MARCH 2025

THE VOICE OF ONTARIO'S ENGINEERS

Fire and Environmental Sustainability: Engineering Solutions for a Greener Future in Canada

An Overview of Canadian Wildfire Risks and Evolving Mitigation Strategies

Fire Safety in Transportation Engineering: Ensuring Safety in Aviation, Rail, Maritime Transport, and Emerging Technologies in Canada

Analysis of Human Behaviour during Wildfire Evacuations

Fire Science: Advancements in Fire Safety, Behaviour, and Technology in Canada

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[1] Statistics Canada, "Survey of Household Spending in Canada," 2022.
[2] ctvnews.ca, "How much money does it take to raise a child in Canada?" July 2022.
[3] clhia.ca, "A guide to disability insurance," 2021.
[4] Canadian Cancer Society, "Cancer Statistics at a Glance," 2023.

* For complete details, see **manulife.ca/newmember**.
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Fire Science: Advancements in Fire Safety, Behaviour, and Technology in Canada

OSPE'S 25TH ANNIVERSARY

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THE VOICE
OF ONTARIO'S ENGINEERS

PUBLISHER

Sandro Perruzza

EDITORS

Baijul Shukla
Matt Wiesenfeld
Rachael Masih

CONTRIBUTORS

Mukul Asthana, P.Eng.
Carl Bodimeade P.Eng.
Veronica Bergs P.Eng.
Hannah Carton
Andrea Chan, PhD
John Gales, PhD
Eric B. Kennedy
Victoria Kerr, MASc
Moureen Khella
Pierre J.F. Lebel, C.Mgr.
Emily Moore, P.Eng.
Manha Najam
Lee Weissling, PhD
Mo Yousefpour, MEng, EIT

DESIGN & PRODUCTION

Lia Forgione

ADVERTISING & PARTNERSHIP

Ed Byers
partnerships@ospe.on.ca | 416.737.7424

Kamila Konieczny
partnerships@ospe.on.ca | 431.276.6659

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Dear Engineering Community:

Last month, we engaged our membership to share with them our plans for the future. Among a few acute priorities is the need to elevate the awareness of the value of engineers and engineering in our communities. The simple fact is that for some time the impact of engineers has been taken for granted, and we are starting to see some concerning outcomes within, and for, the engineering community.

One of those concerns is the perception that engineering is a commodity. While our modern world is far from perfect, the reality is that a lot of things work really well, almost all the time. As a result, we fail to appreciate the intricacy and ingenuity that underlies so many of our vital systems. Making sure we have electricity, where and when we need it, enables our economy and quality of life; safe transportation and healthcare enables our communities to grow and thrive. In short, the continuity of our world is a result of core systems that engineers keep running all day, every day.

No matter how simple it might seem for our critical systems to "work", the reality is that they are "working" under more extreme conditions than they ever have or, in some cases, were designed to. Recent disasters like wildfires are extreme, but on a more basic level, nearly all communities are being tested to provide more services, to more people than ever before. More food, more fuel, more data, and all of those "mores" require ongoing systemic improvements. They require the engineering of systems that can support the needs of today, and can grow to meet the needs of tomorrow smartly, sustainable, and ethically.

It is not easy and the more we distance ourselves from that understanding, the more concerned we need to be as an engineering community.

Core to our plan for the future is reshaping the engineering narrative. Sure, technology is making some aspects of engineering "easier", but the mastery of that technology is still the responsibility of an engineering workforce that has to balance more complex needs than ever before, and we need to make sure that we are not losing our best engineers to other pursuits.

One of the ways we can do that is by ensuring that engineers are fairly compensated for their contributions. While most engineers are financially comfortable, there is increasing evidence that compensation levels have stagnated, especially compared to other licensed professions. On many occasions, I have heard of clients who, post project completion, negotiate with/bully their engineers so they can achieve a profit, compelling them to accept reductions in agreed upon fees. This has a very concerning negative effect to engineers at all levels and is one of many reasons OSPE has identified for engineers leaving the field.

In response, OSPE has targeted a couple of actions that can begin to reverse this trend. The first is, consistently, and perhaps annoyingly, trumpeting the value of our engineering workforce to the public, the government, the media, and all who will listen. The more we stay silent, the more opinions are shaped that engineering, in its many forms, is not the lifeblood of a diverse and decadent world.

Another is to give you, the engineers, the tools to breakthrough the stereotypes that, while sometimes anchored in truth, are inhibiting the growth and attractiveness of the profession. OSPE has always been the champion of the engineer, and we are actively working to increase transparency in costing through the development of fee structure guides, salary benchmarking tools and case studies supporting qualifications-based selection, all of which guide procurement decision makers to selecting the right people for the right jobs and compensating them fairly. There is no quick fix in this regard but there are options for our engineering community and while OSPE is a voice, there is even more power in all of us using our voices to make sure that engineering employers, from government to industry, appreciate the important, intricate roles that engineers play in keeping society moving.

In the months to come our new strategic plan will be approved at our Annual General Meeting. From there we will begin executing an operational plan to engage and update leaders within and beyond the engineering community, with the intent to remind them of the critical, meaningful work that so many engineers do to create economic value and keep our province safe and functioning.

Look forward for more about OSPE's efforts to move the needle in support of engineers, one of our country's greatest resources.

Sincerely,

Sandro Perruzza
Chief Executive Officer
Ontario Society of Professional Engineers

DIGITAL SAFETY FOR YOU & YOUR FAMILY

UNDERSTANDING FAMILY CYBER INSURANCE

In today's digital age, devices like cell phones and tablets connect us in ways we never imagined. However, our online presence makes us vulnerable to cyber threats.

Families have become prime targets for cybercriminals. You face risks like phishing, identity theft, and cyberbullying, which can lead to financial losses and reputational harm. By understanding the various threats you and your family may encounter and by implementing proactive measures, you can simply focus on your day-to-day lives.

Through education, awareness, and the adoption of safe online practices, **Family Cyber Insurance empowers you to make informed decisions and stay safe in the digital world.** This coverage consists of two components:

1 Insurance coverage to reimburse for real-life scenarios including:

- Extortion Threats
- Identity Threats
- Social Engineering
- System Compromise
- Cyber Bullying

2 Continuous monitoring, an online platform, and educational services:

- Identity Management
- Educational Services
- Ransomware Management
- Online Platform

Consider the following scenarios where a Family Cyber policy may respond:

Olivia's Locked Resume

Olivia's resume was almost complete when a tech support scam infected her computer with malware. The malware encrypted all her files, including her resume and cover letter, demanding a significant ransom to unlock them. With the job posting deadline approaching, Olivia faced the risk of not submitting her information in time, potentially impacting her ability to apply for a job she was working towards.

Fortunately, Olivia had a cyber insurance policy that covered ransomware attacks. The coverage provided immediate access to cybersecurity experts who assessed the situation and determined the best course of action. While paying the ransom was considered, the experts were able to use decryption tools to recover her files, avoiding the need to pay the cybercriminals. The insurance also covered the costs of professional data recovery services.

Richard's Reputation Battle

Richard became the target of a malicious cyberbullying campaign. Anonymous individuals spread false accusations about him online, severely damaging his reputation and mental health. The situation escalated to the point where Richard felt unsafe and struggled to focus.

Richard's cyber insurance included coverage for cyberbullying, providing him with access to psychological support to cope with the emotional distress. The policy also covered temporary relocation expenses for 3 months.

Sarah's Mortgage Scam

In a quest to secure a mortgage for Sarah's newly purchased house, she provided sensitive information to a fraudulent website, which not only stole her identity but she was also deceived into transferring funds from her savings account, funds she had saved for this house.

The cyber insurance policy reimbursed her for the financial losses incurred up to the policy limits from the scam. The policy also covered the costs associated with identity restoration services to secure her personal information and prevent further fraudulent activities.

To learn more about Family Cyber Insurance or to secure coverage, please contact BMS.

1-844-294-2717

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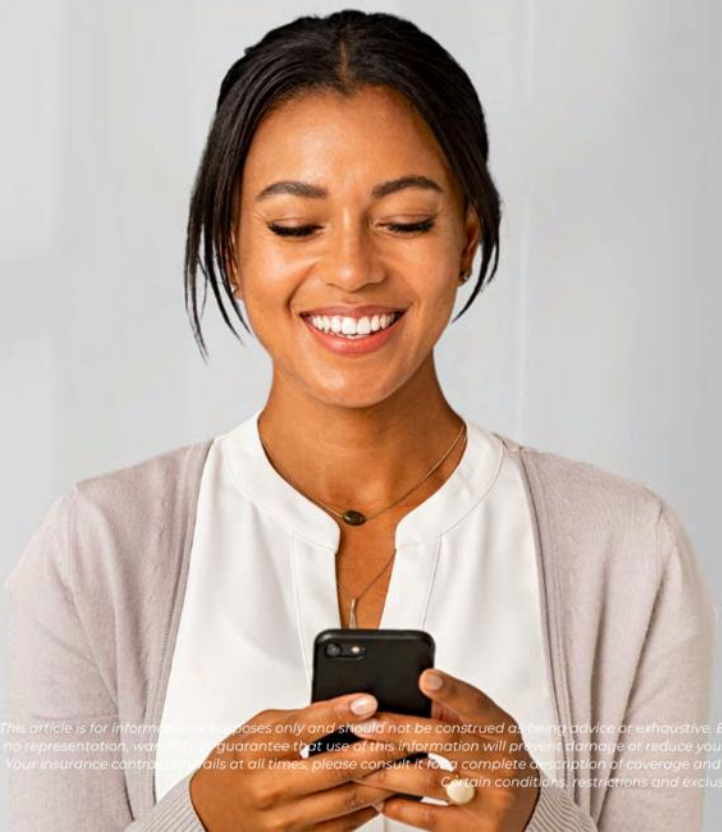

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ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

News from the Front

It has been a very busy start to 2025 for OSPE. In addition to responding to an unexpected provincial election, we have also made headway on a variety of advocacy goals and amplified the voice of Ontario's engineers into new spaces, while clinching two policy wins in the critical minerals and infrastructure sectors.

January 22 - Land Drainage Committee Joins OSPE

The Ontario Society of Professional Engineers welcomed this committee into the fold, akin to our existing task forces. This committee will operate under OSPE's leadership to advance drainage engineering practices under the **Drainage Act of Ontario**.

January 22 - OSPE Supports Toronto and Area Road Builders Association (TARBA)

The Ontario Society of Professional Engineers, along with a coalition of Ontario civil infrastructure leaders, builders, suppliers, and engineers launched a campaign urging municipal and provincial government leaders to adopt policy changes that will increase sustainability in the construction of public infrastructure projects.

This includes a government mandate to use at least 20 percent **Recycled Crushed Aggregate (RCA)** for critical construction projects. This can save local governments more than $260 million while reducing greenhouse gas emissions equivalent to removing 15 million cars from the road annually.

January 31 - Media Comment to 'Toronto Today' on Bill 212

Journalist **Kathryn Mannie** reached out to OSPE for a comment on **Bill 212 Reducing Gridlock, Saving You Time Act**. OSPE has historically advocated against this act and OSPE staff provided an engineering perspective to Mannie on why we oppose this bill.

This quote was used to inform Mannie's article published in **Toronto Today**, "Email campaign takes aim at Stantec, firm hired to remove Toronto bike lanes."

February 4 – Halton Champions of Innovation Meeting

OSPE staff attended the **Halton Champions of Innovation** meeting, a forum of innovative engineering and technology companies, academic institutions, and members of municipal, provincial, and federal governments. The purpose of the forum was to analyze the challenges faced by the **Halton Region** and hear perspectives from a diverse set of industries and thought leaders.

The meeting covered several key topics, including the role of artificial intelligence in optimizing municipal services and enhancing data-driven decision-making in Oakville. There was a focus on the town's continued investment in electric vehicles, solar energy, and geothermal systems to support sustainability goals and reduce carbon emissions. The advancement of digital accessibility through smart technologies, such as real-time transit updates and intelligent parking, was explored, along with initiatives to improve connectivity for residents. **Mukul Asthana, P.Eng., Sustainable Cities Task Force** member, presented transportation strategies aimed at enhancing public transit, reducing congestion, and integrating sustainable options into urban planning.

February 6 – OSPE Creates Fee Guidelines Working Group

The first meeting of the **OSPE Fee Guidelines Working Group** was held. The purpose of this group is to develop a standardized approach and comprehensive guidelines for Ontario engineers to use when negotiating engineering fees that reflect the true value of engineering expertise and services.

February 7 – Ontario Business Association Council Meeting with Hon. Anita Anand - Minister of Transport and Internal Trade

OSPE staff attended an **Ontario Business Association Council (OBAC)** meeting. Also in attendance was **Minister of Transport and Internal Trade, the Hon. Anita Anand**. The discussion surrounded the imposed tariffs from the **United States President**, **Donald Trump**, and how they will affect Ontario's Industries. We look forward to collaborating with OBAC to help engineers in Ontario navigate these tariffs effectively.

February 11 – The Case for Qualifications-Based Selection

OSPE published a research report by **Carl Bodimeade, P.Eng.**, **Veronica Bergs, P.Eng.**, and the **Sustainable Cities Task Force** on **Qualifications-Based Selection (QBS)** in engineering. In the research report, OSPE details its support for qualifications-based selection as the

preferred procurement method for engineering services. You can read the full report on Page 32.

February 19 – Engineering Change Project with White Ribbon Commences

OSPE, in partnership with **White Ribbon**, has undertaken a project funded by the **Department of Justice** called **ngineering Change: A White Ribbon Sexual Harassment Intervention and Prevention Program**. This project aims to support employers and vulnerable populations, such as women and 2SLGBTQ+ individuals within the engineering sector through new content, awareness-building activities, training opportunities, and more.

February 20 – Meeting with Bonnie Crombie

OSPE staff met with **Liberal Party Leader Bonnie Crombie** to discuss OSPE's policy recommendations to the **Liberal Party** in Ontario. Crombie and the Liberal Party are generally aligned with the recommendations presented. We are eager to continue to work with Bonnie and the Liberal Party on future aligned initiatives.

February 25 - OSPE attended the Top 100 Projects Dinner

OSPE staff, as well as **Carl Bodimeade, P.Eng.** and **Mukul Asthana, P.Eng.** from the **Sustainable Cities Task Force** and **Kadra Branker, P.Eng.** from the **Climate Crisis Task Force** attended the Top 100 Projects Key Players and Owners Dinner hosted by **ReNew Canada**, celebrating Canada's biggest infrastructure projects. The evening offered networking and engaging discussions with owners, constructors, engineers, and industry leaders.

February 26 - International Engineering Graduate Networking Event

OSPE hosted an **International Engineering Graduate (IEG)** networking event. This initiative was created by OSPE's **Equity, Diversity, Inclusion, and Accessibility Task Force**.

30 people attended a virtual presentation during the day and enjoyed the opportunity to network with others for a few hours in the evening. The attendees appreciated having an open-format event to ask questions about OSPE and what we do to help IEGs.

Policy Wins

January 15 – Ontario Announces New Energy Efficiency Programs

OSPE has been advocating for comprehensive energy efficiency programs, and we were excited to see the **Government of Ontario** announce new energy efficiency programs including the **Home Renovation Savings**

Paola Cetares, Public Affairs Director for OSPE (left) & Ontario Liberal Party Leader, Bonnie Crombie (right)

From left to right: Paola Cetares, Matt Wiesenfeld, Kadra Branker, P.Eng., Mukul Asthana, P.Eng., Jamie Gerson, P.Eng., Bojana Nakic and Carl Bodimeade, P.Eng. seated at the OSPE table at the Top 100 Projects Dinner hosted by ReNew Canada.

International Engineering Graduate Networking Event on February 26, 2025, in Toronto, ON.

Program. This marks a significant policy win for our organization and a crucial step toward achieving a more sustainable and energy-efficient future for Ontario.

January 17 - Advancing the Critical Minerals Strategy

The Ontario Government recently announced a critical minerals supply chain strategy that reflects many of the key priorities and recommendations identified in a report submitted by OSPE.

Learn more about the revised strategy here.

Letters and Submissions

February 3 - 2025 Budget Recommendations to the Minister of Finance

OSPE submitted a document to the **Ontario Minister of Finance**, the **Hon. Peter Bethlenfalvy**, outlining key priorities and recommendations for the upcoming provincial budget. This submission represents not just a list of requests but a comprehensive vision for a stronger, more sustainable Ontario.

Learn more about OSPE's recommendations here.

February 10 - Proposed Amendments to the Accessible Canada Regulations

OSPE submitted a formal response to the **Department of Employment and Social Development** regarding the proposed amendments to the **Accessible Canada Regulations** published in the **Canada Gazette** on December 21, 2024.

Learn more about OSPE's proposed amendments here.

February 19 – Policy Recommendations

OSPE published a set of policy recommendations to the leaders of the **NDP, Liberal, Green, and Progressive Conservative Parties**. These recommendations aim to provide practical, actionable insights that will ensure Ontario remains a leader in economic growth, infrastructure development, and environmental sustainability.

View the full letters here.

The Land Drainage Committee is Now an Official OSPE Task Force

Originally founded at the University of Guelph, this newly established OSPE Task Force is now collaborating with OSPE's advocacy team to advance drainage engineering practices under the **Drainage Act of Ontario** and to organize the **2025 OSPE Land Drainage Conference**.

Interested in joining?
Contact us at advocacy@ospe.on.ca

EngLead
By OSPE

Sustainable Cities Task Force

Ontario's urban areas are central to our vibrant economy and diverse community. The **Sustainable Cities Task Force** is focused on the future development and redevelopment of these areas in smart, sustainable ways.

Help this team ensure urban development follows the right path by...

- Recommending improvements and retrofits
- Engaging the government in proper planning
- Sharing feedback on new policies and programs

Interested in shaping the communities of today and tomorrow?
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ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

national ENGINEERING MONTH

Who Ends Up Where? And How do Race, Gender, and Where You Studied Matter?

Deciphering occupational stratification among engineering graduates in Canada, using 2021 Census data.

Andrea Chan, PhD, Victoria Kerr, MASc, Lee Weissling, PhD, and Emily Moore, P.Eng.

Many factors influence how people land certain careers. Aspiration and opportunity are two factors, but just as likely a person's gender, race, and even where they studied may be influencing their entire engineering journey.

Unfortunately, this is not uncommon across industries, and those with marginalized identities, like women, are often unconsciously siphoned into lower-status or lower-paying positions.

What happens when we then factor in race as part of the analysis? Or where you earned your degree? The results can be staggering.

Victoria Kerr, Assistant Professor at the University of Waterloo and University of Toronto PhD Candidate, did just that in her **Mitacs** internship with the **Ontario Society**

Fig. 1. Proportion of Engineering Graduates in Canada Working in an Engineering Occupation by Race, Gender, and Location of Study

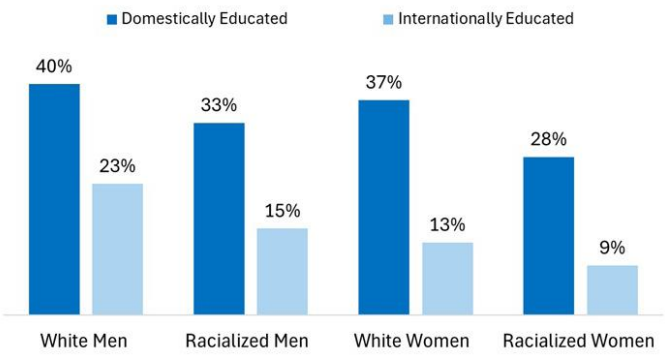
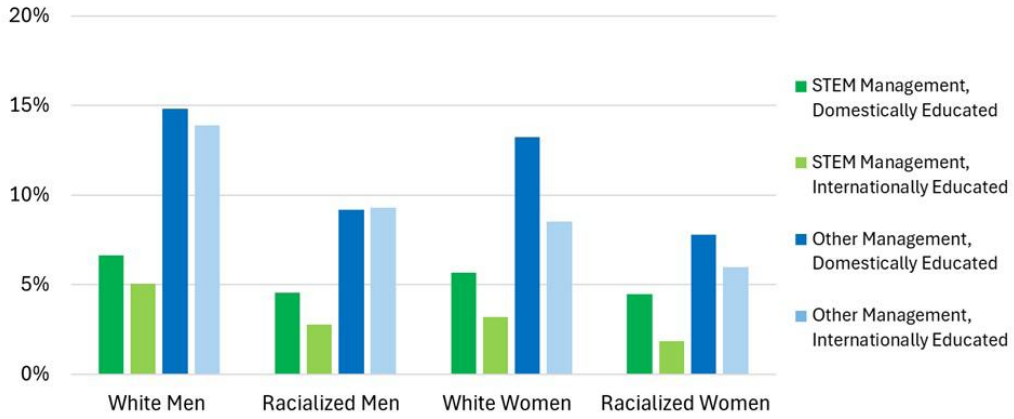


Fig. 2. Engineering Graduates in Canada Working in STEM Management and Other Management, by Race, Gender, and Location of Study



of Professional Engineers (OSPE). Her study looks at engineering graduates in Canada, 25 to 64 years of age, with the specific intent to consider the effects of more than one social identity at a time – in this case, race, gender, and location of study.

Here are some highlights from the study:

- The challenge of finding engineering employment in Canada as an **International Engineering Graduate (IEG),** outweighed the challenges faced by any Canadian engineering degree holder, regardless of race, or gender.
- A higher percentage of White Men were found in STEM management and other management roles compared to other race and gender groups. In contrast, Racialized Women who studied outside of Canada have the lowest percentage of working in STEM management or other management occupations. (Figure 2)
- A higher percentage of Women, especially Racialized IEGs, were longer-term unemployed or out of the labour force compared with others.
- 'Professional/Scientific/Technical Services' and 'Manufacturing' were the top two industry sectors of employment for engineering graduates across all race and gender groups. The Retail sector was a top three employer *only* for Racialized Women with engineering degrees from outside Canada. For Racialized Women with Canadian engineering degrees, the third top sector of employment was Education.

To policymakers, industry employers, and advocacy groups, the evidence suggests a need for more targeted support to specific segments of engineering graduates who experience the most inequitable occupational outcomes and labour market exclusion.

Click here to view the full report.

Andrea Chan, PhD, is a Senior Research Associate at the Troost Institute for Leadership Education in Engineering (ILead), University of Toronto.

Victoria Kerr, MASc, is an Assistant Professor of Systems Design Engineering at the University of Waterloo. She is also a PhD Candidate at the Institute for Studies in Transdisciplinary Engineering Education and Practice (ISTEP), University of Toronto.

Lee Weissling, PhD, was Senior Research Officer at the Ontario Society of Professional Engineers (retired).

Emily Moore, DPhil, P. Eng., FCAE, is an Associate Professor and Director of the Troost Institute for Leadership Education in Engineering (ILead), and Associate Director of the Institute for Studies in Transdisciplinary Engineering Education and Practice (ISTEP), University of Toronto

[i] The Ontario Human Rights Commission (2005) refers to racialization "as the process by which societies construct races as real, different and unequal in ways that matter to economic, political and social life." Racialized persons include those who have been attributed with racialized characteristics, where White has historically been treated as the "norm." https://www3.ohrc.on.ca/en/policy-and-guidelines-racism-and-racial-discrimination

Shaping the Future of Engineering: OSPE's 2025-2030 Strategic Plan

In February, **Sandro Perruzza, CEO of the Ontario Society of Professional Engineers (OSPE)**, and **Nicholas Burgwin, P.Eng**, OSPE Vice Chair, presented OSPE's 2025-2030 plan to association members.

The two covered the challenges currently facing the engineering profession and the vision OSPE has for how engineering can be transformed in the next generation.

As a member, your feedback is valued. Before OSPE's next Strategic Plan is finalized please tell us what you think by emailing your comments to info@ospe.on.ca.

View OSPE's Strategic Plan 2025-2030 Draft ↗

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Fire Science: Advancements in Fire Safety, Behaviour, and Technology in Canada

Fire science and research have made significant strides in recent years, providing engineers, firefighters, and safety professionals with new tools and methodologies to enhance fire prevention, safety, and mitigation. As fire-related incidents continue to impact communities, infrastructure, and the environment, the role of research in improving fire safety has never been more critical. In Canada, where both urban and rural areas face fire risks, especially with changing climate conditions, advancements in fire science are directly influencing how we understand fire behaviour, design safer buildings and systems, and protect lives. This article delves into the latest fire research developments, how they impact safety, and the role of fire simulation and modeling technologies in shaping fire prevention strategies.

Advancements in Understanding Fire Behaviour and Combustion Processes

Understanding fire behaviour and combustion processes is fundamental to improving fire safety. Researchers have been focusing on the dynamics of how fires spread, the factors that influence their intensity, and how different materials react when exposed to heat and flame. This

research helps engineers design fire-resistant buildings, improve firefighting techniques, and develop better fire suppression systems.

Fire behaviour research in Canada has made significant contributions to understanding how fires move in different environments. For example, according to **Natural Resources Canada, the Canadian Forest Fire Behaviour Prediction (FBP)** system provides quantitative estimates of potential head fire spread rate, fuel consumption, and fire intensity, as well as fire descriptions. With the aid of an elliptical fire growth model[1], the FBP system gives estimates of fire area, perimeter, perimeter growth rate, and fire behaviour at the head, flanks, and back of a fire. This research is essential in understanding how fire spreads and how to control it. By studying the properties of different materials and understanding their ignition points, fire safety engineers can design buildings, vehicles, and products that are less likely to catch fire or contribute to fire spread.

Fire Simulation and Modeling Technologies

Advancements in fire simulation and modeling technologies have been game-changers in fire safety engineering. These technologies allow researchers, engineers, and safety professionals to simulate various fire scenarios in real time, offering invaluable insights into fire behavior without the need for dangerous live testing. Fire simulation helps engineers and architects design safer buildings, transportation systems, and industrial facilities by predicting how a fire might behave in different settings.

In Canada, fire simulation technologies have been used to improve safety protocols in large public spaces, such as shopping malls, airports, and public transit systems. **Fire Dynamics Simulator (FDS)** and **PyroSim's** software can model how smoke and heat will move through a building during a fire. These models consider factors like ventilation, building layout, and the materials used in construction. They help engineers design evacuation plans, improve fire suppression systems, and create fire-resistant structures.

Fire simulation technologies are also being used in wildfire management. Firefighting agencies in Canada are increasingly using predictive modeling to track and anticipate wildfire behaviour, particularly in remote areas where traditional firefighting resources are limited. These models consider weather patterns, terrain, and fuel types to predict the spread of wildfires, allowing for more effective and efficient firefighting strategies.

The Future of Fire Science and Engineering

As research in fire science continues to evolve, the potential for improving fire safety and minimizing environmental damage from fires grows. Advanced fire detection systems are being developed to send real time alerts to first responders, providing faster response times in emergencies. These systems will become increasingly important in urban areas where the risk of fires is higher, and quick containment is essential.

In addition, the integration of Artificial Intelligence (AI) into fire safety management systems is expected to improve decision-making during firefighting operations. AI can analyze data from fire simulations, environmental sensors, and previous fire events to recommend the most effective suppression strategies, ultimately saving lives and reducing property damage.

Moreover, with the rise of sustainable building practices and green technologies, innovation in fire safety engineering will continue to be pursued. Research on fire-resistant, eco-friendly materials, such as bamboo and sustainable timber, combined with improved fire suppression systems, will help architects and engineers meet sustainability goals while ensuring that safety is not compromised.

Fire science research in Canada is driving important advancements in fire safety, from understanding fire behaviour and improving fire-resistant materials to developing sophisticated fire simulation technologies. As wildfires increase in frequency and intensity, and new technologies like electric vehicles and high-rise buildings emerge, these research efforts will become even more critical in ensuring the safety of Canadian communities, infrastructure, and the environment. Canadian engineers are at the forefront of creating smarter, safer, and more sustainable solutions to manage the risks posed by fire, ensuring that Canada is better prepared for the challenges of tomorrow's fire safety needs.

[1] An "elliptical fire growth model" is a mathematical model used to simulate the spread of a wildfire by assuming its shape resembles an ellipse, where the fire grows outward from its ignition point with a faster rate of spread in the direction of the wind (longer axis of the ellipse) and a slower rate perpendicular to the wind (shorter axis), effectively representing the fire front as an expanding oval shape.

Fire and Environmental Sustainability: Engineering Solutions for a Greener Future in Canada

Fires, whether in urban, industrial, or natural environments, pose a significant environmental threat. Beyond the immediate destruction they cause, fires can lead to lasting impacts on ecosystems, air quality, and biodiversity. However, Canadian engineers are increasingly working to mitigate these environmental effects through innovative firefighting practices and sustainable design strategies. This article explores the environmental impact of fires, the role of engineers in mitigating these effects, and how fire safety systems can be designed to protect both lives and the environment.

The Environmental Impact of Fires

In Canada, wildfires are a recurring concern, particularly in provinces like British Columbia, Alberta, and Ontario, where dry conditions and climate change are contributing to more frequent and intense fire seasons. While wildfires are a natural part of many ecosystems, human activity, including urban sprawl, deforestation, and industrial activities, can exacerbate their intensity and spread. According to the **British Columbia Wildfire Service**, fires can lead to significant environmental damage, including the destruction of forests, wildlife habitats, and the

release of large quantities of greenhouse gases (GHGs) into the atmosphere.

Urban and industrial fires also contribute to environmental degradation. The combustion of materials such as plastics, chemicals, and metals can produce harmful pollutants, including particulate matter, carbon monoxide, and other toxic substances that contaminate the air, water, and soil. The environmental impact of fires extends beyond the immediate damage, affecting ecosystems and human health long after the flames are extinguished.

Engineers in Canada are at the forefront of developing innovative solutions to mitigate the environmental impact of fires. From designing sustainable firefighting technologies to improving fireproofing materials and systems, engineers are playing a vital role in reducing the environmental footprint of fire-related incidents.

Wildfire Management and Prevention

In wildfire-prone areas, engineers are leveraging technology to enhance wildfire management and prevention. One such technological according to **Transport Canada Canadian Aviation Regulations** is the use of drones and satellite technology to detect and monitor wildfires in real time. These technologies allow for faster detection and more precise firefighting efforts, reducing the need for large-scale, high-impact fire suppression methods like aerial water bombing. Drones can also be used to assess fire damage and support post-fire recovery efforts by identifying areas that require restoration or reforestation.

Moreover, engineers are working to develop fire-resistant landscapes and infrastructure. This includes designing firebreaks[1], creating defensible spaces around properties, and implementing fire-resistant construction materials in areas at high risk for wildfires. Some examples of fire-resistant building materials are non-combustible siding, roofing, and glass, which are being used in residential areas near forests to reduce the spread of fire to homes.

Sustainable Firefighting Practices and Eco-Friendly Alternatives

Sustainability in firefighting is a growing focus, with Canadian engineers developing practices and technologies aimed at minimizing the ecological footprint of fire suppression activities.

Traditional firefighting methods, such as using large volumes of water or foam-based agents, can have a negative environmental impact by contributing to water pollution and harming local ecosystems. As a result, engineers are working on eco-friendly alternatives.

One such alternative is the use of “green” fire suppression agents that are non-toxic and biodegradable. These fire suppression systems use inert gases such as nitrogen and argon which are considered environmentally friendly suppression agents. According to a **Western States Fire Protection** article, these gases are naturally occurring and leave no chemical or toxic byproducts, reducing the environmental impact of firefighting. Engineers are also improving water conservation in firefighting efforts by developing more efficient sprinkler systems and fire suppression technologies that require less water and are better at containing fires without excessive runoff.

Another example of sustainable firefighting technology is the use of **Compressed Air Foam Systems (CAFS)** which has gained traction in Canada. CAFS produces foam with a much smaller environmental footprint by using less water, reducing runoff, and preventing water wastage. According to the **National Research Council of Canada**, this technology is useful for urban and wildland firefighting, where water conservation and minimization of environmental harm are key priorities.

Fire-Resistant Landscaping and Urban Planning

Fire-resistant landscaping and green infrastructure[2] are gaining popularity in areas where the risk of wildfires and urban fires is high. Engineers are designing fire-resistant landscapes by selecting plants and materials that are less likely to catch fire and by creating defensible spaces around structures. This reduces the need for harmful firefighting chemicals and helps contain fires before they spread.

In urban planning, engineers are promoting the incorporation of fire-resistant materials into the design and construction of buildings and infrastructure. Fire-resistant materials such as concrete, steel, and fire-resistant glass help prevent the spread of fires and limit environmental damage. Moreover, engineers are developing fire-resistant coatings and paints that can be applied to buildings and infrastructure to enhance fire protection without harming the environment.

[1] An obstacle to the spread of fire, such as a strip of open space in a forest.
[2] A network of natural spaces and structures that manage water and improve quality of life.

Designing Fire Safety Systems for Environmental Protection

As fire safety systems become more advanced, engineers are focusing on integrating environmental protection into the design of these systems. Fire safety systems must be effective at saving lives and property, but they also need to minimize the environmental impact.

One of the key innovations in fire safety engineering is the development of smart fire detection systems that can more accurately identify fires early, enabling quicker responses and minimizing the extent of fire damage. These systems use sensors, real-time data, and machine learning algorithms to detect fires before they spread, reducing the need for excessive water use or large-scale fire suppression methods.

Furthermore, engineers are focusing on integrating fire safety systems into the broader environmental design of buildings. For example, advanced fire suppression systems can be integrated with building automation systems that manage air quality and ventilation, ensuring that smoke and pollutants are contained and filtered. This not only improves fire safety but also contributes to a healthier and more sustainable built environment.

The environmental impact of fires is significant, but Canadian engineers are playing a vital role in developing innovative solutions to mitigate the effects. From wildfires in rural areas to industrial fires in urban centers, engineers are working to reduce the ecological footprint of firefighting activities, integrate sustainable practices into fire safety systems, and design fire-resistant infrastructure. As fire safety and environmental sustainability continue to intersect, engineers will be key to ensuring that Canada's transportation, housing, and industrial sectors remain safe, resilient, and environmentally responsible. Through continued research, innovation, and collaboration, Canada can build a safer and more sustainable future in fire safety engineering.

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An Overview of Canadian Wildfire Risks and Evolving Mitigation Strategies

With climate change contributing to more extreme weather patterns, the threat of wildfires has increased significantly across many parts of the world, including Canada experiencing record-breaking wildfires in 2023. From an engineering standpoint, it's crucial to analyze the risk factors, challenges, and preparedness in Canada that could make such catastrophic events more or less likely.

Canada faces significant wildfire risks, particularly in the western provinces of British Columbia and Alberta. The fire safety industry in Canada is grappling with how to better prepare, mitigate, and adapt to the increasing risk of fires in Canada's changing climate. This article will cover the main factors contributing to wildfire risk in Canada and how engineers are creating solutions to minimize the risks of fire, and minimize the damage when fires do occur.

Landscape and Vegetation

Parts of Canada, especially in the western provinces, have vast areas of forested land that are vulnerable to wildfires. British Columbia, Alberta, and parts of Ontario are particularly at risk due to dry periods during the summer months and the prevalence of highly combustible vegetation like pine trees and shrubs. The risk of fires in forests and grasslands is increasing year by year in both regions and must be mitigated to prevent future disasters.

Engineers have been focusing on developing fire-resistant materials for homes and infrastructure, especially in fire-prone areas. Using non-combustible roofing materials, fire-resistant building materials, and creating defensible spaces around homes can help mitigate the spread of fire from vegetation to residential areas. Ensuring that urban sprawl does not extend into fire-prone areas is a key focus of urban planning and engineering.

Climate Change and Drought

Rising temperatures and changes in precipitation patterns are expected to increase the frequency and intensity of wildfires in Canada. Parts of Canada, such as British Columbia, are already experiencing extended periods of drought and hotter summers. With more frequent heatwaves, the risk of wildfires spreading becomes greater. The 2021 Lytton, British Columbia wildfire, which was sparked in an area experiencing record-breaking temperatures, illustrates how climate change is exacerbating wildfire risks.

Engineers are working to implement better water management strategies, such as creating fire breaks (defensible zones devoid of vegetation) and water supply

systems that can be quickly mobilized during firefighting efforts. Moreover, advancements in wildfire prediction, monitoring, and detection technologies, such as satellite-based sensors and AI algorithms, help improve early detection and reduce the extent of damage.

Firefighting Resources and Technology

While Canada has a robust firefighting system, the sheer size of the country and the remote areas at risk can make firefighting efforts challenging. In addition, Canadian firefighting resources are often stretched during peak wildfire seasons, like in California.

Advancements in firefighting technology, such as the use of drones, unmanned aerial vehicles (UAVs), and satellite-based monitoring systems, are being integrated into firefighting strategies. These technologies can improve situational awareness, assess fire behavior, and deploy resources more effectively. Moreover, the development of portable, scalable water systems and fire suppression methods designed specifically for rural and remote areas is crucial for combating fires in locations where access is difficult.

The Role of Engineers in Finding Solutions

In conclusion, the increasing threat of wildfires in the country is undeniable. Engineers and urban planners play an essential role in mitigating these risks and ensuring that Canadian communities are prepared for increasingly frequent and intense fire seasons. Through engineering innovations in fire prevention, firefighting technology, and infrastructure design, Canada can better manage the wildfire risks posed by climate change and urban sprawl. As this issue becomes more pressing, collaboration across engineering fields, environmental planning, and government policy will be essential in safeguarding Canadian lives and landscapes from the growing threat of wildfire.

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Fire Safety in Transportation Engineering: Ensuring Safety in Aviation, Rail, Maritime Transport, and Emerging Technologies in Canada

Aviation, rail, and maritime transportation systems are fundamental to Canada's connectivity, but they also face the persistent risk of fire-related incidents. With Canada's vast geography, the country relies heavily on these systems to ensure mobility across urban and rural areas. Fire safety engineering in these sectors is crucial to protect lives, infrastructure, and the environment. As new technologies such as electric and autonomous vehicles emerge, the need for advanced fire safety measures becomes even more pressing.

This article explores fire safety in transportation engineering in Canada, focusing on traditional modes of transport, and innovations in electric and autonomous vehicles, alongside design considerations for fireproofing transportation infrastructure.

Fire Safety in the Aviation Industry

Fire safety in aviation is critical and complications can lead to significant damage. The **Canadian Aviation**

Regulations (CARs) and **Transport Canada** have stringent fire safety standards, requiring aircraft to have fire-resistant materials, smoke detection systems, and automatic fire suppression systems.

One of the most significant fire risks in aviation arises from the growing use of lithium-ion batteries in personal devices, often stored in cargo. Alos, as electric and hybrid aircraft technology grows, engineers are focusing on improving fire suppression systems and better managing the risks associated with high-capacity batteries. According to Transport Canada, Canada is also investing in advanced fire-resistant materials for the aviation sector, ensuring that new aircraft designs and retrofits are safer.

Fire Safety in the Rail Industry

The Canadian rail system, managed by major operators like **Canadian National Railway (CNR)** and **Canadian Pacific Railway (CPR)**, sees both passenger and freight trains moving through a range of environments - from rural areas to urban centers. Freight trains may carry hazardous materials, adding to the risk of fires. According to the **Transportation Safety Board of Canada (TSB)**, incidents such as the **2012 Lac Mégantic Derailment** are events that have shaped fire safety as we know it. The derailed tank cars were breached, and the petroleum crude oil was released, fuelling the fire. The damage to the tank cars could have been reduced with enhanced safety features. This is why the TSB called for tougher standards for tank cars carrying flammable liquids.

Fire Safety in the Maritime Industry

Fire safety in Canadian ships, particularly those transporting goods, has always been a top priority due to the increased potential for hazardous materials to catch fire. Canada follows International **Maritime Organization (IMO)** regulations for fire safety on vessels via the **Canada Shipping Act of 2001**. The Shipping Act includes mention of fire detection systems, fire-resistant walls, and fire suppression systems in cargo holds.

According to Transport Canada, as the Canadian maritime sector grows, especially with the increased use of **Liquefied Natural Gas (LNG)** powered ships, fire safety measures must evolve to handle the risks associated with these new technologies. The IMO's **International Code for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code)** is now influencing fire safety designs for

Canadian maritime vessels, ensuring that risks from LNG fires are adequately managed.

Fire Safety for Electric and Autonomous Vehicles in Canada

With the increasing adoption of **Electric and Autonomous Vehicles (EVs and AVs)**, fire safety in Canada's road transportation system is undergoing significant changes. EVs present unique fire risks, primarily related to their lithium-ion battery systems, which can overheat and cause thermal runaway— high temperatures and the release of potentially hazardous gases that can lead to explosions and fires.

In Canada, the demand for EVs is growing rapidly, particularly with the federal government's support for green energy initiatives. However, EVs also present new fire risks, especially related to their batteries. When temperatures rise beyond a certain point, the risk of catching fire or explosions rises. Manufacturers are working to improve battery design and incorporate better cooling systems to prevent battery malfunctions. Recently a Japanese company - **Asahi** began manufacturing "Battery Separators" between the cathode[1] and anode[2]. According to **Invest Ontario**, Asahi recently invested in

[1] The negatively charged electrode by which electrons enter an electrical device.
[2] The positively charged electrode by which the electrons leave a device.

Ontario to build Canada's first industrial-scale EV battery separator plant in **Port Colborne, Ontario** which will help mitigate malfunctions in the future.

Fire safety engineers are also developing systems tailored specifically to EVs to quickly detect and suppress fires before they spread. According to the **Canadian Fire Safety Association (CFSA)**, several municipalities have implemented training programs for first responders on how to safely handle EV fires. Additionally, new innovations like fireproof enclosures and advanced battery management systems are becoming more common. As the market for EVs grows, Canada is prioritizing fire safety in this evolving sector.

According to the **Canadian Council of Motor Transport Administrators (CCMTA)**, autonomous vehicles pose additional fire safety challenges due to their reliance on many electronic components. As AVs integrate more sensors, cameras, and complex circuitry, fire safety engineers are working to improve vehicledesign to prevent electrical fires. Much like EVs, AVs often use lithium-ion batteries, but the increased complexity of the electrical systems could lead to more potential points of failure. As part of fire safety initiatives in Canada, AV manufacturers are exploring enhanced fire detection and suppression systems that can operate autonomously, ensuring fires are detected and dealt with promptly, even without human intervention. These systems are designed to work seamlessly with AV technology, prioritizing safety while maintaining autonomous operations.

Design Considerations for Fireproofing Transportation Infrastructure

Fire safety engineering extends beyond vehicles and into the infrastructure that supports transportation systems. This includes designing fireproof materials for rail and road tunnels, as well as airports, seaports, and roads. Effective infrastructure fireproofing is essential to ensure that, in the event of a fire, damage is minimized, and evacuation is safe.

Tunnels, particularly those for rail and road transport, are high-risk areas where fire can quickly spread. Canada has been improving fire safety standards for these types of infrastructure by using fire-resistant materials for tunnel construction and installing advanced ventilation systems to control smoke spread. According to Transport Canada, new designs focus on ensuring that firefighters can quickly access the area and evacuate passengers in the event of a fire. Fire-resistant materials, such as concrete and steel reinforcement, along with automatic sprinklers, is now standard in many Canadian tunnels.

Airports and seaports in Canada are designed with fireproof materials in key areas, including terminals, baggage handling systems, and maintenance facilities. Enhanced fire safety systems like automatic sprinklers, CO2 suppression systems, and smoke control systems are crucial in preventing fires in such high-traffic areas. Canada's fire safety engineering in airports also extends to new technologies that can detect fires in real time, ensuring that fires are suppressed quickly without causing extensive damage. Additionally, training for fire response teams has been a priority to ensure that they are prepared for fire emergencies in both public and private facilities.

Fire safety in transportation engineering is critical to the safety of passengers, goods, and infrastructure in Canada. From aviation and rail, to maritime transport, engineers are working tirelessly to implement cutting-edge fire detection and suppression systems, and design innovations that protect us all against the risks of fire.

As Canada's transportation sector continues to innovate with electric and autonomous vehicles, the role of fire safety engineering becomes increasingly important. By adopting advanced technologies and integrating fire-resistant designs into transportation infrastructure, Canada can ensure that its transportation systems remain safe, resilient, and capable of handling emerging challenges.

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Analysis of Human Behaviour during Wildfire Evacuations

Hannah Carton, John Gales, PhD, and Eric B. Kennedy

*This is an abridged version of the report published in the **Canadian Journal of Civil Engineering**, 2024. To read this research paper in full with references, you can find the open access version here.*

Globally, wildfires are increasing in number and severity. The increase is associated with climate-change- factors; increased interactions between people and the wildland through population growth, urbanization and seasonal recreation; and changes in fuels and ecosystems, among others. It is forecasted that by 2100, the number of severe wildfire events will increase by a factor of 1.31 to 1.57, depending on climate mitigation efforts.

As the number and severity of wildfires impacting people increase, there is a need to collect data on human behaviour during evacuations to inform evacuation management and strategies. The objective of this research was to analyze videos of Fort McMurray evacuations for notable human behaviour and traffic behaviour and with an overarching vision to compare the behaviours observed to existing behavioural frameworks.

Additionally, the study aimed to collect quantifiable data about the evacuation process and determine the appropriateness and applicability of the video analysis methodology. This research contributes to the critical research need for more data on human behaviour in

wildland and **Wildland Urban Interface (WUI)** fires during the evacuation itself, using an exploratory methodology that, at the time of writing, had not yet been applied to wildfire evacuations.

The 2016 Fort McMurray Fire

The 2016 Fort McMurray Fire is one of the largest WUI fires in Canadian history and the largest evacuation in Alberta's history with 88,000 residents evacuated and almost $8.9 billion in damages. Its evacuation was largely regarded as successful, however, only 24% of residents surveyed considered the evacuation well-organized.

The fire began in the afternoon of May 1, 2016, and reached the Athabasca River the next day. Overnight the fire had "jumped" over the river, a distance of almost one kilometre, however, the approaching fire was not visible to the residents. On May 3, a press conference offered mixed messages to the residents, saying to go along with their day as normal, but also advising them to be on high alert as fire conditions were extreme. By early afternoon, the fire had grown larger and closer to the community due to high winds and at 6:49 p.m. local time, a full evacuation of Fort McMurray was ordered, though many of the surrounding communities had already evacuated.

Methods

The methodology used was the video analysis of footage of evacuations from Fort McMurray. Video analysis of emergency events such as wildfires, as a method of data collection has been used in the past to collect empirical data on human behaviour from a variety of emergency scenarios, such as earthquakes and evacuations of buildings and stadiums. The advantage of this methodology of analysis is that the videos are taken from real-world events and therefore are considered highly representative and credible.

However, as a real-world event and not an experiment, there is very little control over variables and responses. Additionally, real-world events inherently have very low replicability capabilities where it is difficult to recreate the circumstances, and as such, the sample sizes available may not be representative of the event. The methodology also does not allow for explanations of behaviours observed or the underlying decision-making processes as only the final actions are shown.

The video inclusion criteria were that the video had to be from the 2016 Fort McMurray evacuation and depict a vehicular journey leaving Fort McMurray. The videos should be one continuous recording with no jump cuts or skipping ahead chronologically.

Alignment with Existing Behavioural Theories

Some behaviours observed were consistent with different existing behavioural theories such as cognitive biases where there did appear to be a bandwagon effect. However, not all behaviours observed have been categorized under contemporary behavioural frameworks, due to a lack of validation of those theories during wildland fire evacuations and are simply stated such as driving outside of marked lanes.

During the video analysis, the bandwagon cognitive bias, defined as doing an action because others are doing the same, appeared to occur. This bandwagon effect has also been observed in studies of indoor building evacuations and exit choice. In Video 2 and Video 3, when one car changed into the opposite lane to avoid congestion or flames, other cars did the same. Additionally, in Video 4, when the visibility got worse due to smoke, cars began to turn on their blinkers. While some may have chosen to do so independently, there appeared to be a bandwagon effect as it was staggered across the cars.

The presence of authority figures, such as those directing traffic, may have indicated that there was an "authority bias" where actions are done because an authority figure does or requests it as there were authority figures directing traffic. The presence of authority was mainly seen at intersections and lane merges where they directed traffic.

Additionally, during the evacuation, authorities had changed the lane directions of the highway to one-way, in order to allow for more evacuees to head south. These lane reversals were unofficial decisions on the part of the local authorities and not part of the government's official plans. In addition to directing lane reversals, at intersections they were observed to manage the traffic flow as well as direct traffic towards the egress routes.

While some intersection traffic lights still functioned, traffic was largely directed by police which played a role in the evacuation route. Authorities were also present at highway entrances, directing vehicles. Due to Fort McMurray's remote location, there were only two vehicular egress routes, either north or south on Highway 63. Thus, evaluating authorities' impact on egress route choice is difficult as evacuees did not have many options. Some hurricane studies have found that when evacuating from a community, residents preferred familiar routes which is consistent with indoor evacuation studies, however, it has been found that some wildfire evacuees will use other nonhighway roads if available. It is difficult to make conclusions on evacuation route strategies due to the already limited egress routes that were available

to residents of Fort McMurray, as all vehicular routes observed in the videos used major roads which led to the highway.

There may have been other cognitive biases that could have been identified, however, the purpose of the video analysis was not to identify cognitive biases present and thus they may have been missed. It must be noted that the cognitive bias framework has not been validated using wildland and WUI fire contexts. Identifying cognitive biases specific to wildfire evacuations using video analysis is recommended as future work.

Common Observations Across Videos

The use of lane reversals was evident across many of the videos, driven by the direction of authority, or by the driver's risk perception based on traffic congestion or fire behaviour. While the use of lane reversals is not an uncommon traffic control method used during large-scale evacuations, Fort McMurray's lane reversals were all "unofficial" on the part of the local authorities and the residents. There is limited empirical data on individual driving behaviour during evacuations and as such, it is difficult to compare the lane reversal behaviour observed in the videos to other evacuation events. As the videos were all of the individual evacuations and not the evacuation as a whole, it is difficult to determine the impact of these lane reversals on the evacuation, though a previous study did find that it reduced the congestion.

There were also driving behaviours observed where evacuees appeared to engage in their risk assessment before making a driving choice. For example, in Video 1 some residents chose to use the right-most lane which was close to the wildfire instead of using the more congested middle lanes. In other videos, when faced with high levels of traffic congestion, drivers chose to use the opposite lane or drive outside of marked roads. These unique driving behaviours have not been researched in detail. The majority of studies done on traffic during evacuations focus on the traffic flow itself and not on individual driving behaviours en route. While a study has found that some evacuees may choose to use backroads to avoid congestion, more local measures such as lane changes and driving outside unmarked lanes have not been studied.

Not all the driving behaviours were motivated by traffic behaviour and congestion, as fire behaviour also played a role in actions. In Video 6, authorities closed one of the highway lanes due to the fire's proximity to the side of the highway. In Video 3, cars swerved into the opposite lane to avoid flames approaching the right curb. These

actions further support the need for coupled modelling as these are actions which may not be represented in current modelling due to a lack of coupling and data. Smoke from the fire was also observed to slow cars down and motivate others to turn on their blinkers. While there have been limited studies on the effects of smoke on driving behaviour in wildfires, it is consistent with results observed in virtual reality experiments on the topic as well as walking speeds in smoke and driving speeds in fog.

For the full discussion and results, you can view the original research paper here.

Conclusions

In conclusion, the increase in the number and severity of wildfires has also increased the amount of people impacted by wildfires through evacuation. This exacerbates the critical research need for data on human behaviour during wildfire evacuations. Using video analysis of public videos from social media sites, this study observed unusual traffic behaviours across multiple videos of the 2016 Fort McMurray Fire, which included using lanes in the opposite direction and driving outside of marked roads, in response to traffic and wildfire conditions.

This study supports the need for coupled evacuation modelling as unusual traffic behaviours not usually present under normal traffic conditions were observed. These behaviours can also be used to inform evacuation management and planning.

Hannah Carton is Lead Researcher and student at York University.

John Gales, PhD is Principal Investigator at York University.

Eric B. Kennedy is a Thesis Committee Member at York University.

Ensuring Excellence in Engineering: The Case for Qualifications-Based Selection (QBS)

Carl Bodimeade P.Eng., Veronica Bergs P.Eng., and the Sustainable Cities Task Force

Introduction

The **Ontario Society of Professional Engineers (OSPE)** is the voice of the engineering profession in Ontario, advocating for policies, standards, and best practices that promote innovation, sustainability, and public safety. OSPE represents engineers across all disciplines and industries, ensuring that their expertise is recognized and valued in decision-making processes that impact society.

As part of its commitment to advancing professional engineering practices, OSPE supports **Qualifications-Based Selection (QBS)** as the preferred procurement method for engineering services. QBS prioritizes selecting firms based on their qualifications, technical expertise, and experience rather than cost alone. This approach ensures that engineering projects, especially those with complex, high-impact, or innovative elements, are led by the most capable professionals, resulting in better long-term outcomes, cost efficiency, and public safety.

This document outlines the principles and benefits of QBS, emphasizing its role in fostering trust between clients and consultants, optimizing project performance, and ensuring high-quality engineering solutions that deliver lasting value.

Qualifications-Based Selection for Engineering Services

QBS is a procurement method that emphasizes selecting the most qualified firm based on their expertise, experience, and technical capabilities, rather than their cost (FCM & NRC, 2006). QBS has been proven effective for engineering assignments, programs, and projects with complex aspects, significant impacts, multiple alternative approaches, and those requiring innovation or specialized expertise. The primary objective is to provide high-quality engineering services that reduce project life cycle costs, ensure public health and safety, encourage innovative and holistic solutions, and achieve a high level of project satisfaction while ensuring that a fair and reasonable price is agreed upon. Selecting a qualifications-based procurement method can develop confidence and trust between a client and consultant, yielding even better project results.

QBS Procurement Process

The QBS procurement process involves three key steps (APWA, 2022).

1. **Planning:** The owner confirms project objectives, scope, budget, schedule, and procurement process.
2. **Selection:** A Request for Statement of Qualifications is issued, and respondents are ranked based on past performance, technical competence, capacity, and related factors.
3. **Negotiation:** The top-ranked respondents engage in negotiations with the client to reach a mutual understanding of the scope and a fair and reasonable fee structure.

Legislation in Canada and the United States

In Canada, only a few provinces and municipalities, such as Calgary, AB, London, ON, Kingston, ON, and Coquitlam, BC have experience with QBS. There is no federal law in Canada requiring QBS for engineering services.

In the USA, the **Brooks Act** has mandated QBS for federally funded architecture and engineering projects since 1972. Most US states have embedded QBS in state laws and many of them have extended the mandate to local entities and state agencies (ACEC, 2022).

Benefits of QBS Procurement

QBS offers numerous benefits to owners, industry participants, and the public (Chinowsky, P.S. 2022). These can include:

- **Lower procurement and project costs.**

  QBS outperforms the national average in both minimizing cost and schedule delays. Analysis of the data highlighted in a report by the ACEC Research Institute indicates a correlation between the experience of a design team and the quality of construction documents they produce. Higher-quality construction documents lead to reductions in construction costs and project schedule delays, (ACEC, 2022). Another study, focusing on US airport public works contracts, yielded similar findings (Gransberg et al. 2019).

  With a QBS procurement model, clients can ensure that they are choosing the most experienced teams available and benefitting from those cost reductions.

  Further, in a review of 76 design-build projects in the US, QBS was found to have the lowest cost growth[1] and the fastest construction speed when compared to sole source, best value, and lowest bid procurement methods (Wardani et al. 2006).

The use of QBS can also facilitate adequate investment in pre-construction planning and design (CDAO, 2021). Even though the initial consulting could be more costly, the long-term savings will be much higher with better, more predictable outcomes (OSPE, 2021).

- **Improved quality, and enhanced safety.**

  In an international conference paper, researchers found that QBS awards have been used successfully across procurement methods. Clients expect an increase in a project's quality, longevity, and safety by decreasing the chances that a marginally qualified contractor wins the project (Gransberg et al. 2019).

- **Enhanced understanding and relationships between clients and consultants.**

  A 2019 study found that clients perceive significant benefits associated with using a QBS model, including fewer disputes during project execution (Gransberg et al. 2019).

Procurement Procedure

QBS involves a multi-stage process that includes competitive contract procurement during the planning, selection, and negotiation phases of the procurement process.

Initially, a thorough evaluation of potential firms is conducted based on criteria, such as professional competence, which ensures that firms have the necessary technical expertise and specialized knowledge to execute a project. Managerial ability is also a critical factor, as it reflects the firm's capacity to effectively lead and manage teams, resources, and project timelines. The availability of resources, including personnel, equipment, and technology is also assessed to ensure the firm can handle the scope of the project efficiently. Additionally, the firm provides a track record of similar projects they've delivered successfully, particularly those of comparable scope and complexity. This provides confidence that the firm has the experience and capability to achieve the desired project outcomes. This comprehensive evaluation process helps ensure the selection of a highly qualified firm that can deliver innovative, high-quality results.

Implementation in the United States and Canada

The United States widely implements QBS with the Brooks Act guiding federal, state, and municipal projects. At the same time, in Canada, Quebec has taken a significant step by mandating the use of QBS for public procurement, setting a strong precedent for other provinces to follow. While other provinces and municipalities in Canada have not fully adopted QBS, many have piloted it for specific, high-stakes projects that demand expertise and innovation, demonstrating its growing acceptance and effectiveness across the country.

QBS Effectiveness Studies

A joint Canada-US research study conducted in 2022 provides a detailed examination of the advantages of QBS over other procurement methods. Data from the ACEC Research Institute, (ACEC, 2022) reveals that QBS projects experience notably lower cost growth, with only 3% cost growth attributed to change orders[2] compared to the industry average of 6%. Moreover, construction schedule growth for QBS projects averages 7%, outperforming the industry average of approximately 10%. These statistics underscore the strong association between the use of QBS, the quality of construction documents developed by the design team, and the final cost and schedule.

In addition, the Canadian QBS study (Chinowsky, P.S. 2022) finds that QBS procurement especially benefits complex projects, whether that complexity is driven by technical challenges in design, construction, community engagement, political or social sensitivities, management, or collaboration of project participants.

Project owners from both countries expressed "very high" or "high" levels of satisfaction with the quality of completed QBS projects, emphasizing the high standard of outcomes achieved through this procurement approach. Another key benefit of increased innovation on QBS projects is that it allows for more creative and effective solutions to complex challenges. Since firms are selected based on their qualifications and expertise rather than cost, they are motivated to propose innovative approaches that can deliver better long-term value, improve efficiency, and address unique project needs.

[1] "Cost growth" refers to the increase in the total cost of a project, product, or service over time, essentially the difference between its initial budgeted cost and its final realized cost, often caused by factors like inflation, unexpected changes, or additional work added during the project lifecycle.
[2] A "change order" is a formal amendment to a contract that changes the scope of work, timeline, or budget.

These statistics highlight the effectiveness of QBS in ensuring project success by prioritizing engineering expertise and qualifications over low prices, ultimately resulting in project cost savings, improved timelines, and enhanced overall quality.

Best Practices

While QBS offers numerous advantages, it also presents challenges such as limited experience in some regions of Canada and concerns about the lack of emphasis on cost competitiveness. However, best practices can significantly mitigate these risks, ensuring that QBS remains a fair and effective procurement method.

One key best practice is the involvement of a QBS facilitator, an impartial third party who can help guide the selection process, ensure transparency, and maintain fairness. The facilitator helps manage communication, sets clear expectations, and keeps the process on track, reducing potential biases or misunderstandings.

Another important practice is to thoroughly document the entire QBS selection process. Proper documentation not only helps ensure compliance with legal and procedural requirements but also provides a transparent record that can be referenced if any questions or disputes arise. This documentation should detail the criteria used for evaluation, the reasoning behind decisions, and the steps taken to ensure fairness and objectivity throughout the process.

Forming a multidisciplinary selection committee is another best practice that can enhance the effectiveness of QBS. By including individuals from various backgrounds such as engineering, project management, law, and finance the committee ensures that multiple perspectives are considered when evaluating candidates.

These best practices help reduce the risks associated with QBS, ensuring a more balanced, transparent, and effective procurement process that leads to the selection of the most qualified and capable firms for complex projects and, in turn, reduces costs.

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Carl Bodimeade, P.Eng., Chair of OSPE's Sustainable Cities Task Force

Veronica Bergs, P.Eng., Member of OSPE's Sustainable Cities Task Force

ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

EST. 2000 | CELEBRATING 25 YEARS

Shaping OSPE: Honourary Member Profiles

Alourdes Sully, P.Eng.

As OSPE celebrates 25 years of representing Ontario's engineers, we reflect not only on the impact our community has made on our members, but the influence our members have made on us. To celebrate this milestone, we reached out to OSPE leaders who have shaped the industry and OSPE itself, beginning with Alourdes Sully, P.Eng., one of OSPE's founding members.

When Alourdes Sully joined OSPE at its inception in 2000, she was enthusiastic about OSPE's mandate and eager to contribute to the creation of an advocacy group for Ontario's engineers.

She believed wholeheartedly in the need to represent engineers to the government, employers, and the public. When Professional Engineers Ontario (PEO) launched a call to draft OSPE's first strategic plan, Alourdes didn't hesitate to step up.

She responded to the call and became one of the first 100 professional engineers who worked on the initiative.

As Alourdes grew with the organization as a member, her peers encouraged her to run for the Board of Directors in 2006. With support from the OSPE community, she was elected for two consecutive 3-year terms.

Alourdes served as the Treasurer in 2009, Vice-Chair in 2010, and the Chair for the 2011-2012 term. In 2013, she remained on the board for another year serving as Past Chair of OSPE.

During her seven years on the board of directors, Alourdes played a vital role in shaping OSPE's direction. She represented OSPE on the Board of the Professional Engineers Foundation for Education, chaired both the Executive Committee and the Audit and Finance Committee, and contributed to several other initiatives, most notably the Women in Engineering Advisory Committee.

Reflecting on her time with OSPE, Alourdes highlighted key achievements during her leadership. "I am grateful that under my leadership, the board agreed to have a board member chair the Women in Engineering Advisory Committee," she shared in an email. "In addition, we expanded government liaison activities throughout Ontario. At some point, OSPE faced a very challenging moment during a PEO referendum. The board members, with the support of the acting CEO, worked collaboratively to ensure that OSPE was relevant then and remains relevant today."

Looking to the future Alourdes hopes to see OSPE further expand its membership and continue its leadership role representing the engineering profession.

"I will continue to be an active advocate for OSPE by encouraging my peers to join and engage in the governance of the organization," said Sully.

Robert Goodings, P.Eng.

The Ontario Society of Professional Engineers (OSPE) stands as a powerful advocate for engineers across the province, championing their interests and amplifying their voices. At the heart of its founding and early advocacy efforts is engineer Robert "Bob" Goodings, P.Eng., the recipient of the distinguished Lifetime Achievement Award at the 2022 Ontario Professional Engineer Awards. His lifelong commitment to the profession has left a lasting impact on the engineering community in Ontario and beyond.

A Life in Engineering

Born in Timmins, Ontario, in 1929, Robert Goodings shared an inseparable bond with his identical twin brother. Their journey through life and education mirrored one another's, ultimately leading Goodings to Queen's University, where he graduated in 1951 with an engineering degree.

His professional career began at Gore and Storrie Limited, an engineering company specializing in designing water and sewage treatment plants across Canada. Goodings played a crucial role in major projects such as the Ashbridges Bay Sewage Plant and the R.C. Harris Water Treatment Plant. Over time, his career extended beyond Canada, contributing to global projects through his work with Parsons Brinkerhoff and CH2M Hill.

OSPE members Bob Goodings, P.Eng., and Bill Goodings, P.Eng., photographed with their classmates after receiving their iron rings from Queen's University in 1951.

The Birth of OSPE

Goodings' leadership extended beyond engineering design. He became actively involved with Professional Engineers Ontario (PEO), serving as its president. However, during his tenure, he recognized a critical gap in that while PEO was responsible for licensing and regulating engineers, it was unable to advocate on behalf of the profession. There was a pressing need for an organization that could address the professional, economic, and business concerns of engineers. This realization led to the creation of OSPE.

In the early days, OSPE faced an uphill battle. Few knew of its existence, and it had to establish its role as the voice of engineers. One of its first major advocacy efforts came during the Walkerton water crisis, where Goodings and OSPE played a pivotal role in shaping legislation that strengthened water and sewage system regulations. This effort marked OSPE's emergence as a trusted advocate and industry leader.

A Lasting Impact

Goodings often credited the success of OSPE to the engineers who rallied behind it. His leadership philosophy was not about personal accolades, but about enabling others to thrive. He believed in creating opportunities for engineers to advance their careers and contribute meaningfully to society.

His legacy is evident not only in the policies and advocacy efforts spearheaded by OSPE, but also in the engineers who have gone on to lead within OSPE and PEO. As he humbly put it, "I don't think I had any special skills, but I was a hard-working guy that people could depend on."

Thanks to his tireless leadership and dedication, OSPE has grown into the strong organization it is today, serving as a model for other provinces in Canada. His contributions to the engineering profession—both in practice and advocacy—have transformed the field, ensuring that engineers in Ontario have a platform to advance their interests and shape the future.

From the Archives: Celebrating 25 Years of OSPE

As OSPE marks 25 years of championing Ontario's engineering community, we're reflecting on the milestones that have shaped both our organization and the profession. From groundbreaking inaugural events that are now OSPE traditions, to the foundations of our advocacy framework, we're celebrating the moments that have defined our journey.

2006

OSPE Establishes the Political Action Network (PAN)

In 2006 OSPE began a grassroots initiative for volunteers to meet with MPPs called the **Political Action Network (PAN)**. This network of volunteers opened the gates for OSPE to influence policymakers at the provincial level and ensure OSPE's messages reached every constituency in Ontario.

Through this network, members became engaged in advocating for the engineering profession. In 2012, PAN volunteers expanded their reach to include Ontario-based MPs and federal ministers with portfolios of interest to engineers. By March 2014, 82 Ontario ridings had a PAN representative.

2014

OSPE Hosts its First Engineering Employment Event (E3)

In early 2014, the Engineering Employment Event (E3) became an instant classic for all of the same reasons it's so popular today.

E3 events offer engineers from all disciplines and career stages the opportunity to connect face-to-face with companies actively recruiting engineering talent. The event consistently gets positive feedback from both attendees and partners. The quality of engineers who engage with OSPE and attend these events is what has brought many partners like **Toronto Hydro**, **Enbridge**, and **Bombardier** back year over year to participate.

2018

OSPE Officially Creates P.Eng. Day in Ontario

In March 2018, OSPE received formal recognition from the **Legislative Assembly of Ontario** that every March 1st be declared **Professional Engineers Day** in Ontario.

P.Eng. Day recognizes the vital role that professional engineers play in designing, creating, and safeguarding our province. They are on the front lines of innovation and create paradigm-changing solutions that drive and improve the world around us. To honour that first P.Eng. Day, Sudbury's iconic attraction, the **Big Nickel**, was lit purple to celebrate engineers across the province!

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Meet our members and view their stories at
ospe.on.ca/weareengineering

ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

From Karun's Heights to Hatch's Horizons: Carl Bodimeade and Leila Jafari

From the rugged mountains of Iran to the bustling cities of Ontario, Carl Bodimeade and Leila Jafari's engineering stories are woven together by their connection to the Karun Dam and their current careers at Hatch.

Carl, who serves as Senior VP at Hatch and is originally from the UK, worked on the Karun Dam project in Iran early in his career. "As part of my overseas work, I worked on the Karun Dam, which is on the Khusestan River in the southwest of Iran," he explains. "It's a 200-meter high dam in very mountainous terrain with a 2000-megawatt powerhouse. The purpose of the dam is power generation, flood control, and irrigation. Seeing that as a young engineer was quite an experience."

This project was not only technically challenging but also logistically demanding. "When we were doing the geotechnical investigations, we had to move the drill rigs around by helicopter," Carl recalls. "But during the Iran-Iraq war, helicopters were unavailable, so we had to break down the drill rig into parts and manually transport it to the top of the mountain. It was a very challenging site, but very rewarding."

Leila's connection to the Karun Dam came years later as an engineering student in Iran. "I got my inspiration from the very same dam," she says. "As part of an educational field trip, our professor took us to see the dam. I was stunned by the height and scale of it. It was almost jaw-dropping for me as a young student. I decided then that I wanted to work for the company that designed it, which was Hatch."

Prior to encountering the Karun dam, Leila's engineering aspirations were influenced by her father, who was also an engineer. "My father brought work home and had us

help with calculations," she remembers. "I wanted to be like my dad. I was good at solving problems and meeting new people, which led me to engineering."

After completing her studies at Shahid Chamran University of Ahvaz with a B.A.Sc. in Civil Engineering and then working for several years thereafter, Leila moved to Canada to continue her engineering career.

"When I came to Canada, I faced the challenge of understanding the work culture here," she says. "The technical skills are the same, but the culture and teamwork are different. OSPE helped bridge that gap, providing opportunities for networking and mentorship."

Both Carl and Leila found their professional homes at Hatch, a global engineering, project management, and professional services firm. "Hatch has been instrumental in our careers," says Carl, who holds an M.Sc. in Soil Mechanics from Imperial College, London and a B.Sc. (Hons.) in Engineering Geology Newcastle University. "I moved to Canada and worked in Alberta before settling in Ontario with Hatch. My roles have varied from geotechnical to municipal water and wastewater engineering, and now strategy and business development across multiple sectors."

Leila echoes Carl's sentiments about Hatch. "Working at Hatch was a dream come true," she says. "I faced challenges, such as gaining Canadian work experience, but Hatch and OSPE provided the support I needed. Being selected as one of the best mentors at Hatch was one of the most rewarding experiences of my career."

Their work at Hatch often intersects with their past experiences. Carl, with his vast expertise in geotechnical and environmental engineering, and Leila, with her focus on project management and mentorship, both bring unique perspectives to their roles. "Our experiences in Iran, particularly with the Karun Dam, have shaped our engineering philosophies," Carl notes. "The challenges we faced there taught us resilience and innovative problem-solving."

Leila adds, "The Karun Dam project inspired me to pursue engineering, and now at Hatch, I can contribute to projects that have a lasting impact. It's fulfilling to work on projects that not only solve technical problems but also improve communities."

Their involvement with the Ontario Society of Professional Engineers (OSPE) has been a critical part of their professional development. "OSPE has been

Image: Karun Dam project in Iran.

essential for networking and professional growth," says Leila. "Through OSPE, I found mentors who helped me navigate the Canadian engineering landscape. Now, I give back by mentoring others, helping them integrate into the workforce."

Both Carl and Leila emphasize the importance of professional networks and mentorship. "Networking is crucial in engineering," Carl notes. "Through OSPE and Hatch, we have been able to build strong professional networks that have supported our career growth and development."

Their work at Hatch allows them to leverage their diverse experiences and skills. Carl's expertise in geotechnical and environmental engineering and Leila's focus on project management and mentorship make them valuable assets to the firm. "Our work at Hatch often brings together our past experiences and current roles," Carl says. "The projects we work on have a significant impact on communities, and it's fulfilling to contribute to these projects."

"Engineering is about solving problems and overcoming challenges," Carl adds. "Our experiences in Iran, particularly with the Karun Dam, taught us valuable lessons that we apply to our work today."

Leila says she always strives to pass on her experience through project management and mentorship. "Project management requires a balance of technical skills and interpersonal skills," she explains. "Mentoring others is also a big part of my role. Helping new engineers integrate into the workforce and navigate their careers is something I am passionate about."

"Engineering is about solving problems and overcoming challenges," Carl notes. "Our experiences in Iran, particularly with the Karun Dam, taught us valuable lessons that we apply to our work today."

Leila adds, "The Karun Dam project was a turning point for me. It inspired me to pursue a career in engineering, and now at Hatch, I can contribute to projects that have a lasting impact. It's fulfilling to work on projects that improve communities and make a difference."

Their stories are a testament to how early career experiences and challenges shape resilient, innovative engineers who continue to contribute significantly to their fields. At Hatch, they continue to build on their legacies, working on projects that matter while mentoring the next generation of engineers.

Meet our members, learn what they do and why it matters:

Emily Pepper, P.Eng.

Hamza Alami, EIT, PMP

Carl Bodimeade, P.Eng.

Leila Jafari, P.Eng.

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- The Engineering Profession
- Research & Innovation
- Project Management
- Public Safety

Note: All presenters earn continuing professional development credits for their efforts.

OSPE's Upcoming Events

MAR 19
MAY 14

Engineering Employment Event (E3)

Join us at one of OSPE's engineering job fairs. They bring together dozens of major employers and skilled engineering candidates across Ontario to network face-to-face.

GTA | March 19

Ottawa | May 14

MAY
06

Annual General Meeting

Members and guests who attend the annual general meeting get to celebrate OSPE's advocacy wins for the year, recognize in-coming and outgoing Board members and conduct official OSPE business.

Virtual

JUN
05

OSPE Classic Golf Tournament

Relax, mix and mingle with Ontario's engineering community and industry stakeholders over golf and dinner. A portion of all proceeds go to the Ontario Professional Engineers Foundation for Education, which helps engineering students design the world of tomorrow!

Angus Glen Golf Club, Markham, ON

NOV
3-4

The 2025 Engineering Conference

Join us for Canada's largest engineering event. In 2025, the Engineering Conference will bring engineers together with industry, government and academic partners to discuss the latest opportunities, challenges and innovations in engineering.

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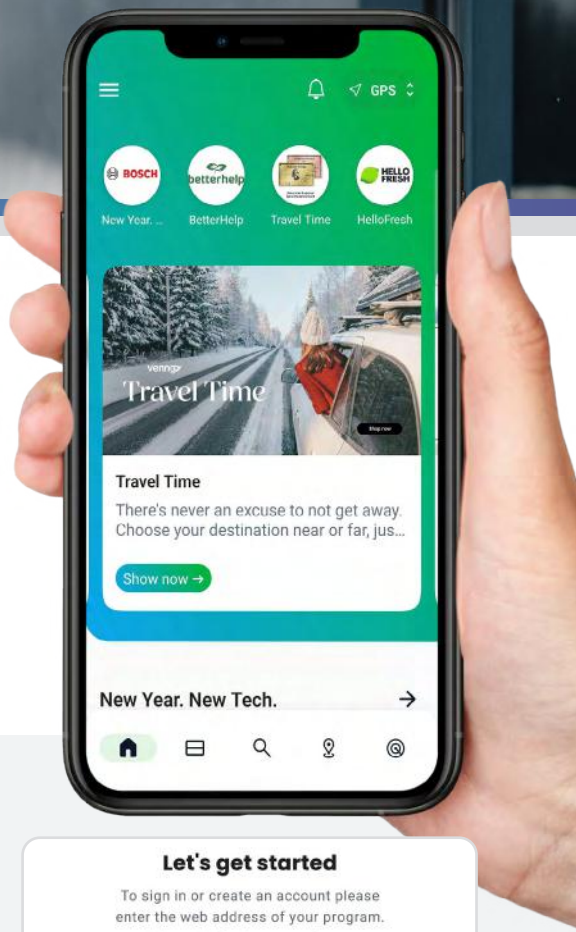

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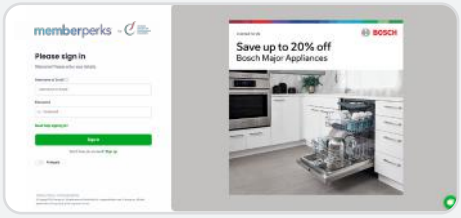

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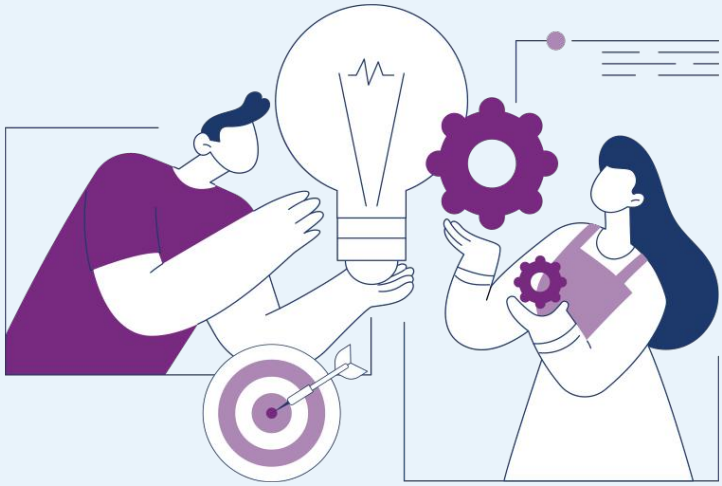
National Engineering Month



Upcoming Events

Building Tomorrow's Grid: Engineering Ontario's Energy Future

March 17 (3 pm)

Virtual

Join Mark Tulloch, CEO and founder of TULLOCH for an in-depth exploration of Ontario's evolving energy infrastructure, current landscape, and future requirements. As the province's energy sector requires increased capacity, this session highlights the challenges and opportunities shaping the future of sustainable development and how our industry will support these demands. Learn More

Celebrating Engineering Month in Ottawa

March 21 (5 pm)

St-Laurent Complex, Ottawa, ON

This event is catered towards engineering students, engineers-in-training (EITs), and fully licensed professional engineers (P.Eng.). This event invites attendees to listen to professionals, Mina Sedarous, P.Eng. and Christian Guimond, P.Eng., talking about their projects and challenges within their field. This event aims to inspire and inform attendees about the roles that engineers play in society. Learn More

Beyond the Buzz: The Application of Nuclear Energy and EV's in Ontario

March 27 (6 pm)

Rotman School of Management, Toronto, ON

Join the Society of Women Engineers Toronto for an enlightening evening as they explore the powerful intersection of nuclear energy and electric vehicles (EVs) in shaping Ontario's clean energy future. As the province accelerates its transition to net-zero emissions, nuclear power remains the backbone of Ontario's electricity grid, supplying over 50% of the province's energy—a reliable and low-carbon source crucial for meeting rising electricity demands. Meanwhile, EV adoption is surging, with Ontario aiming to have 400,000 EVs on the road by 2030, supported by expanding charging infrastructure and government incentives. Learn More

Brought to you by OSPE

The Debrief: A Post-Election Engineering Advocacy Forum

March 25 (12 pm)

Virtual

Wondering what the results of Ontario's provincial election mean for you as an engineer?

Join the **Ontario Society of Professional Engineers (OSPE)** for a virtual panel discussion bringing together the engineering community and industry leaders to explore five key topics shaping Ontario's engineering sector post-election. The discussion will focus on how Ontario's newly elected government's policies will impact the profession and how engineers can contribute to addressing provincial challenges in infrastructure, energy, housing, and education. Learn More

Other Events You Won't Want to Miss:

2nd Annual National Engineering Month Mentor-to-Mentee Connection | March 15

Engineering Nature Walk for a Sustainable Future | March 16

Bridging the Gap Between Sustainability and Indoor Air Quality | March 19

Emerging Trends in Information Technology | March 19

HanStone Canada Guided Tour | March 20

Engineering the Future: A Panel on Empowering the Next Generation of Engineers | March 20

Industry-Academia Synergy: Building Engineering Partnerships | March 20

Promoting Females in Engineering for Young Girls | March 20

Engineering the Digital Backbone: TELUS's Infrastructure & Cybersecurity Resiliency | March 25

Shark Tanks for Sustainable Engineering | March 26

Engineering Startup Challenge | March 26

Ursula Franklin Women in Engineering Faculty Panel | March 26

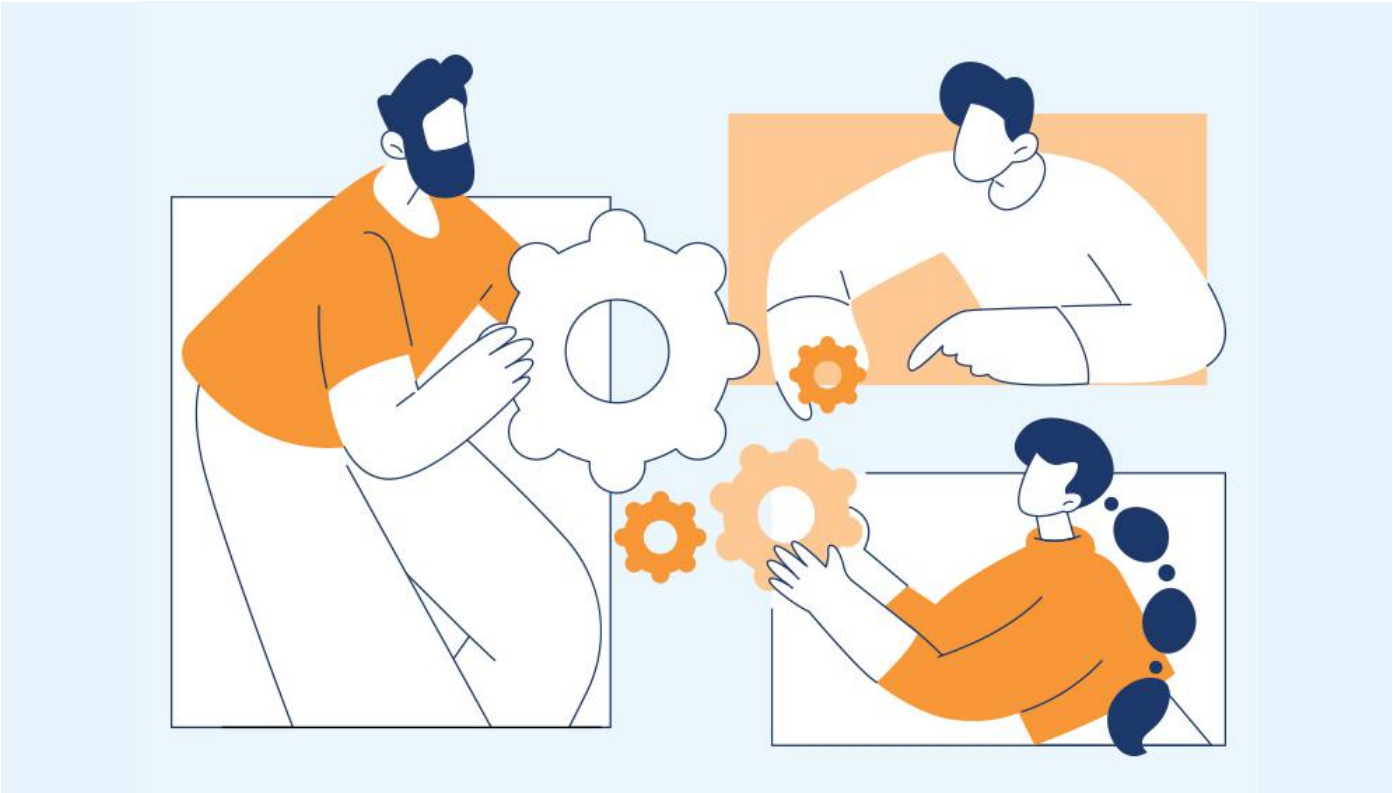
Fuel iX – TELUS Digital's Enterprise GenAI SaaS | March 27

The Use of AI, Information Systems and Robotics in Tackling Environmental Challenges | March 28

Si se puede | March 28

For Full Details Visit Events - nemontario.ca/events/

national ENGINEERING MONTH



International Engineering Graduate Networking Event Recap

The Ontario Society of Professional Engineers (OSPE)'s **Equity, Diversity, Inclusion, and Accessibility (EDIA) Task Force** proudly held its first International Engineering Graduate (IEG) Networking Event on February 26, 2025.

The event, tailored to those who received engineering degrees from outside Canada, aimed to bring clarity, confidence, and community to IEGs in Ontario. The event started with a lunchtime virtual gathering where 30 participants engaged with presentations from community members. OSPE staff gave a talk on the P.Eng. licensure process. **Hamza Alam**i and **Zubair Hossain, P.Eng.** from the EDIA Task Force spoke about their experiences as IEGs and **Daniel Bernhard** from the **Institute for Canadian Citizenship** gave the perspective of someone who works with many newcomers to Canada. Bernhard emphasized the support the Institute for Canadian Citizenship has to offer and how valuable it is to stick to the Canadian citizenship process, even through potential difficulties.

Later, the group of 30 IEGs met at The Pickle Barrel in Toronto for an evening of food, drinks, and casual networking among peers. The atmosphere was supportive, and the event was an open forum for people to get to know each other, share their experiences, and inform OSPE of what supports are needed for IEGs going forward.

International Engineering Graduate Networking Event Lunchtime Webinar.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The Student's Perspective: The Ontario Engineering Competition 2025

The **Ontario Engineering Competition (OEC)** (hosted by the **Engineering Student Societies' Council of Ontario**) is an annual student-run, three-day competition that brings together more than 300 of the province's brightest students. Competitors demonstrate their engineering skills in a competitive environment, while also developing meaningful relationships with their peers. OSPE has been an avid supporter of the OEC, here is what two participating students had to say about this year's competition held at McMaster University:

Moureen Khella, Mechatronics Engineering Student, Toronto Metropolitan University

The **Ontario Engineering Competition (OEC)** was an exciting event that brought together engineering students from across the province to compete, share ideas, and grow as professionals. It was a unique opportunity to meet people from different schools, make new friends, and learn from others' experiences. Teamwork played a key role in this competition as it was required and helped build collaboration, problem-solving, and communication skills that are essential for any engineer. Watching the innovative solutions presented by other teams was both inspiring and motivating as it allowed us to think outside the box when tackling challenges.

One of the highlights of OEC was the career fair, where we were able to network with professionals from various companies and learn about different roles in the engineering industry. Speaking directly with engineers who have the jobs you aspire to have one day was motivating and insightful. We asked questions, got tips on how to prepare for our careers, and even discovered paths we hadn't even considered before.

Manha Najam, Biomedical Engineering Student, Toronto Metropolitan University

The **Ontario Engineering Competition (OEC)** was an insightful and exciting experience—one that pushed my partner, Moureen Khella, and me to think critically, communicate effectively, and connect with like-minded individuals.

The competition kicked off with an adrenaline rush. We competed in the Engineering Communications category,

Toronto Metropolitan University students Moureen Khella (left), and Manha Najam (right) at the Ontario Engineering Competition 2025 in Hamilton, ON.

so we received our prompt and had two hours to research and write an abstract. With the clock ticking, we gathered sources and crafted a clear, compelling argument. By 4 pm, the abstract was submitted, but there was no time to relax—we had a full presentation to prepare by 11 pm.

The competition day was intense but exhilarating. We took an interactive approach to our presentation, which the judges appreciated, making the presentation engaging and dynamic.

OEC taught me the value of resilience under pressure and the power of clear communication. In today's world, articulating ideas effectively is just as important as having great ideas in the first place.

The Ontario Engineering Competition 2026 will be held in January of next year at Carleton University.

All-Candidates Virtual Town Hall

go.ospe.on.ca/town-hall-2025

Register Now

Meet your 2025 Board of Directors candidates and make an informed choice in this year's election.

March 26, 2025
6:30 pm

Hosted Virtually

EngConnect
By OSPE

These events are open only to OSPE Members.

Join us at OSPE's Annual General Meeting

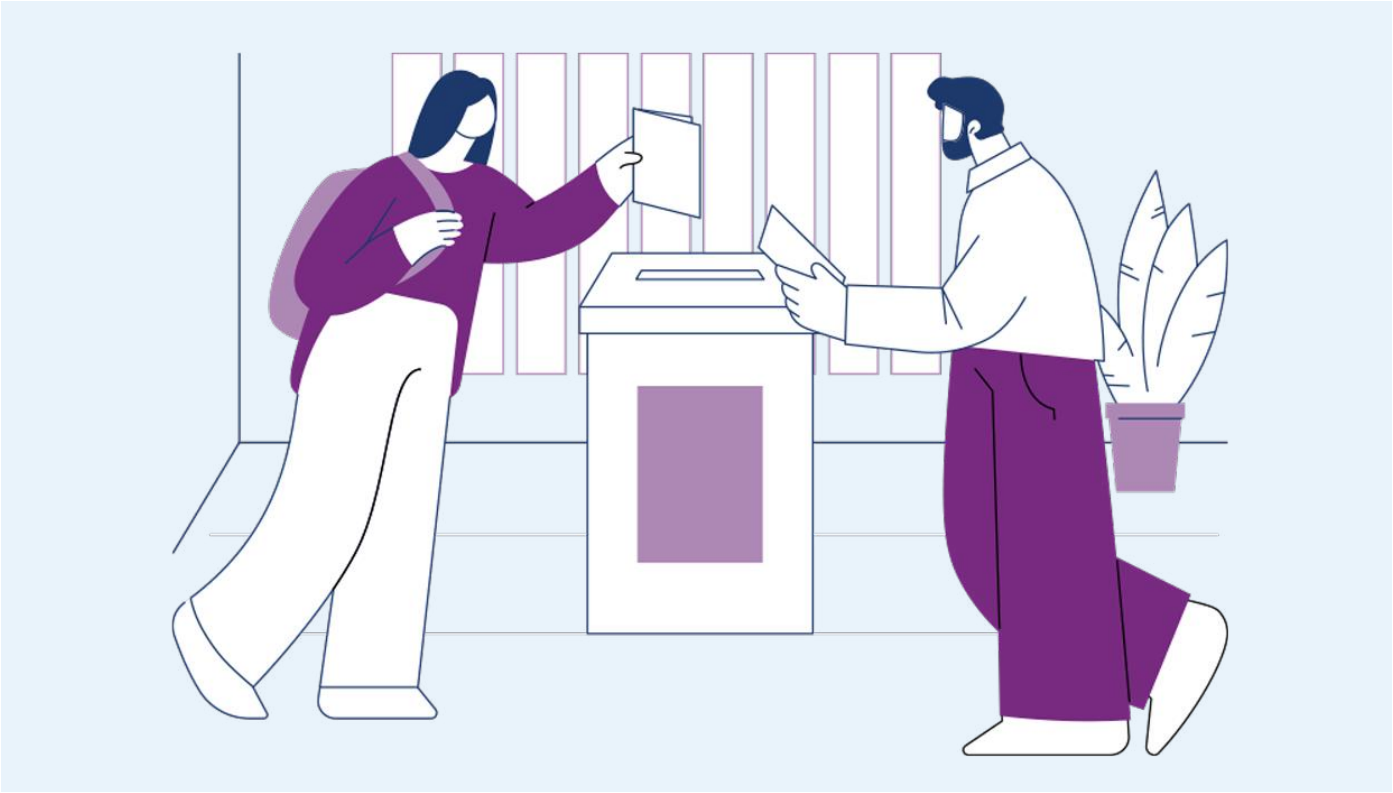
- Hear about OSPE's 2024 activities and achievements
- Meet your 2025/26 Board of Directors
- Receive important updates and learn about plans for the future
- Engage fellow OSPE members.

May 6, 2025
6 pm

Hosted Virtually

Register Now

go.ospe.on.ca/agm-2025



2025 OSPE Board Elections

Help Guide Your Member Association By Voting

The following pages contain profiles for all candidates running in this year's OSPE Board elections. There are 4 open positions, each for a 3-year term. The profiles are listed in alphabetical order. These profiles, along with complete details on OSPE election procedures, may also be viewed online at https://ospe.on.ca/the-profession/governance/board-elections/.

The slate of candidates presented has been approved by the OSPE Nominations Committee and the OSPE Board of Directors. All biographical information was prepared and submitted by the candidates. All candidate statements are the opinions of the candidates and do not necessarily reflect the opinions of OSPE.

For more information on OSPE, please visit www.ospe.on.ca or call 416-223-9961 or 1-866-763-1654.

Important Dates

March 24, 2025
Ballots and candidate information sent to members – Voting Opens

March 26, 2025
All andidates Virtual Town Hall

April 14, 2025
Voting closes

May 6, 2025
OSPE Virtual Annual General Meeting

For more information please contact **Valeria Mueller** at **vmueller@ospe.on.ca**.

Sandra Ausma, Ph.D., P.Eng.

EMPLOYER AND POSITION
Retired. Volunteer director on engineering focused boards.

EDUCATION
Ph.D. Land Resource Science, University of Guelph
M.Sc. Biological Engineering, University of Guelph
B.A.Sc. Chemical Engineering, University of Waterloo

EMPLOYMENT HISTORY
Ontario Forest Industry Association - Technical Advisor,
Ontario Public Service (OPS) - Supervisor
- Ministry of Natural Resources and Forestry
- Ministry of the Environment

AMEC – Senior Air Quality Engineer,
Ministry of the Environment – Project Manager, Assistant Manager,
- Recipient, OPS Amethyst Team Award
- Nominee, Ministry of the Environment Emerald Award

Ministry of the Environment – Air Quality Analyst,
Max Planck Institute for Chemistry, Germany – Post-Doctoral Scientist,
University of Guelph – Engineering Technician

ACTIVITIES IN ADVOCACY ORGANIZATIONS
- Director, OSPE (2022 – 2025, 2015 – 2016)
  - Audit and Finance Committee, Board Development and Strategic Planning Committee
  - Chair, Women in Engineering Advocacy Committee (2015 – 2016)
  - Co-Chair WEAC 2015 Fall Forum “Getting a Seat and Having a Voice: The Importance of Women Engineers at the Boardroom Table”
- Member, Women in Engineering Advisory Council – OSPE (2012 – 2016)
- Member, Women in Science and Engineering, Sudbury (2003 – 2014)

YEARS OF REGISTRATION WITH PROFESSION
- 36 years

OTHER PROFESSIONAL AFFILIATIONS
- PEO, elected councillor
  - Councillor-at-Large (2019-2021)
  - Vice President, Appointed (2013-2014)
  - Councillor, Northern Region (2012 – 2014)

COMMUNITY SERVICE
- Ontario Professional Engineers Foundation for Education
  - Vice President, Fundraising Committee co-chair (current)
  - Director, Fundraising Committee chair (2019 to 2025)
- Laurentian University School of Engineering Advisory Board Director (2023 – present)
- OWD’s Leading Women Building Communities Award Recipient
- United Way Toronto – Ministry of the Environment (2009) Campaign Co-Chair
  - UW GTA Spirit Award Nominee
- Volunteering at schools as science fair judge as well as organizer and volunteer at GoEngGirl events
- Member, Clean Air Sudbury Steering Committee (2005 – 2013)

CONFERENCES OR TECHNICAL PAPERS
Six refereed publications. More than 10 conference proceedings / presentations.

CANDIDATE STATEMENT
I am honoured to serve on the OSPE Board and I am now seeking to be re-elected and serve for a second term. As a professional engineer and a longtime member of OSPE, I support the diverse advocacy work that OSPE does on behalf of all engineers and the engineering profession, and I support PEO’s transformation into a modern engineering regulator. My desire is to apply my skills and continue to serve on the OSPE Board to support our growth and evolution through our next strategic plan.

Since 2012, I have played a role in the leadership of our profession as an elected member on PEO council and a director on OSPE’s board. I bring to the board my experience with governance of the engineering profession, relationship building skills and collaborative approaches.

Thank you for your consideration and your engagement as an OSPE member.

Sara Dolatshahi, P.Eng.

EMPLOYER AND POSITION
Nuclear Waste Management Organization (NWMO), Director of Strategic Projects

EDUCATION
- Bachelor of Chemical Engineering & Master of Nuclear Engineering, McMaster University

EMPLOYMENT HISTORY
- 1999-2022: Ontario Power Generation (OPG)
- 2022-Present: NWMO

ACTIVITIES IN ADVOCACY ORGANIZATIONS
- Chair, Bridging the Gap Committee – Led initiatives that increased diversity in nuclear operations management and contributed to regulatory changes, earning nomination as one of Canada's Most Powerful Women in 2020.
- OSPE Keynote Speaker – Addressed climate change, nuclear energy, and waste management.

YEARS OF REGISTRATION WITH PROFESSION
- Registered Professional Engineer in Ontario since 2003

OTHER PROFESSIONAL AFFILIATIONS, INCLUDING POSITIONS HELD
- Mentor at Engineer Girl
- Women in Nuclear (WIN) Speaker
- Pursuing professional speaker certification (John Maxwell Leadership Organization)

COMMUNITY SERVICE
- Organization: Blythwood Junior Public School Parent Council
- Position: School Support
- Length of Service: 2 years

CONFERENCE OR TECHNICAL PAPERS GIVEN OR PUBLISHED
- Keynote Speaker, Panelist & Moderator at 20+ domestic & international conferences

CANDIDATE STATEMENT
With 25 years in the nuclear industry, I am deeply committed to advancing the engineering profession through advocacy, policy development, and leadership. My expertise spans operations, regulatory affairs, governance, and strategic planning—aligning with OSPE's mission.

In 2023, I led the development of Canada's Integrated Strategy for Radioactive Waste Management, ensuring alignment with government policies and industry needs. This work required extensive engagement with Indigenous peoples and public, strategic advocacy, financial accountability, and decision-making—skills that are critical to OSPE's initiatives. I now lead the implementation of a new mandate for NWMO stemming from that Strategy, managing multi-million-dollar budgets, developing a sustainable funding model, and building technical and engagement programs from the ground up.

As a board member of a small business specializing in home improvements, I provide strategic leadership while ensuring financial sustainability and risk oversight. My experience as a licensed Nuclear Plant Shift Manager further strengthened my ability to lead in high-pressure environments, uphold regulatory compliance, and safeguard public safety.

As a mother of two daughters, a daughter of a hardworking immigrant parent, and the first female shift supervisor at Pickering B Nuclear Power Plant, I understand firsthand the value of a diverse workforce. Diversity and inclusion are essential to a thriving profession. In 2020, I spearheaded an initiative that increased female participation in the federally licensed nuclear plant operations program by 30%, leading to regulatory updates by the Canadian Nuclear Safety Commission. These efforts underscore my commitment to equity, representation, and systemic change.

Engineers play a vital role in shaping Ontario's future. If elected, I will advocate for policies that elevate our profession, strengthen member engagement, and create meaningful opportunities for engineers to excel and lead.

I appreciate your support and look forward to serving.

John Hazel, P.Eng., FEC

EMPLOYER AND POSITION
Senior Leader (quondam), WaveSuite Application Software at Nokia

EDUCATION
- MBA, University of Ottawa
- B. Eng. Concordia University

EMPLOYMENT HISTORY
- Senior Leader, Network Management Engineering, Nokia
- Leader, IP/Optical Access Product Quality Assurance, Alcatel-Lucent
- Leader, System Integration, eXtremeVoice

ACTIVITIES IN ADVOCACY ORGANIZATIONS
- Officer (Chair, Vice-Chair, Secretary) and Director roles – PEO Ottawa Chapter
- Member / Chair - PEO Ottawa Chapter Committees: Awards, Licensure Assistance, Government Liaison, New Members, By-Laws, OSPE Liaison
- Member, OPEA Judging Panel
- Vice-Chair, Education Outreach Central Committee – PEO

PROFESSION REGISTRATION
33 years with PEO

OTHER PROFESSIONAL AFFILIATIONS
- Order of Honour, PEO
- Fellow of Engineers Canada
- Featured in Enabling the Next Generation of Engineers to See Farther & Achieve More, The Voice, OSPE
- Featured in Everyday Engineers, Engineers Canada

COMMUNITY SERVICE
- Ontario Volunteer Service Award, Ministry of Heritage, Sport, Tourism and Culture
- Special Awards Judge, Ottawa Regional Science Fair
- University of Ottawa Student Mentorship Program
- Engineer In Residence for Ottawa-Carleton District School Board
- Ottawa Network for Education
- National Research Council Engineering Challenge
- Board of Directors, Qualicum-Graham Park Community Association

CONFERENCE OR TECHNICAL PAPERS
- WaveSuite: Open Applications for Network Transformation, presented to the IEEE Student Professional Awareness Conference
- Adapting Test Teams to Organizational Power Structures, presented at STAREAST Orlando, Florida
- Field-Tested Techniques to Identify Thinking Testers presented to the Kitchener-Waterloo SQA Conference
- Tester Credibility: From Agile to Waterfall presented at Toronto Workshop on Software Testing
- On Improving Design Practice, Engineering Dimensions

CANDIDATE STATEMENT
As a member of OSPE since its inception, I have observed steady progress in elevating the profile of the profession through government advocacy, and serving members with opportunities for learning, networking and community.

I have held numerous leadership roles overseeing geographically dispersed teams serving customers in dozens of countries. In both small start-ups and established multi-nationals, I planned, directed and delivered cutting edge product and service solutions, applying business acumen, collaboration, and a passion for innovation.

Volunteering with PEO, I was accountable for governance, committee oversight, business plans, recruiting volunteers and succession planning. I engaged with partner organizations to conceive, develop and deliver programs to benefit stakeholders, raising awareness of engineering (government liaison, education outreach, community engagement) and serving the PEO membership (professional development, mentorship, networking events). I recognize the importance of the fiduciary duty and maintain high personal standards for respect, accountability and integrity, closely aligning with OSPE's values. I am confident these experiences, and my familiarity with effective board operations will serve in realizing OSPE's mission: leading through advocacy, fostering inclusivity, and furthering member's prosperity with growth opportunities, and enhanced public perception. Thank you.

Inga Hipsz, M.A.Sc., P.Eng.

EMPLOYER AND POSITION
Canadian Standards Association (CSA Group) – VP, Standards, Strategic Development

EDUCATION
- M.A.Sc., Mechanical Engineering, University of Toronto, 1996
- B.A.Sc., Mechanical Engineering, University of Toronto, 1994

EMPLOYMENT HISTORY
- Canadian Standards Association (CSA Group) – 2005 to Present
  - VP, Standards, Strategic Development
  - Regional VP, Operations, Americas – Testing & Certification
  - VP, Global Programs – Strategic Development
  - Director, Global Programs – Strategic Development
  - Director, Sustainability – Standards
  - Program Manager, Environment & Climate Change – Standards
  - Innovation Champion – Standards
  - Project Manager, Nuclear – Standards

- Eastman Kodak Co. (Kodak Canada Inc.) – 1997 to 2005
  - Process & Maintenance Engineer/Coating Division Team Leader
  - LEAN Communication Team Leader
  - Quality Analyst/Manager
  - Technical Support/Project Manager

ACTIVITIES IN ADVOCATING ORGANIZATIONS
- Canadian Standards Association – coordination with public policy and government relations teams, as well as advocacy for CSA's mission are a part of core responsibilities

YEARS OF REGISTRATION WITH PROFESSION
- PEO (25yrs)

COMMUNITY SERVICE
- PEO Strategic Stakeholder Advisory Group Member (1yr)
- University of Toronto Engineering Faculty Council Alumni Representative (1yr)
- University of Toronto Mechanical Engineering Class of 9T4 Alumni Ambassador (31yrs)
- Oakville Girls Softball Association, Etobicoke Girls Softball League, City of Vaughan Softball Association, Toronto Fastpitch Club, Mississauga SW Girls Softball – Fundraising Volunteer (10yrs)
- Nativity of Our Lord School Parent Committee Member (6yrs)
- Hydro Bright Lights Childcare Centre Board Member (4yrs)

CONFERENCE OR TECHNICAL PAPERS GIVEN OR PUBLISHED

Listed on https://www.linkedin.com/in/ingahipsz/

CANDIDATE STATEMENT
With over 28 years of leadership experience in world-class engineering environments, I have dedicated my career to advancing the profession, driving innovation, and delivering meaningful change. My ability to align organizational goals with impactful initiatives, coupled with expertise in standards, advocacy, regulatory compliance, risk mitigation, and financial management, uniquely position me to contribute to OSPE's mission.

As an executive at CSA, I advanced national and international industry standards, championed engineers, and led transformative change. My career in standards development has honed my ability to collaborate with diverse stakeholders from government, industry, and academia to build consensus and deliver solutions that safeguard and address the public interest. Recognized with multiple awards, my leadership reflects a deep commitment to engineering excellence. Beyond my professional achievements, I am deeply committed to mentoring and shaping the next generation of engineers. As the UofT Engineering Alumni Ambassador, a community volunteer, and an advisor to young professionals, I actively drive DEI initiatives, ensuring the profession reflects the diversity of the communities it serves. I take pride in mentoring young female engineers, sharing insights, and fostering leadership growth.

Serving on the OSPE Board is a meaningful opportunity to give back on a greater scale - advocating for engineers across Ontario and elevating the profession's significance in Canada. I would be honoured to bring my expertise and passion to help OSPE drive lasting impact for its members.

Raymond J. Mantha, P.Eng., F.E.C.

EMPLOYER AND POSITION
Retired

EDUCATION
University of Ottawa, BASc in Civil Engineering, 1978

EMPLOYMENT HISTORY
Worked in the Ontario Government for 34 years where I held two Assistant Deputy Minister level positions, most recently at the Ministry of Northern Development, Mines.

Held progressively responsible positions at the Ministry of Transportation, serving as its Chief Engineer, responsible for a broad range of policies, standards and investment strategies for Ontario's roadways. I also led Ontario's transportation response post 911 including the planning and early design of the new Gordy Howe Bridge between Windsor and Detroit.

Served a four-year term as the Executive Director of the Transportation Association of Canada Foundation supporting the development tomorrow's transportation professionals.

External member on the Morrison Hershfield, Consulting Engineers, board of directors from 2013 to 2021 and board Chair from 2018 to 2020.

ACTIVITIES IN ADVOCACY ORGANIZATIONS
- OSPE Board Director, 2022-present, Chair, Audit and Finance Committee, 2023-present, Executive Committee Member, 2023-present
- Engineers Canada, Member of the Public Affairs Advisory Committee for 10 years. Supporting the CEO through the creation of National Position Statements on engineering matters critically important to Canadians.

YEARS OF REGISTRATION WITH PROFESSION
PEO, since 1980
Engineers Canada Fellowship, 2009

OTHER PROFESSIONAL AFFILIATIONS, INCLUDING POSITIONS HELD
- Technical Standards and Safety Authority Board, 2024-present
- Canadian Mining Innovation Council, Ontario's Board Member, 2011-2012
- Transportation Association of Canada Board, 2006-2011, President, 2010-2011
- Transportation Association of Canada Chief Engineers Committee, 2004-2006, Chair, 2005-2006
- Canadian Transportation Engineering Research Standing Committee, 2004-2010
- US Standing Committee on Transportation Research, 2004-2010
- Canadian Council of Motor Transport Administrators, 2004-2010

COMMUNITY SERVICE
- Science North Board, Canada's now largest Science Centre, 2020-present, Chair, Business Affairs Committee, 2022-present, Executive Committee Member, 2022-present
- YMCA Canada National Board, 1995-2005, Chair, 1999-2002
- World Alliance of YMCA's – 128 countries, 2002-2006, Executive Committee Member
- PEO Chapter in North Bay, 1988-2005, Chair, 1992-1993
- Local organizations such as Rotary, Easter Seals, Ski Racers, Canoe Club

CANDIDATE STATEMENT
For the past three years, I have proudly served on the OSPE Board, contributing to its growth and impact. OSPE is leading the way in developing diverse learning opportunities in response to PEO's PEAK initiative, ensuring engineers stay ahead. We are the strong, unwavering voice advocating for Ontario's engineering community, delivering critical insights that shape our province. As a member of the Audit and Finance Committee and serving as Treasurer, I have been dedicated to ensuring that our organization's financial resources are managed with transparency, accountability, and efficiency. Fiscal responsibility is essential to maintaining the trust of our membership.

While I continue to call Northern Ontario home, my commitment extends to serving and representing engineers across the entire province, while also representing the unique needs and perspectives of our region.

Jane Ravenshaw, P.Eng.

EMPLOYER AND POSITION
President, one-two-five inc.

EDUCATION
University of Toronto, BASc, Industrial Engineering, 1985

University of Waterloo, MASc, Management Science, 1990

EMPLOYMENT HISTORY
- 1985-1996: General Motors, Manager, Industrial Engineering. Focused on simulation modeling of manufacturing systems and analytics.
- 1996-2002: Nortel Networks- Manager, New Product Introduction. Obtained PMP certification and rose to Director, Program and Product Management.
- 2003-2013: The Marketing Store- Managing Partner, Toronto Agency and COO, North America.
- 2016-2018: CEO, TSI Auto Solutions brought in to take the company through a sale process with a successful exit
- 2014- current: Started a consulting company, one-two-five inc. focused on marketing and customer experience technology platforms. Currently focused on Board Advisory activities for small Technology companies.

ACTIVITIES IN ADVOCACY ORGANIZATIONS
- Board Director, OSPE 2022-2025, member of the Research and Innovation Task Force, Artificial Intelligence Working Group, Board Strategy Committee
- Board Director, June Callwood Centre for Young Women 2015-2019
- Advocate for young pregnant teens, funding for programs via Ministry of Children and Youth Services. Focus: economic empowerment.

YEARS OF REGISTRATION WITH PROFESSION
PEO, 1986 - present

OTHER AFFILIATIONS
PMP, 2001-2020

Executive Coach, Royal Roads University, certified 2013

COMMUNITY SERVICE
- Director, Ontario Masters Cross country skiing
- The Forum -Pro Bono coaching for female entrepreneurs

CANDIDATE STATEMENT
I would like to continue my work in these three areas:

1. Technology- through my work in AI and analytics I understand the importance of technology in driving Ontario and Canada's future economic growth. Through the Research and Innovation Task Force, AI working Group and my influence as a Board Director, I would like to ensure OSPE is able to advocate in these areas to support Ontario entrepreneurs and Ontario engineering jobs in this space.
2. Diversity and Inclusion: realization through working in the automobile industry, diversity and inclusion are a huge issue. Most dealerships are still white male-dominated as are most suppliers to auto industry. I have continued interest in changing the community of engineering to be inclusive. Although change has happened over the past 30 years, we still have a way to go to remove barriers to inclusivity.
3. Continue to advocate for OSPE to support the entire Ontario engineering community and not just licensed engineers.

I have a strong marketing background that assists in communication and advocacy. This can be used to engage current members and to increase membership in OSPE. I have lived in rural Oro-Medonte since 2014 but have also lived in small towns, mid-sized cities and Toronto; I have a broad geographic perspective of Ontario. I have 4 grown children so understand the voice of youth. I think my broad skill set and societal awareness will aid in promoting OSPE to increase membership and to influence policy making.

EngConnect
By OSPE

Guide the Next Generation of Professional Engineers

Become a Mentor with OSPE

Are you looking to give back to the engineering community? Consider joining OSPE's mentorship program.

Help aspiring engineers navigate the engineering space in areas like:

- Getting their license
- Developing their careers
- Building leadership skills
- And more!

We're looking for OSPE members of all career stages and disciplines.

If you're interested in learning more, email **info@ospe.on.ca**

Retaining Engineers Requires More Than Pay Raises: What We Can Learn from Google's Project Oxygen

Pierre Lebel, CEO and Founder of Engineers4Hire, Talent4Hire, and Rzultz Consulting

In 2008, **Google** faced a surprising internal challenge: Did managers matter? The company, known for hiring the brightest minds in tech and engineering, initially believed that a flat, non-hierarchical structure could thrive without traditional managers.

To evaluate this assumption, Google launched **Project Oxygen**, a multi-year research initiative analyzing thousands of employee surveys, performance reviews, and interviews to determine whether good managers made a difference—and if so, what made them great. The results shattered Google's original belief.

Data revealed that high-quality managers directly impacted employee satisfaction, performance, and retention. Teams led by effective managers:

- Reported **higher engagement and motivation**
- Delivered **better project outcomes**
- Were **less likely to quit**
- Innovated **more consistently**

The takeaway? Great managers don't just supervise—they actively drive team success.

Fast forward to today—Project Oxygen's findings remain more relevant than ever, especially for Canadian employers navigating economic headwinds, tariff-related slowdowns, and talent shortages in STEM fields. On one side, there's a fierce war for top talent, with companies scrambling to attract and retain skilled professionals in fields like engineering, artificial intelligence, and advanced manufacturing.

On the other side, a sluggish economy—exacerbated by the threat of U.S.-imposed tariffs—is forcing Canadian employers to rethink hiring strategies, optimize workforce productivity, and do more with less.

In this challenging environment, how do organizations keep their best STEM professionals engaged, motivated, growing, and retained?

What Employees Are Telling Us

Through **Talent4Hire** and **Engineers4Hire** – Canada's dedicated employment agencies for engineers and STEM professionals – employees tell us that many engineers are feeling work burnout, are often unmotivated, feel that their manager doesn't care about their career growth, and they receive very little training and development.

My work with **Rzultz Consulting** – a Canadian boutique consulting agency working directly with CEOs and senior executives across North America, strengthens my view and stance that employers need to do a better job at engaging and motivating their employees to stay.

Through both firms, I highlight with employers the return on investment on engaged and diverse employees and teams.

How Employers Can Apply Google's Findings Today

1. **Invest in Manager Training for STEM Leaders**
   - Train technical managers in coaching, communication, and employee development—not just project execution.

2. **Build a Culture of Psychological Safety**
   - Encourage employees to speak up, share ideas, and take calculated risks without fear of criticism.
3. **Prioritize Employee Growth**
   - Offer career development programs, mentorship, and stretch assignments to keep employees engaged.
4. **Encourage Data-Driven Decision-Making**
   - Like Google, use performance analytics and employee feedback to continually refine leadership strategies.

Google's Project Oxygen provided a blueprint for effective management, and its lessons still hold the key to attracting, developing, and retaining Canada's best STEM talent.

For Canadian employers navigating today's challenges, one truth remains clear: If you want to win the war for engineering and STEM talent, start by investing in better managers.

The 10 Behaviours That Define Great Leaders

Google distilled its findings into **10 key behaviours** that define effective managers:

1. **Be a good coach** – Provide regular feedback and career guidance rather than just assigning tasks.
2. **Empower the team and avoid micromanagement** – Trust employees to take ownership of their work.
3. **Create an inclusive team culture** – Ensure that team members feel valued, heard, and psychologically safe.
4. **Be productive and results-oriented** – Keep projects focused and aligned with business goals.
5. **Be an effective communicator** – Listen actively and share information transparently.
6. **Support career development** – Help employees grow their skills and advance in their careers.
7. **Set a clear vision and strategy** – Align the team's work with the company's broader mission.
8. **Have strong technical skills** – Understand the work well enough to provide meaningful guidance.
9. **Encourage collaboration** – Work effectively across departments and functions.
10. **Be a decisive leader** – Make timely, informed decisions to keep projects moving forward.

Engineers4Hire is OSPE's partner in growing, developing, and employing engineers and STEM employees across the country. To contact us, visit Talent4Hire and Engineers4Hire.

THE ENGINEERING ACADEMY | EngLearn By OSPE

CERTIFICATE PROGRAMS

Leadership Development for Engineers

1-5 CPD HOURS

Date:
On-Demand & Live Sessions Available

Price:
Member Price: Starting at $150
Non-Member Price: Starting at $200

Leadership skills are essential for engineers looking to advance their careers, lead teams, and drive organizational success. The Leadership Development for Engineers program offers a range of CPD-accredited courses tailored specifically to engineers, focusing on the unique challenges they face in leadership roles.

With both on-demand and live, instructor-led options, these courses cover key leadership competencies, including strategic decision-making, managing high-performing teams, effective communication, and mentorship. Engineers will gain practical skills through case studies, exercises, and real-world scenarios designed to bridge the gap between technical expertise and leadership effectiveness.

Emerging Leaders Certificate Program for Engineers

40 CPD HOURS

Date:
May 14 - July 30

ONLINE

Price:
Member Price: $1,950
Non-Member Price: $2,200

Developing the next generation of leaders is critical for driving business growth and sustainability. The Emerging Leaders Certificate Program for Engineers, offered by The Engineering Academy, is designed specifically for engineering professionals. This program equips emerging leaders with the skills, confidence, and tools they need to lead teams and drive strategic initiatives. Led by expert instructors from Rzultz, who combine deep leadership expertise with an understanding of engineering challenges, this program offers interactive and engaging sessions. Participants will hone their leadership abilities through case studies, exercises, and real-world engineering scenarios, gaining practical skills they can immediately apply in the workplace.

Lean Six Sigma White Belt Certificate Program

8 CPD HOURS

Date:
March 24 (8:30 am - 4:30 pm)

ONLINE

Price:
Member Price: $49
Non-Member Price: $119

Kickstart your journey into Lean Six Sigma White Belt Certificate Program this March.

Designed for individuals seeking to understand the core concepts of process improvement and operational efficiency, this introductory program covers the essentials of Lean and Six Sigma, illustrating how these powerful methodologies work together to enhance processes and eliminate waste. Our Lean Six Sigma White Belt Certificate Program (March) is the perfect place to start!

Guided by industry expert Ed Welsh, you'll explore the Lean Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) methodology, learn to distinguish between

Critical Communication Skills – Team and Client Communications

2 CPD HOURS

Date:
April 10 (3:30 pm – 5:30 pm)

ONLINE

Price:
Member Price: $140
Non-Member Price: $170

Effective communication is essential for engineers, especially when working in teams or interacting with clients. The Team and Client Communications for Engineers Workshop is a hands-on, virtual course designed to help engineering professionals navigate team dynamics and client relationships with clarity and efficiency.

This workshop will help participants understand how to break ineffective communication cycles and establish strong, clear, and effective communication practices with both internal teams and external clients. Through interactive sessions, participants will learn how to optimize communication to improve project outcomes, avoid misunderstandings, and foster better relationships in the workplace.

Please note this is part of a 3 part series, you can take them individually or all together!

Journey to P.Eng.

PE300: Journey to P.Eng.

Dates:
April 9 (12:00 pm – 1:00 pm)
May 7 (12:00 pm – 1:00 pm)

Price:
$0

ONLINE

This free 1-hour webinar will offer you guidance and support on the licensing process in Ontario. At the end of this presentation, participants will have a foundational understanding of:

- Submission requirements for PEO's application form
- Overview of the stages to licensure
- OSPE's membership services
- Ways in which OSPE's Career Services can benefit you in your skill development and job search techniques
- Professional Development programs that may help you in building your career in Ontario

Journey to P.Eng.

Prep Course for the National Professional Practice Exam

Dates:
April 23 – May 21

Price:
Member Price: $350
Non-Member Price: $450

ONLINE

Ready to take the next step in your engineering journey and secure your P.Eng license? Our workshop, Preparatory Course for the National Professional Practice Exam (NPPE), provides the essential tools, knowledge, and guidance to help you excel in the National Professional Practice Exam (NPPE). Designed for both members and non-members, these sessions ensure you're fully prepared to meet the licensure requirements.

PE302: Competency-Based Assessment (CBA) Workshops for P.Eng. Experience

Dates:
June 11 (Workshop A)
July 29 (Workshop B)
September 12 (Workshop A)

Price:
Member Price: $350
Non-Member Price: $475

ONLINE

How can you best navigate the P.Eng. competency-based assessment (CBA) system? Professional Engineer (P.Eng.) applicants are required to obtain a minimum of 48 months of acceptable, verifiable professional engineering experience, submitted through a CBA model. CBA is a tool, introduced by PEO in 2023, also used by other provincial regulators (BC, SK, MB, ON, NB, PEI, NL) to assess readiness for licensure that examines 34 engineering competencies across 7 categories: technical, communication, project management, professional accountability, and more.

Our workshop pair gives you the skills and confidence to successfully write your CBA's 34 engineering competencies. We've developed two alternating 4-hour workshops, each offered every few weeks (dates listed below). Each session covers different competencies while having common elements so learners can start with either one. After making progress on your CBA, join the next workshop, to reflect and ask questions then practice more competencies.

Check the OSPE Events Calendar for more information:
go.ospe.on.ca/learn

THE ENGINEERING ACADEMY | EngTalks By OSPE

1 CPD HOUR

THOUGHT LEADERSHIP THURSDAYS

OSPE's Engineering Academy hosts Thursday webinars with leading experts on a diverse range of technical and non-technical topics.

Maching Safety: Robots, Cobots and AMRs

Date:
April 3 (12 pm - 1 pm)

ONLINE

Price:
Member Price: $0
Non-Member Price: $59

Join this webinar to learn about how Robot systems have advanced in recent years and safeguarding techniques along with them. Unlike traditional industrial robots, which require physical separation from workers to prevent accidents, collaborative robot (cobot) and automated mobile robot (AMR) systems are designed to operate in shared spaces with humans.

Recalibrating Success: Lessons in Leadership, Growth and Purpose

Date:
April 10 (12 pm - 1 pm)

ONLINE

Price:
Member Price: $0
Non-Member Price: $59

Join JD Tremblay, an ultra-endurance triathlete and one of only three people in the world to complete the Epicdeca, for an inspiring session that will challenge the way you view success. JD's story is one of grit, determination, and an unyielding hunger for more. With his philosophy of "If your goals don't scare you, set the bar higher," JD demonstrates how pushing mental and physical boundaries can lead to profound personal growth and fulfillment.

From Words to Wisdom: Engineers and ChatGPT

Date:
April 17 (12 pm - 1 pm)

ONLINE

Price:
Member Price: $0
Non-Member Price: $59

This session will highlight how Generative AI and Large Language Models (LLMs) are revolutionizing the engineering field by enhancing creativity, efficiency, and problem-solving. Drawing from real-world examples and personal experiences, our speaker will explore practical applications, including accelerated training, design optimization, predictive analytics and automation, showcasing the transformative potential of these technologies in modern engineering practices.

Authentic Brand Design and Evolution: Build and Bring Your OWN Table

Date:
April 24 (12 pm - 1 pm)

ONLINE

Price:
Member Price: $0
Non-Member Price: $59

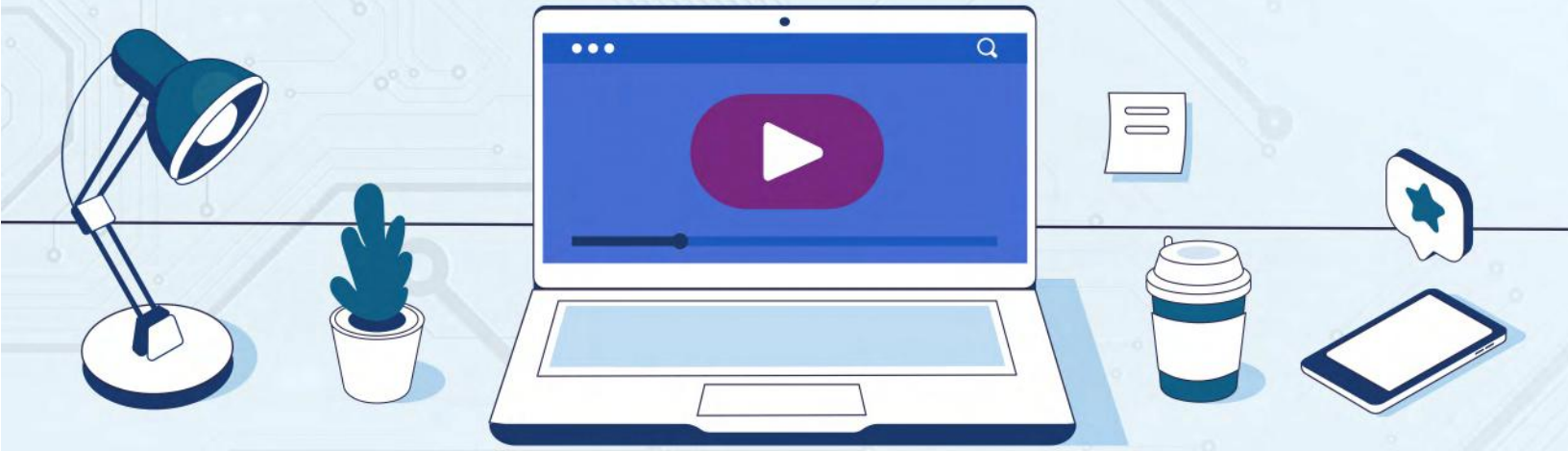
Authentically engineer your evergreen personal professional brand, and bring your own table to any industry culture, for your career, and future evolution. This session will equip you with an arsenal of tools that can ensure you will not need to ask for a seat at any proverbial tables of opportunity, prestige, or influence. Intead, strategically and continually design your own table to attract each of those aspirations, naturally, and sustainably. The hour will also debunk commonplace assumptions about "FOMO" (Fear of Missing Out), serial network-building and business-card collecting, and glossy, or AI-manufactured, personal professional image creation. Reverse-engineer your evolution ("retirement") years, or design a new income stream until then, by turning your subject matter expertise into a marketable brand.

Check the OSPE Events Calendar for more information:
go.ospe.on.ca/learn

EngLearn
By OSPE

learn.ospe.on.ca

All of OSPE's educational content on one convenient platform.



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2025

Ontario Professional Engineers Awards

RECOGNIZE A GREAT ENGINEER IN YOUR COMMUNITY!

Since 1947, the **Ontario Professional Engineers Awards (OPEA)** have recognized professional engineers in Ontario who have made outstanding contributions to their profession and their community. The Ontario Society of Professional Engineers is proud to honour the very best of the Ontario engineering community at an annual awards gala in November. This annual gala brings industry innovators, business leaders and policy makers

Recognize an engineer in the areas of:

- **Innovation**
- **Community Service**
- **Entrepreneurship**
- **Research**
- **Leadership**
- **And more!**

Please see back for more information. Learn more: opeaawards.ca

What is OSPE?

The **Ontario Society of Professional Engineers (OSPE)** is the voice of the engineering profession in Ontario. We represent the entire engineering community, including professional engineers, engineering graduates and students who work or will work in several of the most strategic sectors of Ontario's economy.

Who is eligible to be nominated?

All P.Eng. licence holders of Professional Engineers Ontario (PEO) in good standing, who have demonstrated achievements significantly above the standards of the profession, with the exception of members serving on PEO Council, the Board of Directors of the Ontario Society of Professional Engineers (OSPE) and the OSPE Awards Committee (OAC), are eligible to receive an Ontario Professional Engineers Award (OPEA). A licence holder from one of the excluded groups above may be nominated for an award after 12 months have elapsed from their participation in the group.

Who can Nominate?

Nominations may be made by any P.Eng. licence holder of Professional Engineers Ontario (PEO). The nominee must not be aware of the nomination and self-nomination is not allowed. All nominations must be submitted using the Awards Force platform.

ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

Learn more: opeaawards.ca

Award Types

The Gold Medal

This is the OPEA highest honour, recognizing conscientious commitment to public service, as well as technical excellence, and outstanding professional leadership.

Citizenship Award

This award recognizes a professional engineer's contributions to public service. Those who earn this award have given freely of their time, professional experience, and engineering expertise to the benefit of humanity.

The Engineering Medal - Entrepreneurship

The award recognizes professional engineers for applying new technologies or innovative approaches that have enabled new companies to get started, and/or assisted established companies to grow in new directions. The engineer should have demonstrated the initiative, energy, and spirit it takes to seek out new ideas and to take a leading role in fostering and promoting them.

The Engineering Medal - Management

The award recognizes professional engineers who are managing and directing engineering projects or enterprises where innovative management practice has contributed excellence in engineering achievement.

The Engineering Medal -Engineering Excellence in Industry

This award recognizes excellence in the practice of engineering in industry, where the innovative application of engineering knowledge and principles has solved a unique problem, led to advanced products, or produced above-average results based on work-related contributions and achievements from the last four (4) years.

The Engineering Medal -Research and Development

The award recognizes professional engineers using new knowledge in developing useful, novel applications, or advancing engineering knowledge or applied science, or discovering or extending any of the engineering or natural sciences.

The Engineering Medal - Young Engineer

The award recognizes outstanding young Ontario engineers in industry, who have made exceptional achievements in their chosen fields and are active in communities both personally and professionally.

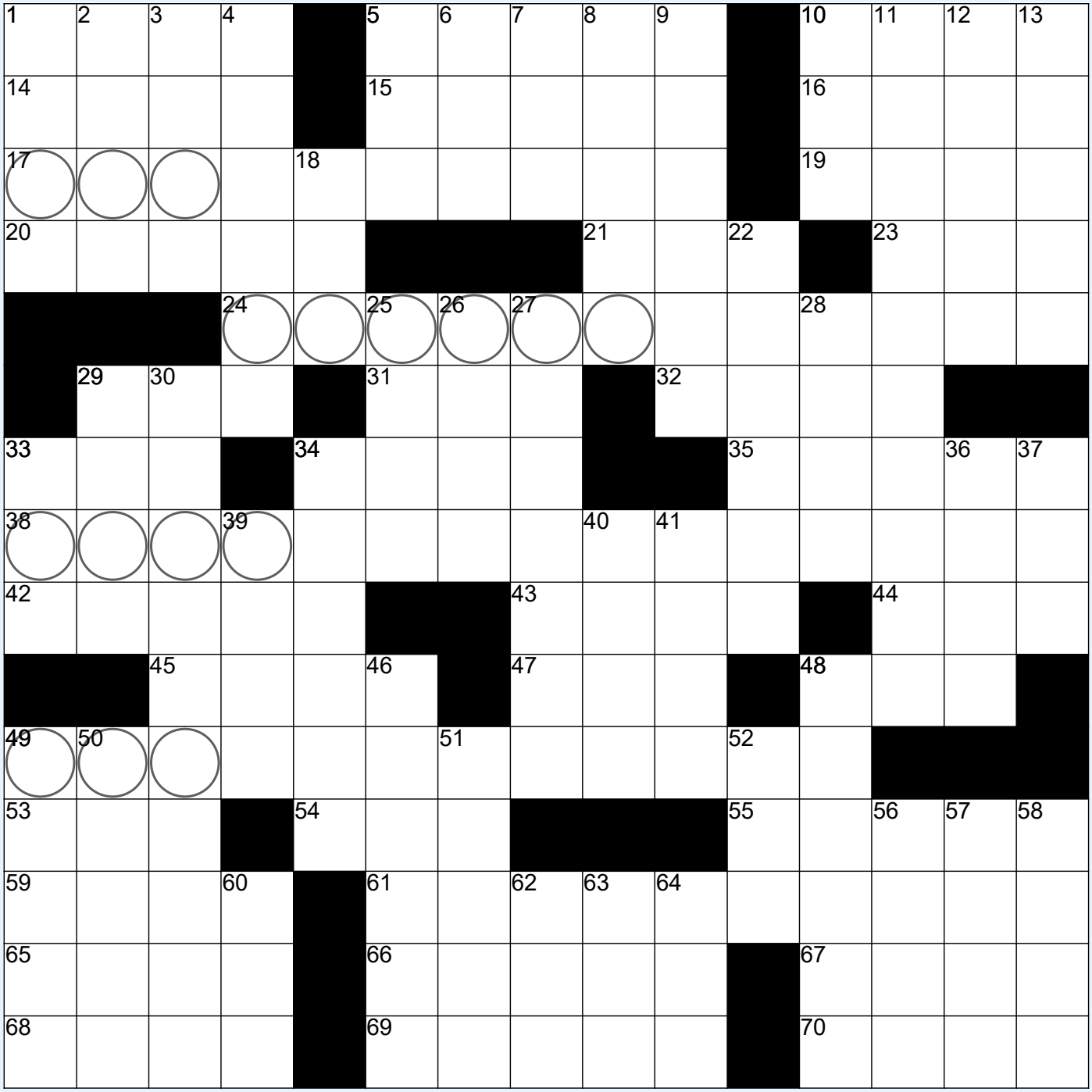
*NOTE: The Nominee must be 35 years of age or younger by the submission deadline date.

Engineering Achievement of the Year

The award recognizes a professional engineer, or group of professional engineers, who have given freely of their time, professional experience, and engineering expertise - to improve the engineering profession in Ontario.

OSPE Crossword Puzzle

Extreme Measures



For a printable version of this crossword please click here. Answers on page 71.

ACROSS

1. Dog docs
5. Foundational belief
10. _____ Cola
14. Big Apple?
15. Some vehicles
16. Lacking moisture
17. Thriving in both dry and aquatic settings
19. Fifth digit of pi (fittingly!)
20. Restorative eye surgery
21. Cashew or almond
23. Slippery substance
24. Do-over
29. Device that snaps, for short
31. Kerfuffle
32. Sewn edges
33. A long, long time
34. When Sidney Crosby's "Golden Goal" was scored
35. Name that has become synonymous with prestigious prizes
38. Editors, for example
42. Available, at a bar
43. Golfer's target
44. Pot cover
45. Burden
47. Dynamic hospital wards, for short
48. Had a bite
49. "I can't believe it!"
53. Stinging sea creature
54. Fresh
55. Reference book, of a sort
59. River that runs through Egypt
61. Digit to the left of a decimal point… or what the circled portions of 17-, 24-, 38-, & 49-across each represent
65. "Fair enough"
66. Sparsely populated
67. Like half of all counting numbers
68. Go downhill fast!
69. Like houses that feel open
70. Place to set up a lawn chair

DOWN

1. Chemist's container
2. Actress Watson who played Hermione
3. Does some rhythmic dancing
4. Cause of sect separation
5. Touch of cream
6. French affirmative
7. Old-style muscle car
8. Pitcher's place, in baseball
9. "Therefore"
10. Student's lunch haven, for short
11. Group of stars named for a mythical huntsman's apparel
12. _____ duty
13. Single-named singer with the hit "Skyfall"
18. President Eisenhower, familiarily
22. "Therefore"
25. Biblical site of water turning to wine
26. Stench, to an American
27. Indented
28. One way to run
29. Food that is all ears?
30. Cutting class, for med students?
33. Id's counterpart in psychology
34. Call into question (one's character)
36. Lake that sounds spooky
37. Acid that may be "tripped" on
39. Tons
40. Source of some road noise
41. Programming conditional
46. French sisters
48. Rick who sang "Never Gonna Give You Up"
49. "… alright, I was wrong"
50. Poetic form that's three lines long
51. Confess (to)
52. Syrup source
56. Liquid that rocks?
57. Major computer company
58. Button on an email
60. Site of rods and cones
62. Composer Gershwin
63. Tic-___-Toe
64. Resembling a fox

By Jeffrey Martinovic, a Mechanical Engineering Student at Western University

Jeffrey Martinovic is a fourth-year mechanical engineering student at Western University. He is currently on co-op at an engineering consulting firm in London, called SBM, where he assists with HVAC design. In his free time, he constructs crossword puzzles for the New York Times and other publications, plays in a variety of intramural sports (softball being his favourite), and loves playing cards with friends.

MEMBER PROFILE

Michael Wiggin, P.Eng.

The Power of Collaboration in Creating Change

Engineer Michael Wiggin P.Eng.'s retirement has been an unusual one. After having a rich 40-year career in Canada's energy sector, he had a growing concern about the lack of engineering and science behind policy decisions being made. And he needed to do something about it.

With extensive experience in district heating, nuclear power, and electricity systems, Michael and his peers were frustrated that government policies were pushing for electrification without fully understanding its technical and economic implications.

Heating demand in Canada is highly seasonal—soaring in winter and dropping in summer—creating an enormous challenge for the electrical grid. The proposed shift could increase electricity rates by as much as 300%, making it both technically and economically unfeasible.

So, he shifted from a relaxing retirement to one marked by a continued appetite for activism and promoting policies based on research. Recognizing that no single person could tackle these challenges alone, he gathered several dedicated peers.

"I can't emphasize it enough. We can't do much alone, but if we take advantage of alliances, and work with other committed people, we can get a lot done," said OSPE Member Michael Wiggin.

Together Michael along with industry experts Stephen Taylor, P.Eng., John Stephenson, P.Eng., Caroline McGrath, Martin Green, and Richard Gilbert formed **The Boltzmann Institute** - a membership organization rallying for the widespread implementation of **District Energy Heating Systems** that use hot water and/or cold water, for heating and cooling respectively, provided through underground piping.

According to the institute, "The pipes link the buildings to thermal energy sources that can be emissions-free. They include summer heat harvested and stored as hot water, deep geothermal heat drawn from kilometers below ground, and cold water from deep in Lake Ontario."

Michael, representing The Boltzmann Institute and its mission, consulted with many different organizations, and he brought his advocacy work in front of OSPE. As a long-term, and clearly passionate, member, he was invited to join OSPE's Energy Task Force. As someone with a firm belief in working together to make an impact, it was a no-brainer to agree. He now brings valuable expertise in thermal energy systems to the table and appreciates the diverse perspectives on the team. Michael now takes inspiration from his diverse peer groups, Ontario's engineers, and energy-efficient practices being implemented worldwide.

Globally, other countries have already implemented efficient solutions that reduce such waste. In Scandinavia, 98% of buildings in major cities use district heating. Finland is building massive underground thermal energy storage systems, while China is using nuclear power to desalinate water and pipe both the water and excess

heat over long distances. These innovations prove that large-scale change is possible.

“There are no technical barriers and no economic barriers, it’s awareness barriers. And people acting on their gut, rather than listening to science and engineering,” said Michael Wiggin.

Through OSPE’s Task Force Michael has contributed to research reports like the Electricity Supply Mix Study, published in 2022, and brought his knowledge to MPs in Ottawa at OSPE’s first MP Lobby Day last year. He’s looking forward to continuing conversations with Minister of Energy, Stephen Lecce and creating more awareness around what engineers consider to be the best energy solutions to benefit Ontario and Canada as a whole.

When considering government practices, Michael looks to European examples of knowledge sharing as a model for progress, emphasizing that industries must work together to find practical, sustainable solutions.

“We need to get all these different elements, economists, engineers, more active in talking to each other, more active in advising government together. We can’t do it individually as a company as a company, or a sector like engineers or economists, we have to work together,” said Michael Wiggin.

The power of collaboration lies in its ability to bring together diverse perspectives, pool resources, and drive innovation. No single person or organization has all the answers, but through collective effort, industries can tackle complex challenges and create meaningful change.

Answers for crossword puzzle on page 68.

V	E	T	S	■	D	O	G	M	A	■	C	O	C	A
I	M	A	C	■	A	U	T	O	S	■	A	R	I	D
A	M	P	H	I	B	I	O	U	S	■	F	I	V	E
L	A	S	I	K	■	■	■	N	U	T	■	O	I	L
■	■	■	S	E	C	O	N	D	C	H	A	N	C	E
■	C	A	M	■	A	D	O	■	H	E	M	S	■	■
E	O	N	■	I	N	O	T	■	■	N	O	B	E	L
G	R	A	M	M	A	R	C	H	E	C	K	E	R	S
O	N	T	A	P	■	■	H	O	L	E	■	L	I	D
■	■	O	N	U	S	■	E	R	S	■	A	T	E	■
O	H	M	Y	G	O	O	D	N	E	S	S	■	■	■
R	A	Y	■	N	E	W	■	■	■	A	T	L	A	S
N	I	L	E	■	U	N	I	T	S	P	L	A	C	E
O	K	A	Y	■	R	U	R	A	L	■	E	V	E	N
T	U	B	E	■	S	P	A	C	Y	■	Y	A	R	D

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