

BY K.D. PRESSNAIL

Imagine a junior engineer, seated around a large table with 10 more senior members of a building design team. The design team has been summoned to meet with the owner, who is considering modifying the design of a 10-storey, \$70-million building so that it is "more sustainable." The designers include architects, mechanical, electrical, and structural engineers. The owner, a large institution, appears committed to addressing environmental concerns in the design of its new building. As a budding expert in low-energy buildings, the junior engineer listens intently as various options are evaluated. However, as more sustainable design options are examined, it becomes clear to the junior engineer that initial capital cost considerations appear to be of paramount importance to the owner.

Although the owner is enlightened as to issues of sustainability and is concerned for the environment, the owner's representative is on the verge of making design decisions that meet only the minimum standards prescribed in the building code, rather than more sustainable options that are initially more expensive. To argue that sustainability is well worth the cost, the junior engineer raises issues of reducing CO₂ emissions, life-cycle energy, and the impact on future generations of an inefficient building that is expected to endure for more than 100 years.

Cost is paramount

Unfortunately, others around the table are quick to follow the owner's focus on initial capital costs to the exclusion of all other costs and considerations. Collectively, they dismiss issues of life-cycle energy use. While many of the more senior engineers could have spoken up and supported the more sustainable view that considers life-cycle energy use, they did not. The junior engineer leaves the meeting disappointed.

From persuasion to determination



The imperative to work for the good of society need not necessarily be limited to the here and now. Whether as individuals or members of a team, engineers can take a leadership role in promoting sustainability, environmental stewardship and the longer-term public good.

The disappointment stems, in part, from the difficulty in speaking up in such a team situation. Speak up too loudly, and the junior engineer, or even a more experienced counterpart, may be looking for employment elsewhere. It is also difficult for the junior engineer to accept that another opportunity has been lost. Another building will soon be built that will be needlessly squandering precious energy resources and needlessly contributing to CO₂ accumulation over a relatively long time.

Ultimately, it is disappointing to be reminded of an engineer's powerlessness in such situations. As developers and enablers of new and creative technologies, engineers are often loath to hand over their design works when they know that such designs may needlessly burden future generations. Although they may try their best to inform and to convince building owners to consider the impact of their decisions on the environment, in the end, engineers have only the power of persuasion.

Yet all engineers, in accepting the principles of sustainability, are bound to consider the needs of the present society without compromising the ability of future generations to meet their own needs. Perhaps the engineers described here should have done more, but they lack the necessary power. In a recently published *Guideline on the Environment and Sustainability for All Professional Engineers*, the Canadian Council of Professional Engineers (CCPE) reminds us that engineers have a leadership role and that "engineers must use their role within multi-disciplinary teams and their role in influencing management decisions to the benefit the environment."¹ At a time when all societies face such enormous environmental challenges, it is clear that engineers are uniquely positioned to lead. However, fulfilling this leadership role is difficult, particularly when the engineer has only the power of persuasion.

How can engineers find the power to fulfil this leadership role? It is well rec-

ognized that all engineers have a paramount duty to society. How broadly one interprets "society" ultimately determines the extent to which engineers owe an ethical duty to protect the interests of future generations. If "society" means the "present society," engineers' duty to future generations is limited. However, it can be argued that it is in the best interests of "society" to consider and to protect the interests of future generations. If this view is accepted, engineers already have the power to provide environmental leadership. If one adopts the latter, expanded, view of "society," the outcome of the mythical, but all too typical, meeting described above, could have been very different. If the design engineers had been ethically bound to consider the impact of their decisions on future generations, their role at the table could have been more than just persuasive—it could have been determinative.

Beyond persuasion

If engineers are to fulfil their leadership role in sustainability, they need to have more than just a persuasive role. Such shifts in power can gradually be brought about by professional bodies, through codes and standards, day-to-day practice and education.

As a professional body, PEO can assist in empowering engineers so that they can provide the necessary environmental leadership: first by setting ethical standards that specifically

protect the interest of future generations, and second by educating members on how to achieve and, more importantly, how to exceed these standards.

As educators, universities have a role to play, too, by providing tools for resolving such ethical challenges. Ethics education can assist students in identifying potential solutions. It can also help students identify and rank the importance of the many competing interests as they appear. In the end, education in ethics becomes a means of more efficiently resolving ethical challenges. Interestingly, when it comes to matters of ethics and the environment, engineering students already come equipped with their own ethical tools and intuitive judgments. As an emerging generation of engineers who have grown up with well-publicized warnings of the dire adverse effects of global warming, the challenges faced at the table by the junior engineer may not seem so daunting. Students who have the intuitive view that engineers are, at least, stewards for future generations may recognize and more readily seize the opportunities to argue on behalf of future generations. Yet emerging engineers would still be lacking the power to bring about the necessary change.

Society may look to the next enlightened generation of engineers to solve the challenges of sustainability, but society need not wait. Engineers and the regulators of professional engineering are uniquely positioned to bring about the necessary changes, now. How different the decision table would be if, as a matter of ethics, all engineers had to consider and protect the interests of future generations. Speaking up in a team environment would have been a lot easier for the junior engineer had everyone at the table been compelled, as a matter of ethics, to look to the future as well.

There can be no question that engineers have a duty to provide leadership in the area of environmental protection and sustainability. Although engineers have always had opportunities to lead, they have often lacked the necessary power to lead. While engineers have led through codes and standards and through persuasion in their daily practice, this is only the beginning. Given the environmental imperatives, engineers must do more. Perhaps it is time that we recognize the ethical duty of engineers to protect the interests of future societies, as well as our own. Then they may be able to more properly fulfil their role as leaders in sustainability; future generations will be able to look back at our collective decisions and, rather than find betrayal, find inspiration. ♦

K.D. Pressnail, LLB, PhD, is associate professor of civil engineering at the University of Toronto.

References

1. *The Environment and Sustainability in the Practice of Professional Engineering*. Ottawa: Canadian Council of Professional Engineers, 2001. website: <http://www.ccpe.ca/e/index.cfm#> accessed. April 1, 2004.

BE A LEADER IN OPERATIONS!

M

MANAGEMENT

**MASTER IN MANUFACTURING
MANAGEMENT
AT MCGILL UNIVERSITY**

- educates leaders in manufacturing & supply chain logistics
- utilizes state-of-the-art resources at a renowned university
- combines business and engineering subjects

M

MANUFACTURING

- focuses on operations optimization
- emphasizes cost reduction & productivity gains
- provides access to expertise for projects and internships

M

MASTER

**BECOME A MENTOR TO THIS
SPECIALIZED EDUCATION
PROGRAM
HIRE AN MMM STUDENT!**

**CONTACT THE
MMM PROGRAM COORDINATOR**

(514) 398-7201
mmm.mecheng@mcgill.ca
<http://www.mmm.mcgill.ca>