BREAKING DOWN BARRIERS

By Michael Benedict

A reform initiative aims to make it easier for Canadian engineers to practise throughout the country.

ONTARIO CENTRE FOR ENGINEERING AND PUBLIC POLICY

AN HISTORIC INITIATIVE to streamline the engineering profession and make life easier for its practitioners is on track and supported nationally. The effort, known as the Canadian Framework for Licensure (CFL), has several goals, including the reduction or elimination of barriers to cross-Canada mobility. As well, the CFL is to establish standard requirements for licensure and consistent discipline practices across the country. And to enhance public confidence in the profession, the CFL wants to enshrine ongoing professional development as a requirement to remain a professional engineer in good standing. The CFL has started by researching and analyzing an initial 21 different areas where reform may be considered. The CFL processes will facilitate looking at all areas required to regulate the practice of professional engineering and govern licence holders in the public interest.

The Ontario Centre for Engineering and Public Policy (OCEPP), through an engagement with Engineers Canada funded by the federal government, prepared the research paper that laid the groundwork for the CFL effort. PEO CEO Kim Allen, P.Eng., FEC, earlier spearheaded the comprehensive review. "Clearly, many obligations come with the privilege of self-regulation," Allen wrote in OCEPP's *Journal of Policy Engagement* in March 2009. "Foremost among them remains serving and protecting the public."

In making the case for protecting the public through national standards, Allen went on to say: "Improvements to current licensing and membership frameworks are both possible and desirable. While some measure of differentiation among the provinces can be tolerated, the situation has gotten out of hand and the interests of individual engineers and the public have been harmed."

The CEOs of Canada's provincial and territorial regulatory organizations have been meeting regularly for the past two years to ensure the project maintains momentum. Recently, the task of turning this reform spirit into action has fallen to Andrew McLeod, FEC (hon), current chair of the Engineers Canada Chief Executive Officers Group (CEO group). "Everyone wants to make it easier for engineers to practise in another province," says McLeod, CEO, Engineers and Geoscientists New Brunswick. "We are looking at all possibilities for engineering licence holders to make a seamless transition from one jurisdiction to another without a province losing its right to set its own standards. At the same time, provincial standards should be essentially the same across the country."

He adds: "Generally accepted national standards would make life so much easier for Canadian engineers, no matter where they live. The idea is to facilitate them working wherever they want in the country with a minimum of fuss."

Under the 1994 interprovincial Agreement on Internal Trade, Canada's premiers promised to reduce barriers that hindered recognized professionals in one province from practising in another. "We're so much ahead of the other professions in this regard," says McLeod. "Some haven't even looked at the issue yet, but that doesn't mean we can't do more."

One mobility barrier is the requirement that an engineer licensed in one province must become licensed in the other province he or she wishes to work in, even if on a limited job assignment. This requirement can lead to additional licence fees or delays in being allowed to practise if the provinces differ even slightly in their licensing criteria.

Another barrier concerns discipline–there are different standards and procedures across the country. As a result, one province's regulatory body may not recognize the process and outcome in another.

Or consider the province that makes an arrangement to recognize engineers from a

foreign jurisdiction. That's what happened recently between British Columbia and Hong Kong. But if a licensed Hong Kong-trained engineer working for a BC firm is asked to work on a project the firm is managing in another province, views will differ as to whether the engineer is immediately qualified to become licensed in the other province.

It's no surprise, therefore, that "international agreements" is one of the first three issues being tackled by the CFL exercise. The others are corporate registration and continuing professional development.

"Our overriding concern is to protect and serve the public interest," says McLeod. "Continuing professional development is essential to achieving that goal. Not all provinces require it, and those that do are inconsistent in their requirements and how they monitor compliance."

He adds: "We need more than nationally accepted standards for becoming an engineer. We need to commit our members to continually refreshing and upgrading their learning. That's the only way we can retain public trust."

Despite differences among the provinces, there are many more commonalities. "The provincial engineering associations agree on the need for more harmonized practices," says Jana Levison, PhD, EIT, former OCEPP acting director, who interviewed senior officials at all 12 Canadian engineering regulators and contributed to the 150-page CFL background paper.

Adds the document: "The engineering profession has achieved remarkable consensus on the approach it would like to take to comply with the expressed will of the country's political leaders as embodied in the Agreement on Internal Trade."

Levison, now a post-doctoral fellow at the University of Quebec (Montreal), "found a good spirit" toward working co-operatively to resolve the issues facing the profession. "They all realized everyone benefits if mobility, for one, is easier," she says.

McLeod says Levison and the centre's work was "the spark" for further action, and "we continue to use their research as a road map to get us where we want to go."

Where McLeod wants to go is set out in a detailed schedule, listing each of the initial 21 topics the CEO group is considering. The stages include research, review by the CEO group, consultation with key stakeholders, analysis of the consultation results by the CEO group, approval by the constituent associations, endorsement by Engineers Canada and, finally, constituent association implementation. He wants to finish dealing with the 21 elements by 2013, except for any provincial enabling legislation that may be required. "I don't want this to be a 20-year exercise," he says. "However, by the time we complete this effort there will likely be other issues that need to be considered. Reform is an ongoing process. It will be an ongoing process of development."

While McLeod expects the current initiative will lead to all engineering regulators moving forward together, he acknowledges that any provincial or territorial body can reject any recommendation. "Of course, an association has the right to disagree. But I feel the spirit of goodwill and the recognition that we must act to enhance the profession will lead to agreement."

He adds: "Provincial autonomy will always be preserved. But to build the profession for everyone's benefit, we need to have consistent standards and practices across the country. Ultimately, I am optimistic that everyone will see that's the right way to go."

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ONTARIO CENTRE FOR ENGINEERING AND PUBLIC POLICY

UNDERSTANDING THE PRACTICE OF PROFESSIONAL ENGINEERING

By Rachael Pauls and Kora Paciorek
Prepared by Geoff Thiele, LLB

To determine what is the practice of professional engineering, you need to consider whether all of its three defining characteristics apply.

WHAT IS "the practice of professional engineering"? Ontario's and other provinces' and territories' legislated definitions are broad, and overlap with other professions' scopes of practice. Further, engineering is a profession that includes within it various subdisciplines, each with its own unique practice requirements and challenges. As a result, providing an inclusive yet sufficiently descriptive definition of the practice of professional engineering has proven challenging.

There are, however, three defining characteristics to the practice of professional engineering. First, professional engineers are "regulated professionals" because the work they undertake involves risk to the public; as a result, government has mandated they act in the public interest by protecting safety, health and the environment. Second, professional engineers are trusted by the public to manage these risks to acceptable levels, because they possess specialized competencies suited to understand these risks. Third, professional engineers are accountable to their peers and the public for their work. This article will discuss these defining characteristics of professional engineering practice.

The practice of professional engineering is the application of mathematics, natural and applied science, as well as specialized engineering knowledge, training and experience, to analyze and solve problems. This requires an understanding

of the risks to public health, safety, the environment and the economy inherent in this work. Professional engineers have a primary obligation to society to protect it from these risks and are accountable to the public and their professional colleagues to ensure this obligation is met.

WHY SELF-REGULATION?

Self-regulation of the professions emerged in Canadian law from the English tradition of self-regulation of the clergy, civil service, doctors and lawyers. These early professions were described as "status professions"–professions whose designations were justified on the basis of advanced education and social standing. However, in the early 20th century, the move to professional self-regulation by government focused increasingly on preventing harm to the public. The professionalization of engineering in Ontario and elsewhere in Canada through the enactment of engineering legislation was a part of this movement, "as risk reduction…[became] a principal goal of modern governments."[1] The self-regulation-as-risk-management ethos was simple: because these professions engage important risks to public health and safety, as well as economic and environmental welfare, the public interest required protection: "In our society, certain professions and occupations perform work activity of such a nature that if it is carried on in a negligent or fraudulent way, it can be dangerous to the public or contrary to the public interest."[2]

Because self-regulated professions are competitive amongst those who are competent, their existence must benefit the public interest. In exchange for competence, expressed through a right to title and scope of practice, self-regulatory legislation imposes a duty on professionals to act not only in their clients' interests, but also in the interests of the public as a whole.[3] Professionals are required to subordinate self interest and the interest of the client to that of society.[4]

THE RISKS INHERENT IN PROFESSIONAL ENGINEERING

The legal definition of "practice"

The definitions of "the practice of professional engineering" contained in various provincial and territorial engineering legislation are broad, and the exemptions in those acts for the practice of related professions recognize that engineering work has the potential to overlap with the practice of other professions.[5]

Risk as the restricted scope

The practice of professional engineering involves risks to public safety and the environment. Engineering involves "unknowns in…diverse areas" of the built and natural environments, including forces of winds, forces of machines, and complex mathematical and scientific principles.[6] The interplay of these elements makes engineering an "experiment" in improving the human condition–a risky experiment that has the potential to have an impact on public safety.[7]

There is, therefore, a restricted subset of the practice of professional engineering within the broad scope of practice outlined in the act.

Aspects of engineering work within the broad legal definition that involve high level risks to public welfare are the purview of professional engineers. This view has been affirmed by the British Columbia Supreme Court in *George L. Brough Marine Consultants Ltd. v. Aqua Terra Flotations Ltd.*, where the court held that an essential aspect of the exclusive scope of professional engineering practice is the protection of the public from risks to their "safety, health and welfare."[8] Given the diversity of engineering work, determining sufficient risk to merit the involvement and accountability of a professional engineer is context specific. Nonetheless, there are several areas where it is clear the public demands accountability to protect against serious threats to public health, safety, the environment and the economy.

- *Risks to public health and safety that warrant a P.Eng.* A great deal of work undertaken by professional engineers poses significant risks to public health and safety. Where there is the potential for serious injury or death resulting from the failure of an engineering project, a professional engineer is required to act as an assurance to the public that all risks have been considered and addressed by a competent and accountable professional.
- *Risks to the environment and the economy that warrant a P.Eng.* Engineering practice can also have a significant impact on the environment. Since environmental considerations often run the risk of being subordinated to cost-effectiveness, the professional engineer's primary responsibility to the public welfare is essential in achieving protection of the environment.

The client or employer may have as their priority the economics of a project and be less concerned with the externalities imposed on society by his or her enterprise.

THE ACCOUNTABILITY AND COMPETENCE OF PROFESSIONAL ENGINEERS ADDRESS THESE RISKS

Given the potential impact on the public, a professional engineer is an essential resource for projects that involve a high level of risk. The greater the potential impact of the work on the environment, public health and safety, as well as the potential of economic and financial risk, the more critical the work's design and management becomes. By virtue of their competence and accountability, professional engineers are best equipped to handle the risks inherent to an engineering project.

The education of a professional engineer is not limited to an education in mathematics, natural and applied science, and specialized engineering knowledge appropriate to his or her field.[9] He or she must also possess an understanding of the environmental,

cultural, economic and social impacts of engineering work on society.[10] The unique education of a professional engineer involves developing the skills to recognize, mitigate and prevent risks to the client, and most importantly, to public health and safety.

In addition to formal education, an applicant for a P.Eng. licence must have four years of relevant work experience involving the application of engineering principles at the appropriate level, demonstrated readiness to accept the full professional responsibility in the practice of professional engineering, as well as the demonstrated professional maturity necessary to judge when the applicant is out of the applicant's area of competence.[11]

Who can do engineering work?

Canadian engineering legislation affirms that the practice of professional engineering is not exclusively about knowledge or technical competencies. Rather, it is an undertaking of legal accountability and professional responsibility–an assurance that engineering work will be undertaken in a safe, socially responsible way.

While legislation permits engineering work to be undertaken by anyone under the supervision of an engineer, a professional engineer is both legally and ethically bound to supervise that work. Under the legislation, "direct supervision" means the responsibility for the control and conduct of the subordinate undertaking engineering work. This means a professional engineer is accountable to the public to ensure the end product and the means to achieve a desired outcome do not compromise public health or safety and that work undertaken by a subordinate has had appropriate guidance from the engineer.[12] Responsibility for engineering decisions does not require that the P.Eng. control every decision on the project.[13] However, the professional engineer has an obligation to "turn his or her mind" to the elements at risk in any work undertaken by a subordinate, and to ensure all measures to address these risks have been taken.[14]

If a professional engineer fails to appropriately supervise those conducting engineering work under his or her supervision, the legislation ensures that he or she is held accountable for any risks to the public that arise as a result of negligent supervision.

Tort liability: Why accountability matters

It may be argued that the civil legal system provides an adequate mechanism of redress for those who sustain serious loss as a result of an engineering error. However, tort liability does not address the primary public interest in engineering work, which lies in the prevention of harm. Self-regulation and its concomitant professional accountability best respond to the need to prevent serious risks to the public by imposing rigorous entry standards to ensure competence before an engineer is allowed to be accountable for engineering work, as well as standards of professional practice and ethics to ensure work is done diligently, competently and ethically.

DRAWING THE LINE: WHEN DO RISKS IN AN ACTIVITY NECESSITATE A PROFESSIONAL ENGINEER?

When are the elements at risk to the public such that that they warrant a professional engineer's accountability? Given the vast number of unique engineering problems within the many engineering subdisciplines and the potential for overlap in practice scope with other professionals, finding a boundary on this question is difficult. There are, however, several stakeholders who may at different points in a project determine that the risks inherent to that project demand a professional engineer to be accountable for them.

Policy makers: Professional reliance legislation as a policy statement on risk

Professional reliance represents the shift by the government from prescriptive regulation and extensive government control to increased reliance on the qualifications, judgment and decisions of licensed professionals like professional engineers. Professional reliance legislation allows for flexibility in private activity while simultaneously protecting against risks to the public and the environment. This model allows a professional engineer to use his or her judgment and expertise to decide upon the best method to accomplish the regulated activity's legislative goal of public and environmental protection.

The key aspect behind the success of the professional reliance model is the personal accountability of licensed professionals. Professional engineers can be held directly responsible for their actions and decisions regarding the regulated activity. The potential of being held directly responsible gives more incentive for the professional engineer to exercise a high level of care and skill in the regulated undertaking. The result of professional reliance legislation is a more comprehensive system of accountability that responds better to the public interest. The use of the experience, knowledge, judgment and accountability of professional engineers for regulated activities can result in a more effective and efficient system.

The client's interest in requiring a P.Eng.

Where legislation does not require a professional engineer, clients may still decide they wish or need to protect themselves from vulnerability to risk by hiring a professional engineer. Engineering work has the potential to expose a client to a number of risks. For example, an engineer could design an unsafe or ineffective consumer product. If this product were mass produced and distributed to the public, the client would face tremendous financial costs and legal liability. For these reasons, it is in the interest of the client that work that implicates such risks be undertaken by a professional engineer. A professional engineer's unique combination of com-

petence and accountability can help to minimize financial and legal risks to the client.

The professional engineer and professional judgment

The work of the engineer is complex. It involves applying a significant range of fundamental principles, enabling the development and application of new technologies, the promotion of advanced designs and design methods, and the introduction of new and innovative production techniques and construction concepts. To do this, an engineer applies his or her knowledge of mathematics, natural and applied science, as well as specialized engineering knowledge, training and experience, to analyzing and solving problems. In contrast, the client is typically someone who comes from a non-engineering background. Therefore, a professional engineer may have to decide when a project involves such high-level risks that professional accountability is necessary.

One aspect of recognizing and mitigating risk includes an understanding of when one is acting beyond his or her area of competence.

Professional engineers are often in the best position to determine whether the elements at risk in a given project warrant high levels of accountability due to their specialized knowledge of engineering problems and their impact upon society. The public is often not in a position to assess these risks, and the result may be to the detriment of the public interest if unguided: "salient, vivid examples can make [the public] overreact to small risks" and failure to understand an element of the risk can cause the public to under-react to hazard.[15] Professional engineers know and understand the elements at risk when they undertake work in the built environment, and are accountable to safeguard the public from these risks. This exercise of "risk-related judgments" is one crucial aspect of the engineer's professional judgment and discretion.[16]

Self-regulation is designed to address risks to the public at minimal or no cost to the general public by requiring that those who engage in risky work are competent and accountable to assess these risks. The self-regulation of a professional engineer is an acknowledgment by government that engineering practice poses risks to the public. In turn, professional engineering regulators like PEO safeguard that professional engineers will meet their professional obligations by setting admission standards, developing professional practice standards and guidelines, and monitoring compliance with these standards.

While the legal definition of professional engineering practice is broad and overlaps with the scopes of practice of other professions, there are activities that professional engineers alone should undertake due to risks that could have a significant impact on public health, safety, the environment and the economy. Professional engineers are best equipped to address these risks because they are competent to understand and address the impact of engineering work upon society and the environment, and are accountable in the most far-reaching sense for any work they undertake. Requiring a professional engineer to undertake work that carries high-level risks to public health, safety, the environment and the economy best prevents risks from materializing into harm to the public.

It is impossible to draw a clear line on where the risks at hand require the competence and accountability of a professional engineer. However, there are several key stakeholders who may determine that a P.Eng. is best suited to address the risks arising in a policy, program, product or project. Governments, through demand-side legislation, may prescribe the use of a professional engineer on certain projects requiring professional expertise and accountability. Owners, entrepreneurs, institutions or clients may determine their or society's well-being is best served by the work of a P.Eng. Finally, professional engineers themselves may alone be competent to identify the level of risk involved in an activity through the use of their professional judgment and discretion. Σ

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