

Ethics in engineering, science and technology—the need has never been greater

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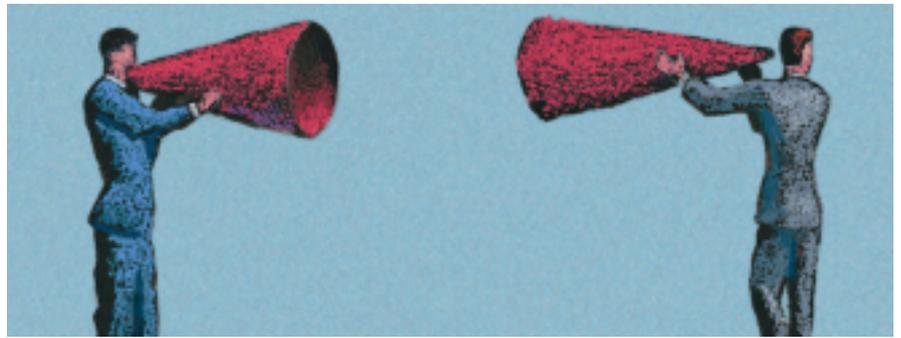
Inappropriate ethical practices have caused problems of all sorts throughout history, with results ranging from financial losses and personal hardships to injuries and deaths.

Often the focus of such practices is on shady business dealings, including overly creative accounting and financial reporting practices. Recent examples, such as the activities reported in the media about the energy powerhouse Enron and the telecom giant WorldCom, have been the stuff of which headlines are made.

But those involved in science, technology and engineering have caused their share of ethical concerns:

- The explosion in 1986 of the space shuttle Challenger raised questions about whether the advice of engineers to scrub a launch had been overridden by management at NASA, in an effort to keep an ambitious launch schedule on target.
- Similar accusations arose after the recent tragedy involving the shuttle Columbia, but it's still too early to ascertain if ethical improprieties were involved related to the advice given by those with technical expertise or the way that advice was used.
- Likewise, ethical questions couldn't help but arise when we learned in 2000 that tread-separation problems with Firestone tires, which led to numerous accidents and injuries over many years, seemed not to have been adequately addressed soon after they were first observed.
- And many probably recall the 1989 claims by chemists Stanley Pons and Martin Fleischmann of having achieved "cold fusion," which raised hopes for solving the world's energy-supply problems. The hopes collapsed soon after when the claims proved unverifiable, raising questions of professional ethics.

The need and desire to ensure that high ethical standards are adhered to by those



As technology advances, so does the need to ensure high ethical standards.

involved in technology is not to be taken lightly. After all, these people wield incredibly powerful and, if misused, dangerous tools—the tools of science and engineering. The public places great faith in these people, and in fact has no real choice but to place great faith in them, given the complexity of their trades. The public rightfully, therefore, expects high ethical standards and is fearful that some practitioners might not behave ethically.

The concern for high ethical standards among scientists and engineers is, of course, not new. And some bodies do instill it. Professional Engineers Ontario, the licensing body for engineers in Ontario, for instance, requires all applicants for a licence to pass an exam on law and ethics, and requires licensed engineers to observe a code of ethics. In fact, all provinces and territories in Canada have a code of ethics to which licensed engineers must adhere. The primary objective of virtually all such codes of ethics is to ensure the engineer understands that he/she has a duty to watch out for the public welfare, whether it involves public health, the environment or other people's money.

Also, the Canadian Engineering Accreditation Board, which is responsible for evaluating engineering programs across our country, requires accredited engineer-

ing programs to "ensure that students are made aware of the role and responsibilities of the professional engineer in society. Appropriate exposure to ethics ... must be an integral component of the engineering curriculum."

But the manner in which ethical behaviour is instilled in students of engineering, science and technology varies and often is neither focused nor emphasized. In fact, it is probably fair to say that at times—and perhaps frequently—the message does not get through.

If the need for ethical behaviour in scientists and engineers is not new, why do I call for more emphasis on ethical standards in these disciplines? What prompts my concern is that, as these disciplines advance, their power and control over our lives, and our reliance upon them, becomes even greater. As a result, I believe that along with advancing technology, we need increasing reinforcement of and education on ethics.

Perhaps this increased concern with professional ethics is reflected in *Time* magazine's decision to name "The Whistleblowers" as the Persons of the Year in 2002. Cited as two of the year's most prominent individuals to blow the whistle on what went wrong at their companies, were Enron Vice President Sherron Watkins

and WorldCom Vice President of Internal Audit Cynthia Cooper.

Agencies like PEO and the Canadian Engineering Accreditation Board are doing an admirable job of encouraging high ethical standards. But sustaining increased vigilance is essential at all times, not just when scandals arise, not just when disasters grab headlines.

That is one reason why the University of Ontario Institute of Technology (UOIT), a new university that offers career-focused and market-driven educational programs utilizing advanced teaching technologies and that engages in value-added research, has introduced a course on ethics and law for professionals. The course is required for all engineers. Its goal is to ensure a strong appreciation and understanding of the concerns that give rise to the code of ethics, its details, and how it affects and can benefit a professional's everyday work life.

Having such a course is at the heart of the UOIT. The core values of the university are integrity, honesty, respect, dignity and accountability—all prime factors in ethical behaviour. These values are reflected in all curricula at the university and give rise to courses like the one noted above on ethics and law for professionals.

Can more be done to instil high ethical standards? Certainly. I have long felt that we need in Canada a centre devoted to all aspects of engineering ethics. Thus, I was pleased to read in the April/May 2003 issue of *Engineering Dimensions* magazine an article by Jim Ridler calling for the creation of an engineering ethics centre.

I have investigated the possibility of establishing such a centre at the UOIT. As a first step in testing this idea, we have sought support and funding from key agencies, societies and companies.

The creation of such a centre and similar initiatives would, I believe, go a long way toward increasing the attention paid to ethics in science, engineering and technology as the pace of scientific and technological innovation increases. It's that type of attention we need. ◆

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