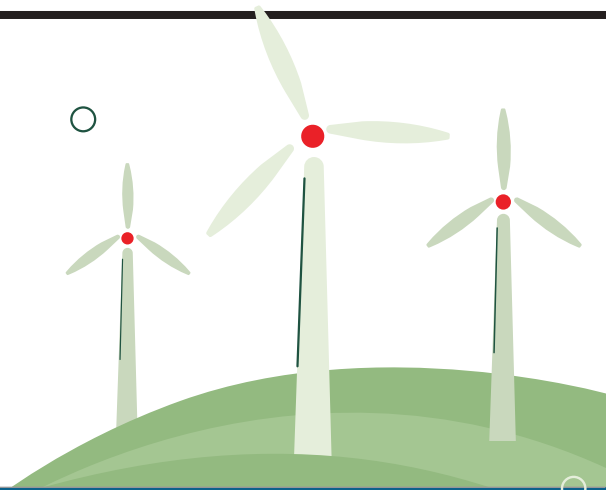
**C**lean Tech activity in Canada contributes to clean growth and the transition to a low-carbon economy. It provides environmental solutions to issues such as climate change, air and water pollution, and resource scarcity. Clean technologies also contribute to economic growth and diversification by increasing access to international markets and creating well-paying jobs for Ontarians and all Canadians.

## **Clean Technology Data Strategy**

OSPE's Research and Innovation Task Force (RITF) aligns itself with the Canadian Government's Clean Technology Data Strategy. Over the course of 2023, the RITF will be seeking out companies, individual engineers and applied science researchers who are engaged in the following areas of research & development:

1. Air, environment and remediation
2. Water and wastewater
3. Waste and recycling
4. Biofuels, bioenergy and bioproducts
5. Renewable and non-emitting energy supply
6. Smart Grid and Energy Storage
7. Energy efficiency
8. Precision agriculture, forestry, and biodiversity
9. Mining, processing, materials, manufacturing and industry
10. Transportation





### What is “Clean Tech”?

Understanding what is considered “Clean Tech” is essential to ensuring Ontario’s engineers grow and develop in meaningful ways. The table below provides a helpful guide to engineers wondering if their research and product development falls within the category of “clean technology.”

#### CLEAN TECHNOLOGY RESEARCH & DEVELOPMENT CATEGORIES

<p><b>Air, environment and remediation</b></p> <ul style="list-style-type: none"> <li>• emission control; monitoring and compliance; management or treatment or industrial services for air pollution, flue gas, and GHG management</li> <li>• in situ and ex situ physical, chemical, biological, and thermal treatment of soil, sediment, and sludge</li> <li>• noise and vibration abatement</li> <li>• environmental protection activities</li> <li>• protection from radiation</li> </ul>	<p><b>Water and wastewater</b></p> <ul style="list-style-type: none"> <li>• treatment of industrial wastewater; treatment of sewage; wastewater management</li> <li>• in and ex situ physical, chemical, and biological treatment of groundwater, surface water, and leachate</li> <li>• control, containment, and monitoring services; treatment of air emissions or off-gases</li> <li>• treatment of drinking water and filtration systems</li> <li>• water efficiency; measurement and control of water use; water recycling</li> </ul>
<p><b>Waste and recycling</b></p> <ul style="list-style-type: none"> <li>• non-hazardous waste collection</li> <li>• separating and sorting</li> <li>• disposal</li> <li>• recycling</li> <li>• compaction</li> <li>• centralized biological reprocessing and composters</li> </ul>	<p><b>Biofuels, bioenergy, and bioproducts</b></p> <ul style="list-style-type: none"> <li>• biofuel production</li> <li>• bioenergy production</li> <li>• equipment for producing biofuels and bioproducts</li> <li>• biochemicals</li> <li>• biomaterials</li> </ul>
<p><b>Renewable and non-emitting energy supply</b></p> <ul style="list-style-type: none"> <li>• wind</li> <li>• bioenergy</li> <li>• geothermal</li> <li>• hydro</li> <li>• solar</li> <li>• nuclear</li> <li>• waste to energy</li> </ul>	<p><b>Smart grid and energy storage</b></p> <ul style="list-style-type: none"> <li>• smart grid demand management</li> <li>• transmission and distribution</li> <li>• mechanical storage</li> <li>• electrochemical storage</li> <li>• electrical storage</li> <li>• thermal storage</li> <li>• hybrid storage</li> <li>• energy storage services</li> </ul>
<p><b>Energy efficiency</b></p> <ul style="list-style-type: none"> <li>• energy and resource-efficient modifications and improvements</li> <li>• measurement controls and monitoring</li> <li>• industrial design and related services</li> <li>• efficient industrial equipment</li> <li>• efficient commercial and residential equipment</li> </ul>	<p><b>Precision agriculture, forestry, and biodiversity</b></p> <ul style="list-style-type: none"> <li>• precision inputs</li> <li>• machinery and equipment</li> <li>• aquaculture</li> <li>• wild flora and fauna management</li> <li>• sustainable forestry</li> </ul>
<p><b>Mining, processing, materials, manufacturing and industry</b></p> <ul style="list-style-type: none"> <li>• minerals use</li> <li>• green mining and processing</li> <li>• advanced and lightweight materials</li> </ul>	<p><b>Transportation</b></p> <ul style="list-style-type: none"> <li>• fuel-efficient automotive equipment</li> <li>• fuel-efficient aerospace equipment</li> <li>• infrastructure and traffic control</li> </ul>

### Get Involved

If you are a company, department leader or individual engineering researcher developing technology in any of the above areas, please reach out to our Research and Innovation Task Force by contacting [advocacy@ospe.on.ca](mailto:advocacy@ospe.on.ca). We are happy to explore how OSPE can support your team’s work. 🌱

# 2022 ADVOCACY WINS



*The Ontario Society of Professional Engineers (OSPE) is the advocacy body for professional engineers in Ontario. We had an impactful year of policy wins fueled by the dedicated work of our volunteers. In 2022, OSPE saw the following victories.*

## ONTARIO IS INVESTIGATING AN ULTRA-LOW OVERNIGHT ELECTRICITY RATE

**T**he Government of Ontario is investigating options for a new ultra-low overnight electricity rate. In February 2022, Energy Minister Todd Smith asked the Ontario Energy Board (OEB) to provide him with options for implementing an ultra-low overnight electricity price plan. The government also invited public feedback, with the intention of launching the new price plan in May 2023.

OSPE’s Energy Task Force has advocated for such a plan for many years, and we are pleased to see the government considering this possibility. An ultra-low overnight rate could save money for consumers who use more electricity at night, and could also support electric vehicle adoption by reducing overnight charging costs.

## ONTARIO STRIKES A DEAL FOR \$10-A-DAY CHILDCARE

The Ontario Government has struck a deal with the Federal Government to bring \$10-a-day childcare to the province. On March 28, Premier Doug Ford and Education Minister Stephen Lecce met with Prime Minister Justin Trudeau and Federal Minister of Families, Children and Social Development Karina Gould to sign a six-year agreement that brings the \$10 childcare program to Ontario. The agreement outlines a gradual reduction in childcare costs for Ontario families, culminating in an average of \$10-a-day by September 2025.

OSPE has long advocated for Ontario to establish this deal with the Federal Government in order to advance the development of the engineering workforce. Research shows that the economic effects of the COVID-19 pandemic have disproportionately impacted women’s ability to work. A key barrier to women’s participation in the workforce is the lack

of affordable childcare spaces, a problem exacerbated by the ongoing pandemic. The introduction of \$10-a-day childcare will support the development of a more diverse and inclusive engineering workforce, one of OSPE’s key priorities.

## ONTARIO INTRODUCES A LOW-CARBON HYDROGEN STRATEGY

On April 7, The Government of Ontario released its Low-Carbon Hydrogen Strategy, which outlines how the province can be a leader in the hydrogen sector. The world is adopting hydrogen as an alternative energy carrier and Ontario is set to become a hydrogen economy hub. The strategy outlines how the province can build a self-sustaining hydrogen energy sector that will develop the economy and reduce carbon emissions.

OSPE has been advocating for the government to introduce a strategy that leverages Ontario’s natural resources and human talent to build our green economy. In 2021, OSPE submitted a response to the call for consultation on Ontario’s Low-Carbon Hydrogen Strategy, using the expertise of our members to shape our advocacy position. We are pleased to see how our input has shaped the province’s strategy. 

### INTERESTED?

Want to get involved? As we enter 2023, OSPE continues to advocate on the day’s most important topics on behalf of the engineering community. We are continually recruiting for our task forces, and invite all members to join a committed team of volunteers who are using their expertise to build a better Ontario.

To learn more, email [advocacy@ospe.on.ca](mailto:advocacy@ospe.on.ca).



# Reusing Concrete Aggregates IN ROAD CONSTRUCTION

Peter Waisanen, P.Eng.

**P**rovincially, there are many opportunities to combat the climate crisis. Construction – specifically, the use of concrete aggregates – is a significant contributor to Ontario’s greenhouse gas footprint. (“Aggregates” are the sand, rock and other geological materials used in concrete processing). Industry experts, including prominent engineers, believe recycling concrete aggregates is one solution to the climate crisis.

There is good reason to focus on concrete and aggregates when exploring sustainable growth opportunities. Concrete is 100 percent recyclable, and it can be crushed, cleaned, screened, and reused as valuable construction material. Typically, the RCM (recycled concrete material) can be processed into different sizes and reused as aggregate in road bases, shoulders and backfill, among other applications.

According to the Environmental Commissioner of Ontario’s 2017 Environmental Protection Report<sup>1</sup>, about 184 million tonnes of aggregate are used annually in the province. New aggregate, typically from quarries and pits, meets most of this demand; only about 7 percent comes from recycled sources. In contrast, some European countries use up to 20 percent recycled aggregate. Certain provincial bodies do the same; Ontario’s Ministry of Transportation, for example, already uses about 20 percent recycled materials in highway construction. The Commissioner’s report predicts that Ontario could avoid extracting up to 33 million tonnes of new aggregate each year if a similar recycling rate is achieved province wide.

One reason concrete is not recycled in greater quantities is that many Ontario municipalities prohibit or severely limit the use of recycled aggregates in road construction and other public works. And yet, according to a 2010 study, municipalities are the largest consumers of aggregate in the province, using between 60 and 70 million tonnes a year.<sup>2</sup>

Considering the above, road authorities and municipalities should be encouraged to use increased quantities of recycled aggregate in their infrastructure projects.

If Ontario fails to recycle aggregates, the concrete generated from demolition projects will be stockpiled in growing mountains of urban rubble or dumped in landfills. This is a terrible waste of a precious resource. On the other hand, Ontario municipalities can enjoy numerous benefits from recycling their concrete, including:

### **Reduced Need for Quarry Expansion**

Using recycled concrete reduces the need for fresh gravel from mining sources, easing pressure to develop and expand quarry operations.

### **Lower Freight Costs**

Using recycled aggregates, which are located close to major construction projects, reduces the need to haul fresh aggregate from distant quarries. This lowers energy consumption and greenhouse gas emissions, and accordingly, has a significantly lower environmental impact.

**Less Need for Landfill Space**

Recycling aggregates reduces the landfill space required for concrete debris and keeps aggregate out of the waste stream.

**Economic Benefits**

Using recycled aggregate is more economical than using newly mined aggregate. Producing recycled aggregate for reuse is also more cost-effective than sending unwanted materials to landfill. And by removing both waste disposal and new material production costs, transportation costs for each project are significantly reduced.

**Improved Air Quality**

Adapting the transportation requirements and manufacturing processes significantly reduces greenhouse gas emissions. ♻️

LEARN MORE 

OSPE’s Sustainable Cities Task Force focuses on the reuse of concrete aggregates, planning impactful outputs that the province’s engineering community will benefit from. If you are interested in learning more, email [advocacy@ospe.on.ca](mailto:advocacy@ospe.on.ca).

<sup>1</sup>Good Choices, Bad Choices. Environmental Rights and Environmental Protection in Ontario. Accessed 11.10.2022. <https://www.auditor.on.ca/en/content/reporttopics/envreports/env17/Good-Choices-Bad-Choices.pdf>

<sup>2</sup>The State of the Aggregate Resource in Ontario Study – Consolidated Report. Accessed 11.10.2022. <https://files.ontario.ca/environment-and-energy/aggregates/aggregate-resource-in-ontario-study/286996.pdf>



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OSSFFA members are ready to tackle your next Section 5 structural steel project.

Today, our membership has invested in the latest CNC fabrication, plasma, laser, water cutting and robotic technologies as well as advancements in 3-D steel detailing and engineering programs to service our clients. For a list of our members please visit our website.



Visit [www.ossfa.com](http://www.ossfa.com) for a list of our members.

**FABRICATOR MEMBERS**

- ACL STEEL LTD. ([aclsteel.ca](http://aclsteel.ca))
- AKAL STEEL (2005) INC. ([akalsteel.ca](http://akalsteel.ca))
- BENSON STEEL LIMITED ([bensonesteel.com](http://bensonesteel.com))
- BRAMALEA STEEL WORKS LTD.
- BETTER IRONWORKS LTD. ([betterironworks.com](http://betterironworks.com))
- COOKSVILLE STEEL ([cooksvillesteel.com](http://cooksvillesteel.com))
- ETOBICOKE IRONWORKS ([eiv.ca](http://eiv.ca))
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- IBL STRUCTURAL STEEL LIMITED ([iblsteel.com](http://iblsteel.com))
- JCT METALS INC. ([jctmetalsinc.com](http://jctmetalsinc.com))
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- LINESTEEL (1973) ([linesteel.com](http://linesteel.com))
- LORVIN STEEL ([lorvinsteel.com](http://lorvinsteel.com))
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- MIRAGE STEEL ([miragesteel.com](http://miragesteel.com))

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- QUAD STEEL ([quadsteel.ca](http://quadsteel.ca))
- REFAC INDUSTRIAL CONTRACTORS ([refacindustrial.com](http://refacindustrial.com))
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- SKYHAWK STEEL GROUP ([skyhawksteel.com](http://skyhawksteel.com))
- STEELCON FABRICATION INC. ([steelcon.ca](http://steelcon.ca))
- TELCO STEELWORKS LTD. ([telcosteelworks.ca](http://telcosteelworks.ca))
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- WALTERS INC. ([waltersgroupinc.com](http://waltersgroupinc.com))

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- CRAWFORD METAL ([crawfordsteel.com](http://crawfordsteel.com))
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- TRIAD METALS ([triadmetals.com](http://triadmetals.com))
- VULCRAFT CANADA ([vulcraft.ca](http://vulcraft.ca))



**A**s the voice of Ontario's engineers, OSPE regularly meets with leaders from industry, government, and academia to advocate for the engineering community and develop solutions to today's most pressing issues. Recent advocacy highlights include:

---

### HON. SEAN FRASER

(Federal Minister of Immigration, Refugees and Citizenship)

On November 1, OSPE joined a roundtable discussion with The Hon. Sean Fraser (Federal Minister of Immigration, Refugees and Citizenship), hosted by the Ontario Chamber of Commerce. OSPE joined leaders from Ontario's business community to discuss how immigration can address labour shortages and support economic growth.

With the composition of the engineering workforce changing quickly, OSPE has made it a priority to advocate for the interests of International Engineering Graduates. As more international graduates find employment and earn their P.Eng. licences, it will be easier to fill the gaps left by retiring engineers and build a strong engineering workforce in Ontario.

---

### HON. KINGA SURMA

(Provincial Minister of Infrastructure)

On October 20, OSPE joined a discussion with the Hon. Kinga Surma (Provincial Minister of Infrastructure) and Michael Lindsay, President and CEO of Infrastructure Ontario. The discussion centred on the government's efforts to ensure Ontarians have access to modern infrastructure, while also ensuring Ontario remains a global market of choice for industry partners.

OSPE also met with Minister Surma and Infrastructure Ontario earlier in the fall to discuss the importance of indoor air quality amidst the ongoing COVID-19 pandemic.

OSPE is working hard to ensure that Ontario's engineers can provide management and oversight of public and private infrastructure, enhancing the value, functionality, resiliency and safety of projects that support our communities.

---

### HON. JONATHAN WILKINSON

(Federal Minister of Natural Resources)

On October 25, OSPE joined a discussion with the Hon. Jonathan Wilkinson (Federal Minister of Natural Resources), hosted by Canadian Club Toronto. Minister Wilkinson discussed the federal government's plans to make Canada the world's clean energy and technology supplier of choice.

As the climate crisis grows more serious by the day, OSPE is committed to protecting the environment and supporting Canada's transition to clean energy. We are leveraging the skills and expertise of engineers to accelerate this transition and build a more sustainable Ontario.

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### HON. TODD SMITH

(Provincial Minister of Energy)

On November 14, OSPE met with the Hon. Todd Smith (Provincial Minister of Energy) at Queen's Park. The meeting focused on how Ontario can capitalize on current energy opportunities – namely, how the province can upgrade its energy grid to minimize emissions and reduce costs for consumers.


As inflation and weather disruptions impact life in our province, OSPE will continue to advocate for reliable and cost-effective energy solutions in Ontario. ♡


**ON THE WEB** 

For more information on OSPE's advocacy work, visit [www.ospe.on.ca/advocacy](http://www.ospe.on.ca/advocacy).


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**BEGINNING JANUARY 2023, LEADING EXPERTS WILL DELIVER WEEKLY ONE-HOUR WEBINARS ON RELEVANT TOPICS IN ENGINEERING. REGISTRATION IS FREE FOR OSPE MEMBERS, AND GUESTS CAN COUNT WEBINAR ATTENDANCE TOWARD THEIR CONTINUING PROFESSIONAL DEVELOPMENT (CPD) HOURS. EARN 1 CPD HOUR FOR EACH WEBINAR ATTENDED.**

**THE FOLLOWING WEBINARS ARE CURRENTLY SCHEDULED, WITH MANY MORE TO COME:**

<b>JANUARY 12</b>	70 ACRES OF NET-ZERO ENERGY
<b>JANUARY 19</b>	SUSTAINABLE/RENEWABLE ENERGY
<b>JANUARY 26</b>	REDUCING CANADIANS' EXPOSURE TO AIR POLLUTION
<b>FEBRUARY 2</b>	CONTRACTS FOR ENGINEERS
<b>FEBRUARY 9</b>	TIPS & TRICKS FOR CLIENT-PLEASING REPORTS AND COMMUNICATIONS
<b>FEBRUARY 16</b>	PEO ELECTRONIC DOCUMENT AUTHENTICATION: WHAT YOU NEED TO KNOW (PART 1 OF 3-PART SERIES)
<b>FEBRUARY 23</b>	APPLICATION OF GIS AND SPATIAL ANALYSES IN MUNICIPAL ENGINEERING
<b>MARCH 2</b>	BMS GROUP ON PROFESSIONAL LIABILITY FOR ENGINEERS
<b>MARCH 16</b>	DOCUMENT RELIABILITY & DIGITAL SIGNATURE AS A KEY ENABLER OF DIGITAL TRANSFORMATION (PART 2 OF 3 PART SERIES)
<b>MARCH 23</b>	FIBER OPTICS TECHNOLOGY (FREE FOR MEMBERS AND NON-MEMBERS)
<b>MARCH 30</b>	COMMUNICATION STRATEGY FOR ENGINEERS
<b>APRIL 13</b>	HANDS-ON TRAINING: DIGITAL SIGNATURE SOFTWARE FOR PEO LICENSED PROFESSIONALS (PART 3 OF 3 PART SERIES)



# PEO To Begin Mandatory Continuing Professional Development for Licence Holders In January 2023

**S**ection 51.2 of Regulation 941 under the Professional Engineers Act in Ontario will take effect on January 1, 2023. This new regulation section sets out an annual requirement for continuing education and professional development for PEO licence holders.

To fulfil this new requirement, Professional Engineers Ontario (PEO), the province's engineering regulator, will implement an annual mandatory continuing professional development (CPD) requirement for its professional engineer (P.Eng.) and limited licence (LL) holders to complete to maintain their licence.

## ON THE WEB

See full details on PEO's mandatory CPD program: [peo.on.ca/licence-holders/mandatory-cpd](https://peo.on.ca/licence-holders/mandatory-cpd)

The mandatory CPD program will be based on PEO's voluntary Practice Evaluation and Knowledge (PEAK) program, which has been piloted since 2017. The mandatory program, which will continue to be called the PEAK program, will include three elements:

### 1. Practice Evaluation

This element has two parts and must be completed by all individuals who are required to complete the program.

**Part 1** involves the completion of a *practice status declaration* where the individual self-declares their practice status as "practising" or "not practising."

**Part 2** involves either:

- A *Practice evaluation questionnaire*—for an individual to describe their practice activities. This will be used to determine their personalized CPD target of up to 30 hours for that year.

- Or a *Non-practising survey*—for a "not practising" individual to describe their non-practising situation and prospect for practising again. They will not be assigned a CPD target that year.

### 2. Professional Practice Module

This element must be completed by all individuals—both practising and not practising—who are required to complete the program and involves the completion of a self-paced learning module that covers regulatory topics such as professional practice, engineering ethics and regulatory processes, as well as promotes equity, diversity and inclusion within the profession, and the role played by engineers in safeguarding the public welfare and the environment.

### 3. Continuing Professional Development Report

This element must be completed by an individual who is assigned a CPD target that year and involves the declaration to PEO of the CPD activities they completed that year. The number of CPD hours required will be determined by the Practice Evaluation Questionnaire.

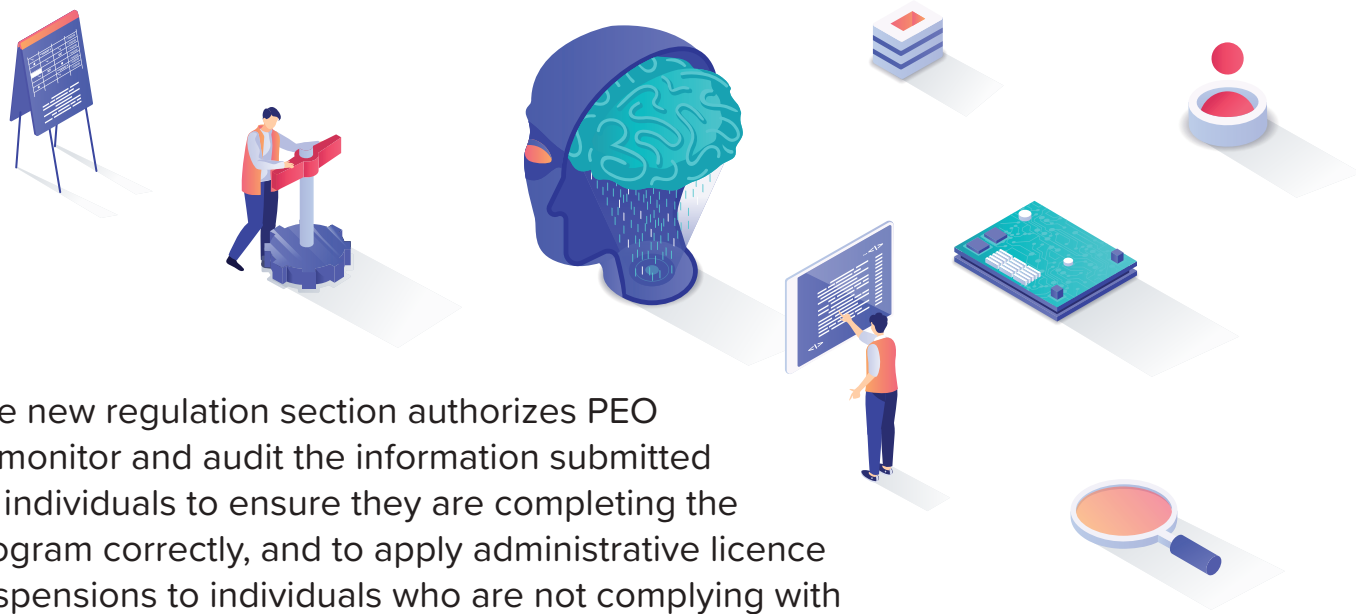
## STEPS AND DEADLINES

An individual who self-declares as *practising* professional engineering will be required to complete all three elements of the PEAK program: The *Practice Evaluation* and *Professional Practice Module* are both due on *January 31*; and the *Continuing Professional Development Report* is due on *December 31*.

An individual who either self-declares as not practising professional engineering, or is *not practising* for other reasons will be required to complete two elements of the PEAK program: the *Practice Evaluation* and *Professional Practice Module*, both due by *January 31*.

However, a "not practising" individual could choose to complete the program as a "practising" licence holder by completing all three elements of the program.





The new regulation section authorizes PEO to monitor and audit the information submitted by individuals to ensure they are completing the program correctly, and to apply administrative licence suspensions to individuals who are not complying with the program requirements.

The new regulation section authorizes PEO to monitor and audit the information submitted by individuals to ensure they are completing the program correctly, and to apply administrative licence suspensions to individuals who are not complying with the program requirements. However, PEO will start auditing compliance and applying suspensions beginning with elements due in 2024, so there will be no auditing and suspensions for elements due in 2023, which is the first year of the mandatory program. Details about compliance auditing and administrative suspensions will be published as they become available.

## HOW TO ACCESS THE PROGRAM AND REPORT CPD HOURS

From January 2023, to access the CPD program the licence holder must log in to their PEO portal account and select the “PEAK” menu to start. Here, the licence holder will be able to access the Practice Evaluation, complete the Professional Practice Module, and submit their CPD hours to the Continuing Professional Development Report.

CPD activities are considered acceptable if they help to maintain a licence holder’s competency to practise professional engineering. A CPD activity will be admissible for the PEAK program if the activity is not their professional practice activity, and the learning content of the activity contains engineering content that meets the following criteria: It must be aimed at maintaining their competence to practise professional engineering; be directly relevant to their engineering practice area(s); and be sufficiently technical or regulatory in nature.

All learning formats will be recognized. So, even though an individual must choose CPD activities that meet the admissibility criteria, they will still have the freedom to choose activities that are available to them in their preferred learning format and price point, including free activities. Types of activities include free and paid activities, self-paced and instructor-led undertakings, virtual and in-person sessions, as well as local and overseas events.

## PRACTISING LICENCE HOLDER REQUIREMENTS/ DEADLINES:

A “practising” individual is one who is currently engaged, or intends to engage this year, in the practice of professional engineering in Ontario, including practising on a part-time or occasional basis, whether or not they are paid for their practice activities.

A “practising” individual must complete all three elements every year:

- the Practice Evaluation is due on January 31
- the Professional Practice Module is due on January 31
- the Continuing Professional Development Report is due on December 31

## NOT-PRACTISING LICENCE HOLDER REQUIREMENTS/ DEADLINES:

A “not practising” individual is one who is not currently engaged, or not intending to engage, in the practice of professional engineering this year in Ontario, not even on a part-time or occasional basis. This definition also includes a person who, based on a PEO-imposed restriction, is not currently allowed to engage in the practice of professional engineering.

A “not practising” individual is required to complete two elements every year:

- the Practice Evaluation is due on January 31; and
- the Professional Practice Module is due on January 31.

However, a “not practising” individual could choose to complete the program as a “practising” licence holder by completing all three elements of the program. See the section above for the requirements for a “practising” licence holder. ✓

### ON THE WEB

See full details on PEO’s mandatory CPD program:  
[peo.on.ca/licence-holders/mandatory-cpd](https://peo.on.ca/licence-holders/mandatory-cpd)

Questions? Email [peopeak@peo.on.ca](mailto:peopeak@peo.on.ca)

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**Greetings from OSPE President & Chair  
Dr. Marilyn Powers, P.Eng.**



**Morning remarks from OSPE CEO Sandro Perruzza**

NOVEMBER 3, 2022  
THE SHAW CENTRE – OTTAWA, ONTARIO



Guests enjoying our Morning Networking Break



Smiles and laughter at our Social Reception

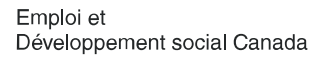
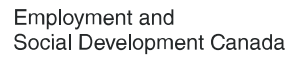


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Keynote Speaker Jesse Hirsh

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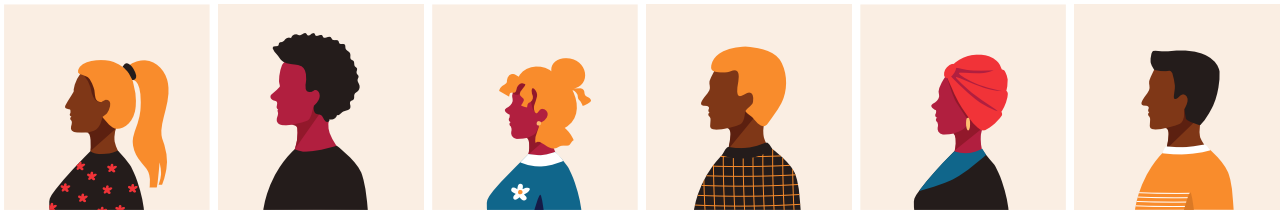
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## MOVING FORWARD ON DIVERSITY IN PROCUREMENT



**T**he engineering profession has long underrepresented women in its workforce. In particular, the consulting engineering sector – a large employer of engineers – lags behind the broader industry in gender equity and diversity. Although the sector is making progress, there is much more to be done.

Tackling this problem requires the attention and efforts of our entire profession, but it will be worth it. Gender equity and diversity will strengthen the overall capabilities of the engineering sector and improve our ability to serve our clients and our communities.

As a result, the engineering profession in Canada has committed itself to greater gender equity and diversity. The clearest example of this is Engineers Canada’s 30 by 30 initiative, a commitment to increase the representation of women in professional engineering to 30 percent by the year 2030.

A key way to achieve the 30 by 30 goal is to adopt policies that promote equity, diversity, and inclusion (EDI). This is being accelerated in both the private and public sectors through the use of procurement policies.

In support of the 30 by 30 initiative, OSPE has received funding from Women and Gender Equality Canada (WAGE) to better understand how public procurement policies can increase gender equity and diversity in professional engineering. With this funding, OSPE has published a series of studies that will help us advocate for policies to accomplish these goals.

### The Current State of EDI in Procurement

Through a comprehensive review of academic literature, existing policies, and interviews with stakeholders, OSPE examined the current state of EDI-focused procurement policies. Stakeholders interviewed for the study included representatives of both the public and private sectors, subject matter experts, procurement

professionals, representatives of interest groups, and academics.

A key finding from this research was that Canada’s public sector lags well behind other jurisdictions in incorporating EDI into procurement policies. To the extent that this does occur in Canada, municipal governments are leading the way in implementing new EDI-focused procurement policies. It will therefore become more common over time for consulting firms bidding on municipal projects to encounter EDI goals as part of the procurement process.

Research also showed that private sector entities are outpacing the public sector in implementing EDI-focused policies. There is also a trend towards private sector entities using EDI to inform their own procurement. As a result, it will become more common for consulting engineering firms to be expected to demonstrate a commitment to EDI when bidding on contracts.



Requests for Proposal (RFPs) for consulting engineering services should ask prospective suppliers to describe their policies, programs, and initiatives to increase opportunities for women as Professional Engineers. Among others, these may include: mentoring programs, outreach initiatives in hiring, income support during pregnancy and parental leave, work-from-home policies, training opportunities, hiring targets, etc. Firms should have the autonomy to determine which policies and programs are best suited to their operations. Whenever practical, firms that can demonstrate that they have implemented such policies and programs should be given preference in the evaluation of prospective suppliers.



## Common Approaches for EDI-Focused Procurement

The study also identified that there are two primary approaches for assessing a bidder's commitment to EDI. The first approach focuses on the composition of the firm or project team of the bidder, while the second focuses on the policies and programs that the bidder has put in place to support EDI.

Although focusing on the composition of firms or project teams is an intuitive way of measuring commitment to EDI, and was the most common method among those interviewed, it has a number of flaws. The most significant flaws concern privacy and poor staffing practices. Privacy concerns relate to the need for team members to self-identify as members of certain groups. Staffing concerns relate to the potential tokenization of team members and over-hiring to meet EDI targets.

OSPE has concluded that the second approach – emphasizing the bidder's EDI-focused policies and programs – is more flexible and more likely to achieve long-term systemic change. Given the wide variability in size, location, and specialty, it is important to allow firms to enact policies that best fit their circumstances.

### ON THE WEB

Our complete studies are available at:  
[ospe.on.ca/advocacy/our-work/research-reports/](https://ospe.on.ca/advocacy/our-work/research-reports/)

This also allows for a greater variety of EDI policies to be tried and compared, to determine which are most effective.

## Moving Forward

OSPE's next steps are to share what we have learned with policy-makers and public sector procurement authorities. Although this represents only a small portion of our efforts, it is a step in the right direction. By sharing our recommendation that these entities incorporate gender equity criteria into their procurement of engineering consulting services, we hope to create lasting, positive change in the state of gender equity and diversity in the engineering profession. ♡

*This project has been funded through Women and Gender Equality Canada's Women's Program.*



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- Research and Innovation
- Energy
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Assumptions:

<sup>1,2</sup> 6% annual gross growth rate and mid-year annual lump sum contributions are assumed. Ontario HST is applied.

<sup>1</sup> Management Expense Ratio MER (%) based on the average Canadian equity mutual funds from Morningstar.

<sup>2</sup> Investment Management Fee IMF (%) based on the JF Canadian Equity fund.

The above example is for illustrative purposes only. Situations will vary according to specific circumstances.

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# 2022

# ONTARIO PROFESSIONAL ENGINEERS AWARDS

On November 18, 2022, OSPE hosted the Ontario Professional Engineers Awards Gala. This annual event recognizes Ontario engineers' outstanding contributions to their profession and their community.



Master of Ceremonies Evanka Osmak



Sofia Spilberg providing the evening's music



Robert A. Goodings, P.Eng., accepting the Distinguished Lifetime Achievement Award



TOP ROW (L-R): David Wilson, P.Eng., Brian Daniels, P.Eng., Cory Jones, P.Eng., Dr. Janusz Kozinski, P.Eng., Dr. Daolun Chen, P.Eng., Dr. Saad Younis Jasim, P.Eng., Dr. Marilyn Powers, P.Eng.  
 BOTTOM ROW (L-R): Dr. Kibret Mequanint, P.Eng., Robert A. Goodings, P.Eng., Jeanette Southwood, P.Eng., Dr. Pirathayini Srikantha, P.Eng., Dr. Roderick C. Tennyson, P.Eng.



**Dr. Janusz Kozinski, P.Eng. (Winner - Gold Medal)**



Project of the Year Award Winners: (L-R): Marc Chabot, P.Eng., Mark Hughey, Allan McMurray, P.Eng., David Wilson, P.Eng., Blair Greenly, P.Eng., Rahul Swarnkar, P.Eng., David Cole, P.Eng., Brian Daniels, P.Eng.

## Award Recipients

Distinguished Lifetime Achievement Award  
**Robert A. Goodings, P.Eng.**

Professional Engineers Gold Medal  
**Dr. Janusz Kozinski, P.Eng.**

Engineering Medal – Engineering Excellence  
**Dr. Robert Delatolla, P.Eng.**  
**Cory Jones, P.Eng.**

Engineering Medal – Research and Development  
**Dr. Daolun Chen, P.Eng.**  
**Dr. Kibret Mequanint, P.Eng.**

Engineering Medal – Management  
**Dr. Roderick C. Tennyson, P.Eng.**

Engineering Medal – Entrepreneurship  
**Dr. Saad Younis Jasim, P.Eng.**

Engineering Medal – Young Professional  
**Dr. Pirathayini Srikantha, P.Eng.**

Citizenship Award  
**Jeanette Southwood, P.Eng.**

Project or Achievement of The Year  
**Natural Resources Canada –**  
**Port Granby Engineering Project**





(L-R) OSPE CEO Sandro Perruzza and Jeanette Southwood, P.Eng. (Winner – Citizenship Award)



Guests enjoying the evening's festivities



Dr. Kibret Mequanint, P.Eng., accepting the Engineering Medal – Research and Development



Just a few of the gala's 300+ guests from industry, government, and academia



Engineering innovation on display, courtesy of the evening's Dinner Partner (Bombardier)



Dr. Pirathayini Srikantha, P.Eng., accepting the Engineering Medal – Young Professional

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# THE FUTURE OF THE P.ENG. LICENCE AND WHY IT MATTERS

**F**or many generations of engineers, the P.Eng. licence has been a point of pride. It's the mark of competence, high standards, and a shared ethic among professional engineers. This is still very much the case, as reported by OSPE's *Ontario's Engineering Community in Transition - Benchmarking Report 2022*. The majority of 821 respondents surveyed for this report agreed that the P.Eng. was a vital distinction.

But as the very definition of 'engineering' shifts underfoot, as does the domain of those who practice it, what does the P.Eng. licence mean anymore, anyway?

OSPE commissioned a study surveying hundreds of professional engineers, engineering graduates and International Engineering Graduates, and uncovered that the engineering community is in an era of great upheaval and opportunity. The study uncovered interesting contradictions as we chart a course for imminent change.

"I have gotten jobs because people have said, 'Oh, you're a P.Eng.,' but I've also left it off resumés to get hired," says Dr. Marilyn Powers, P.Eng., President and Chair of OSPE's Board of Directors. "I've never needed my professional engineering licence to work, but it depends on your niche. As I entered into the technology side, I noticed more people leaving out the P.Eng. to avoid being seen as expensive or overly technical rather than visionary."

Engineering graduates are certainly sought-after in adjacent

fields. As Dr. Powers notes, start-up tech companies are fast-growing, highly valued, and often founded or led by engineering graduates—innovators who bring their analytical mindset to work on a daily basis regardless of whether or not they identify, first and foremost, with traditional engineering fields.

"I work at the University of Toronto in a contract teaching role, and that's why I have my P.Eng.," says Nicholas Burgwin, P.Eng., Treasurer of the Ontario Society of Professional Engineers and co-founder of FIBOS. "The university's strong preference is that all staff have it for accreditation purposes, but if not for that, I probably wouldn't have it. I'm the co-founder of a company that's developed an optical-sensing platform for industrial uses, and for what I do day-to-day, it's not necessary."

Engineering graduates who have translated their knowledge and skills to new and emerging industries have made themselves indispensable, and are gratified in their work. But where does that leave the professional stamp?

Burgwin believes the high demand for engineering skillsets outside core engineering will inevitably shift the application of the P.Eng. to complement the licence's traditional application, as well as market demand. As new industries apply engineering know-how, they'll have to implement their own oversight where oversight makes sense.

"Our regulators will always watch over traditional applications like infrastructure and energy, mechanical, or civil systems," he

The engineering community is in an era of great upheaval and opportunity. The study uncovered interesting contradictions as we chart a course for imminent change.

says. “But we need to include emerging fields that may require regulation or certification. We’ve got engineers designing lifesaving devices in medicine, medical devices, bioengineering, and navigating rapidly-accelerating tech applications like cybersecurity or autonomous vehicles. They fall outside the P.Eng. circle right now, but it may be time to expand the scope of the designation.”

Drawn to various professional sectors for many reasons, younger International Engineering Graduates are highlighting the gap in how engineering graduates view the P.Eng. licence. The survey data reflects this, with just 45 percent of internationally-trained respondents having the designation compared to 68 percent of domestically-trained respondents. Similarly, only 61 percent of international practitioners believe the designation is necessary, compared to 74 percent for domestically-trained respondents.

This gap may stem from the difficulty and expense of licensure, which can interrupt the trajectory of experienced mid-career professionals from other countries. This is exacerbated by the sense that the P.Eng. licence hasn’t caught up with the explosion of new disciplines and fields in engineering. And so off these highly skillful professionals go, innovating elsewhere, outside of Canada.

“An MBA is more respected in some fields than a P.Eng.,” says OSPE CEO Sandro Perruzza. “Most of the companies at the Ontario Economic Forum, which showcases start-ups building new, ground-breaking technology, are founded or operated by engineering graduates and many professional engineers. But do they put it on their bio? No. They say they graduated from the University of Waterloo’s engineering program, but then talk at length about their MBA. That will be the designation they’ll feature, because they find it more professionally valuable.”

OSPE’s benchmarking study found that much of what determines “value” rests on the concept of diversity. But this must go beyond our current cultural concept of economic, linguistic and cultural diversity. A truly diverse cohort of engineers includes professionals from a range of educational backgrounds.

“We want diversity of education because we want a range of opinions and perspectives at the table,” adds Perruzza. “Take MBAs, for instance. A lot of things that a P.Eng. signs off on are going to be influenced by the strategy or input from an MBA to help determine pricing and sales tactics. We need to deliver something safe, of course, but it also needs a compelling business case. Diversity means blending different ideas, opinions, and areas of knowledge to build better and more useful things. That’s what a P.Eng. should stand for.”

The takeaway as to the future of the P.Eng.? Burgwin recognizes that shifts in the field can be a point of concern—but he’s ultimately optimistic.

“The benchmark study confirmed the trend of graduates drifting from en-



### Survey Insights Identify Need for New Strategies

**71% OF RESPONDENTS** agree that a P.Eng. should be required to work as an engineer. We still have pride in our designation. But how can it better reflect and serve a changing job market?

**32% OF RESPONDENTS** who pursued non-engineering education opted for an MBA. Educational diversity shows us there are many paths to innovation. How can the P.Eng. keep pace with the new expectations around perspective and skills? Does it need to?

**22% OF RESPONDENTS** without a P.Eng. don’t see it as relevant to their career. Should the focus of the P.Eng. shift to reflect the changes in the engineering landscape and job market?

**55% OF RESPONDENTS** believe a P.Eng. is necessary to ensure quality standards are met. How can we balance the longstanding respect and structure of the P.Eng. designation while leaving room for new ways of ideating?

gineering, and from the P.Eng. licence. However, I don’t think we can look at this as a bad thing, necessarily,” he says. “It reflects the movement of people out of core engineering fields, but that’s driven by the growth of new and emerging industries. Engineering graduates are answering the call for their knowledge and skills in alternative fields. We can call that a mixed story, but it’s positive, too. It certainly helps to have a broader set of opinions at the table.”

# BROAD PERSPECTIVES MAKE BROAD TALENT

Challenges still persist to help International Engineering Graduates reach their full potential in Ontario's engineering community

**T**he generational transition in the engineering community isn't just on its way; it has already begun. We must make sure to clear away the stumbling blocks in the way of that transition as these obstacles may slow progress or drive away talented and qualified individuals in the engineering field.

To chart the well-being of the industry as we head towards an era of upheaval and opportunity, OSPE commissioned a survey and published the results in *Ontario's Engineering Community in Transition - Benchmarking Report 2022*. We queried hundreds of engineering graduates in Ontario, including experienced engineers, as well as new engineering graduates and International Engineering Graduates (IEGs).

The main focus of the study was to define and enumerate who makes up Ontario's entire engineering community today, what they think of engineering as an education choice, and where they see the profession going in Ontario.

We seek Ontario's next crop of idea-makers and builders all over the globe. They are not only diverse in demographics, but in training, skills, experience, and specializations.

Though IEGs represent only one-quarter of our respondents, they exemplify a fast-growing and especially enthusiastic part of the province's engineering workforce.

"Through the Engineering Academy, we're looking at how we can support companies to bring a broad array of talent to their internal cultures, with tools and resources they can use easily," said Dr. Marilyn Powers, P.Eng., President and Chair of OSPE's Board of Directors. "I'm optimistic because I know the interest is out

there, I know the profession is more and more aware of the need to create that change. But we need that guidance and knowledge to help make the change real."

The study noted that female graduates and IEGs are passionate and enthusiastic, but may face an uphill climb to feel established in their profession.

In 2013, Anna Gkalimani, P.Eng., now Project Manager/ Structural Engineer at Westinghouse Electric Company, arrived in Canada from Greece, where she worked as a civil and structural engineer. After arriving, she quickly joined OSPE and several committees, and met many fellow international colleagues and made local connections.

"The connections—co-workers, students, professors—you gain in school and in those first years in the field are enormously important," she explains. "Domestically-trained engineering graduates already have that built into their history. On top of that, we arrive from a different culture with distinct social norms, behaviours, and customs. Someone who has very good soft skills from their home country may take time to adjust to life in Canada no matter how qualified they are."

IEGs are some of the most passionate and enthusiastic members of our profession. They bring an eagerness to try on new ideas and apply classical engineering skills and aptitudes to today's world. They are more likely to have decided early in life to pursue engineering, in part due to an inherent respect for its social importance. IEGs in our survey exhibited even greater pride in the profession than domestically-trained engineers, as well as more enthusiasm for new innovations, and greater interest in pursuing



driving some talented professionals away from the field and towards adjacent lines of work.

Women who have been in the industry less than ten years are more likely to note limited job and co-op opportunities as barriers to advancement, further limiting their engagement with the field. This may cause female engineering graduates to move elsewhere. The study revealed that 48 percent of female graduates in Ontario were currently working as engineers, compared to 59 percent of men. Further, 36 percent of female graduates are employed in a related field and do not hold a P.Eng. licence, compared to 27 percent of men indicating the same.

As older engineers reach retirement, it will be critical, both for reasons of social equity and for the health of the profession, to tear down any barriers that may exist, and ensure the contributions of women and IEGs are encouraged.

Dr. Powers points to the Engineering Academy, which already has EDI courses and is currently developing more

novel technologies and sub-fields.

However, IEGs are less likely to believe a P.Eng. is necessary for their careers, and are less likely to pursue the licence. Only 43 percent are currently employed as professional engineers, compared to 61 percent of domestically-trained graduates, and 20 percent are not actually employed in engineering or even a related field. The barriers they face finding employment may limit their ability to contribute in the future, ultimately undermining the health of the profession overall.

“When you engineer only for the people at the table, you end up with something that works brilliantly for those people, but may miss out on obvious design flaws,” said Dr. Powers. “A classic example of this is seatbelt design—decades ago, cars were designed with an average male in mind, and that included the fit of seatbelts. The result was that women were much more likely to be injured or killed in accidents.”

In addition to charting the challenges of IEGs, the study surfaced the apprehension of female engineers, many of whom have felt judged on their failures, whereas men seemed to be judged on their successes.

As Dr. Powers recalls, “Time and time again in my career, I’ve heard, ‘Oh, that guy, he’s competent. He’s done this and that and this,’ even though he might have had failures. Whereas women will often find their failures held against them.”

“We end up with an over-rotation on those who are said to have merit, but who determines the concept of ‘merit’? Merit also may mean a certain kind of technical expertise, while leaving out the soft skills that are increasingly needed in the world today.”

Altogether, this suggests a profession which is moving towards more equal representation for women and men, but there are clearly systemic barriers limiting women’s participation, slowing the transition, and

“When you engineer only for the people at the table, you end up with something that works brilliantly for those people, but may miss out on obvious design flaws.”

- Dr. Marilyn Powers, P.Eng., OSPE President and Chair



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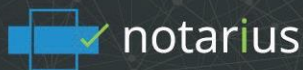
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It's critically important that IEGs, who can choose from any number of jurisdictions around the world, feel at home in our province. Unsurprisingly, IEGs were also more likely to express concern over issues of equity, less likely than domestic engineering graduates to feel welcomed in Ontario's engineering community post-graduation, and reported more limited job opportunities and costly licensing.

Gkalimani reports the same phenomenon that many IEGs have experienced. There are plenty of openings for electrical and mechanical engineering jobs, licensing is costly, and those newly-arrived to Canada may be mid-career, with families and busy lives that can make studying for a P.Eng. exam difficult. Given that other fields don't require this designation, talented senior contributors often drift from the engineering community in Canada.

"If you don't have Canadian experience you're not qualified, regardless of what you've done in your career," Gkalimani explains. "It needs to become easier to turn international experience into domestic opportunities. Part of that is who you know, and OSPE is a great place to network. They do have many workshops, events, and valuable opportunities like that that have helped me a lot—it's a great place to start as you're building your networks and contacts."



## Survey Insights Identify Need for New Strategies

### 20% OF INTERNATIONAL ENGINEERING GRADUATES (IEGs) are not working as engineers, nor even in a field requiring engineering training. How can we make it easier for them to transfer their skills to the engineering profession?

**71% OF FEMALE RESPONDENTS** said there is a lack of gender representation in engineering. How can we ensure women are represented in the profession?

**50% OF IEGs** find the licensing process is too costly. How can the engineering community better retain qualified contributors?

**71% OF IEGs** find schooling is too expensive. Do we do enough as an industry to communicate the value of this education to new Canadians, as well as integrating education from elsewhere?

# ONTARIO'S ENGINEERING COMMUNITY: A DISCIPLINE IN TRANSITION

A generation-defining transformation in focus and opportunities

**A** generation-defining transformation is underway in Ontario's engineering community. Nearly one-third of those working in engineering, and in our province, are over 50 years old. As they retire, there may be a talent chasm, making for a time of either opportunity or uncertainty.

"Employers in core engineering fields are saying, 'My people are retiring, and I don't have the next wave,'" said Sandro Perruzza, CEO, Ontario Society of Professional Engineers. "Senior employees are leaving, and there's no way to fill the gap. This has been the case for several years, really, but there wasn't a lot of urgency about it."

To map the coming shift, OSPE commissioned a survey and published the results in our new benchmarking report. OSPE queried hundreds of Ontario's professional engineers and engineering graduates.

Of the 821 respondents surveyed, more than half were over the age of 50, 29 percent were between 50 and 64 (not too far from retirement), and 25 percent were under the age of 35.

OSPE Member Manraj Pannu, P.Eng., reflects on the survey that "Many of the results are encouraging and exciting, highlighting the strong sense of pride, unity and professional purpose felt by engineering graduates of all backgrounds. Engineering as a whole permeates so many aspects of life."

Albeit charting enthusiasm, the survey also uncovered potential cracks in the discipline's foundation that warrant discussion.

According to the survey, there may not be enough incomers to fill the growing demand of roles being vacated by soon-to-be retir-

ees. Some young female graduates and International Engineering Graduates (IEGs) face barriers to opportunities, and may drift from core engineering to move into related industry fields.

From transportation to housing to cutting-edge computer systems, the engineering community is vital to every aspect of modern life. How can we ensure that Canada, and Ontario in particular, is equipped to sustain our best engineering future filled with plenty of brilliant and fresh ideas to build it?

Survey respondents were nearly universal in expressing positivity about their work and its contributions to society. This pride transcended all ages, demographics, and educational backgrounds.

"Engineers have the ability to change the future for the better," says OSPE Member Nick Mocan, P.Eng. "Not many professions can say that."

The study indicated that 93 percent of respondents were proud of their engineering degree. Reasons included the vital nature of engineering to a functioning society (66 percent) and the capacity of engineering graduates to contribute to ground-breaking innovation in how we live our lives (53 percent). A majority of respondents added that universities are doing a good job of ensuring graduates are at the top of their game from a technical standpoint, and in applying new technologies.

Some concern did arise in regards to universities inadequately imparting soft skills in students relating to collaborativeness, interpersonal diplomacy, leadership, and team creativity. Unfortunately, only about half of respondents agree that schooling is currently doing enough in this regard.



“Employers in core engineering fields are saying, ‘My people are retiring, and I don’t have the next wave.’”

— Sandro Perruzza, CEO, Ontario Society of Professional Engineers

More than half of the engineering graduates surveyed, many being of the younger cohorts, noted that schooling is expensive, diversity in the profession is lagging, and wage standards are not always equitable. A third of all respondents, particularly females and IEGs, reported that the profession may be falling out of step with modern society.

“Women are less than a quarter of students in engineering undergraduate programs,” notes Perruzza. “They’re even less represented among those getting newly licensed. Enough inequitable experiences and someone might say, ‘Forget this, banks are hiring engineers and paying better.’ And the longer young engineers stay away from ‘traditional’ engineering, the less connection they have to it.”

The loss of graduates to related fields isn’t limited to one gender. While only 48 percent of women indicated that they were currently working as professional engineers, 59 percent of men said the same.

Only about one-fifth of respondents were women, which would indicate a significant gender imbalance in the profession; however, the proportion of women has already changed among younger graduates. Surprisingly, 75 percent of all women surveyed were under 50 years old, compared to about half of male respondents (46 percent).

Change is already underway, and academic programs and firms are working to recognize and dismantle barriers that may hinder the participation of women or internationally-educated students. The goal? To keep talented professional engineers thriving in the field.

“I’m optimistic because I know the interest is out there,” said Perruzza. “As a profession, we are aware of the need to create change. But we need that guidance and knowledge to help make the change real.”

In the spirit of good design, OSPE’s benchmarking report sets a baseline for future planning. This is where we begin to not only compel the right individuals to join us, but to welcome and retain them. As noted by OSPE Member Sandra Odendahl, P.Eng.: “The superpower of engineers is problem-solving.”



### Survey Insights Identify Need for New Strategies

**29% OF EMPLOYED ENGINEERING GRADUATES** are between 50 and 64, suggestive of an imminent wave of retirement. Are students being encouraged to fill the demand of retirements + industry growth?

**93% OF RESPONDENTS** are proud of their engineering degree. Will they continue into the field, and stay on a path of accomplishment?

**58% OF FEMALE RESPONDENTS** viewed the profession as struggling to keep up with the needs of modern society. How can we create a welcoming space for female engineers?

**66% OF RESPONDENTS** say their pride is due to the fact that engineers are a vital component of a functioning society. Do we do enough as an industry to communicate this purpose and potential to our young professionals?



# What Does the Future Hold for Engineering in Ontario?

The answers might surprise you.

“There are clearly systemic barriers limiting women’s participation in the field.”

“International Engineering Graduates are passionate and enthusiastic, but barriers to employment may limit their ability to contribute.”



“I work in a contract teaching role, and that’s why I have my P.Eng....but if not for that, I probably wouldn’t have it.”

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# MEMBER PROFILES



**ZUBAIR HOSSAIN, P.ENG.**

Professional Member  
Environmental Engineer

**What does your job or volunteer work consist of?**

I am working as an Environmental Engineer for CENTRUS, a joint-venture team of engineers and architects providing services to the Parliament of Canada’s Centre Block Rehabilitation project. My role is to ensure work is performed according to the requirements set in specifications and drawings, and that asbestos removal work is performed under proper engineering controls.

**How do you apply engineering knowledge and principles to your job or volunteer work?**

In my job, I use engineering principles to control exposures to hazards and protect the health of workers and the public. Asbestos abatement is done by following a set of procedures to control the release of asbestos fibres. The part of the building from which asbestos is removed is separated and sealed off to prevent contamination of the other areas. These enclosures are maintained under

negative air pressure so asbestos fibres cannot get discharged outside the enclosure. When designed properly, these engineering controls are highly effective in protecting the health and safety of building occupants.

**Why are you an OSPE member/why do you think the work OSPE does is important?**

I have been a member of OSPE since I was in graduate school. OSPE was an excellent platform for me to know my peers and grow my network, particularly when I was new to this country. In OSPE, I felt connected with Ontario’s engineering community. OSPE supported my journey to become a professional engineer; I attended the NPPE prep course and the engineering record workshop. I have also attended various events, courses and workshops organized by OSPE, and met some great mentors through the mentorship program. Now I feel I can give back to the community by doing the same.

**What issues in the profession are most important to you?**

I believe that, for engineering solutions to become sustainable and to make the world a better place for everyone, it is critical to have participation and opinions from diverse perspectives. I am fortunate enough to work with people from diverse backgrounds and benefit from those collaborations. Stakeholders with diverse mindsets can bring their own experiences to the table when it comes to problem solving. Diversity and inclusion must be encouraged in engineering if we do not want to miss out on innovation and creativity.

**What advice would you give your younger self?**

I would remind myself that today is our greatest gift, so do not forget to live in the moment. While it is important to spend time planning your next steps, it is also very important to take it easy and not to be hard on yourself.



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### **PAVITHRA KUGARAJAH, EIT**

Intern New Graduate Member  
Engineering Instructor

#### **What does your job or volunteer work consist of?**

As an engineering instructor, I get to teach students coding, robotics, engineering design, and kid-friendly STEM technologies through hands-on projects. Working at Kids Tech Inc. has allowed

me to incorporate my creativity and leadership skills with engineering.

In my volunteer work with OSPE's Toronto Exchange Hub, I get to participate in discussions and in the development and completion of initiatives that are consistent with OSPE's mission, such as creating opportunities for engineers to connect.

#### **How do you apply engineering knowledge and principles to your job or volunteer work?**

Based on my technical tasks from the systems engineering work, I think engineering has taught me to become an analytical thinker and a lifelong learner. This is assigned to all aspects of my life cycle.

#### **Why are you an OSPE member/why do you think the work OSPE does is important?**

I'm an OSPE member because I want to get engaged with the various advocacy committees and task forces to ensure the voice of engineers is heard. Also, OSPE has many benefits such as insurance discounts and mentorship programs, etc...

#### **What issues in the profession are most important to you?**

The most important issue that engineers can play a significant role in is climate change. At the same time, OSPE's tasks and activities must be carried out in a way that thoroughly innovates in terms of diversity. ♡



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\$295.00

**IN-PERSON**

While it is a trending topic, Industry 4.0 is not widely understood, because there are different notions of what it means. People working in leadership positions are more likely to encounter Industry 4.0 and must be knowledgeable about its impacts. Industry 4.0 offers wide-ranging opportunities for companies to improve their productivity, quality, and processes.

However, engineers and managers must first have a basic understanding of the core elements and technologies and how the interaction leads to Industry 4.0.

**Learning Outcomes:**

- understand the core elements and basic technologies of Industry 4.0
- understand how the core elements and technologies are connected and can lead to a holistic approach to improve processes and products
- recognize the opportunities for developing new business models and what to consider when implementing new strategies towards Industry 4.0

# Journey to P.Eng.

[ospe.on.ca/peng](https://ospe.on.ca/peng)

## PE301 - Preparing Your PEO Experience Record

**Dates:**

February 10, 2023  
April 14, 2023  
June 16, 2023

**Price:**

\$195.00

**ONLINE**

This highly interactive program was designed to provide participants with knowledge and skills to develop their Experience Record, which is an absolute requirement for P.Eng. licensing in Ontario with PEO.

It introduces the five criteria by which PEO assesses experience, outlines a six-step process for completing your experience record, and equips you to effectively communicate your “engineering stories.” Templates to help you organize your stories will be used in this workshop. As a follow-up to this exercise, participants are invited to discuss their Experience Record content in a follow-up coaching conference call three weeks after the workshop. In addition, optional individual programs will be made available.

## Preparatory Course for the National Professional Practice Exam (NPPE)

**Dates:**

Tuesdays  
December 13, 2022 - January 10, 2023  
February 28 - March 28, 2023  
April 25 - May 23, 2023

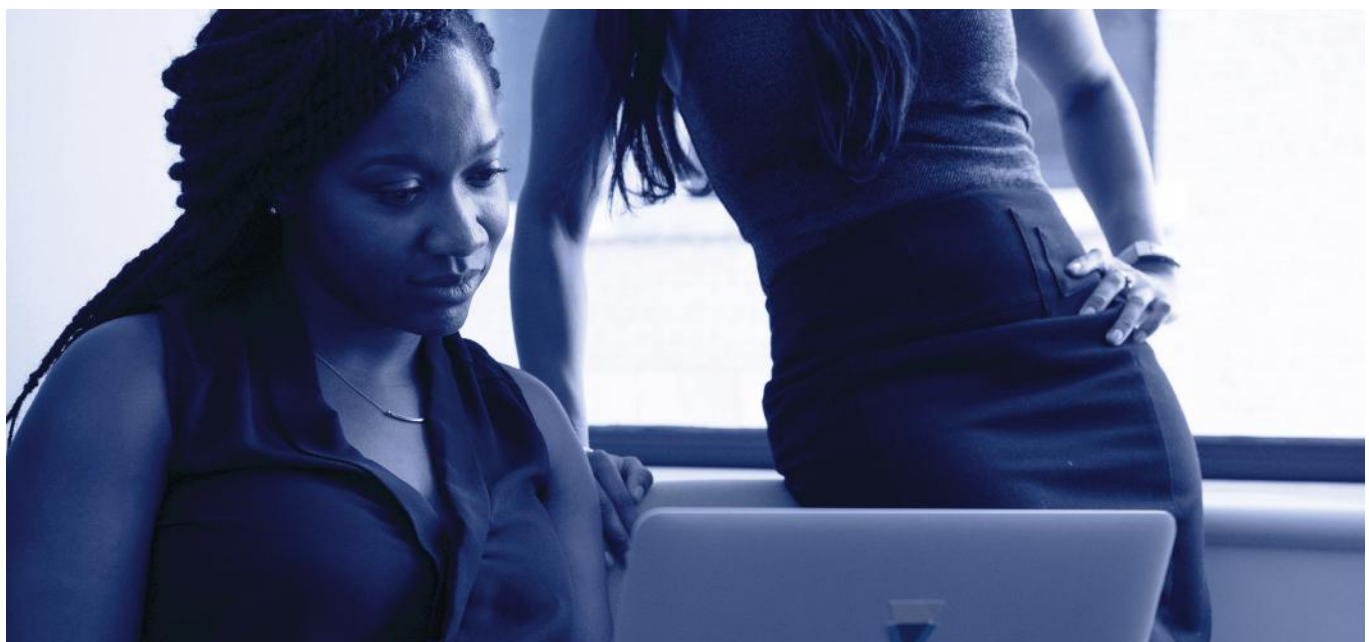
**Price:**

\$350.00

**ONLINE**

OSPE’s most popular course equips you to pass PEO’s National Professional Practice Exam (NPPE). Taught by an experienced instructor, this course prepares students for the topics covered in the exam and includes a detailed review of sample exam questions. Students also enjoy on-demand access to pre-recorded prep videos.

This course is backed by the OSPE Guarantee: if you do not pass the exam on your first attempt after taking the NPPE prep course, you can retake the course within one year at no cost.



# ENGINEERING ACADEMY Provides Employment Readiness Training (EER100) FOR INTERNATIONAL ENGINEERING GRADS (IEGS)

**O**SPE's Engineering Academy has successfully launched its new "Engineering Employment Readiness" course (EER100) for international engineering graduates (IEGs). This program is funded by the Ontario Ministry of Labour, Immigration, Training and Skills Development, and is being delivered eight times over 2022-23.

This course is launching at an opportune time. Since 2020, many IEGs have had limited engineering career opportunities due to the pandemic. The Engineering Employment Readiness course is a 48-hour, 6-week online program that prepares IEGs for the realities of post-pandemic engineering employment in Ontario. It provides essential job search skills training and introduces participants to the resources and engineering networks essential to employment and professional growth.

During the course, participants explore engineering sector growth trends in Ontario, adapt their engineering skillsets to new workplace expectations, and prepare to apply for employment with skill and confidence. Resources include online instruction, four sessions of job coaching per student, interview simulations, a resource library, engineering guest speakers, and access to OSPE's virtual engineering employment events.

Each course admits only 12 participants per session to ensure individual attention to each person's career goal. Interest continues to be very high, with courses filled with wait lists. The course is open to those with an international engineering or technical degree who have permanent resident, refugee, or naturalized citizen status in Canada. It is also open to those on post graduate work permits and certain types of temporary work permits. Each application is individually assessed by the Project Manager.

"Course graduate comments are always the best indicators of successful elements of a new course and we incorporate their recommendations into the course continuously," says Project Manager Judith Wright. "The course ratings to date average 4.8 out of 5 and we love to hear about grads getting employment soon after the course!"


## Some Participant Comments:

"Thank you Judith for giving me the opportunity to join the OSPE EER course. I highly appreciate the coaching sessions as they were very beneficial for my career growth and job search. I landed a job this week in my field, thanks to your course and coaching support!"

"The course explained a wide range of opportunities in Ontario and different sectors of engineering employment. It prepared me for my job search with a better resumé, better cover letter, and coaching for interviews and tips to be better in any future job."

"I highly recommend this course for newcomers and recent graduates. Definitely a 5/5!"

"The course was very informative and I got more confidence for my job search. Thank you for your support. I would highly recommend this course to other International graduates."

"I now understand where to look for jobs in Ontario in my field, how to market myself, and the importance of connecting with professionals on LinkedIn." 



Online Registration is open for the Fall/Winter EER 100 Session (January 31, 2023 start date) at [www.ospe.on.ca/ieg](http://www.ospe.on.ca/ieg).

For further information about the EER 100 course please contact [jwright@ospe.on.ca](mailto:jwright@ospe.on.ca)

Canada 

EMPLOYMENT  
ONTARIO

Ontario 

This Employment Ontario project is funded in part by the Government of Canada and the Government of Ontario.



# INDOOR AIR QUALITY RECOMMENDATIONS



*OSPE's Indoor Air Quality Advisory Group comprises the following members:*

Joseph Fox, P.Eng. (Chair), Stephane Bilodeau, P.Eng., Ph.D., Sandra Dedesko, P.Eng., David Elfstrom, P.Eng., Amy Katz, Marianne Levitsky, CIH, ROH, Victor Leung, MD, FRCPC, Amy Li, Ph.D., Ted Mao, P.Eng., Ph.D., Petre Moga, Mech. Eng., Duncan Phillips, P.Eng., Ph.D., James Andrew Smith, Ph.D., P.Eng., Andy R. Thomson, M.Arch., OAA, MRAIC, Tomer Zarhi, P.Eng.

**I**n spring 2022, the Ontario Society of Professional Engineers (OSPE) formed the *Indoor Air Quality (IAQ) Advisory Group*, responding to the need for evidence-based guidance around indoor air quality and airborne transmission of COVID-19.

As a first step, OSPE'S IAQ Advisory Group is releasing six recommendations that all businesses and organizations can implement to provide safer indoor air in their facilities. These recommendations set clear and achievable targets for clean air in all buildings, and if implemented, will make a significant contribution to protecting all Canadians from the spread of COVID-19.

Details and guidance on masks are shared following the six high-level recommendations.

**Mitigation of Airborne Disease Transmission:** All organizations should target a minimum of six air changes per hour (ACH) in occupied indoor spaces. This can be achieved through a combination of outside ventilation (supplying outdoor air), filtration (filtering recirculated air), or ultraviolet light (germicidal light wavelengths from ultraviolet light fixtures)

**Ventilation:** All existing buildings should be brought into compliance with current ventilation standards established by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) and the Canadian Standards Association (CSA) confirmed through CO<sub>2</sub> monitoring.

**Filtration:** Filtration should be implemented as a priority measure in settings where particulate matter is a known concern. In these cases, air handling units should be equipped with MERV-13 or higher-rated filters where possible. Standalone HEPA filters or DIY Corsi-Rosenthal Boxes can also be employed as alternative solutions.

**Ultraviolet Germicidal Irradiation (UVGI):** UVGI uses ultraviolet light to inactivate microorganisms such as bacteria, viruses, and fungal spores. These systems should be strongly considered in places with high occupant density or high risk of spread, and in places with at-risk populations (including all healthcare facilities and congregate living settings).

**Avoiding Additive Air Cleaning and Alternative Methods:** Additive air cleaners are a category of technologies that add particles or chemically reactive species to the air. These can create harmful by-products, and testing the effectiveness of these technologies is not currently standardized. These systems should not be used until credible certifications of safety and effectiveness are available.

**Transparency and Public Education:** Facilities should make information about their air quality measures available to the occupants, including information about what strategies have been used to ensure safe indoor air. Government and public health agencies should also consider public education campaigns about the importance of clean air.

## THE INDOOR AIR QUALITY (IAQ) ADVISORY GROUP'S RECOMMENDATIONS REGARDING USING OF MASKS:

Masks can help to prevent this transmission in two ways:

1. By preventing the emission of infectious aerosols by an infected person.
2. By preventing infectious aerosols from being inhaled by an uninfected person.

## MAIN RECOMMENDATION:

To reduce the risk of becoming infected or of infecting others, wear a respirator or a well-fitting mask that provides particle fil-

Members of the public who want good protection against COVID-19 will often select a filtering facepiece with 95% particle filtration efficiency (PFE)



tration equivalent to an approved respirator such as an N95 when in indoor settings and/or in a crowded outdoor area where infected people may be present

1. Use a respirator or mask when indoors if infected people may be present (or if you may be infected) or in crowded outdoor spaces.
2. If you do not use an approved respirator, select a mask that has a filtration efficiency equivalent to an N95 or better.
3. Get as good a fit as possible – if possible, get fit tested or at least learn how to get the best fit when putting it on and how to check the seal.
4. Respirators with headbands will fit better than masks with ear loops. But if you must use ear loops, learn how to get the best fit.
5. Masks can be re-used.
6. Where a respirator is used in the workplace, legal requirements may apply.

### USING A FILTERING FACEPIECE RESPIRATOR

Members of the public who want good protection against COVID-19 will often select a filtering facepiece with 95% particle filtration efficiency (PFE). Not all these facepieces are approved respirators, but some can provide relatively good protection. Here are some things you need to know about using them.

1. Learn how to don (put on) a mask to get the best fit and prevent leaks. Also, learn how to doff (take off) the mask to prevent contamination. Instructions for donning and doffing a mask should be available from the manufacturer.
2. After you don the mask, conduct a seal check to make sure you get a good fit. A seal check is a way of checking that air is not leaking out or in at the edges of the mask.

### MANDATORY RESPIRATORY PROTECTION IN THE WORKPLACE

Every Canadian jurisdiction has legal requirements regarding the workplace use of respirators. In addition to the legal requirements, the Canadian Standards Association standard *CAN/*

*CSA-Z94.4-18 - Selection, use, and care of respirators* sets out important measures regarding the selection and use of respirators. In some jurisdictions, this standard is referenced in regulation, so it is a legal requirement.

Most legal requirements cover the following issues:

**A respirator program:** If a respirator is required to protect workers from airborne hazards, the employer must have a written respirator program that covers the selection, fitting, replacement, and maintenance of respirators.

**Selection:** The respirator and filter selected must be appropriate to the nature and concentration of the hazard and should be based on a risk assessment. *CAN/CSA-Z94.4-18* provides selection guidance based on the risk level of the biological agent, the generation rate, and existing control measures.

**Fit:** Workers required to wear a respirator must be fit-tested to make sure the selected respirator fits them well enough to ensure that contaminated air will not bypass the filter. The person(s) who conducts fit testing must be qualified to do so through appropriate training.

**Maintenance and replacement:** The respirator program must address how reusable respirators will be cleaned and maintained, and how FFRs and replaceable cartridges will be replaced.

**Worker training:** The program must provide training to workers on how to don and doff the respirator, conduct seal checks, check for defects, and care for the respirators assigned to them. ✓

#### ON THE WEB

Look for more information from the Indoor Air Quality (IAQ) Advisory Group at [www.ospe.on.ca](http://www.ospe.on.ca)

# CORE RECOMMENDATIONS FOR SAFER INDOOR AIR

## Mitigation of Airborne Disease Transmission

Target a minimum of six air changes per hour in occupied indoor spaces using any combination of ventilation, filtration, and ultraviolet germicidal irradiation systems.

## Ventilation

Bring buildings into compliance with current ventilation standards established by ASHRAE (American Society of Heating, Refrigeration and Air-Conditioning Engineers) and the Canadian Standards Association (CSA) confirmed through CO<sub>2</sub> monitoring.

## Filtration

Upgrade filters in air handling units to MERV-13 or higher where possible, or use a portable HEPA filter or DIY CR box in each occupied space when air pollution is a concern.

## Ultraviolet Germicidal Irradiation (UVGI)

Use upper room UVGI systems installed by qualified professionals in health care settings and congregate living settings. Consider its use in high-risk settings and places with high occupant density.

## Avoid Additive Air Cleaning and Alternative Methods

Do not use additive air cleaning methods or similar products, such as ionization, until there is a standardized way to ensure their safety and effectiveness.

## Transparency and Public Education

Share information about your facility's air quality with occupants including sharing the strategies you are using to ensure safe indoor air and install CO<sub>2</sub> monitors with readable displays.



ONTARIO  
SOCIETY OF  
PROFESSIONAL  
ENGINEERS



For more information, view the complete report: Core Recommendations for Safer Indoor Air.  
[ospe.on.ca/indoor-air-quality](https://ospe.on.ca/indoor-air-quality)

# WRITING TIPS FOR ENGINEERS

Christa Bedwin

*During such time that it was possible to do so, we undertook to perform an inspection of the facility.*

**W**hat's wrong with this sentence? Spend a minute to think about it before you read further. Try to improve it before you move along.

While crunching through the engineering details to solve problems can often be fun, the real product engineers deliver to clients is writing. Many of us feel that the faster and easier we can get that writing done, the happier we'll be.

However, spending a little extra time to learn how to be a more effective writer will make your clients much happier. And as you practice good writing, it will become an easier process for you, too.

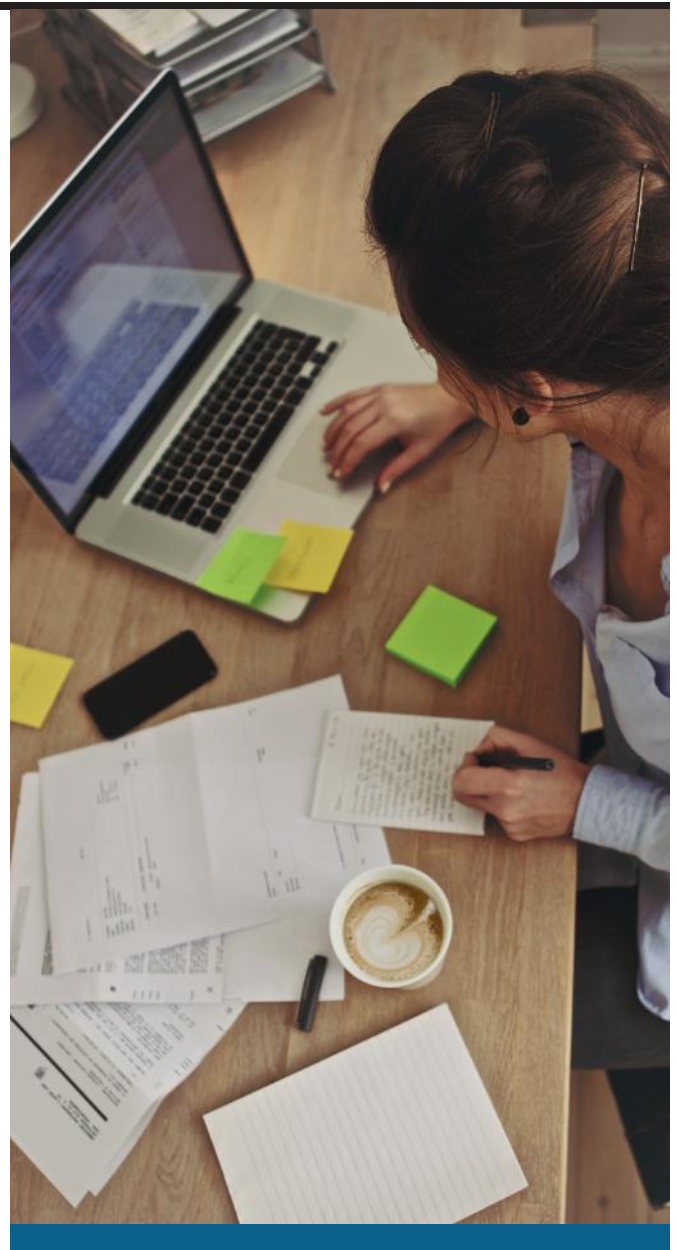
## HERE ARE SOME TIPS TO HELP YOU IMPROVE:

### 1. Think About Your Audience

In university, we learn to write with ever-larger words and ever-more-complicated concepts as we progress, but in the real world of client work, it is essential to learn to speak in terms of the client's needs and interests, and in plain, clear language that they will understand. Always take the time to make sure you have illustrated or explained any terms they might not be familiar with.

Understanding your reader's point of view is an art that can take a while to learn. The quickest way to know if you have hit the mark is to have someone outside your immediate project group read what you have written.

- Do they understand it on the first read-through?
- If your reader has to ask you questions, whether it's about missing logical steps or what the heck your jargon or acronyms mean, you need to go back and answer those questions clearly before unleashing your writing on the world.



### 2. Simpler Writing Sounds Smarter

It may seem paradoxical, but many experienced engineers have observed that the more someone knows what they are doing, the fewer words they need to tell you about it.

Young engineers or scientists who are trying to figure out what they want to say are more likely to write rambling, obfuscatory sentences. The surest-fire way to sound like you know what you're doing is not to try to wow them with large words and complex concepts. It's to deliver a sound solution, concisely!

- e.g., When a senior engineer receives the following sentence from a junior: *"During such time that it was possible to do so, we undertook to perform an inspection of the facility."*
- they will probably edit it to this clearer and equally meaningful form: *"While we could, we inspected the facility."*

But we can improve upon this sentence even more! Can you already see the next problem with it?

Understanding your reader's point of view is an art that can take a while to learn. The quickest way to know if you have hit the mark is to have someone outside your immediate project group read what you have written.



### 3. Be Specific

Adjectives can get you into trouble and may imply something that you don't mean. It's much safer and clearer to say exactly what you mean, instead of using replacement words.

- Example - *If you noticed a 0.2 point increase in the pH in a river, in your report, say "we observed that the pH in the fall was 7.4, whereas it was 7.2 in the spring."*
- Do not say - *"we noticed a significant change in the pH of the river." The word "significant" could induce client panic.*

I have noticed that some writers use "that one" or "the latter" quite frequently. Save your reader the hassle and say what you mean instead of making them refer back to the sentence before to figure it out. Don't worry about it if this means you're repeating a word; this is technical writing, not poetry to impress your high school English teachers!

In the example, what is meant by "while we could"? Further examination of the context showed that the writer meant "While the plant was shut down, we inspected the facility." Concise and totally unambiguous.

### 4. There are Engineering Solutions to Make Your Writing Simpler

The good news is that adding an editing layer to your writing is not as mysterious or difficult as it may seem. There are solid, simple procedures you can take to improve your writing. Some engineers have even made these procedures into macro tools that they run on reports to mark their own habitual errors or see where easy improvements can be made.



You can read more about these procedures from the free textbooks on my site [www.christabedwin.com](http://www.christabedwin.com), or on web pages such as the one from the Plain Language Association. [www.plainlanguage.gov/guidelines/words/use-simple-words-phrases/](http://www.plainlanguage.gov/guidelines/words/use-simple-words-phrases/)

We will also be offering some better writing courses through OSPE.

#### **HOMework:**

Here's another one for you to try. It's 27 words. I can get it down to 7 words. Can you?

*This review proposes to focus on the research and, more specifically, will point out their specificities as revealed by the most recent works reported within the literature.* 📖

#### **ON THE WEB**

If you would like to learn more about Writing Reports, Proposals, and Communications for Engineers, join us in April for 2 half-day workshops. Visit [www.opse.on.ca/oea](http://www.opse.on.ca/oea) for details.

# A Look into the Career Aspirations of First Year Engineering Students

Mackenzie Campbell, Emily Moore, P.Eng., and Philip Asare

In recent years, leaders in the engineering community have been interested in developing the next generation of engineers. They are asking critical questions about the future of the engineering workforce: How can we encourage more students, particularly females, to pursue engineering? How can we encourage them to stay in the profession once they graduate? What do engineering graduates who do not pursue licensure end up doing?

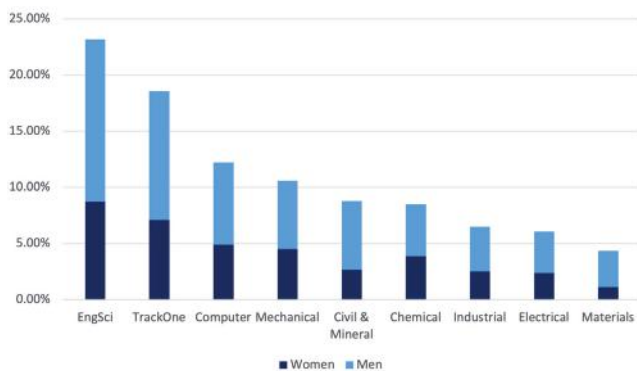
To answer these questions, OSPE recently sponsored a study through the Mitacs Accelerate Fund.<sup>1</sup> Researchers at the University of Toronto surveyed first-year students on their career expectations and readiness for engineering work.

The survey respondents were part of the student development program for UofT's Professional Experience Year (PEY) program – meaning they intended to pursue industry internships in future years and had completed at least one term of engineering studies. These students have chosen an engineering education and are beginning to understand what the profession is – but for the most part have not yet had work experience in the field.

## Student Demographics

We analyzed survey results from 1347 students, nearly the entire first-year class. The respondents were 38 percent female-identifying, and one third were international students. (Figure 1 shows the breakdown of respondents by declared discipline and gender.)

Figure 1: Survey respondent engineering disciplines by gender.<sup>2</sup>



## Preparing for P.Eng.

Obtaining a P.Eng. is a definite goal for students as they enter university. When asked whether they intended to pursue the P.Eng. status, 77.5 percent indicated that they would, 19.6 percent were

neutral, and only 2.8 percent indicated that they did not intend to seek licensure. No significant difference was observed between genders or citizenship status on this measure.

## Sectors of Interest

Students were asked to indicate their top three industry sectors of interest, shown in Figure 2. The most popular industry sector was Computer Software, with over 50 percent of all respondents selecting it in their top three. The next most popular sectors were Electrical, Electronics & Semiconductor and IT, Security & Services – both at 40 percent. The fourth most popular choice was Banking, Finance and Investing.

The ranking of sectors is likely indicative of current industry patterns – and matches well with the current top PEY employment sectors. Students are clearly aware of this even as they start in engineering.

## Sectors of Interest – By Gender

Looking more closely at Figure 2, we see a few interesting signals by gender. Men are significantly more likely to select Computer Software, Electrical, Electronic and Semiconductor, and Automotive sectors – replicating historic patterns.

Women were significantly more likely to select IT, Security and Services and Banking, Finance and Investing as well as being twice as likely to select Government Administration. Women were also significantly more likely to choose Other, suggesting that they are more likely to be exploring emerging industries like biomed (which was frequently mentioned by students in their open-ended comments).

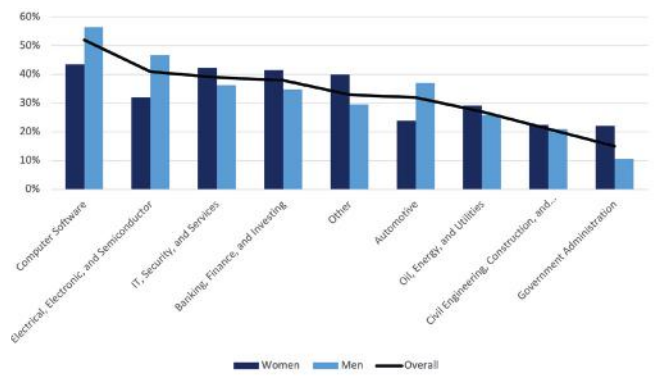


Figure 2: Portion of students selecting a sector in their top 3, by gender.

**Sectors of Interest – By Academic Discipline**

The top four sectors were further analyzed by discipline, as shown in Figure 3. Unsurprisingly, electrical and computer engineering students chose the top three at the highest rate, but other disciplines (including TrackOne and EngSci) also showed a keen interest in these areas. Banking, Finance and Investing showed a different order but broader interest across all the disciplines.

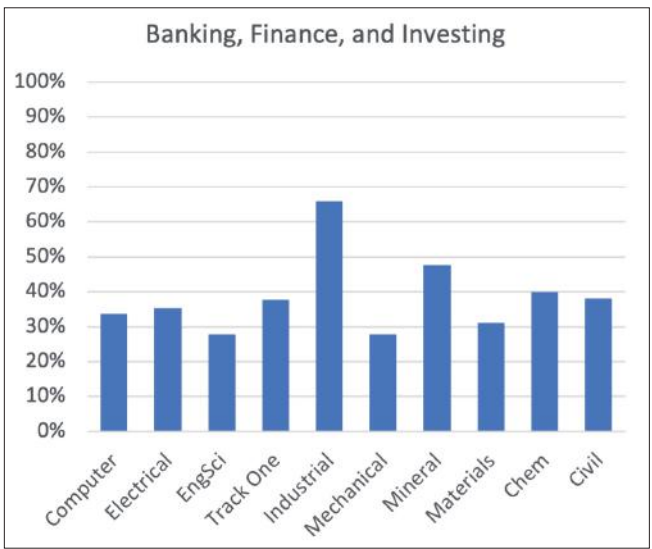
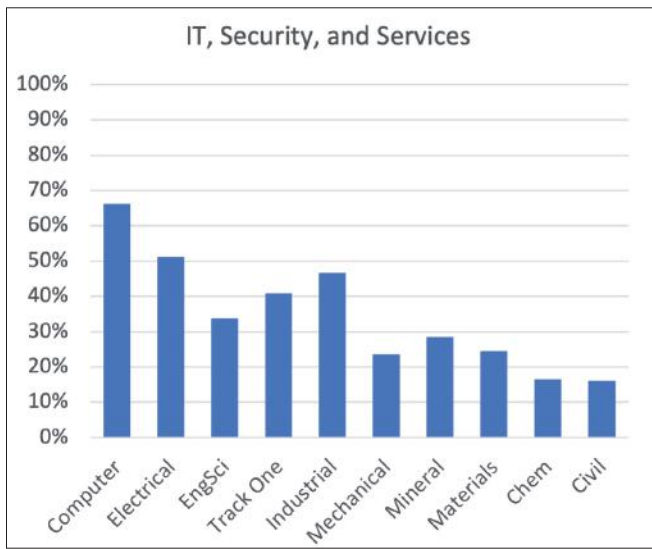
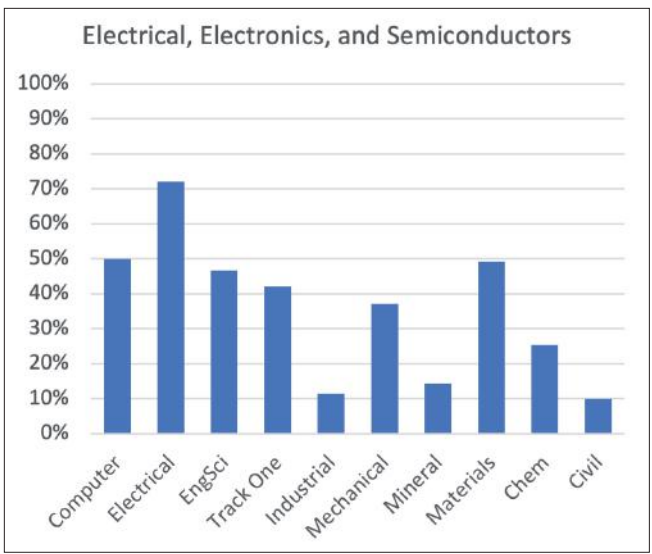
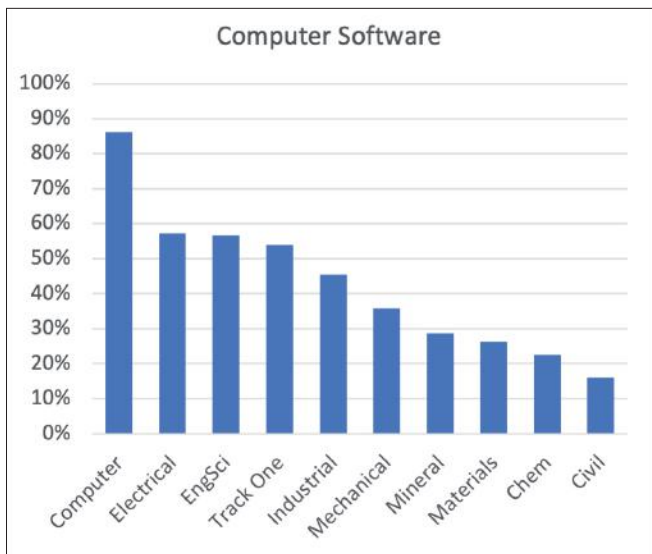


Figure 3: Portion of student selecting industry sector in their top 3, by discipline.

### Sectors of Interest – Student Motivations

Students were asked to explain their interests in given fields through responses to open-ended questions. We coded these responses to find the themes that emerged.

The most common theme was wanting to do important work and make an impact on the world, and students saw these links across many industries. Many students cited the connection of a given industry to other industries – for example, viewing the Software, Finance, and Energy sectors as important facilitators of other work.


Intellectual fulfillment was a second theme. Students felt a curiosity and excitement to apply technology in the real world, and also expressed interest in interdisciplinary fields with significant interpersonal elements. Another common theme was the career benefits offered by their industry of choice – not only in terms of financial stability, but also the growth of the field itself.

Finally, students were influenced by prior experiences with their field of choice, whether through hobbies and extracurriculars, previous work experience, or influence from their family, friends, or community. Of course, many students expressed uncertainty as they were still figuring out what engineers do.

### Conclusions

This peek into the career aspirations of first year engineering students gives us some important insights that can inform strategies for building up the engineering profession. It appears that in first year, students are already well-oriented to the current hiring patterns for engineering graduates. Since the licensure

rate is typically lower in students' chosen industries (such as Computer Software and IT, Security & Services), it suggests that without changes to our approach to licensing, we will continue to see low numbers of graduates going on to obtain their P.Eng. This is unfortunately a disconnect between the original intention of students who clearly aspire to be included in the profession, and their ability to become licensed post-graduation.

Industries looking to recruit graduates should emphasize how they make an impact on the world, articulate the intellectual challenge of the work, and demonstrate the potential for career growth. 

*This work was funded by OSPE and MITACS. The authors are all at the University of Toronto. MacKenzie Campbell is a MASC student in Chemical Engineering, supervised by Professor Emily Moore, Director of Troost ILead, and Professor Philip Asare, faculty member in the Institute for Studies in Transdisciplinary Engineering Education and Practice.*

<sup>1</sup>Mitacs is a nonprofit national research organization that, in partnerships with Canadian academia, private industry and government, operates research and training programs in fields related to industrial and social innovation.

<sup>2</sup>While most students declare a discipline in first year, the TrackOne program allows students to defer discipline selection until second year. EngSci, or Engineering Science, is a program that integrates enriched science fundamentals with engineering and has upper year specializations such as aerospace, biomedical engineering, machine intelligence and robotics.

Many students cited the connection of a given industry to other industries – for example, viewing the Software, Finance, and Energy sectors as important facilitators of other work.







# A PATH FORWARD FOR THE ENGINEERING COMMUNITY

Mark Abbott, P.Eng., MBA

Since 2015, OSPE has been a key member of the Engineering Change Lab (ECL), working alongside other leaders to examine the engineering community's necessary evolution within a rapidly changing world. Today, we are thrilled to introduce you to an exciting next step in this effort: the Tech Stewardship Practice Program. This program introduces Tech Stewardship as a vision for the future of the engineering profession and provides a practical path forward.

It's no secret that technology is transforming our world - for better and worse. Now more than ever, those of us involved in the creation and application of technology must consider the social, ethical and environmental impacts of our work so that we can help bend the arc of technology towards good.

## But What is Tech Stewardship Exactly?

Being a tech steward means that you commit to continuously discussing, refining and imagining new ways to shape technology for the benefit of all. It is about finding opportunity within the value tensions that are so often inherent in our work. It means contributing to technology that is more purposeful, responsible, inclusive, and regenerative.



- **purposeful**  
Tech is not neutral. We imagine, design, and implement technology intentionally for positive impact.
- **responsible**  
The pace of tech disruption is accelerating. We anticipate, monitor and manage the complex impacts of technology.
- **inclusive**  
Who's driving tech? We expand who and what is considered and involved in decision making.
- **regenerative**  
Tech is often extractive. We proceed in a manner that cares for the environment, economy, communities and individuals.



**Tech Stewardship is built around three commitments:**

**Tech Stewardship Core Commitments**

 <p><b>Advance Understanding</b></p> <p>We continuously deepen our understanding of our relationship with technology, challenge dangerously limited narratives and stereotypes.</p>	 <p><b>Deliberate Values</b></p> <p>We seek to understand how our values are shaping and being shaped by the technologies we build and scale.</p>	 <p><b>Practice Behaviours</b></p> <p>We support each other to practice the daily behaviours that enable progress in all its forms – from incremental steps all the way to breakthroughs!</p>
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At its root, technology is the means by which humans adapt our environment to meet our needs and wants. We have been “co-evolving” with our technologies since the dawn of humanity. For example, when humans “invented” fire, it allowed us to begin pre-digesting our food, which eventually led to us developing weaker jaws. Today the pace and power of technological change is making the potential and peril of this coevolution much more apparent.

As the great Canadian Marshall McLuhan once said: “we shape our tools and then our tools shape us.” By better understanding the nature of this process, we can become more skilled as engineers at ensuring that we are serving the full diversity of perspectives and values in society, as opposed to defaulting to privileging the values of the engineering community. By engaging with the value tensions that result, we can more often find creative “both/and” solutions - for example: privacy AND convenience, centralized AND decentralized, profitable AND sustainable, etc...

You might care very much about issues such as climate change, diversity, or mental health. But you have clients to serve, managers to report to, and shareholders to satisfy. These tensions aren't easy, especially once we've dragged them into the light. That's why it's so important to have a community of tech stewards, who can support each other in the trenches of our day-to-day jobs.

**ON THE WEB**

OSPE is proud of our ongoing work as part of the Engineering Change Lab, Together, we're building toward a tipping point where tech stewardship becomes the new normal within the engineering community. And it all starts with you! **Become Tech Stewards and register for the program today: [programs.techstewardship.com](https://programs.techstewardship.com)**

**Shall We Get With the Program?**

The Tech Stewardship Practice Program is a series of simple but powerful reflective exercises that have been developed with you top of mind:

- It's **relevant to your work** and overlays your day-to-day work current technical and innovation efforts.
- It's **flexible**, allowing you to integrate it around you work, educational, and personal commitments.
- It's **beneficial to your career**; you'll earn a micro-credential that will help you stand out from the crowd at hiring time, and completion of the program counts toward the new PEO mandatory continuing professional development (CPD) requirements to maintain your P.Eng.
- It's a **meaningful, nourishing activity**, giving you the chance to align your personal values with your profession and connecting you with a network of like-minded individuals.

We're also happy to work with you to introduce and integrate tech stewardship practice within your team or your organization. It's a powerful tool for turning your tech culture into a competitive advantage! 📈



**What People Are Saying About Tech Stewardship**

“Diversity and inclusion is critical to both the means and ends of tech stewardship. To start we must combat the ‘myth of rationality’ in engineering and tech fields that has for too long created a headwind against substantive change.” *Marisa Sterling, P.Eng., FEC, Assistant Dean and Director of Diversity, Inclusion and Professionalism (University of Toronto Engineering) and Past President, PEO*

“Too often technological development is focused on frivolous purposes when there is so much to be done to meet our sustainable development challenges.” *Mary Wells, Ph.D., P.Eng., Dean of Engineering (University of Waterloo)*

“My experience with the tech stewardship practice program has reignited my interest in my engineering education.” *Engineering Student and TSPP alumnus, Winter 2022*

# UPCOMING EVENTS

📅 March 2023



*national*  
**ENGINEERING  
MONTH**

📅 May 8, 2023

📅 May 31, 2023



**ANNUAL  
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MEETING**



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<sup>1</sup> 2018 SOM Client Experience Benchmarking Report on leading home and auto insurers in Ontario and Quebec.