ETHICS

Generic or discipline-specific licensure?

By Marc A. Rosen, PhD, P.Eng.

Debate occurs from time to time about engineering licensure and whether a generic or discipline-specific licence is appropriate. Here, the author makes the case for a generic licensure model, and presents suggestions as to how the integrity of that model can be maintained and improved to minimize potential ethics issues.

With generic engineering licensure models, the licence applies to the entire practice of engineering and is not limited to a particular field within engineering. This model of licensure is followed in many jurisdictions, including all licensing bodies in Canada and the majority of engineering licensing boards in the U.S.[1, 2].

A generic engineering licence allows one to take on engineering activities in all areas of engineering, regardless of:

- the specific type, duration and level of education that one has attained; and
- the type, breadth and depth of experience one has acquired.

Under such a licensure model, the main safeguard for limiting the activities of engineers to areas of competence is the requirement, often stipulated in engineering codes of ethics, to undertake only activities for which one feels competent. For instance, the Code of Ethics of Professional Engineers Ontario (PEO) states in its first point, "It is the duty of a practitioner to the public, to the practitioner's employer, to the practitioner's clients, to other members of the practitioner's profession, and to the practitioner to act at all times with…competence in the performance of any professional engineering services that are undertaken." That point goes on to state that the engineer shall act with "knowledge of developments in the area of professional engineering relevant to any services that are undertaken"[3].

In discipline-specific engineering licensure models, the practitioner is permitted to take on activities only in specific fields of engineering where one is deemed competent to practise by virtue of education, experience and sometimes other criteria. This alternative method of licensure is applied in some form in several jurisdictions and has been proposed by many as advantageous to a generic licensure model. Proponents of discipline-specific licensure often cite a need for more rigorous standards in the respective disciplines.

A discipline-specific engineering licence restricts engineers' rights to practise to engineering activities for which they are deemed competent via their a) area of education (e.g. chemical engineering graduates would be restricted to practise in the field of chemical engineering), and/or b) area of experience. Sometimes other measures are used to assess an engineer's area of expertise. This licensure model requires assessment mechanisms to ensure sufficient knowledge and ability in one or more areas.

Discipline-specific difficulties

I feel that the generic engineering licensure model is superior to discipline-specific engineering licensure and that the latter model is fraught with pitfalls. Some reasons:

- *Multi-disciplinary and inter-disciplinary engineering.* Much engineering activity nowadays involves more than one engineering discipline or lies between two or more engineering disciplines. Many engineers need to cross over to other disciplines to some extent. A discipline-specific engineering licence makes it difficult–or virtually impossible–to undertake such work, which is becoming much more prevalent as engineering advances and projects become greater in size and complexity.
- *Engineering disciplines with unclear boundaries.* Traditional engineering disciplines (e.g. chemical, civil, electrical, computer and mechanical) are relatively easy to identify regarding scope of the discipline, but many emerging engineering disciplines are less well defined in terms of scope and have boundaries that are vague. For example, nuclear engineering, which was launched as a unique Canadian program at the University of Ontario Institute of Technology in 2003, includes aspects of mechanical, chemical and electrical engineering. Similarly, aerospace engineering involves a range of traditional engineering disciplines, while biomedical engineering involves not only a range of traditional engineering disciplines but also extensive health sciences.

- *Breadth of engineering degree programs available.* A wide range of engineering degree programs are available in different countries. Often, these are difficult to classify within a traditional category for purposes of discipline-specific engineering licensure. For instance, the syllabus of PEO, which outlines the educational requirements in an engineering field to substantiate a person's qualifications in that field, only covers a limited number of disciplines. Yet many more engineering disciplines exist in the world and, as a consequence, PEO sometimes has difficulty in assessing educational credentials and often needs to force a fit between a person's degree and a category of engineering.

Keeping up with new and emerging engineering disciplines, and how they will be dealt with by licensing bodies, is proving to be a challenge. This challenge is difficult enough to address within a generic engineering licensure approach, without adding the complexities associated with discipline-specific engineering licensure.

Generic difficulties

Despite my preference for generic engineering licensure, this model has some problems, too. The main one is that it relies on the judgment of the engineer to ascertain his or her competence to undertake engineering work in a specific discipline or area. This reliance can lead to:

- *Errors in judgment.* Asking a person to self-evaluate will often lead to honest errors in judgment, just as one often misses mistakes when proofreading one's own work. It is often helpful to obtain the advice and views of one or more other people.
- *Conflict of interest.* It is difficult for many engineers, especially those in some form of private practice, to turn down work. So, the requirement that they judge their competence to undertake engineering work in a specific discipline or area often places them in a difficult conflict. This requirement can lead to a tendency to stretch or bend the definition of competence in a field so as to justify not turning away work.
- *Loss of professional respect.* Some cite the generic licensure model as a potential cause for loss of respect for the engineering profession by the public and others[4]. Such statements are often accompanied by claims that specialized licences are one hallmark of professionalism.

Perhaps a key to overcoming some of the difficulties associated with generic engineering licensure, and improving it, lies in our educational system.

The burden placed on engineers when the generic licensure model is followed is thus significant, from both ethical and technical perspectives. A quite reasonable question is sometimes asked by proponents of discipline-specific licensure: Is it ethical to place upon engineers the requirement to judge their own competence to undertake engineering work in a specific discipline or area?

Generic licence can work better

Perhaps a key to overcoming some of the difficulties associated with generic engineering licensure, and improving it, lies in our educational system.

To explain this statement, let's consider the role of engineering education. I have always believed that one of the main objectives, if not the main objective, when teaching engineering is to ensure students know how to solve problems and address opportunities, regardless of the type or field. Within this view, I have felt that if we were successful, engineers would be able to identify what they need to know for a given task and, if they do not have this knowledge, to learn it. This ability will likely prove even more important in the future when, with technological advances continuing at an increasing pace, the need will grow for engineers who are flexible, can think outside their specific discipline, and have strong ethical foundations[5].

I maintain, therefore, that the weaknesses in generic engineering licensing that give rise to the call by some for discipline-specific licensure would be greatly diminished if engineers attain the key skills outlined in the previous paragraph. The engineering education system must instill in graduates a solid knowledge of how they can realistically gauge their competence for a task, and firm understanding of the need to do so honestly.

If graduate engineers are educated to know what they do and don't know and if we continue to ensure engineering ethics are really understood and appreciated by engineers, the generic licensure model can serve the profession well.

References

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