

# Public guideline on the practice of engineering in Canada

Public guideline on the practice of engineering in Canada - February 2012

# Notice

## Disclaimer

Engineers Canada's national guidelines and Engineers Canada papers were developed by engineers in collaboration with the provincial and territorial engineering regulators. They are intended to promote consistent practices across the country. They are not regulations or rules; they seek to define or explain discrete topics related to the practice and regulation of engineering in Canada.

## **The national guidelines and Engineers Canada papers do not establish a legal standard of care or conduct, and they do not include or constitute legal or professional advice**

In Canada, engineering is regulated under provincial and territorial law by the engineering regulators. The recommendations contained in the national guidelines and Engineers Canada papers may be adopted by the engineering regulators in whole, in part, or not at all. The ultimate authority regarding the propriety of any specific practice or course of conduct lies with the engineering regulator in the province or territory where the engineer works, or intends to work.

## **About this Engineers Canada paper**

This national Engineers Canada paper was prepared by the Canadian Engineering Qualifications Board (CEQB) and provides guidance to regulators in consultation with them. Readers are encouraged to consult their regulators' related engineering acts, regulations, and bylaws in conjunction with this Engineers Canada paper.

## **About Engineers Canada**

Engineers Canada is the national organization of the provincial and territorial associations that regulate the practice of engineering in Canada and license the country's 295,000 members of the engineering profession.

## **About the Canadian Engineering Qualifications Board**

CEQB is a committee of the Engineers Canada Board and is a volunteer-based organization that provides national leadership and recommendations to regulators on the practice of engineering in Canada. CEQB develops guidelines and Engineers Canada papers for regulators and the public that enable the assessment of engineering qualifications, facilitate the mobility of engineers, and foster excellence in engineering practice and regulation.

## **About Equity, Diversity, and Inclusion**

By its nature, engineering is a collaborative profession. Engineers collaborate with individuals from diverse backgrounds to fulfil their duties, tasks, and professional responsibilities. Although we collectively hold the responsibility of culture change, engineers are not expected to tackle these issues independently. Engineers can, and are encouraged to, seek out the expertise of Equity, Diversity, and Inclusion (EDI) professionals, as well as individuals who have expertise in culture change and justice.

# 1 Introduction

This guideline has been prepared as a model manual of Engineering Practice in Canada. It is a companion document to the Engineers Canada Public guideline on the Code of Ethics. Its underlying objective is to offer a model definition of the practice of engineering in Canada ("The Definition") and to enhance the understanding of the role and responsibilities of practising engineers in Canada.

The Engineers Canada Definition of the Practice of Engineering is an expansive general definition that serves to establish the role of engineers. The Definition enunciates comprehensive governing principles while avoiding detailed interpretations which are the responsibility and authority of the regulators.

The Definition is a guideline for the regulators who may adopt and adapt it for their practising engineer members. Regulators adapting the guideline to meet their own legislative needs will wish to do so with the understanding that the Definition may be used in disciplinary proceedings.

This guideline includes a Definition of the Practice of Engineering in Canada as well as the fundamental principles upon which it is based. The subsequent interpretive articles expand and illustrate the concepts presented in the text and are intended to assist practising engineers and the regulators to identify the scope of engineering practice.

# 2 Fundamental principles

The underlying principles which form the basis of the Definition of Engineering and the Code of Ethics and their relevance to the practice of engineering are summarized below.

1. Society recognizes engineering as a profession and assigns engineers the privilege of the exclusive right to practice engineering, and with it, the responsibilities of self-regulation.

2. As professionals, engineers individually and collectively commit to serve and protect the public in all their engineering endeavours. The responsibility of self-regulation also obliges the profession to ensure that only qualified persons practice engineering and that they do so with concern for societal and environmental needs, while maintaining responsibility to clients, employers, colleagues, subordinates, themselves, and the profession at large.
3. These obligations provide a framework for a Definition of Professional Practice and give rise to a Code of Ethics which outlines the broad, fundamental principles to which the profession aspires.
4. The Definition and Code apply to all engineers whether they are serving as fee-for-service practitioners, employee engineers, managers of engineering, or as private citizens.
5. The responsibilities and obligations of self-regulation identified above have been entrusted by the provincial and territorial legislatures to their respective engineering regulators. The principle mandate of each regulator is to regulate the practice of engineering within its jurisdiction through the maintenance of appropriate licensure provisions. This includes disciplining its members whose conduct breaches the code of ethics or is otherwise contrary to the licensure provisions, and it extends to include taking actions against others who are in violation of the Provincial or Territorial Act governing the engineering profession (the engineering act). Specific disciplinary and act enforcement purposes and measures, with the common objective of fulfilling the obligation as a self-regulating profession, are embodied in the regulators' acts, bylaws and regulations.

## 3 Defining the engineering profession

The characteristics of professions are discussed below and applied to the societal role of engineers based on the Definition of Professional Practice. This is followed by interpretive comments and some examples of the practice of engineering.

### 3.1 Characteristics of professions

A profession is a learned calling which requires advanced knowledge, understanding, and abilities gained from intensive and specialized education, training, and practical experience. Members of a profession limit their activities to their areas of knowledge and experience, doing so out of commitment to serve and protect the public. Professional practitioners also ensure that their competence is maintained throughout their careers. Professions tend to be characterized by high levels of organization and regulation, yet their members participate in activities which are varied rather than routine, and typically require the exercise of discretion and judgement.

Professions adopt distinctive codes of ethics which deal with their members' relationships with the public, colleagues, employers, employees, and clients. Adherence to a code of ethics ensures an adequate standard of competence and conduct based on a relationship of responsibility and trust between the profession and the public, while maintaining respect, integrity, and confidentiality between practitioner, employer, and client. But the highest obligation of a profession is to society, which it serves: the members of a profession shall protect the interests of society in the areas of the profession's specialized expertise. This obligation rises above all others when there are conflicting responsibilities. As part of this "social contract", the recognized professions in Canada have been given the authority and responsibility to be self-regulating under their respective provincial or territorial legislation, and to ensure that only qualified professionals are licensed to practice.

### 3.2 The Engineers Canada definition of the practice of engineering

The "practice of engineering" means any act of planning, designing, composing, evaluating, advising, reporting, directing or supervising, or managing any of the foregoing, that requires the application of engineering principles and that concerns the safeguarding of life, health, property, economic interests, the public welfare or the environment.

### 3.3 Interpretation of the definition

The Definition uses a generic or expansive approach in defining the practice of engineering. It identifies the broad criteria which define engineering, without either listing examples or attempting to provide a comprehensive roster of engineering works. In this way the Definition inherently incorporates new engineering activities as they evolve, and it does not run the risk of inadvertently missing some engineering activity in a list intended to be exhaustive.

The Definition has three elements:

1. any of various particular intellectual activities or combinations of them,
2. the application of engineering principles, and
3. safeguarding societal interests.

A particular work or undertaking is not considered to be the practice of engineering unless all three elements are present.

The Definition applies universally in all situations where the particular intellectual activities are performed, where engineering principles are involved, and where there are any effects on any "public" or on society in general. It therefore applies to all engineers, whether they are employees or are self-employed. The Definition has sufficient breadth so that it applies to all phases of engineering endeavour, including feasibility studies, designing or planning, operations, and decommissioning. That is to say, engineering is not only the design, planning, and supervision of construction of a process plant such as a petroleum refinery, but it also includes supervision of the operation, ongoing maintenance and modifications of such a facility, as well as its eventual decommissioning.

The Definition extends to include certain areas that are sometimes considered peripheral to engineering, such as teaching engineers or engineering students, supervising engineers, engineering sales, or certain computer applications to engineering works. Each particular circumstance must be judged on its own merits, based on the three components of the Definition. For example, teaching senior engineering science or design courses could be considered engineering, whereas instructing a junior physics or mathematics course would not. Similarly, certain engineering sales positions involving layouts or applications which depend heavily on the application of engineering principles might be considered engineering. As a final illustration, the application of computer technology that involves engineering principles or affects engineering decisions, perhaps in an on-line function within a complex engineering project, could readily be judged as engineering. On the other hand, certain other computer applications related to engineering projects, such as cash flow or manpower monitoring applications, would not be so considered.

The issue of protecting the public interest and the question of whether the public is at risk must be considered in the broadest terms. The component, product, device, system, process, etc. that is the outcome of the engineering undertaking must be viewed from its broader societal perspective - the judgement of the engineer's employer or client, or the engineer, are not necessarily adequate.

The "taking of responsibility" is not specifically identified as a required component of the Definition, since it is understood that all individuals are expected to take responsibility for their involvement in any undertaking. Consequentially, engineers are expected to be fully accountable for their professional activities; indeed, they cannot dissociate themselves from this obligation unless another properly qualified engineer formally assumes responsibility for the work. For example, if performing a particular assignment involves all three elements of the Definition, (that is, it is the practice of engineering), then it is necessary for an individual adequately qualified by training and experience (that is, an engineer) to undertake the assignment, or supervise its undertaking, and to take responsibility for it. Conversely, it is not legitimate for an individual to assume engineering responsibility for the work if that individual is unqualified to satisfactorily undertake all three elements identified in the Definition, nor to supervise others in undertaking them. In short, it is necessary that engineers take engineering responsibility; others cannot. Put another way, the answer to the question "Who claims to take engineering responsibility?" is not the issue — rather, it is a matter of whether the individual taking responsibility is qualified to do so for all three elements of the Definition and has been sufficiently involved to legitimately take the engineering responsibility.

A similar argument applies with respect to the question of whether an individual is adequately qualified by education and experience to take responsibility for all three elements identified in the Definition. The tacit assumption is that all individuals involved in any undertaking would participate only in areas of their capability and competence. Hence, while not specifically included in the Definition, proper qualifications are assumed to be present.

An important corollary arising from the Definition in conjunction with the interpretation above is that professional responsibility for engineering endeavours can only be assumed by individuals. While companies and other entities engaged in engineering work have an obligation to provide and maintain an environment where engineers can practice in accordance with the Engineering Act, and while they may assume overall general authority and responsibility for the entity and may be legally obliged to take on financial burdens arising because of engineering flaws, such legal and/or fiscal liability or overall responsibility cannot be equated with professional responsibility. The essence is that the practice of engineering, namely, the intellectual activities, the application of engineering principles, the use of judgement in protecting public interest or the environment - all based on adequate education and experience - these are human traits and abilities and cannot be performed by a business or government entity. Individuals within the entity must assume the professional responsibility; they must be licensed under the Engineering Act and be in a position to influence engineering-related decisions made by the company or entity engaged in engineering work.

## 4 The code of ethics

Understanding and living by a Code of Ethics is an essential component of the practice of engineering in Canada.

A definition and interpretation of the Engineers Canada Code of Ethics are contained in the Engineers Canada

Public guideline on the Code of Ethics.