



ENGINEERING at the CROSSROADS

The first-ever National Engineering Summit, in Montreal, was an opportunity for engineers to look beyond their own profession to address critical challenges facing Canada today.

By Michael Mastromatteo

It was an ambitious effort to convene a national conference dedicated to the engineering profession and its contributions to Canada's health, safety and economic competitiveness in the 21st century.

The first-ever National Engineering Summit, May 18 to 21 in Montreal, brought together nearly 300 delegates from universities, industry, engineering regulators, professional associations, government and the media, to take stock of the engineering profession and extrapolate its influence over the next several decades.

Operating with the theme "Leading a Canadian future/The new engineer in society," the summit was organized by the ad hoc Canadian Engineering Leadership Forum (CELF), comprising Engineers Canada, the Association of Canadian Engineering Companies, the Canadian Academy of Engineering (CAE), the Canadian Federation of Engineering Students (CFES), the Engineering Institute of Canada and the National Council of Deans of Engineering and Applied Science (NCDEAS).

The idea for a national engineering summit originated nearly five years ago under then Engineers Canada President Darrel Danyluk, P.Eng., who brought all engineering stakeholders together so that the profession might achieve a single voice on pressing issues.

Two-time PEO President Pat Quinn, P.Eng., chaired the organizing committee. In his introductory remarks May 18, Quinn described the conference as a roadmap for the engineering profession as it looks to enhance the health, safety, quality of life, environmental sustainability and economic competitiveness for all Canadians.

"Our profession was instrumental to the progress made during the 20th century," Quinn said. "It remains to be seen what our contributions will be in the 21st."

Conference facilitator and pollster Allan Gregg, best known as host of Canadian television programs *Gregg and Company* and *Allan Gregg in Conversation*, told delegates keynote speakers and workshops were selected to shed light on what a "better Canada" might look like over the next half century.

OTHER PROFESSIONS

Many of the keynote speakers came from other professions to present a picture of what engineers must contend with as masters of technology in an era of rapidly changing social, economic, environmental and political constraints.

Prominent speakers at the summit included Gregory Taylor, director general, Office of Public Health; Thomas d'Aquino, president, Canadian Council of Chief Executives; Robert Walker, assistant deputy minister (science and technology), Department of National Defence; James Johnson Duderstadt, professor of science and engineering, University of Michigan; and Richard Worzel, futurist and chartered financial analyst.

Each speaker focused his remarks on how engineering should respond to changing demographics and the increased expectations of those who control and implement technology. Richard Worzel, for example, challenged engineers to stay alert to innovation as a means of making the profession more attractive to the next generation. "One sure way to attract people to engineering is by talking about the problems in society that we've yet to overcome," Worzel said.

The summit also featured wide-ranging workshops divided into five general streams:



University of Ottawa professor Tom Brzustowski, PhD, P.Eng., outlined the interplay of engineering, public policy and economic prosperity.

health; safety and security; quality of life; the environment; and Canada's competitiveness in the global economy. In the energy sector, speakers Clem Bowman, PhD, P.Eng., recipient of CAE's distinguished service award, and David Sanborn Scott, PhD, P.Eng., led a presentation on the hydrogen economy and the evolving Canadian energy system.

In the quality-of-life stream, economist and demographer David Foot, author of the 1996 bestseller *Boom, Bust & Echo*, discussed societal evolution and its challenges to the engineering profession. Meanwhile, in the global competitiveness workshop stream, Tom Brzustowski, PhD, P.Eng., University of Ottawa professor and former president of the Natural Sciences and Engineering Research Council, outlined the interplay of engineering, public policy and economic prosperity.

A recurring theme in the health-related workshops was the growing interdependence of engineering and medicine. Much of the discussion in these workshops focused on the need to revamp elements of engineering education to take the health-care link more firmly into account.

A key outcome of the summit was a memorandum of understanding signed by major stakeholders in the engineering community, committing them to work together for a safer, healthier and more competitive Canada. The memorandum responds, in part, to concerns that engineering remains a largely hidden profession, its vital contributions to public safety and the development of public policy unrecognized.

"Engineering plays a largely hidden but vital role in almost every aspect of society," said Dick Fletcher, FEC, P.Eng., chair of CELF. "Our organizations are partnering to optimize the value and effectiveness of the engineering profession as it supports Canada and its needs that evolve in the increasingly global society in which we live."

Summit organizers also issued a May 21 "Montreal Declaration" that commits the signatories to combined efforts in the five conference streams (see sidebar).

In a June 2 interview, conference chair Quinn expressed mild disappointment at the low turnout for the conference, but said it otherwise succeeded on all counts.

OUTWARD LOOKING

"The real success, if you want me to be honest, was the number of young people," Quinn said. "The deans need to be congratulated. They sponsored a large group of students and, to me, these students were what this conference was all about—the new engineer in society. These were a bunch of people who really seemed to be interested in contributing. And they are not in it for the money or for the glory. They see an opportunity to contribute to society. It seemed to me they were altruistic and outward looking."

There can be no doubt the summit was enlivened by the presence of the engineering students. Their input was especially welcome in helping chart some direction for education and curriculum revision.

"I'm hoping to take the outcomes and working both internally and externally with the Canadian Engineering Leadership



CFES President Kyle Ruttan hopes to use summit outcomes in his organization's strategic vision.

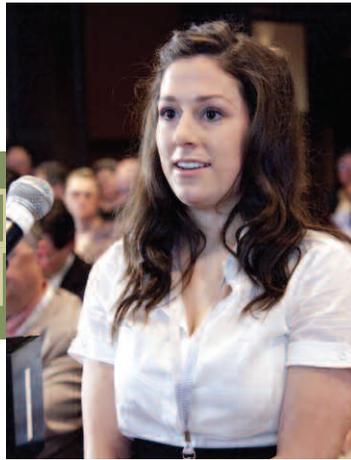
Forum to find ways we can integrate the ideas into our strategic vision," said CFES President Kyle Ruttan, a graduate of the University of Western Ontario engineering program.

Student Laura Meimari, an engineering undergraduate at McGill University in Montreal, represented the Quebec Confederation for Engineering Student Outreach (QCESO) at the conference.

"I hope to relay the importance of the issues discussed at the summit to the members of QCESO," Meimari says. "The discussions concerning the reform of engineering education were especially relevant to my organization, and I hope that I can encourage QCESO to turn its focus more towards the social issues surrounding the engineering profession. As students, we have so much opportunity to make an impact."

Other delegates had different priorities for the engineering summit.

Claude Laguë, PhD, P.Eng., dean and professor of engineering, University of Ottawa, and NCDEAS chair, says the



University of Alberta engineering student Melanie Pelletier poses a question during one of the plenary sessions.

The Montreal DECLARATION

Issued at the National Engineering Summit, May 21, Montreal, Quebec

THE NATIONAL ENGINEERING SUMMIT 2009

The first-ever National Engineering Summit brought Canadian engineers together with experts from a broad range of sectors and disciplines to consider key trends, critical issues and future projections related to health; the environment; safety and security; global competitiveness; and quality of life.

Two days of presentations and discussions afforded an unprecedented opportunity for the engineering profession to identify how it can contribute to a healthier, cleaner, safer, more competitive and sustainable Canada—to apply its leadership, leverage the strengths of its various disciplines, and prepare the next generation of engineers for the challenges to come.

ENGINEERS: ENABLERS OF DREAMS

Engineers play a key role in our societal development, contributing to and enabling initiatives that drive economic progress, enhance social and physical infrastructures, and inspire the changes that improve our quality of life.

The following declaration expresses the profession's resolve to help ensure Canada and its citizens thrive and prosper—today and into the future. The Canadian Engineering Leadership Forum (CELFF) has committed to playing a central role in enabling the profession to achieve these ends by providing direction and fostering collaboration.

OUR PROFESSION'S COMMITMENTS

Carrying forward the learning objectives of the National Engineering Summit we, Canada's engineers, pledge to:

conference was helpful in refining or adjusting existing engineering curricula.

"As an engineering educator, I heard a need repeated throughout the summit for engineering education to become more broadly based and to be more inclusive of non-scientific/technical disciplines, in order to educate engineers who are better prepared to contribute to modern challenges that are often inter- or multi-disciplinary in nature," Laguë says. "This is something that had been conveyed, to some extent, to engineering schools by the profession and a number of employers in the recent past, but it clearly emerged as a key component of the future of Canadian engineering."

The future of engineering education was also a priority for PEO Past President Dave Adams, P.Eng. "From discussions at the summit, it would appear that many felt that following the initial two years at university, teaching the basic knowledge of problem solving using the principles of mathematics and science, a whole new series of specialty courses must be developed and taught to satisfy the educational requirements for many of the emerging societal needs," Adams says. "Many other changes in the content and application of engineering will require a substantial investment in several more flexible degree programs, with accompanying accreditation, for the future engineer. After a conference like this one, there can be no further accusations that engineering in future belongs solely to the ranks of civil, mechanical and electrical graduates."

The Montreal summit was billed as an historic assembly of disparate engineering stakeholders, all committed to charting a course for the profession as it copes with emerging challenges. It will be interesting to note if the momentum it generated can be maintained.

It's a hopeful note expressed by idea originator Danyluk, who spent the previous 24 months on the conference organizing committee.

"My hope for the outcome of the summit is that it would be the next step towards the vision of Canadian engineering sectors coming together, recognizing the strength that their united voice could have in national and international debates and with an understanding of what the future challenges and opportunities could be," he says. "This vision is what triggered the initial meeting of the leadership forum."

Danyluk anticipates that CELFF will weave the conference deliberations into a common message for all members of the engineering community as it looks to gain more prestige and influence on the national and international stages. Σ

1. deliver Canadian engineering innovation domestically and to the global community;
2. deliver specific engineering capabilities that will be needed in the future to improve health and safety, provide for a cleaner environment, and enable more sustainable development;
3. address areas in which advocacy by the engineering profession can lead to public policy development and directly contribute to Canadians' quality of life; and
4. make educational enhancements that will encourage broader participation in the profession by all segments of the population and foster innovation.

At a high level, we acknowledge that we must:

- pursue greater collaboration across disciplines and professions;
- increase engineers' influence in policy-making;
- re-examine our accreditation process;
- transform engineering education and practice;
- encourage the greater participation of under-represented groups such as Aboriginal peoples; and
- attract and retain women in much greater numbers.

Emerging from the summit, the profession will take collective action in the following areas.

Health

Understanding that:

- Engineering has a role to play in accommodating the changing needs of Canada's aging population;
- We must appreciate the connection between engineering and evolving population demographics, health and the environment;
- We must incorporate biology and study of the social determinants of health into our curriculum;

- We need to better understand the implications and effects of government policies; and
- We need to be more socially aware to address the unique issues facing individuals in our society.

Environment

Understanding that:

- Engineering supports the harmony between human life and the environment;
- Energy offers the opportunity for Canada to achieve a sustainable competitive advantage;
- A national energy grid is essential to derive the greatest benefit from our energy resources;
- Engineering has a critical role to play in rapid adaptation to and mitigation of climate change;
- A focus on adapting infrastructure is required to reduce the carbon footprint in our communities; and
- A national, comprehensive water management strategy is required.

Global competitiveness

Understanding that:

- Engineering must be committed to life-cycle design;
- We must continue to actively promote and embrace a culture of sustainability;
- We must test regulations, codes and standards against policy goals to ensure they are strategically coherent, and we must foster innovation;
- R&D and its commercialization are essential to the Canadian economy;
- Engineers must focus on core areas of strength, such as information and communications technology, environmental engineering and technology, and health and life sciences;
- We must encourage the entrepreneurial spirit of Canada's engineers; and
- Collaboration with First Nations, Métis and Inuit people will be essential to seizing development and economic opportunities across Canada.

Safety and security

Understanding that:

- Safety of the public is of paramount concern to the industry;
- We need to enhance the safety of infrastructure and facilities to manage risks to society and workers and minimize the public's vulnerability;
- We have a role to play in addressing the threats of cybercrime and identity theft;
- Engineers must continue to develop technologies critical to maintaining national security; and
- Energy security is critical to Canada, and we must manage our existing resources and explore sustainable options for the future.

Quality of life

While the profession of engineering itself is largely invisible, its impact is visible all around us: in the built environments of our cities and towns, in our infrastructure, in our technology, and in the ways we work and the systems we rely on to remain safe and secure. As a profession, we are committed to helping provide the best possible quality of life for all Canadians, with the understanding that it is the international measure of Canada.

MAINTAINING MOMENTUM

Through CELF, Canada's engineering profession has the ability to set collective direction and coordinate activities to a greater degree than ever before possible. CELF was created specifically to help steer the profession and implement its vision, providing Canada's engineers with the capacity to realize their strategic vision together. CELF will provide guidance and foster cooperation as Canada's engineers act on the opportunities identified at the National Engineering Summit.

As a first step along that path, the member organizations of the forum will adapt individual strategic plans in recognition of summit findings. Σ