

Creating the IEEE Code of Ethics

by
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Abstract

The origins of the IEEE Code of Ethics can be traced back to 1906 when the president of AIEE gave an address that led to the creation of a “Code of Principles of Professional Conduct,” adopted in 1912. Following the 1963 merger of AIEE and IRE, a new code of ethics for IEEE was adopted in 1974 and revised in 1979 and 1987. In 1990 a shorter code was adopted, with content and wording more appropriate for a worldwide membership. In 2006 the word, engineering, was deleted in one sentence. Related activities in other organizations are discussed in an addendum

Prior to the early 1900s, ethics were viewed as a personal matter and therefore not a responsibility of engineering societies. Among those seeking a change in this point of view was Schuyler S. Wheeler, president of the American Institute of Electrical Engineers (AIEE).

At the AIEE convention in Milwaukee in May 1906, he delivered his presidential address on the subject of “Engineering Honor.” The assemblage was so enthusiastic about his address that a committee was appointed to create a code of ethics. This committee consisted of Schuyler S. Wheeler (Chairman), H.W. Buck and Charles P. Steinmetz. Before the end of 1907, the code was written and distributed to the members of AIEE for their suggestions. But then the code lay dormant for several years.

In 1911 a committee was appointed to review the code. It consisted of George F. Sever (chairman), Schuyler S. Wheeler and five others, and was assisted by 18 advisory members. This committee revised the original code and succeeded in getting the resulting code adopted on March 8, 1912. It had a new name: “Code of Principles of Professional Conduct.” This thoughtful, well-written, document occupied three pages (2227 through 2229) in the final 1912 issue of the *Transactions of the American Institute of Electrical Engineers*. A fourth page was devoted to the history of this Code.

The wording of the “Code of Principles of Professional Conduct” was quite specific and reflected the fact that many AIEE members were self-employed or worked for small engineering companies. Major topics of the Code were “General Principles,” “The Engineer’s Relations to Client or Employer,” “Ownership of Engineering Records and Data,” “The Engineer’s relations to the Public,” and “The Engineer’s Relations to the Engineering Fraternity.” Associated with these five major topics were a total of 22 specific canons.

This “Code of Principles of Professional Conduct” provided ethical guidance for AIEE members until 1963 when AIEE and IRE merged to form the IEEE. In that same year, the Engineers Council for Professional Development (ECPD) revised and updated its recommended “Canons of Ethics of Engineers,” and it asked its constituent societies to adopt them. (The ECPD had been founded in 1932 by seven engineering societies, including AIEE.)

Several engineering societies that had adopted earlier versions adopted the revised version, but the IEEE Board of Directors chose not to endorse the entire ECPD document. Instead, it endorsed the three Fundamental Principles of Professional Engineering Ethics, which were stated in the “Canons of Ethics of Engineers” as follows: “The Engineer, [in order] to uphold and advance the honor and dignity of the engineering profession and in keeping with high standards of ethical conduct: (1) Will be honest and impartial, and will serve with devotion his employer, his clients, and the public; (2) Will strive to increase the competence and prestige of the engineering profession; and (3) Will use his knowledge and skill for the advancement of human welfare.”

Meanwhile there was a continuing desire among IEEE members for IEEE to have its own code of ethics. In December 1974 a new volunteer-developed “IEEE Code of Ethics for Engineers” was approved by the IEEE Board of Directors. It was added to the IEEE Policy and Procedures Manual in January 1975, and it was publicized in the *IEEE Spectrum* issue of February 1975.

The “IEEE Code of Ethics for Engineers” was divided into a preamble and four articles. The relatively brief preamble said:

Engineers affect the quality of life for all people in our complex technological society. In the pursuit of their profession, therefore, it is vital that engineers conduct their work in an ethical manner so that they merit the confidence of colleagues, employers, clients and the public. This IEEE Code of Ethics is a standard of professional conduct for engineers.

Article I said, “Engineers shall maintain high standards of diligence, creativity and productivity, and shall” (and this was followed by 5 canons). Article II said, “Engineers shall, in their work” (and this was followed by 6 canons). Article III said, “Engineers shall, in their relations with employers and clients” (and this was followed by 5 canons). Article IV said, “Engineers shall, in fulfilling their responsibilities to the community” (and this was followed by 3 canons).

This newly adopted “IEEE Code of Ethics for Engineers” was shorter than the AIEE Code adopted in 1912 and somewhat longer than the Engineers Council Professional Development (ECPD) Canons of 1963. This IEEE Code used the same structure as the two preceding models by specifying the desired behavior of engineers in each of several different environments. Interestingly, the number of canons in the three documents was similar: 22 in the AIEE Code, 21 in the ECPD Canons, and 19 in the IEEE Code of 1974.

IEEE CODE OF ETHICS FOR ENGINEERS

PREAMBLE

Engineers affect the quality of life for all people in our complex technological society. In the pursuit of their profession, therefore, it is vital that engineers conduct their work in an ethical manner so that they merit the confidence of colleagues, employers, clients and the public. This IEEE Code of Ethics is a standard of professional conduct for engineers.

ARTICLE I

Engineers shall maintain high standards of diligence, creativity and productivity, and shall:

1. Accept responsibility for their actions;
2. Be honest and realistic in stating claims or estimates from available data;
3. Undertake engineering tasks and accept responsibility only if qualified by training or experience, or after full disclosure to their employers or

clients of pertinent qualifications;

4. Maintain their professional skills at the level of the state of the art, and recognize the importance of current events in their work;
5. Advance the integrity and prestige of the engineering profession by practicing in a dignified manner and for adequate compensation.

ARTICLE II

Engineers shall, in their work:

1. Treat fairly all colleagues and co-workers, regardless of race, religion, sex, age or national origin;
2. Report, publish and disseminate freely information to others, subject to legal and proprietary restraints;
3. Encourage colleagues and co-workers to act in

accord with this Code and support them when they do so;

4. Seek, accept and offer honest criticism of work, and properly credit the contributions of others;
5. Support and participate in the activities of their professional societies;
6. Assist colleagues and co-workers in their professional development.

ARTICLE III

Engineers shall, in their relations with employers and clients:

1. Act as faithful agents or trustees for their employers or clients in professional and business matters, provided such actions conform with other parts of this Code;
2. Keep information on the business affairs or technical processes of an employer or client in confidence while employed, and later, until such information is properly released, provided such actions conform with other parts of this Code;
3. Inform their employers, clients, professional so-

cieties or public agencies or private agencies of which they are members or to which they may make presentations, of any circumstance that could lead to a conflict of interest;

4. Neither give nor accept, directly or indirectly, any gift, payment or service of more than nominal value to or from those having business relationships with their employers or clients;
5. Assist and advise their employers or clients in anticipating the possible consequences, direct and indirect, immediate or remote, of the projects, work or plans of which they have knowledge.

ARTICLE IV

Engineers shall, in fulfilling their responsibilities to the community:

1. Protect the safety, health and welfare of the public and speak out against abuses in these areas affecting the public interest;

2. Contribute professional advice, as appropriate, to civic, charitable or other non-profit organizations;

3. Seek to extend public knowledge and appreciation of the engineering profession and its achievements.

Figure 1. Code of Ethics for Engineers as it appeared in *IEEE Spectrum* of February 2, 1975, on page 65.

As IEEE membership grew and evolved, it became increasingly evident that many members were not engineers by training and desired to be properly recognized for their own professional status. In response to this desire, the opening phrase of the first sentence of the Code's preamble was amended in February 1979 to replace the phrase, "Engineers affect the quality of life for all people," with the phrase, "Engineers, scientists and technologists affect the quality of life for all people." The remainder of the Code's preamble and all four of its articles were similarly amended, leaving the number of canons in each article unchanged. It was convenient in 1979 that most members who were not engineers were satisfied by being referred to as scientists or technologists.

The next change to the IEEE Code of Ethics was motivated by the actions of a dissident member of the IEEE who portrayed himself as the defender of the interests of "working engineers," as distinguished from the interests of the volunteer leaders of IEEE, whom he

characterized as “fat cats” detached from the realities of most engineers. In addition to attacking IEEE policies and activities in a newsletter to his followers, he personally attacked several IEEE volunteers in various ways, including writing damaging letters to their employers.

Finding there was nothing in the IEEE Code of Ethics that specifically forbid this type of behavior, the IEEE leadership chose to correct the omission in November 1987 by adding Article V. This new article, in its entirety, said:

Members shall, in fulfilling their responsibilities to IEEE, its members, and employees:

1. Make no statement that the member knows to be false or with reckless disregard as to its truth or falsity concerning IEEE or the qualifications, integrity, professional reputation, or employment of another member or employee;
2. Neither injure nor attempt to injure, maliciously or falsely, the professional reputation or employment of another member or employee.

A minor change in the preamble was also made to accommodate the new article. With Article V as part of the official Code of Ethics, the IEEE Member Conduct Committee would have a clear mandate to take action against anyone who engaged in such activities.

The “defender of working engineers” immediately charged IEEE leadership with taking this action too rapidly and without proper notification or involvement of the membership. In February 1988, IEEE President Russell Drew appointed an ad hoc committee to examine these charges. The members of this ad hoc committee were Edward C. Bertnolli (chair), Dennis Bodson, Thomas Grim, and myself. We determined that the process by which the Code of Ethics had been revised in 1987 was legal and in keeping with the rules of IEEE. Nevertheless, we did recommend that all IEEE members be given an opportunity to review and comment on any future changes in the Code of Ethics before the Board of Directors voted on them.

Through my involvement on President Drew’s ad hoc committee, I became interested in the possibility of rewriting the Code to make it shorter, loftier in style, and with content and wording more appropriate for IEEE members throughout the world. I was especially interested in this later goal because I was serving as IEEE President-Elect in 1988, and I had identified one of my major goals to be increasing the rate at which IEEE was becoming a truly transnational organization.

Even before President Drew’s ad hoc committee submitted its report, I had begun studying the IEEE Code of Ethics and considering ways to revise it. I was particularly attracted by the possibility of eliminating the clustering of canons into five environments as specified by the five articles. This practice, which had been carried forward since its use in the AIEE Code of 1912, created considerable redundancy and, in my judgment, failed to reflect the increasingly diverse relationships our members had – especially if one took into account the cultural and organizational differences throughout the world.

By May 1988 I had written what I called “a first draft, corrected,” and I had obtained support from the other three members of the ad hoc committee. The draft retained what I believed to be the major concepts of the then-current Code, but it was much shorter because of changes in wording and the elimination of categories into which canons were clustered. The draft had exactly ten canons. I liked the number ten because people throughout the world have ten fingers, they use a decimal system for counting, and many are accustomed to having a moral code specified by ten commandments.

Because I was proposing major changes in the structure and wording of the IEEE Code of Ethics, I proceeded cautiously and had this “first draft corrected” circulated to the members of the Ethics Committee of the IEEE United States Activities Board and to several other individuals. Most comments were supportive, but some expressed concern over the loss of the long-revered IEEE Code of Ethics, with its greater detail and many years of application. Others expressed concern that the more general wording of the proposed code would make “enforcement” more difficult. The idea that IEEE should enforce its Code of Ethics was quite common at the time, and some even wanted to provide financial help to members who suffered financially by following the Code.

On September 14, 1988, I sent a “slightly revised” version of the proposed Code of Ethics to Edward Bertnolli, with a note saying, “It is my intent to appoint you as Chairman of a Blue Ribbon Committee on the Code of Ethics early in January 1989. The purpose will be to create a code of which we can all be proud.”

On January 13, 1989, two weeks after becoming IEEE President, I held a meeting to discuss the Code of Ethics with six well respected IEEE leaders: Carlton A. Bayless, Edward C. Bertnolli, William R. Middleton, William R. Tackaberry, Robert H. Tanner, and Stephen H. Unger. Based on discussions during the meeting, I made a number of minor changes and one major change to the proposed code of ethics. The major change was to delete a provision that admonished IEEE members “to report, publish, and disseminate information freely to others, subject to legal and proprietary restraints” and replace it with one that admonished IEEE members “to neither offer nor accept bribes.”

Stephen Unger, especially, had urged that a strong statement against bribery be included, and I had concluded that the admonition to provide information freely to others “subject to legal and proprietary restraints” would be interpreted so differently in countries throughout the world that it would have little real meaning.

In the April 1989 issue of IEEE’s newspaper, *The Institute*, I published the proposed simplified IEEE Code of Ethics at the end of my “President’s Column.” The title I gave my column was, “Must we give up ethics to eat?” This title was based on an article titled, “I gave up ethics to eat,” which had been published in a 1957 issue of the magazine, *Consulting Engineer*.

The magazine article told how the author, who managed his own engineering consulting firm, found he could not get government contracts without bribing government officials. He finally hired a, so called, “public relations counsel,” who made the necessary

arrangements for a percentage of each contract. In my column, I pointed out how this thirty-year-old story related to problems still faced by IEEE members and how important it was for IEEE to have a code of ethics that was easy to read, readily available, and appropriate to its members throughout the world.

THE INSTITUTE APRIL 1989

PRESIDENT'S COLUMN

Must we give up ethics to eat?

Emerson W. Pugh



"I gave up ethics—to eat!" is the title of an article that originally appeared in the December 1957 issue of *Consulting Engineer*. The problem the author faced 30 years ago is no less real today. His solution, regrettably, is still just as common.

The author described how, as head of his own engineering firm, he had been unable to obtain government contracts without bribing public officials. Faced with either giving up his business or giving up his ethical principles, he chose the latter. He hired a "public relations counsel" who made the necessary arrangements for a percentage of each deal.

Those of us who are employed by large organizations are generally not confronted with this problem, but all of us have faced ethical dilemmas during our careers. Indeed, the complexities of the issues and decision processes may be greater for those employed by large organizations, where authority and responsibility are shared with others.

Fundamental to ethical dilemmas is the question: To whom do we owe our allegiance? To ourselves? Our family? An organization? Or to a larger community such as our country or the world? Being ethical generally implies acting in a manner beneficial to the larger rather than to the smaller group. Thus at its limit—and for the IEEE as a transnational organization—ethical behavior must be considered in the context of the world community.

But how are our ethical principles to be established? Can they be applicable worldwide? Who judges our behavior? How can ethics be enforced? Should ethical principles be discarded if they cannot be enforced or if many people violate them?

I do not have good answers for many of these questions. But our members seem to believe they know what ethics are, and that it is sometimes as important to adhere to ethical principles as it is to eat. Furthermore, when the IEEE Code of Ethics was revised in 1987, many individuals and groups expressed a desire to participate in that process. Many also expressed a desire to have a code of ethics with clear, simple wording.

Following up on these desires—and to begin a dialogue on ethics—I have attempted to simplify and clarify the IEEE Code of Ethics. I have done this by making use of suggestions submitted when the code was last revised and by seeking advice from many others. The resulting "simplified" version, printed below, no doubt also reflects some of my own views, which may or may not be held by other IEEE members or their colleagues.

Members who have thoughts on this subject that they wish to share should write to: IEEE President, Code of Ethics, 345 E. 47th Street, New York, N.Y. 10017, U.S.A. I may not be able to respond directly to everyone, but I have asked Edward C. Bertnolli, Vice President-Professional Activities, to establish a committee to review the responses to this column.

If there is enough interest and sense of direction in the correspondence, the committee will take appropriate action. For example, it may modify either the "simplified version" or the present version to provide a basis for further discussion and possible change, or it may conclude that some completely different action is needed. On the other hand, if there is little response, we shall report that to you and take no further action. The present IEEE Code of Ethics is displayed on p.11.

Simplified Code of Ethics

We the members of the IEEE—in recognition of the importance of our technologies to the quality of life throughout the world, and in accepting our obligations to our profession, its members, and the community we serve—agree and covenant:

1. to conduct ourselves in the highest ethical manner;
2. to make engineering decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public;
3. to avoid real or perceived conflicts of interest where possible, and to disclose them to affected parties when they do exist;
4. to help improve public understanding of technology and its proper use;
5. to maintain and improve our technical competency and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
6. to be honest and realistic in stating claims or estimates based on available data;
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 neither offer nor accept bribes;
9. to treat fairly all persons regardless of race, religion, sex, age, or national origin, and never to attempt to injure maliciously or falsely the person, property, reputation, or employment of others;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Figure 2. President's Column from *The Institute* of April 1989.

I asked readers to compare the proposed simplified IEEE Code of Ethics at the bottom of my President's Column with the then-current Code, which was printed elsewhere in *The Institute*, and I asked them to send me their thoughts. Readers were advised that I had "asked Edward C. Bertnolli, Vice President-Professional Activities, to establish a committee to review the responses." Subsequently, Robert Alden, William R. Middleton, William R. Tackaberry, and Stephen H. Unger were appointed to the committee.

From time to time during 1989, I met with this committee to consider a variety of changes that might make the Code more appealing to all members and also more likely to be approved by the IEEE Board of Directors. Of considerable concern was the strong disapproval of the proposed Code of Ethics by some IEEE volunteers who had spent

many years working with the old version. At least one of them was known to be lobbying the Board of Directors to defeat the new Code of Ethics.

Also during my year as IEEE President, I discussed the proposed simplified Code of Ethics with IEEE members wherever I went. I was especially pleased that the provision on bribery was most strongly supported by members in countries where bribery was pervasive. Previously, I had been concerned that members in such countries would reject the new Code of Ethics on the grounds that adhering to the provision on bribery was not realistic. These members said bribery was a serious problem that needed strong refutation. They believed that a code of ethics should record what people aspire to do rather than what they may actually do. Clearly they did not believe IEEE could, or should try to, enforce its Code of Ethics, except possibly in internal IEEE matters.

In February 1990 the simplified Code of Ethics was again presented in *The Institute* for comment by all IEEE members. This time it was printed side-by-side with the old Code. The old Code of Ethics had 591 words, whereas the simplified Code had only 238. This was a 60 percent reduction in the number of words.

PROPOSED	PRESENT
<p>We, the members of IEEE, in recognition of the importance of our technologies in improving 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 conduct of the highest ethical and professional order.</p> <p>We further agree and covenant:</p> <ol style="list-style-type: none"> 1. to make engineering decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public; 2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist; 3. to help improve understanding of technology and of its proper use; 4. 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; 5. to be honest and realistic in stating claims or estimates based on available data; 6. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others; 7. to neither offer nor accept bribes; 8. to treat fairly all persons regardless of such factors as race, religion, gender, disability, age, or national origin; 9. to never maliciously or falsely attempt to injure the person, property, reputation, or employment of others; 10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics. 	<p>Preamble: Engineers, scientists and technologists affect the quality of life for all people in our complex technological society. In the pursuit of their profession, therefore, it is vital that IEEE members conduct their work in an ethical manner so that they merit the confidence of colleagues, employers, clients and the public. This IEEE Code of Ethics represents such a standard of professional conduct for IEEE members in the discharge of their responsibilities to employers, to clients, to the community and to their colleagues in this Institute and other professional societies. In order to protect and enhance the image and reputation of IEEE, its members, and the profession they represent, members must always conduct themselves in a manner reflecting the highest level of ethical conduct, honesty and openness.</p> <p>Article I: Members shall maintain high standards of diligence, creativity and productivity, and shall: 1. Accept responsibility for their actions; 2. Be honest and realistic in stating claims or estimates from available data; 3. Undertake technological tasks and accept responsibility only if qualified by training or experience, or after full disclosure to their employers or clients of pertinent qualifications; 4. Maintain their professional skills at the level of the state of the art and recognize the importance of current events in their work; 5. Advance the integrity and prestige of the profession by practicing in a dignified manner and for adequate compensation.</p> <p>Article II: Members shall, in their work: 1. Treat fairly all colleagues and co-workers, regardless of race, religion, sex, age or national origin; 2. Report, publish and disseminate freely information to others, subject to legal and proprietary restraints; 3. Encourage colleagues and co-workers to act in accord with this Code and support them when they do so; 4. Seek, accept and offer honest criticism of work, and properly credit the contribution of others; 5. Support and participate in the activities of their professional societies; 6. Assist colleagues and co-workers in their professional development.</p> <p>Article III: Members shall, in their relations with employers and clients: 1. Act as faithful agents or trustees for their employers or clients in professional and business matters, provided such actions conform with other parts of this Code; 2. Keep information on the business affairs or technical processes of an employer or client in confidence while employed, and later, until such information is properly released, provided such actions conform with other parts of this Code; 3. Inform their employers, clients, professional societies or public agencies or private agencies of which they are members or to which they may make presentations, of any circumstances that could lead to a conflict of interest; 4. Neither give nor accept, directly or indirectly, any gift, payment or service of more than nominal value to or from those having business relationships with their employers or clients; 5. Assist and advise their employers or clients in anticipating the possible consequences, direct and indirect, immediate or remote, of the projects, work or plans of which they have knowledge.</p> <p>Article IV: Members shall, in fulfilling their responsibilities to the community: 1. Protect the safety, health and welfare of the public and speak out against abuses in those areas affecting the public interest; 2. Contribute professional advice, as appropriate, to civic, charitable or other nonprofit organizations; 3. Seek to extend public knowledge and appreciation of the profession and its achievements.</p> <p>Article V: Members shall, in fulfilling their responsibilities to IEEE, its members, and employees: 1. Make no statement that the member knows to be false or with reckless disregard as to its truth or falsity concerning IEEE or the qualifications, integrity, professional reputation, or employment of another member or employee; 2. Neither injure nor attempt to injure, maliciously or falsely, the professional reputation or employment of another member or employee.</p>

Figure 3. The proposed new Code of Ethics versus the old Code of Ethics published side-by-side in *The Institute* in February 1990.

The comments received indicated that no significant changes were needed. Therefore, only minor editorial changes were made. Among these was the reordering of the sequence of the canons between numbers 2 and 8.

In August 1990 the IEEE Board of Directors approved the simplified IEEE Code of Ethics, which became effective on January 1, 1991. Unlike the old Code of Ethics, this shorter version has been broadly distributed and read throughout the world. For example, it is prominently displayed on the back cover of the “IEEE Society & Special Interest Memberships & Subscriptions” document that is updated and distributed each year.

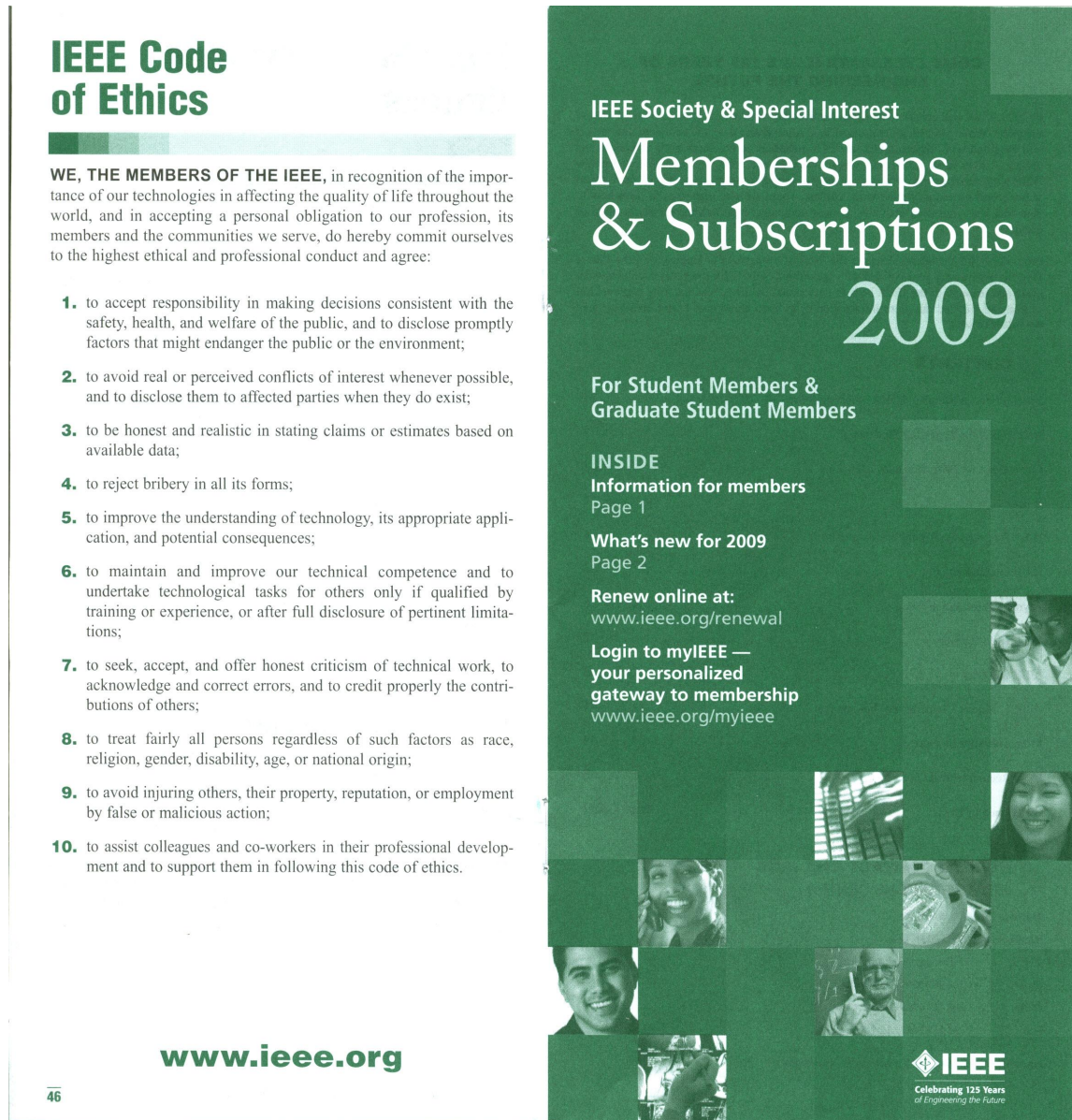


Figure 4. “IEEE Society & Special Interest Memberships & Subscriptions” pamphlet of 2009 with the IEEE Code of Ethics printed on the back.

This Code of Ethics remained unchanged for 15 years, until 2006, when the word, engineering, was removed from the first canon as is indicated below by placing it in square brackets in the original version:

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.

This change was motivated in part by the IEEE Board of Directors approval in February 2004 of a revision to IEEE Bylaw 1-104 that opens membership to professionals who do not see themselves as engineers. Following this change in the Bylaws, the IEEE Ethics and Member Conduct Committee (EMCC) reviewed the IEEE Code of Ethics and then put forth a motion to delete the word, engineering, from the first canon of the Code. Very properly, this proposed change was disclosed to the IEEE membership online in November 2005 and in the print edition of *The Institute* in December. The reaction of the membership was judged to be positive and the Board of Directors voted in favor of the revision in February 2006.

From one perspective, it is surprising that any change was needed in the IEEE Code of Ethics adopted in 1990. After all, it had been crafted to apply to members throughout the world, including those who did not consider themselves to be engineers. From another perspective, however, the use of the word, engineering, in the first canon, had been a troubling consideration even in 1990.

As we saw it then, if we failed to insert the word, engineering, to modify the word, decisions, it would have suggested that the IEEE Code of Ethics was being applied well beyond IEEE's normal areas of interest – an unacceptable concept for many. However, using the word, engineering, might have been objectionable to others who did not consider themselves to be engineers. In the environment of 1990, we ultimately inserted the word, engineering. A major justification was our belief, that decisions made by scientists, engineers, or technologists, concerning the development or use of IEEE technologies in ways that could affect the “safety, health, and welfare of the public” were, by definition, “engineering” decisions.

By 2006 the environment had changed. The explicit broadening of IEEE membership requirements in 2004 reflected significant changes in the activities, interests, and responsibilities of IEEE members. Indeed some of the newer members did not think of themselves as engineers, scientists or technologists. No longer did it seem appropriate to limit the Code's applicability to decisions normally defined as “engineering decisions” when the “safety, health, and welfare of the public” was at issue.

When no suitable replacement for the word, engineering, could be found, the EMCC simply deleted it. I believe this choice was right for these times; and I hope the IEEE Code of Ethics of 1990, as revised in 2006, will continue to serve IEEE well for many more years.

While I was documenting the history of the IEEE Code of Ethics, I also obtained information about related activities in other organizations with professional interests similar to those of the IEEE. (See the Addendum below.) My conclusions in brief are that IEEE codes of ethics have always been developed rather independently; and, on a comparative basis, they put less emphasis on a member's responsibility to other members and greater emphasis on a member's responsibility to society in general.

The IEEE Code of Ethics, adopted in 1990 and revised in 2006, necessarily has much in common with those of other technical societies, but it is unique in overall content, organization, and structure. Brevity, clarity and compactness are important attributes, but the most obvious unique feature is its opening phrase: "We, the members of the IEEE." Many readers will recognize the similarity of this phrase with the opening phrase of the Constitution of the United States of America, which was adopted in 1787. I chose this opening phrase because it indicates a personal commitment to the IEEE Code of Ethics by each member, which I then believed – and still believe – is desirable.

Addendum

Prior to the early 1900s, engineering societies in the United States viewed ethics as a personal matter and thus outside their missions. Gradually this view changed. For example, the American Institute of Electrical Engineers (AIEE) adopted its first code of ethics in 1912 and the American Society of Civil Engineers (ASCE) adopted one in 1914. These and other early codes of ethics focused primarily on the relationships between engineers and their clients, employers or with other engineers rather than on their responsibilities to the public.

In 1932 the Engineers Council for Professional Development (ECPD) was founded by seven engineering societies, including AIEE. Its purposes were to help the societies learn from each other and to help them coordinate activities when appropriate. Among its activities, the ECPD undertook to provide a model code of ethics called the "Canons of Ethics of Engineers."

During the ensuing years, ECPD focused increasingly on accreditation activities. In 1980 it changed its name to the Accreditation Board for Engineering and Technology (ABET), and in 2005 it legally changed its name to ABET. Already in 1965 the American Association of Engineering Societies (AAES) was formed to take on some of the functions no longer emphasized by ECPD. Among these was that of providing a model code of ethics. The AAES offered a model code until at least 1984, but engineering societies increasingly preferred to devise their own codes of ethics.

By the time the first ECPD model code was developed, AIEE already had its own code of ethics called the "Code of Principles of Professional Conduct," which it had approved in 1912, following six years of intermittent yet thoughtful deliberations. When IEEE was formed in 1963 through the merger of AIEE and the Institute of Radio Engineers (IRE), it decided not to embrace the recently revised ECPD code. Instead it undertook to create its

own code of ethics, which it finally approved in 1974, under the title, “IEEE Code of Ethics for Engineers.”

Meanwhile, the American Society of Mechanical Engineers (ASME) appears to have adopted the model ECPD/AAES codes until at least 1976, at which time the model code had diverged significantly from the version IEEE rejected in 1963. From 1976 through 2006, the ASME Code was revised on average once every two years. The codes of 1976 through 1979 had 4 Fundamental Principles and 7 Fundamental Canons. In 1982 the fourth Fundamental Principle, “supporting the professional and technical societies of their discipline,” was dropped, while the 7 Fundamental Canons were retained. In 1998 an eighth canon was added: “Engineers shall consider environmental impact in the performance of their professional duties.” In 2003 a ninth canon was added: “Engineers shall consider sustainable development in the performance of their professional duties.” Finally in 2006 substantial changes in the organization of the canons were made, with one result being that there were now exactly 10 canons.

The 3 Fundamental Principles and 10 Fundamental Canons of the ASME Code of 2006 have 314 words. This is 30 percent more words than in the IEEE Code. Moreover, each of the ASME Fundamental Canons is supported by “ASME Criteria for Interpretation of the Canons,” which add about 1,400 more words to the document. A significant reason for this extensive supporting information is that ASME vigorously enforces its code of ethics, evaluating complaints submitted by members and non-members.

The current American Society of Civil Engineers (ASCE) Code of Ethics is similar to ASME codes prior to 1982, namely there are 4 Fundamental Principles followed by 7 Fundamental Canons and the wording is similar. The early ASCE and ASME codes were clearly based on the ECPD/AAES model codes.

The Code of Ethics of the ASCE has undergone two major changes in recent years. In 1996 the statement, “[Engineers] shall strive to comply with the principles of sustainable development in the performance of their professional duties,” was added to Canon 1. In 2006 the statement, “[Engineers] shall act with zero-tolerance for bribery, fraud, and corruption,” was added to Canon 6. The ASCE is supporting this change with the development in 2008 and 2009 of an Anti-Corruption Educational and Training Program that is partially funded by the United Engineering Foundation.

The 4 Fundamental Principles and 7 Fundamental Canons of the ASCE Code contain only 209 words but (like the ASME Code) each canon is buttressed by supporting information, which collectively add approximately 1,400 more words. These extra words are needed, in part, because ASCE enforces its code vigorously. According to an undated internal six-page ASCE document, for example, in 1954 the ASCE found fourteen of its members guilty of violating a provision of its code that made it unethical to “invite or submit priced proposals under conditions that constitute price competition for professional services.” This provision of the ASCE code was voluntarily removed in 1971 when the U.S. Department of Justice accused the Society of violating the Sherman Antitrust Act.

The National Society of Professional Engineers (NSPE) has created an excellent six-page document dated 8/6/07 and titled, “History of NSPE Code of Ethics.” This document says the first reference to a code of ethics appears in the May 1935 issue of the *American Engineer* but it is not clear whether the Board of Directors ever adopted this code. In 1946 the NSPE Board approved the “Canons of Ethics for Engineers” as prepared by a joint committee sponsored by the Engineers’ Council for Professional Development (ECPD), although NSPE was not a member of ECPD. The NSPE history document then cites event after event in the development of the NSPE Code of Ethics through July 2007.

The July 2007 NSPE “Code of Ethics for Engineers” begins with a Preamble (84 words) followed by three sections: Fundamental Canons (72 words), Rules of Practice (684 words), and Professional Obligations (920 words). In total, this code has 1760 words, indicating vigorous enforcement and associated legal issues. This indication is reinforced by an end-note that references a 1978 decision of the United States Supreme Court declaring: “The Sherman Act does not require competitive bidding.”

Of all the codes of ethics I have seen, the 2009 “Principles of Medical Ethics” of the American Medical Association (AMA) looks most like the IEEE Code of Ethics. It consists of a Preamble with 74 words, followed by 10 Principles of Medical Ethics with 226 words. This is 300 words in total, compared to 238 in the IEEE Code. It should be noted, however, that the AMA has many more documents defining ethical actions by doctors under a variety of circumstances.

With far too many words, I have scarcely begun to describe the similarities, differences, and histories of codes of ethics used by organizations that might reasonably be compared with the IEEE. Nevertheless, this information may help inform readers of this document and be useful to someone desiring to pursue these matters further.

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