

# Engineering struggling to bring women into the profession

By DENISE DEVEAU

When Nadine Miller started her engineering studies at the University of Toronto 15 years ago, she was one of only five women in a class of 22 students. Since then things haven't changed that much in the engineering world.

As president and chair of the Ontario Society of Professional Engineers in Toronto and senior geotechnical engineer for SNC-Lavalin, Ms. Miller is joining others in putting a concerted effort into changing the ratios.

According to data from Engineers Canada, the proportion of women in undergraduate programs stands at 17.7%. This number has held relatively steady for a number of years despite the fact that overall, women outnumber men in university enrolment.

The highest proportions of women (30% or higher) in engineering are found in the areas of environmental, bio-systems, geological and chemical. The lowest ratios (13% or less) are in electrical, computer and mechanical engineering programs.

In 2010, women accounted for only 10.5% of the country's total population of registered professional engineers. This means a significant number of female engineering students are choosing not to enter the field once they graduate.

"Of those that graduate from our engineering programs, almost one-fifth don't work in the field," says Lamya Amleh, professor of civil engineering and director of first year engineering at Ryerson University in Toronto "It's a battle to make them stay."

Ms. Miller contends that if women engineers had a higher profile, things could look quite different. "Growing up, girls have no female engineer role models to even consider engineering as a career. That is absolutely critical for encouraging them to enter the profession. There are so few of us in the field, we need more grassroots solutions so we can at least make girls aware."

Media is partially to blame, she adds. "Generally you see



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JENNIFER ROBERTS / POSTMEDIA NEWS

Nadine Miller, president and chair of the Ontario Society of Professional Engineers, says girls lack female engineer role models who might spark their interest in the the profession.

males in technology roles. But I had a roommate when I was doing graduate studies at MIT who was a systems engineer on the Curiosity Rover design. How cool is that? People need to hear about that."

Nika Zolfaghari, a Ryerson engineering graduate who is now taking her master's degree, says being exposed to engineering at the right

time was an eye-opener for her. "Once I saw all the opportunities, I was sold. A lot of students see an engineer as someone who builds and fixes things. They don't understand how multi-disciplinary it is or the options you have. Only people in the field grasp the concept of what it is and where it can take you."

While there is no clear-cut

explanation for the flatlining taking place in the past decade, Ms. Miller believes the Ecole Polytechnique Massacre in 1989, in which the shooter targeted female engineering students, was a major factor in driving increased enrolment up to the year 2000.

"All of a sudden there was great awareness of women in engineering and the numbers

started climbing. But once that happened, everyone moved on to something else. So a decade of improvement was followed by another decade of flatlining and even dipping down. When that push isn't there, numbers start to drop."

While universities do a good job of targeting people, she says, "Those students

have already made the decision to be in it. We should be targeting those who would consider engineering before that. Right now, younger girls simply don't understand that engineering is more than just a technical job. In my work, I help design things, I am able to work globally and I can influence people."

Industry and educators are applying themselves to reinvigorating the quest for more female engineers. In March 2013 for example, Hydro One launched a Women In Engineering University Partnership initiative in which a consortium of four schools – University of Waterloo, University of Western Ontario, University of Ontario Institute of Technology (UOIT) and Ryerson University – is working to increase enrolment and career opportunities for female students pursuing science, technology, engineering and math.

Ms. Amleh believes the program shows great promise and allows the universities involved to play to their respective strengths. "Ryerson is a leader in marketing and communications. Western and Waterloo have education faculties that can concentrate on developing curriculum for younger grades as well as courses for educators, while UOIT will be building mentorship programs."

Bringing more females into the profession is something industry and schools feel strongly about, Ms. Amleh says. "Women provide a different design perspective and industry wants that."

While the demand is there, increasing the number of women in engineering is not an easy task, says Alourdes Sully, senior technical specialist, engineering and technology for Hydro One in Toronto. "One of the key challenges we are facing now is that 36% of the workforce is retiring. In addition, 50% of female engineers leave the profession by the age of 30. If you look at other professions like medicine and law, women have come a long way. Engineering is still struggling to achieve a better balance."

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## Construction lawyers help mitigate risk for engineers and developers

By KATHRYN BOOTHBY

As engineering companies expand beyond traditional design services into construction and management, contract complexity is increasing, says Suzanne Woolley, associate in the corporate commercial department of Lawson Lundell LLP in Vancouver.

These expanded offerings are increasing the need for legal advice as engineers and developers seek to mitigate the risks associated with large scale projects.

Ms. Woolley works with organizations who engage engineers for projects in Canada's oil and gas, mining, pulp and paper and hospitality industries. "Companies need engineering services at a variety of times, not only at development, but at expansion, upgrade and retrofit," she says. "In recent years as negotiations have become more aggressive, more project owners are seeking legal advice to help negotiate agreements with engineers on their behalf."

She assists developers in two areas of contract negotiation. One is to ensure that

business issues are clearly identified and documented to avoid misunderstandings. This includes scope of work, fees and other compensation, and schedules.

The second, and most significant, relates to limiting liability. Negotiating is often a tricky balance between engineers not wanting to put their

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business at risk and project developers wanting engineers to stand behind their work, says Ms. Woolley.

By way of example, she cites negotiations where engineers might set a time period after which owners cannot make a claim. However, "for a project in the preliminary stages of

development, the owner may not know for many years if the services that they received are up to par, so this is an important part of the process."

The agreement is what defines the relationship between service provider and client, says John Gamble, president of the Association of Consulting Engineering Companies (ACEC). "An overwhelming number of cases that go to litigation have no written agreement in place." Ottawa-based ACEC is a not-for-profit organization that represents 500 consulting engineering companies across the country from sole practitioners to large publicly owned firms.

The relationship between client and engineer continues to evolve and there has been a transfer of more and more risk onto the consultant, says Mr. Gamble. New delivery models are also in place including private/public partnerships and alliances which bring additional scrutiny from taxpayers or shareholders.

"It is important that consulting engineering companies are aware of any risks and liabilities they are incurring in these relationships," he says.



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Lawyer Suzanne Woolley works with companies seeking legal advice when hiring engineers for their projects.

"As an industry, we have been good at getting return on effort but we need to get better at return on risk. This is where sound legal advice is extremely helpful, if not imperative."

There is a great deal of room for interpretation in a contract where unclear or ambiguous clauses can lead to each side seeing them differently, says Robert Joseph, the Canadian Bar Association's Northern Alberta co-chair for construction law, and partner with Prowse Chowne LLP in Edmonton. In many agreements, not enough attention is given

to fully understanding and following the rules that have been established by the owner or contractor, he says. "We also find that a lot of contractors are doing things with a handshake which can end up biting both sides in the back."

There needs to be fairness and balance in reaching solutions, says Mr. Gamble. He recommends mediation and arbitration before positions become too entrenched. "Litigation should always be a last resort. We don't want suits settled by who can outlast the other. It ties up the resources of both

parties and adds no value."

Owners and engineering companies seeking the help of a lawyer should look to those that are collaborative rather than combative in their approach, adds Mr. Joseph.

While contract work is typically a component of any law firm's services, the nuances of procurement and construction law may not be obvious to those doing other types of commercial transactions, says Mr. Gamble. "It's not just about hiring a lawyer. It's about hiring the right lawyer."

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