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# Acting Ethically

## Chapter Overview

Engineering is more than a technical endeavour. The practice of engineering involves working with people, and the decisions we make as engineers can have great impacts and grave repercussions to people, society, and the environment. Looking back at the 20th-century, we find both great engineering achievements, such as the advent of modern electronics, transportation, and health technologies, and horrific engineering failures, such as the disasters at Quebec Bridge (91 deaths) and Union Carbide (3,000-12,000 deaths, over 100,000 injuries). Looking at the bigger picture, the works and decision makings of engineers have certainly contributed to complex planetary issues such as global warming and biodiversity loss, and the advent of new technologies is fundamentally impacting our ways of living, working, and being. As engineers, we have a moral responsibility to ensure the well-being of people and that of our planet, and use our specialized knowledge and expertise to further this goal. This responsibility lies at the core of engineering ethics.

Engineering ethics deals with the moral dilemmas we may come across in our day-to-day work as engineers, as well as the broader and longer-term impacts of our decision making. We may be confronted by ethical issues at any and every stage of our work as engineers, and ethical codes have been created by professional engineering societies to help us become aware of these potential issues, and guide us in making ethical decisions. The codes may vary depending on the area of influence and expertise of engineering societies, but they do share a number of common themes such as public safety, honesty, and conflict of interests. These ethical codes can evolve over time in response to the cultural and societal changes. For example, many engineering codes of ethics have been expanded to include environmental sustainability in recent years.

Traditionally, engineering ethics have been focused on micro-ethical issues dealing with the actions of individuals and the internal workings of the engineering profession, such as situations

arising within the boundary of day-to-day engineering activities involving honesty, conflict of interest, and whistle-blowing. Honesty is integral to an engineer's work; dishonesty can destroy the bonds of trust and erode public confidence in the profession. As such, an engineer must strive to adhere to the truth and avoid all forms of deception, such as lying, distorting a situation, withholding information, or taking undue credits. A conflict of interest is a situation that undermines an engineer's ability to serve the needs of a client or employer objectively and without bias. A conflict of interest can develop from accepting gifts, processing insider information about a company, or having an interest in a competing company. Conflicts of interest are to be avoided or declared. The book defines whistle-blowing as revealing a situation with serious moral implications to a person able to act on the matter, such as a situation in which the interest of the engineer's company conflicts with the safety of the public. The act of whistle-blowing carries significant professional and personal risks, and should be taken only after alternative solutions have been exhausted. An alternative option to whistle-blowing is to resign.

In recent years, the engineering community have begun to recognize our responsibility in mitigating and reversing the negative environmental impacts of technology, as well as our responsibility in considering the complex and transformative impacts of technology on our society and economy. As a result, the domain of engineering ethics has expanded to include macro-ethical issues including sustainable development and the consequences of new technologies. The concept of sustainable development has at least three dimensions: social, economic, and environmental. In the past, we have been focused on reconciling the economic and environmental dimensions of sustainability, and have paid less attention to the social dimension. As new technologies such as information technology, robotics, nanotechnology, and bioengineering mature, there is a need for engineers to participate in the discussion about the future of our technological society.

## Learning Objectives

In this chapter, you will learn to behave ethically as an engineer.

Specifically, you will:

- explore our responsibilities to our colleagues, employers, and the public;
- learn about the engineering codes of ethics;
- explore micro-ethical issues such as (1) honesty, (2) conflict of interest, and (3) whistle-blowing; and
- explore macro-ethical issues such as (4) sustainable development, and (5) impacts of new technologies.