Professional Engineers Ontario
Scarborough Chapter

PEOSC Newsletter – 2025

Issue 1 (Summer 2025)
https://www.peo.on.ca/chapters/scarborough

Chair's Message

Jega Jeganathan, P.Eng., Ph.D., FEC .Chair, Scarborough Chapter – PEO

Thank you to the members for selecting the new Board of Executives (BOE) for the year 2025 and for allowing us to serve another great year.

The current board will continue and enhance such well-known events as the Bridge Building Competition, Mathletics, BBQ, Technical Tours and other events.

For our AGM on February 1st, we invited PEO election candidates so that our members would have a chance to meet the candidates and to understand their respective platforms. A special presentation was provided by James Schembri MHSc., (Director of Volunteer Engagement) on "PEO's Recent News and Announcements".

On May 3rd, we were proud to hold our 20th Annual Bridge Building Competition (BBC) and 7th Annual Seismic Resistance Structure Contest (SRSC) for Scarborough students in grades 3-8. Details of the event are provided in this newsletter.

Scarborough Chapter plans to effectively organize technical seminars and family events, such as technical tours, BBQ and a volunteer appreciation event. We will also organize Mathletics and Mechatronics for students in fall 2025. Hope we will get a good turnout for these events, as usual.

We welcome new ideas and suggestions to let the community know what engineers are doing for the community, for example, how engineering can be identified in many of the day-to-day needs of our lives, and the need to get proper engineering advice before a serious incident might cause damage to property and possibly life, etc.

The board looks forward to working together so that we engineers can be better known in the public.

Please visit our website to get to know your chapter activities and how to get involved.

https://www.peo.on.ca/chapters/scarborough

Board of Executives 2025

Post	Name
Chair	Dr. Jega Jeganathan, P. Eng., Ph.D.FEC
Vice Chair	Syed Qambar Raza, P.Eng., FEC, LEED AP
Past Chair	Peng Zhang, P. Eng., FEC, LEED AP
Secretary	Shawn Lin, P.Eng.
Treasurer	Mohammad Naqvi, EIT
Executive	René Siguenza, P. Eng.
Executive	Qaim Ratansi, P.Eng.
Executive	Lorraine Fraser P.Eng.
Executive	DhruvKumar Patel, EIT

How to contact the board:
Email – scarborough@peo.on.ca.

Fig: Left to Right, Jega J., Lorraine F., DhruvKumar P., René S., Peng Z., Qaim R., Mohammad N., Shawn L, Syed R.

Chapter Activities – Summary since January 2025

- February 1: Annual General Meeting
- May 3: Bridge Building Competition
- May 3: Seismic Resistance Structure Contest
- April 9: Technical Seminar #1

Upcoming Events 2025

- June 25: Technical Seminar #2
- July 19: Summer BBQ Event
- August 16: Technical Tour
- August 27: Technical Seminar #3
- September 19: Chapter Certificate Ceremony
- November 1: Mathletics/STEMZ
- November 15: Mechatronics

PEO Scarborough Chapter 2025 Annual General Meeting

Qaim Ratansi, P.Eng.
Executive, PEOSC

The Annual General Meeting (AGM) of the PEO Scarborough Chapter was held at the Centre for Immigrant and Community Service (CICS), on a very cold Saturday, February 1, 2025. Approximately 45 members, including PEO election candidates, attended the in-person event.

Fig: PEO Election Candidates addressing the audience

The meeting began with a warm welcome from Peng Zhang, P.Eng., LEED AP (Past Chair) who expressed her gratitude to all chapter volunteers for their dedication and hard work. She emphasized that without their efforts, the chapter would not have been able to successfully plan and execute its events throughout the year.

Dr. Jega Jeganathan Ph.D., P.Eng. (newly elected Chair) followed with an opening address that was well received by the audience. He delivered an inspiring speech thanking the board and assuring members that the chapter's events and initiatives would continue seamlessly under the new leadership.

Fig: (Left) Peng Zhang, (Right) Dr. Jega Jeganathan

René Siguenza, P. Eng., FEC (Secretary) presented the 2024 Secretary's Report on behalf of the Board of Executives, and Mohammad Naqvi, EIT (Treasurer) provided a detailed Treasurer's Report outlining the chapter's financial standing.

Fig: (Left) René Siguenza, (Right) Mohammad Naqvi

James Schembri, MHSc. (PEO's Director of Volunteer Engagement) shared PEO's recent news and announcements, keeping members informed about organizational updates.

Fig: (Left) James Schembri, (Right) Michael Rusek

A key highlight of the AGM was the announcement of the new executive board members by Peng Zhang, P. Eng. (Chair of the Search Committee), who conducted a thorough nomination process and presented candidates for nine executive positions. Since no additional nominations were submitted by chapter members, the Search Committee's nominees were all acclaimed.

The AGM also served as a moment of reflection, with the Past Chair sharing memorable highlights from the previous term while looking ahead to the opportunities and goals for the upcoming year. Additionally, the new PEO executive board was formally introduced, marking an important milestone in their professional journeys. PEO staff were present to congratulate the incoming volunteer members, fostering stronger engagement between the regulator and its volunteers.

The meeting concluded on a positive note with members feeling excited about the year ahead. The seamless transition of leadership combined with the recognition of volunteers and new members reinforced the chapter's commitment to collaboration and professional growth. The AGM not only provided an opportunity for updates but also strengthened the sense of community within the PEO Scarborough Chapter.

Bridge Building Competition (BBC) & Seismic Resistance Structure Contest (SRSC)

René Siguenza, P. Eng.
BBC/SRSC 2025 Project Manager

On Saturday May 3rd, 2025, the PEO Scarborough Chapter carried out its 20th Popsicle Stick Bridge Building Competition and 7th Seismic Resistance Structure Contest. The events were held at the Scarborough Civic Centre, with approximately 100 attendees including students, parents, volunteers and dignitaries.

These events are geared towards primary students to develop an early interest in engineering. The events are also meant to encourage teamwork, problem solving and critical thinking as teams, with groups of 2-3 students building their bridges/structures within prescribed rules and specifications ahead of the event. During the event, students were interviewed about their designs and other aspects of their structures including aesthetics, type of bridge, etc.

Fig: Group Photo of BBC position holders – Junior Category

There were two different categories for the BBC competition: Junior (grades 3 and 4), and Senior (grades 5 and 6), and one category for SRSC (grades 7 and 8). A total of 67 students participated in the events as part of 12 senior and 7 junior teams for BBC and 8 teams for SRSC.

Fig: Group Photo of SRSC position holders

As part of the event, we also displayed messages from MPP Raymond Cho and MPP Vijay Thanigasalam, who could not attend in person. The messages were very motivational and congratulated the participants for learning about engineering careers. We also had ECRC councilor Nanda Lwin who delivered an inspirational speech to the students during the event.

Fig: ECRC Councilor Nanda Lwin addressing participants

The events were successfully completed with a lot of positive feedback from attendees/contestants and also more than $1,500 in prizes as well as participation and achievement certificates for the winners. Most importantly, as mentioned to the students, the greatest achievement from the event was their efforts, teamwork and developing their love for engineering.

Fig: Various event photographs

Technical Seminar#1 - Engineered Wood Products - 101

Peng Zhang, P. Eng., FEC, LEED AP,
Technical Seminar Committee Chair

PEO Scarborough Chapter's 2025 Technical Seminar No.1 was a hybrid event and held on Wednesday, April 9 at the Centre for Immigrant and Community Services. The topic was about Engineered Wood Products -101 and was presented by two presenters – Ernst Grell and Steve Love from Weyerhaeuser. There was total 89 people who registered for this event.

Fig: Audience listening to the presenters

The presenters provided our members with a very informative seminar about engineered wood products, mainly Trus Joints, emphasizing the sustainability of wood building design and manufacturing. They demonstrated Trus Joints samples so attendees could see, touch and feel these engineered wood products samples.

Fig: Group photo

As the 1st PEOSC hybrid seminar, despite a few hiccups, overall, the seminar was well delivered. As seminar organizers, we gained valuable experience on how to conduct the hybrid event with a large number of participants, which will guide our future hybrid events.

Technical Article: Overview of Conventional Dissolved Gas Analysis Methods in Power Transformers

Mona Shahbandi, Electrical Designer

Power transformers play a critical role in ensuring stable and efficient power delivery across electrical transmission systems. Over time, aging and environmental stresses can reduce their reliability, potentially leading to failures.

In oil-filled transformers, electrical or thermal faults cause the breakdown of insulation materials, generating gases that dissolve in the insulating oil. Dissolved Gas Analysis (DGA) is a proven diagnostic method that interprets these gases—such as hydrogen (H_2), methane (CH_4), ethylene (C_2H_4), acetylene (C_2H_2), carbon monoxide (CO), carbon dioxide (CO_2), and oxygen (O_2)—to assess transformer condition. Each gas or gas combination provides insights into specific fault types, such as overheating, partial discharge, or arcing. This paper reviews several conventional DGA interpretation techniques.

Following interpretation techniques are commonly employed to analyze dissolved gases and diagnose faults in power transformers.

Key Gas Method:
The Key Gas method identifies transformer faults by detecting specific gases released when insulating oil breaks down under thermal or electrical stress. Instead of using gas ratios, it focuses on the presence and concentration of individual "key gases" like hydrogen, methane, ethylene, and acetylene, each linked to distinct fault types. This method is widely used for its ability to provide early fault indications, making it a valuable tool in routine transformer diagnostics.

Dornenburg Ratio Method:
The Dornenburg Ratio Method is one of the earliest techniques used in Dissolved Gas Analysis (DGA) to identify transformer faults by analyzing specific gas concentration ratios such as CH_4/H_2 and C_2H_2/CH_4. A fault is diagnosed when the gas ratios fall within established thresholds, provided that the gas concentrations exceed certain baseline limits, as outlined in IEEE Standard C57.104. While the method offers useful diagnostic insights, it may result in inconclusive outcomes when gas levels or ratio ranges fall outside the defined parameters.

Rogers Ratio Method:
The Rogers Ratio Method is a widely used diagnostic technique for detecting transformer faults based on the analysis of three specific gas ratios: methane to hydrogen (CH_4/H_2), ethylene to ethane (C_2H_4/C_2H_6), and acetylene to ethylene (C_2H_2/C_2H_4), as defined in IEEE Standard C57.104. This method is particularly effective in distinguishing between various types of thermal and electrical faults, including arcing and overheating. Compared to the Dornenburg method, it provides clearer differentiation of fault types. However, it may yield inaccurate interpretations when gas concentrations are too low or fall outside the established ratio thresholds.

TDCG Method:
The Total Dissolved Combustible Gas (TDCG) Method evaluates the overall concentration of combustible gases present in transformer oil to detect internal faults. By applying a four-tier risk classification system, it categorizes transformer conditions based on gas concentration thresholds, where higher TDCG values indicate more severe or advanced fault conditions. Although lower gas levels generally point to normal operation, the presence of any individual gas above its acceptable limit should trigger further analysis to avoid potential transformer failure.

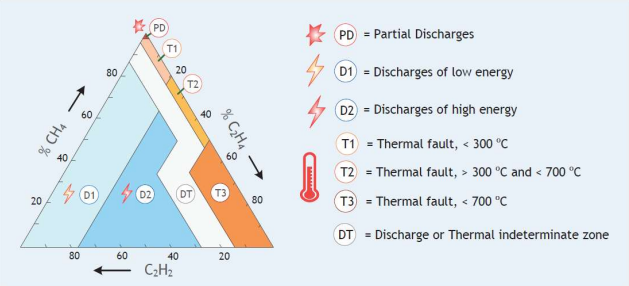

Fig: Duval Triangle Method [2]

Duval Triangle:
The Duval Triangle Method is a graphical diagnostic tool used to identify transformer faults by plotting the relative concentrations of three key gases— acetylene (C_2H_2), ethylene (C_2H_4), and methane (CH_4)— within a triangular diagram. Each zone of the triangle corresponds to a distinct fault type: arcing, thermal faults, or partial discharges. Its visual simplicity and diagnostic accuracy make it a reliable method in routine transformer condition monitoring. Additionally, variations of the Duval Triangle have been developed to accommodate different transformer technologies and fault scenarios, further enhancing its versatility in the field.

Duval Pentagon:
The Duval Pentagon Method builds upon the Duval Triangle by incorporating two additional gases—hydrogen (H_2) and ethane (C_2H_6)—which enhance the detection of low-energy faults and allow differentiation between normal aging and actual transformer defects.

A key feature of this method is the inclusion of a "stray gas zone," which accounts for gases generated during standard, non-fault operation. By calculating the percentage of each gas and plotting them on a five-sided chart, the method provides a more nuanced and reliable interpretation of transformer fault conditions.

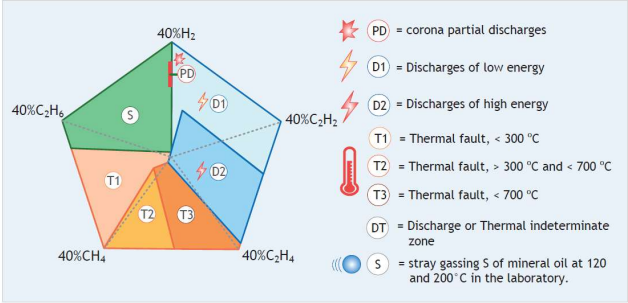

Fig: Duval Pentagon Method [2]

IEC Ratio Method:
A simpler variation of the Rogers method with refined ratio thresholds. The IEC Ratio Method, developed from the Rogers approach, uses three gas ratios to diagnose transformer faults such as partial discharges and thermal or electrical issues. It improves upon earlier models by offering updated ratio ranges and a 3D graphical tool to visualize fault zones. While effective, the method has limitations in precisely distinguishing fault subtypes and may yield overlapping results for certain conditions.

Dissolved Gas Analysis (DGA) is a widely used, practical approach for identifying transformer faults and enhancing system reliability. This paper reviewed several conventional DGA interpretation methods, emphasizing their role in routine maintenance and diagnostics. Looking forward, the integration of AI and big data analytics promises to further improve diagnostic accuracy and real- time monitoring capabilities.

[1] Soleimani M, Faiz J. Dissolved gas analysis evaluation in electric power transformers using conventional methods a review. IEEE transactions on dielectrics and electrical insulation. 017;24(1):1239-.

[2] Duval M. Dissolved gas analysis: It can save your transformer. IEEE electrical insulation magazine. 1989;5(6):22-27. doi:10.1109/57.44605

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Editor: Syed Raza, P.Eng.

We welcome our readers' contributions:

- Articles of engineering interest, and subjects of interest to the engineering community (within guidelines of PEO).
- Suggestions for future events – seminars/technical visits/ workshops, etc.
- Suggestions for improvement of newsletter/website.

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