

Message from the Chair



The Willowdale-Thornhill PEO Chapter held its Annual General Meeting and Certificate Presentation ceremony on the February 28th. Congratulations to the new recipients and best of luck to them as they begin their careers as professional engineers. Congratulations also to Mario Boetto, Francis Yamfwa and Farhad Saghezchi who joined the Chapter's executive.

We began the year in full gear, organizing seminars and tours related to the engineering profession.

One noteworthy seminar held on March 27th explored the impact of greenhouse gases and ozone depletion on global warming. Presented by David Lapp, P.Eng., manager of professional practice at the Canadian Council of Professional Engineers (CCPE) in Ottawa, the seminar shed some light on a very important topic.

For instance, Lapp noted that CO₂ concentrations in the atmosphere are at their highest levels in at least 400,000 years. He also explained how glacial ice will retreat under global warming and that the frequency and severity of both floods and droughts will increase. In fact, according to Lapp, water levels around the world are expected to rise about 1 m in the next 100 years. Furthermore, so-called "hot" days, defined as those with temperatures above 30°C, will double in frequency from the current 30 days per year

to 60 days per year. These changes will have an impact on our infrastructure, as well as the design conditions and parameters we use in our work. The design of storm water drainage systems, HVAC (Heating Ventilation Air Conditioning) systems, electrical power generation and distribution systems are just some of the engineering products that will inevitably be effected.

What does this mean for engineers? We require an engineering solution, backed by thorough planning and preparation, with the future acutely in mind.

Your chapter is trying to increase your awareness of such issues. There are a lot of other challenges that the profession currently faces. Hopefully by offering such seminars we can encourage interest in the PEO, as well as inspire all of us to pursue these pressing issues further in our careers.

We feel that organizing seminars like the one on March 27th will give members a taste of the activist role that engineers can play in solving the ongoing problems of the global community. We owe it to society as a whole and to the generations that will follow.

Please check our website regularly – www.willowdalethornhill.peo.on.ca – for future events. I hope to see you at one of our seminars soon.

Regards,

Noubar Takessian P.Eng.
Chair
Willowdale-Thornhill PEO

www.willowdalethornhill.peo.on.ca

Adapting to Climate Change

By Miriam S. Mozes, Ph.D., P.Eng.

David Lapp, P.Eng., manager of professional practice at the Canadian Council of Professional Engineers (CCPE), addressed the Willowdale-Thornhill PEO chapter on the various effects of global warming and climate change on March 27th. Approximately 50 engineers were in attendance.

I am aware of the latest issues on global warming and climate change but I never thought that we could adapt – mitigate it rather than eliminate it. How is that possible when we hear horror stories from prominent scientists?

The following are some of my observations:

THE PROBLEM

- The current atmospheric concentration of carbon dioxide (CO₂) is about 380 ppm, 100 ppm higher than before widespread burning of fossil fuel began about 130 years ago. CO₂ concentration is now at its highest level in the past 400,000 years.
- As a result of high CO₂ and greenhouse gas emissions, temperatures recorded around the world have increased. Global warming by only a couple of degrees Celsius, as projected by the end of this century, is enough to trigger widespread melting of the Greenland ice cap and the partial collapse of Antarctica's ice sheets. The latest research indicates that the melting is happening faster than we expected. Since the 1980's, the rate of melting at the Greenland ice cap has increased by 40%. It is projected, that by 2100 the world's oceans could easily be 1 m higher, likely causing severe flooding all over the world.
- Climate change will also trigger extreme weather and climatic events:
 - More hot days per year

- More frequent and severe droughts
- Floods, heavy rains and ice storms
- Water shortages for farming and hydroelectric projects
- Insect infestation and forest fires
- An adverse impact on ecosystems and socio-economic activities

Even more alarming is that CO₂ concentration will likely double to pre-industrial levels by 2050! Under the Kyoto Protocol, industrial countries have pledged to reduce greenhouse gas emissions to 5% below 1990 levels by 2008. Unfortunately this may not happen. Soaring emissions from China and other developing nations and the boycott by several industrial countries mean that CO₂ levels could continue to rise.

THE SOLUTION

Fortunately we human beings are very creative. Lapp presented a new scenario to combat the effects of global warming. "We can't eliminate it or ignore it, but we can mitigate it and adapt to it. It is the new approach, and we all have to learn how to apply it to real life situations," he said.

His solution is two-fold: mitigation and adaptation.

Mitigation involves intervention to reduce the greenhouse gas sources and enhance the sinks (carbon reservoirs such as oceans), thereby minimizing the probability of severe climate change.

Factors associated with mitigation include specific design, construction, maintenance and renewal of buildings aimed at reducing emissions.

Adaptation is the moderation of the harm caused by climate change. Its aim is to minimize the consequences of climate change, by adjusting natural and human systems to climate change.

The objective of adaptation is to alter the design, construction and maintenance of new buildings for the increased probability of natural hazards due to changing climate conditions.

Major issues to consider when adapting to climate change include flooding, higher temperatures, water resources, and coastal erosion.

These are very complex issues and engineers will make significant contributions to the strategies, development and application of these new concepts.

In fact, there are a number of adaptation action plans already in place to address these issues.

Furthermore, the CCPE is working with all three levels of government – federal, provincial, and municipal – to apply new engineering knowledge and techniques in preparing infrastructure for climate change.

We all have the moral obligation to minimize greenhouse gas emission, by conserving energy and water and by minimizing waste production.

Engineers will surely play a prominent role in finding creative solutions to combat the devastating effects of climate change. Good luck to all of us: hopefully, with a bit of engineering ingenuity, we'll be able to save our planet.

Miriam S. Mozes, Ph.D., P.Eng., is a retired environmental engineer and an avid environmentalist.

Look What We've Done

The following is a summary of some recent Willowdale-Thornhill PEO's events and activities:

- **Executive meetings.** Held once a month.
- **Cooking Up New Engineering Processes.** A tour of the Canada Bread-Downsview facility near Toronto. Sunday, February 12, 2006.
- **Annual General Meeting.** Tuesday, February 28, 2006.
- **Adaptation to Climate Change.** A seminar by David Lapp, P.Eng. Monday, March 27, 2006.
- **Home Networking and Internet Sharing.** A seminar presented by Mark Friedberg, P.Eng. Monday, April 24, 2006.
- **What Does the New Conservative Government Mean for Canadian Engineers?** A seminar presented by author and political expert Peter G. White. Tuesday, May 16, 2006.
- **Renewable Energy in Ontario - Opportunities and Challenges.** A seminar presented by Allan Jenkins, P.Eng. Monday, June 5, 2006.



Political expert Peter G. White (left) with The Chronicle editor Nanda Lwin, P.Eng., (right) after the seminar on the new Conservative government on May 16, 2006.



The Chronicle

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ENGINEERING NOTES by Nanda Lwin

Happy 30th, CN Tower!

Thirty years ago this summer, Toronto's CN Tower opened its doors to the public, after more than three years of construction and widespread public anticipation. The Tower, clearly the city's most visible landmark, was built as a tribute to Canadian technology and engineering know-how.

I've had a fascination with the CN Tower ever since my childhood. My parents took me to the Tower in 1977, when I was a mere lad - six years old and in Grade 1. "Wow, this thing is really tall," I remember saying to myself. I was impressed, to say the least. And I should be. More than three decades later, the Guinness Book of World Records still acknowledges the Tower, at 553 m, as the world's tallest freestanding structure. In the 1990's, the American Society of Civil Engineers recognized it as one of the seven wonders of the modern world.

The engineering behind the world's tallest is equally impressive. The Tower's shaft, which rises from the base to the Sky Pod at the 454-m level, is made of stronger-than-usual prestressed concrete. (Prestressed construction is the process whereby reinforcing cable embedded in the concrete is stretched and capped in order to give the concrete maximum strength).

The Tower makes use of a lot of concrete – 40,254 m³ to be exact. That's enough concrete to build a sidewalk, stretching from Toronto to Kingston, Ontario. Faulty concrete is constantly replaced, under the supervision of NCK Engineering, the firm that engineered the Tower in the early-1970's. The firm is also involved in several rehabilitation projects at the Tower that run the gamut from testing the glass floor, 342 m above the ground, to replacing the material in the donut-like component of the Tower sphere. NCK is also instrumental in monitoring the general performance of the Tower and checking the tuned mass dampers in the antenna that dampen the Tower's sway in high winds.

And even though it's been a long time since that day in Grade 1 and I now have a degree and work experience in structural engineering, I'm still very much impressed.

Happy birthday, CN Tower! Hopefully in 30 years, you will still be the engineering wonder you are today.

Nanda Lwin, P.Eng., is a professor of civil engineering technology at Seneca College, the author of eight books, and a newspaper columnist. From 1999 to 2002, he worked on the CN Tower rehabilitation program as a structural engineer at the Toronto-based consulting firm, NCK Engineering.