Engineering Ethics Update

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New IEEE Code of Ethics

In August 1990 the Board of Directors of the IEEE approved a new code of ethics, effective January 1, 1991. An earlier version was reported in the Summer 1990 NIEE newsletter:

Proposed

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making engineering decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;
5. to improve the understanding of technology, its appropriate application, and potential consequences;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons regardless of such factors as race, religion, gender, disability, age, or national origin;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Bill Middleton, P.E., member of the Professional Ethics Liaison Council of NIEE, offered these comments to NIEE on the development of this new code:

"Obviously, this is an 'aspirational' type of code and differs drastically in language and approach from the previous Code. The presumption of Dr. Pugh (former President of IEEE) was that simpler, easier to understand language would be more acceptable as a Code for a worldwide body such as IEEE, as opposed to the legislative 'thou shall not' character of the current IEEE code. Whether this is true will have to stand the test of time . . . . Probably the three most significant aspects in finalizing this document were (1) dealing with the inclusion and the wording of number 4 on bribery (2) under number 1 to say 'consistent with safety, etc., and (3) number 8 on discrimination where there was some direct input pushing for the inclusion of 'sexual orientation' in the laundry list. As a matter of fact, the committee at one time strongly favored making number 8 simply 'Treat all persons fairly.' The previous Code had been in existence since 1979 and with the exception of an added Article in 1987 to deal with 'in house' relations among members and members and staff, it had stood the test of time rather well. The real test now comes with membership acceptance."

Also, the degree to which this more "aspirational" Code lends itself to the administration of code enforcement will be of interest.

(Editor's note: for a copy of the previous code, please contact the NSPE Information Center at 703/684-2810.)

Professional Ethics and Engineering: A Resource Guide

For those people involved, or considering involvement, in personal study, discussion or teaching of engineering ethics, *Professional Ethics and Engineering: A Resource Guide* will prove indispensible.

The booklet offers a bibliography of 267 timely and up-to-date reference articles or books on engineering ethics, a list of 18 organizations or centers concerned with engineering ethics (including addresses and telephone numbers), 16 educational films with sources and brief descriptions, plus 6 popular films that raise ethical concerns for engineers, 77 resource professionals in the field including addresses, and 24 consultants in the field of engineering ethics.

Produced for NIEE by the Center for the Study of Ethics in the Professions at the Illinois Institute of Technology, Chicago, Illinois, it is available from NIEE, 1420 King Street, Alexandria, Va. 22314 (tel.: at a price of $20 for members of NIEE and $25 for nonmembers.

Ethical issues in Engineering

What follows are short excerpts by various authors from Deborah Johnson's new anthology entitled *Ethical Issues in Engineering.* Deborah is in the Department of Science and Technology Studies at Rensselaer Polytechnic Institute and has taught ethics to engineering students since 1982. She is also a member of the NIEE Board of Governors.

"The Challenger Disaster: Moral Responsibility and the Working Engineer"-by Roger M. Boisjoly

"Don't just sit passively in meetings when you know in your heart that you can make a constructive contribution and also be prepared to share your design ideas and to compliment others for their ideas, especially when their idea is better and may even replace yours. This is the best way to cultivate colleague respect and friendship which always results in a positive long-term benefit for you, the company and its product line."

"Collective and Individual Moral Responsibility in Engineering: Some Questions"-by John Ladd

". unlike medicine and law, whose services are ordinarily directed to the needs of individual people, the services provided by engineers relate to things, e.g., machines, buildings, equipment, products, etc. Insofar as an engineer has a relationship to people, it is indirect. For example, they relate to people as clients who purchase or use their services or as people who are affected by what engineers make (or design), e.g., workers, consumers or the general public. As a result of not being directly structured around interpersonal relationships, as are medicine and law, the engineer-client relationship is not as central a concept for the ethical problems of engineering as the physician-patient relationship is for medical ethics or the lawyer-client relationship is for legal ethics. Thus, for example, paternalism is not a burning issue in engineering ethics as it is in medical or legal ethics."

"The Engineer and Business"-by Edwin T. Layton

"In 1816, the engineering profession scarcely existed in America . . . There were only about thirty engineers or quasi-engineers then available. But, by 1850 . . there were 2000 civil engineers . . . . From an early stage, organizations employing engineers found it convenient to group their technical staffs into a hierarchy of chief engineer, resident engineers, assistant engineers, and the like. Within this bureaucratic context, regular patterns of recruitment and training emerged on the job, and early projects like the Erie Canal and the Baltimore and Ohio Railroad became famous as training grounds for engineers. . . The golden age for the application of science to American industry came from 1880 to 1920, a period that saw the rise of large industrial corporations. In those forty years, the engineering profession increased by almost 2000 percent, from 7000 to 136,000 members. . . . The astonishing growth of engineering continued, though at a less rapid rate, after 1920. In 1930, there were 226,000 engineers. .260,000 by 1940. Postwar prosperity increased the size of the profession past the half-million mark by 1950, and to over 800,000 by 1960. Engineering is by far the largest of the new professions called forth by the industrial revolution."

"The Definition of a Profession"-by D. Allan Firmage

"All professions are moral enterprises that involve concerns beyond the application of technical principles. How well the professions meet these moral obligations will determine the freedom of the individual professional enterprise. Already the medical profession has lost a great deal of freedom of operation in some European countries, and this wind is already blowing in the direction of North America. If the professions do not regulate the moral actions of their members, then others will. And, as was stated in a newspaper editorial, 'it's down that road that nations go from regulations to regimentation to tyranny.' "

"Codes of Engineering Ethics"-by Stephen H. Unger

"A code of professional ethics may be thought of as a collective recognition of the responsibilities of the individual practitioners. When specified in a clear, concise form, it can be a major factor in the creation of an ambience in which ethical behavior is a norm . . . . Of course, a principal use of an ethics code is as a guide or reminder with respect to behavior in specific situa-

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tions . . . . Ethics codes play fundamental roles with respect to other mechanisms such as support or enforcement procedures of professional societies or licensing agencies. They may also be brought into play in lawsuits . . . . There is thus a sense in which a formally stated rule can provide an 'excuse' for ethical behavior."

Ethical Issues in Engineering begins with an introductory chapter containing two cases, that of Roger Boisjoly (the Challenger disaster) and that of David Parnas (SDI). The chapters that follow take up codes of professional ethics, responsibilities to society, obligations to clients and fair play in engineering, and finally, changing engineers and engineering. Most of the chapters are organized with brief scenarios at the beginning followed by related readings. Each scenario is intended for reader reflection and response followed by study of the readings that follow the scenario. Finally, the reader should review the scenario in light of the readings. The book may also serve as a textbook for a one-semester course on ethics in engineering. Scenarios include:

1. Falsifying Data; Conflict of Interest; Gifts to Foreign Officials.
2. Knowledge Damaging to Client's Interest; Criticism of Engineering in Products.
3. Use of Engineers' Creed; Supplanting Another Engineer.
4. Writing an Environmental Impact Statement; "Natural" May Not Mean "Good" (potential cancer); Inquiring About the Customer Base (i.e., questioning customer uses of your products).
5. Spying on the Boss; Covering Design Flaws; Who Owns Your Knowledge?; The Costs of Keeping a Secret.
6. Public Employment; Ownership of Another Firm; Charging Your Time to Another Project; Working in Saudi Arabia; Wife's Investment in Project; Catching Up with a Lucky Star (a case of bribery).

Those who wish to obtain the book (paperback; 392 pages) should contact Prentice Hall, Inc., Englewood Cliffs, N.J. 07632.

Workshop for Minority Scholars

The American Association for the Advancement of Science (AAAS), and a number of cosponsors, including NIEE, invite ethnic minority scholars in academic or other institutions to apply for participation in a workshop of intensive study on the values and ethical issues associated with science and technology. The workshop will be held from July 28 to August 4, 1991, at The Woods, a self-contained, residential conference center about 90 miles from Washington, D.C. For further information about the workshop or to request an application form, contact Amy Crumpton, Directorate for Science and Policy Programs, AAAS, 1333 H Street, N.W., Washington, DC 20005; phone 202/326-6798.

NIEE Announces Professional Ethics Liaison Council

Herbert Koogle, P.E., past president of NIEE, recently announced a *Professional Ethics Liaison Council (PELC)* within the NIEE to consist of representatives to NIEE from other professional organizations. The role of such representatives is to strengthen NIEE through a direct relationship with other professional organizations. The PELC will also provide NIEE a means for transmitting ideas and projects to other professional organizations. Members appointed to date are Mark Frankel, American Association for the Advancement of Science, and William W. Middleton, P.E., American Association of Engineering Societies.

Letter to the Editor on IEEE Code of Ethics

Ottis Foster, P.E., wrote as follows regarding the new IEEE code of ethics:

The canon or principle that states "to treat fairly all persons regardless of such factors as race, religion, etc.. . ." does not belong in our code of ethics. This ethic is a fundamental requirement of human relations in any endeavor, similar to "thou shalt not commit adultery. . ." I suggest our code address ethics specifically related to the conduct of engineering only; ditto for the canon regarding bribes-ditto for the canon stating "to never maliciously or falsely attempt to injure the person, property, reputation, or employment of others."

I feel the first canon dealing with protecting the safety, health and welfare of the public is necessary but should be more specific. Is the design and construction of weapons consistent with this canon? A child would say no. But most people probably feel such engineering is appropriate for these times and for our profession. If so, let's state the exceptions clearly.

Where is the guiding principle for dealing with the global impact our engineering is having on this planet? For example, should engineers design a road through the Amazon? Evidence indicates subsequent human activity would most likely clear the rain forest and thereby contribute to catastrophic global climate change. The safety, health and welfare of the South American people would likely improve (over the short term), but over the long term they, and all society, would suffer. What is our sphere of ethical concern-our town, our state, our country, or our planet?

I feel our profession has a major role in the destruction of our home planet, as well as a major role in ameliorating the destruction that is wrought by mankind's mere existence. I suggest thought be given to addressing such concerns.

Ideas for Seminars With "Gilbane Gold"

Remember "Gilbane Gold," our NIEE videotape that depicts the ethical dilemma faced by an engineer concerned with industrial waste disposal?

Winston K. Pendleton, Ph.D., and head of the Physics Department of North Georgia College, wrote to report success with "Gilbane Gold" not only for his engineering college students but also for high school students in an all-day discussion and mock town meeting. The students were each assigned to one of seven teams. Each team represented one of the major players in the video: the environmental engineers (Jackson and Richards), the company (Z Corp), city officials, local farmers, the media, local townspeople, the local college (Hanover University). After viewing the video, each team met for about an hour over lunch to discuss the problem from the assigned viewpoint. Questions were given to each team for discussion in preparation for a one-hour town meeting of all teams after lunch. A spokesperson for each team presented the problem from that team's viewpoint at the town meeting. Discussion at the town meeting included the opportunity to present and vote on motions concerning "Gilbane Gold." For further information, contact Winston Pendleton, North Georgia College, Dahlonega, Georgia, 30597; 404/864-3391.

The New Hampshire Society of Professional Engineers (NHSPE) organized a very successful joint dinner meeting of the NHSPE and the Maine Society of Professional Engineers, including spouses, around "Gilbane Gold." A panel of "experts" were invited to individually discuss specific questions assigned by a moderator once a group viewing of "Gilbane Gold" was completed after dinner. Experts representing engineering, state utility regulation, municipalities, and industrial management were on the panel. Once an expert completed discussion of a question, the panel was invited to respond and the audience to ask questions. In this way a vigorous discussion of the issues kept up for over an hour. For further information, contact Woodbury Fogg at work on 603/267-7477 or at home on 603/524-8268.

Who else has a novel and successful method for reviewing "Gilbane Gold?" Please write to John Alger, NIEE, R.R.#l, Box 133, Rumney, N.H. 03266.

Where The Law Ends: Professional Ethics in the '90s

On Saturday, February 2,1991, at the Sheraton Washington Hotel in Washington, D.C., the American Society of Mechanical Engineers (ASME) and the National Association for Science, Technology and Society (NASTS) are sponsoring a symposium to explore ethical dilemmas facing technical professionals. Kate Ingle for ASME and Stephen Cutcliffe for NASTS have described the symposium as follows:

"A moderator will lead a panel of experts through discussions of representative ethical dilemmas which face the technical professional in daily practice. The focus will be on methods of resolving these problems. You will hear the attorney discuss with the senior design engineer, the corporate ethics officer with the professor of ethics. Issues at hand include limits to safety and risk assessment, professional liability and responsibility, as well as conflicts arising out of economic constraints, and race/gender differences."

Contact Robert Merideth at 814/865-9951 for further information.