

Appendix B

ETHICS IN ENGINEERING PROFESSION

Ethical issues in the engineering profession are becoming more prevalent as companies are competing for the same market with greater demands on engineers or alternatively with increasing demands by the public on the environment (e.g. Three Mile Island, Bhopal, etc.). Appendix B presents ethical, moral, and legal obligations, codes of conduct by engineering institutions. It also presents heuristics (i.e. ways of assisting to discover what is best) and identification strategies that are helpful in solving ethical problems. In the final analysis all heuristics are fallible; however, they provide guidelines toward the solution of a problem as their characteristics are as follows [1]:

- A heuristic does not guarantee a solution.
- It may contradict other heuristics.
- It can reduce the time to solve a problem.
- Its acceptance depends on the immediate context instead of on an absolute standard.

American Society of Mechanical Engineers (ASME)

Ethics

ASME requires ethical practice by each of its members and has adopted the following Code of Ethics of Engineers as referenced in the ASME Constitution, Article C2.1.1.

Code of Ethics of Engineers

The Fundamental Principles

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

- I. Using their knowledge and skill for the enhancement of human welfare;
- II. Being honest and impartial, and serving with fidelity the public, their employers and clients; and
- III. Striving to increase the competence and prestige of the engineering profession.

The Fundamental Canons

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
2. Engineers shall perform services only in the areas of their competence.
3. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional and ethical development of those engineers under their supervision.
4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest or the appearance of conflicts of interest.
5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.
6. Engineers shall associate only with reputable persons or organizations.
7. Engineers shall issue public statements only in an objective and truthful manner.
8. Engineers shall consider environmental impact in the performance of their professional duties.

The ASME Criteria for the Interpretation of the Canons

The ASME criteria for interpretation of the Canons are guidelines and represent the objectives toward which members of the engineering profession should strive. They are principles, which an engineer can reference in specific situations. In addition, they provide interpretive guidance to the ASME Board on Professional Practice and Ethics on the Code of Ethics of Engineers.

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
 - a. Engineers shall recognize that the lives, safety, health and welfare of the general public are dependent upon engineering judgments, decisions and practices incorporated into structures, machines, products, processes and devices.
 - b. Engineers shall not approve or seal plans and/or specifications that are not of a design safe to the public health and welfare and in conformity with accepted engineering standards.
 - c. Whenever the Engineers' professional judgments are overruled under circumstances where the safety, health, and welfare of the public are endangered, the Engineers shall inform their clients and/or employers of the possible consequences.
 - (i) Engineers shall endeavor to provide data such as published standards, test codes, and quality control procedures that will enable the users to understand safe use during life expectancy associated with the designs, products, or systems for which they are responsible.
 - (ii) Engineers shall conduct reviews of the safety and reliability of the designs, products, or systems for which they are responsible before giving their approval to the plans for the design.
 - (iii) Whenever Engineers observe conditions, directly related to their employment, which they believe will endanger public safety or health, they shall inform the proper authority of the situation.
 - d. If Engineers have knowledge of or reason to believe that another person or firm may be in violation of any of the provisions of these Canons, they shall present such information to the proper authority in writing and shall cooperate with the proper authority in furnishing such further information or assistance as may be required.
2. Engineers shall perform services only in areas of their competence.
 - a. Engineers shall undertake to perform engineering assignments only when qualified by education and/or experience in the specific technical field of engineering involved.
 - b. Engineers may accept an assignment requiring education and/or experience outside of their own fields of competence, but their services shall be restricted to other phases of the project in which they are qualified. All other phases of such project shall be performed by qualified associates, consultants, or employees.
3. Engineers shall continue their professional development throughout their careers, and should provide opportunities for the professional and ethical development of those engineers under their supervision.

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4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest or the appearance of conflicts of interest.
 - a. Engineers shall avoid all known conflicts of interest with their employers or clients and shall promptly inform their employers or clients of any business association, interests, or circumstances which could influence their judgment or the quality of their services.
 - b. Engineers shall not undertake any assignments which would knowingly create a potential conflict of interest between themselves and their clients or their employers.
 - c. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed to, and agreed to, by all interested parties.
 - d. Engineers shall not solicit or accept financial or other valuable considerations, for specifying products or material or equipment suppliers, without disclosure to their clients or employers.
 - e. Engineers shall not solicit or accept gratuities, directly or indirectly, from contractors, their agents, or other parties dealing with their clients or employers in connection with work for which they are responsible. Where official public policy or employers' policies tolerate acceptance of modest gratuities or gifts, engineers shall avoid a conflict of interest by complying with appropriate policies and shall avoid the appearance of a conflict of interest.
 - f. When in public service as members, advisors, or employees of a governmental body or department, Engineers shall not participate in considerations or actions with respect to services provided by them or their organization(s) in private or product engineering practice.
 - g. Engineers shall not solicit an engineering contract from a governmental body or other entity on which a principal, officer, or employee of their organization serves as a member without disclosing their relationship and removing themselves from any activity of the body which concerns their organization.
 - h. Engineers working on codes, standards or governmental sanctioned rules and specifications shall exercise careful judgment in their determinations to ensure a balanced viewpoint, and avoid a conflict of interest.
 - i. When, as a result of their studies, Engineers believe a project(s) will not be successful, they shall so advise their employer or client.
 - j. Engineers shall treat information coming to them in the course of their assignments as confidential, and shall not use such information as a means of making personal profit if such action is adverse to the interests of their clients, their employers or the public.
 - (i) They will not disclose confidential information concerning the business affairs or technical processes of any present or former employer or client or bidder under evaluation, without his consent, unless required by law or court order.
 - (ii) They shall not reveal confidential information or finding of any commission or board of which they are members unless required by law or court order.
 - (iii) Designs supplied to Engineers by clients shall not be duplicated by the Engineers for others without the express permission of the client(s).
 - k. Engineers shall act with fairness and justice to all parties when administering a construction (or other) contract.
 - l. Before undertaking work for others in which Engineers may make improvements, plans, designs, inventions, or other records which may justify seeking copyrights, patents, or proprietary rights, Engineers shall enter into positive agreements regarding the rights of respective parties.
 - m. Engineers shall admit their own errors when proven wrong and refrain from distorting or altering the facts to justify their mistakes or decisions.
 - n. Engineers shall not accept professional employment or assignments outside of their regular work without the knowledge of their employers.
 - o. Engineers shall not attempt to attract an employee from other employers or from the marketplace by false or misleading representations.
5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.
 - a. Engineers shall negotiate contracts for professional services on the basis of demonstrated competence and qualifications for the type of professional service required.
 - b. Engineers shall not request, propose, or accept professional commissions on a contingent basis if, under the circumstances, their professional judgments may be compromised.
 - c. Engineers shall not falsify or permit misrepresentation of their, or their associates, academic or professional qualification. They shall not misrepresent or exaggerate their degrees or responsibility in or for the subject matter of prior assignments. Brochures or other presentations used to solicit personal employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint ventures, or their accomplishments.
 - d. Engineers shall prepare articles for the lay or technical press which are only factual.
 - (i) Technical Communications for publication (theses, articles, papers, reports, etc) which are based on research involving more than one individual (including students and supervising faculty, industrial supervisor/researcher or other co-workers) must recognize all significant contributors. Co authors listed on proposed and accepted publications should have entered the joint authorship arrangement by mutual consent prior to submittal of the document for publication and should have received written permission to use any unpublished work of others which serves as the major basis or key component of the publication.
 - (ii) Technical Communications should adhere to clearly defined and appropriately disseminated guidelines on authorship. These guidelines should be promulgated and publicized in corporate, university or other employer policies and should take cognizance of professional technical society recommendations on ethical practice.
 - (iii) Plagiarism, the act of substantially using another's ideas or written materials without due credit, is unethical.
 - e. Engineers shall not maliciously or falsely, directly or indirectly, injure the professional reputation, prospects, practice or employment of another engineer, nor shall they indiscriminately criticize another's work.
 - f. Engineers shall not use equipment, supplies, laboratory or office facilities of their employers to carry on outside private practice without consent.
6. Engineers shall associate only with reputable persons or organizations.
 - a. Engineers shall not knowingly associate with or permit the use of their names or firm names in business ventures by any person or firm which they know, or have reason to believe, are engaging in business or professional practices of a fraudulent or dishonest nature.

- b. Engineers shall not use association with non-engineers, corporations, or partnerships to disguise unethical acts.
7. Engineers shall issue public statements only in an objective and truthful manner.
- Engineers shall endeavor to extend public knowledge, and to prevent misunderstandings of the achievements of engineering.
 - Engineers shall be completely objective and truthful in all professional reports, statements or testimony. They shall include all relevant and pertinent information in such reports, statements or testimony.
 - Engineers, when serving as expert or technical witnesses before any court, commission, or other tribunal, shall express an engineering opinion only when it is founded on their adequate knowledge of the facts in issue, their background of technical competence in the subject matter, and their belief in the accuracy and propriety of their testimony.
 - Engineers shall issue no statements, criticisms, or arguments on engineering matters which are inspired or paid for by an interested party, or parties, unless they preface their comments by identifying themselves, by disclosing the identities of the party or parties on whose behalf they are speaking, and by revealing the existence of any financial interest they may have in matters under discussion.
 - Engineers shall be truthful in explaining their work and merit, and shall avoid any act tending to promote their own interest at the expense of the integrity and honor of the profession or another individual.
8. Engineers shall consider environmental impact in the performance of their professional duties.
- Engineers shall concern themselves with the impact of their plans and designs on the environment. When the impact is a clear threat to health or safety of the public, then the guidelines for the Canon revert to those of Canon 1.
9. Engineers accepting membership in The American Society of Mechanical Engineers by this action agree to abide by this Society Policy on Ethics and procedures for its implementation.

Responsibility: Council on Member Affairs/Board on Professional Practice and Ethics

Adopted: March 7, 1976
 Revised: December 9, 1976
 December 7, 1979
 November 19, 1982
 June 15, 1984
 (editorial changes 7/84)
 June 16, 1988
 September 12, 1991
 September 11, 1994
 June 10, 1998
 September 21, 2002

American Institute of Chemical Engineers (AIChE)

Code of Ethics (Revised January 17, 2003)

Members of the American Institute of Chemical Engineers shall uphold and advance the integrity, honor and dignity of the Engineering profession by: being honest and impartial and serving with fidelity their employers, their clients, and the public; striving to increase the competence and prestige of the engineering profession; and using their knowledge and skill for the enhancement of human welfare. To achieve these goals, members shall

- Hold paramount the safety, health and welfare of the public and protect the environment in performance of their professional duties.

- Formally advise their employers or clients (and consider further disclosure, if warranted) if they perceive that a consequence of their duties will adversely affect the present or future health or safety of their colleagues or the public.
- Accept responsibility for their actions, seek and heed critical review of their work and offer objective criticism of the work of others.
- Issue statements or present information only in an objective and truthful manner.
- Act in professional matters for each employer or client as faithful agents or trustees, avoiding conflicts of interest and never breaching confidentiality.
- Treat fairly and respectfully all colleagues and co-workers, recognizing their unique contributions and capabilities.
- Perform professional services only in areas of their competence.
- Build their professional development throughout their careers, and provide opportunities for the professional development of those under their supervision.
- Never tolerate harassment.
 Conduct themselves in a fair, honorable and respectful manner.

National Society of Professional Engineers

Code of Ethics for Engineers

Preamble

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honest, impartiality, fairness and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.

I. Fundamental Canons

Engineers, in the fulfillment of their professional duties, shall:

- Hold paramount the safety, health and welfare of the public.
- Perform services only in areas of their competence.
- Issue public statements only in an objective and truthful manner.
- Act for each employer or client as faithful agents or trustees.
- Avoid deceptive acts.
- Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

II. Rules of Practice

- Engineers shall hold paramount the safety, health, and welfare of the public.
 - If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.
 - Engineers shall approve only those engineering documents that are in conformity with applicable standards.
 - Engineers shall not reveal facts, data or information without the prior consent of the client or employer except as authorized or required by law or this Code.
 - Engineers shall not permit the use of their names or associate in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise.

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- e. Engineers shall not aid or abet the unlawful practice of engineering by a person or firm.
 - f. Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required.
2. Engineers shall perform services only in the areas of their competence.
 - a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.
 - b. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control.
 - c. Engineers may accept assignments and assume responsibility for coordination of an entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.
 3. Engineers shall issue public statements only in an objective and truthful manner.
 - a. Engineers shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony, which should bear the date indicating when it was current.
 - b. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.
 - c. Engineers shall issue no statements, criticisms, or arguments on technical matters that are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters.
 4. Engineers shall act for each employer or client as faithful agents or trustees.
 - a. Engineers shall disclose all known or potential conflicts of interest that could influence or appear to influence their judgment or the quality of their services.
 - b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.
 - c. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible.
 - d. Engineers in public service as members, advisors, or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice.
 - e. Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member.
 5. Engineers shall avoid deceptive acts.
 - a. Engineers shall not falsify their qualifications or permit misrepresentation of their or their associates' qualification. They shall not misrepresent or exaggerate their responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint ventures, or past accomplishments.
 - b. Engineers shall not offer, give, solicit, or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority, or which may be reasonably construed by the public as having the effect or intent of influencing the awarding of a contract. They shall not offer any gift or other valuable consideration in order to secure work. They shall not pay a commission, percentage, or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.
- ### III. Professional Obligations
1. Engineers shall be guided in all their relations by the highest standards of honesty and integrity.
 - a. Engineers shall acknowledge their errors and shall not distort or alter the facts.
 - b. Engineers shall advise their clients or employers when they believe a project will not be successful.
 - c. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside engineering employment, they will notify their employers.
 - d. Engineers shall not attempt to attract an engineer from another employer by false or misleading pretenses.
 - e. Engineers shall not promote their own interest at the expense of the dignity and integrity of the profession.
 2. Engineers shall at all times strive to serve the public interest.
 - a. Engineers shall seek opportunities to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community.
 - b. Engineers shall not complete, sign, or seal plans and/or specifications that are not in conformity with applicable engineering standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project.
 - c. Engineers shall endeavor to extend public knowledge and appreciation of engineering and its achievements.
 3. Engineers shall avoid all conduct or practice that deceives the public.
 - a. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact.
 - b. Consistent with the foregoing, engineers may advertise for recruitment of personnel.
 - c. Consistent with the foregoing, engineers may prepare articles for the lay or technical press, but such articles shall not imply credit to the author for work performed by others.
 4. Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve.
 - a. Engineers shall not, without the consent of all interested parties, promote or arrange for new employment or practice in connection with a specific project for which the engineer has gained particular and specialized knowledge.
 - b. Engineers shall not without the consent of all interested parties, participate in or represent an adversary interest in connection with a specific project or proceeding in which the engineer has gained particular specialized knowledge on behalf of a former client or employer.

5. Engineers shall not be influenced in their professional duties by conflicting interests.
 - a. Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.
 - b. Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the engineer in connection with work for which the engineer is responsible.
6. Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods.
 - a. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical considerations.
 - b. Engineers shall not, without consent, use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice.
7. Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action.
 - a. Engineers in private practice shall not review the work of another engineer for the same client, except with the knowledge of such engineer, or unless the connection of such engineer with the work has been terminated.
 - b. Engineers in government, industrial, or educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties.
 - c. Engineers in sales or industrial employ are entitled to make engineering comparisons of represented products with products of other suppliers.
8. Engineers shall accept personal responsibility for their professional activities, provided, however, that engineers may seek indemnification for services arising out of their practice for other than gross negligence, where the engineer's interests cannot otherwise be protected.
 - a. Engineers shall conform with state registration laws in the practice of engineering.
 - b. Engineers shall not use association with nonengineer, a corporation, or partnership as a "cloak" for unethical acts.
9. Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.
 - a. Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.
 - b. Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the engineer for others without express permission.
 - c. Engineers, before undertaking work for others in connection with which the engineer may make improvements, plans, designs, inventions, or other records that may justify copyrights or patents, should enter into a positive agreement regarding ownership.
 - d. Engineers' design, data, records, and notes referring exclusively to an employer's work are the employer's property. The employer should indemnify the engineer for use of the information for any purpose other than the original purpose.

- e. Engineers shall continue their professional development throughout their careers and should keep current in their specialty fields by engaging in professional practice, participating in continuing education course, reading in the technical literature, and attending professional meetings and seminars.

As revised January 2003

"By order of the United States District Court for the District of Columbia, former Section 11 (c) of the NSPE Code of Ethics prohibiting competitive bidding, and all policy statements, opinions, rulings or other guidelines interpreting its scope, have been rescinded as unlawfully interfering with the legal right of engineers, protected under the antitrust laws, to provide price information to prospective clients; accordingly, nothing contained in the NSPE Code of Ethics, policy statements, opinions, rulings or other guidelines prohibits the submission of price quotations or competitive bids for engineering services at any time or in any amount."

Statement by NSPE Executive Committee

In order to correct misunderstandings which have been indicated in some instances since the issuances of the Supreme Court decision and the entry of the Final Judgment, it is noted that in its decision of April 25, 1978, the Supreme Court of the United States declared: "The Sherman Act does not require competitive bidding."

It is further noted that as made clear in the Supreme Court decision:

1. Engineers and firms may individually refuse to bid for engineering services.
2. Clients are not required to seek bids for engineering services.
3. Federal, state, and local laws governing procedures to procure engineering services are not affected, and remain in full force and effect.
4. State societies and local chapters are free to actively and aggressively seek legislation for professional selection and negotiation procedures by public agencies.
5. State registration board rules of professional conduct, including rules prohibiting competitive bidding for engineering services, are not affected and remain in full force and effect. State registration boards with authority to adopt rules of professional conduct may adopt rules governing procedures to obtain engineering services.
6. As noted by the Supreme Court, "nothing in the judgment prevents NSPE and its members for attempting to influence governmental action . . ."

Institution of Chemical Engineers (ICChemE)

Rules of professional conduct

Issue III: 7th December 2001

The Rules and Regulations embodied in this document are made and published as required by By-law 13 of the By-laws of The Institution of Chemical Engineers. They must be read and interpreted in accordance with By-law 1 of that Institution.

RULES OF PROFESSIONAL CONDUCT

1. A code of professional conduct and related Rules designed to cover broad ethical principles must necessarily be drawn up in general terms. These Rules, published by the Council, indicate the manner in which members are required by the Council to conduct themselves in most situations. This conduct must be of

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a high standard: members must discharge their duties competently, with reasonable skill, and diligence, and shall comply with the standards of behavior, integrity, competence and professional judgement which other members might reasonably expect of them.

For situations not specifically encompassed by these Rules, members are required to order their conduct in accordance with the principle that, in any conflict between a member's personal interests and the fair and proper interests of the community, the member's duty to the community should prevail.

In order to fulfil their duty under these Rules, members shall give due attention to any Guidance Notes that may be published from time to time by the Council in accordance with Rule 2 below.

2. The Council may from time to time publish Guidance Notes to members containing advice as to specific conduct which is to be regarded as proper or improper as the case may be.
3. Members when discharging their professional duties shall act with integrity, in the public interest, and to exercise all reasonable professional skill and care to:
 - a. Prevent avoidable danger to health or safety.
 - b. Prevent avoidable adverse impact on the environment.
 - c.
 - (i) Maintain their competence.
 - (ii) Undertake only professional tasks for which they are competent.
 - (iii) Disclose relevant limitations of competence.
 - d.
 - (i) Accept appropriate responsibility for work carried out under their supervision.
 - (ii) Treat subordinates fairly and without bias.
 - (iii) Encourage others to advance their learning and competence.
 - e.
 - (i) Avoid where possible real or perceived conflict of interests.
 - (ii) Advise affected parties when such conflicts arise.
 - f. Observe the proper duties of confidentiality owed to appropriate parties.
 - g. Reject bribery and any other corrupt practices.
 - h. Assess relevant risks and liability, and, if appropriate, hold professional indemnity insurance.
 - i. Notify the Institution if convicted of a criminal offence or upon becoming bankrupt or disqualified as a Company Director.
 - j. Notify the Institution of any significant violation of the Institution's Code of Conduct by another member.
 - k. Be mindful at all times of the dignity of the profession in their personal conduct.
4. Members may be deemed guilty of improper professional conduct if:
 - a. in the opinion of the Council their conduct fails to conform with the By-laws of the Institution (including the Code of Conduct contained in By-law 12(b)) or of these Rules or with any advice published thereunder; or
 - b. they are convicted by a competent tribunal of any criminal offence, or have in any other proceedings to which they are party been found by a Court or other competent tribunal guilty of conduct which (in either such case) in the opinion of the Council renders them unfit to be members; or
 - c. they are, in the opinion of the Council, precluded from performing their professional duties, in a manner which is consistent with the standards of their profession, as a result of having been adjudicated bankrupt or of making a composition with their creditors; or
 - d. in the opinion of the Council their conduct in other respects renders them unfit to be members of the Institution or is injurious to the Institution.

The following are heuristics that can be used effectively in engineering ethics [2]:

1. Use a traditional problem-solving strategy for solving ethical problems.
2. Consider the possibility that inexperienced people can be right.
3. Debrief people fully before assuming facts about their actions.
4. Consider what will happen if a specific decision is based on a false assumption.
5. Be honest and open. This is especially important when dealing with those who are predisposed to distrust you.
6. Be concerned about the welfare of your company.
7. Be concerned about the welfare of your employees.
8. Do not let people make ethical decisions for you.
9. Acquire all the information you can about the situation. The problem may be more serious than it first appears, or there may be no real problem at all.
10. Acknowledge the concerns of others, whether you share their concerns or not.
11. Remember that one is only as ethical as one can afford to be. One can enhance one's ability to afford to do the right thing by knowing the consequences and by balancing the responsibilities that one accepts with the rest of one's life.

Woods proposed the McMaster five-step strategy [3] in analyzing standard problem solving strategy [4] as follows:

Define. Was the problem well defined? Was the real problem that now things were more uncertain than before? There are other possible definitions of the problem, but, if one defines the problem as how to deal with obviously flawed data, one may miss the entire point. The problem would be thereby unnecessarily over-constrained. What is the real problem? If the characters had defined the problem better, would they reach a different conclusion? Would it have been a better conclusion?

Explore. Explore the "real problem" by creating a rich perspective of the problem. During the Explore stage, see it from many different view points. Be willing to spend at least half the total available time defining the problem. Ask many "what if?" questions. Identify the real problem, by asking a series of "Why?" questions to generalize the situation and to see the problem in the context of a "system."

Plan. Use the criteria to select a sequence of diagnostic actions. Sometimes several actions can be combined. However, usually it is best to wait for the results from the first action before we recycle back to the Explore stage and relook our hypotheses. The criteria in selecting an action include the following: Will the action provide background information to ensure the problem is understood in context or is the action to test a hypothesis? Will the action produce results that give the accuracy needed? Is the action simple? inexpensive? safe?

Do It. Carry out the first action in the plan. Check. Monitor.

Look back. Compare the results obtained with the hypotheses. Look back at the process used. Self-assess. Return to previous stages of *Engage, Explore, Plan* and continue.

Blanchard and Peale [5] proposed a set of guidelines that helps to sort out the issues on ethical solution and to consider the following checklist of questions:

1. Is it legal? Will I be violating either civil law or company policy?
2. Is it balanced? Is it fair to all concerned in the short term as well as the long term? Does it promote win-win relationships?
3. How will it make me feel about myself? Will it make me proud? Would I feel good if my decisions were published in the newspaper? Would I feel good if my family knew about it?

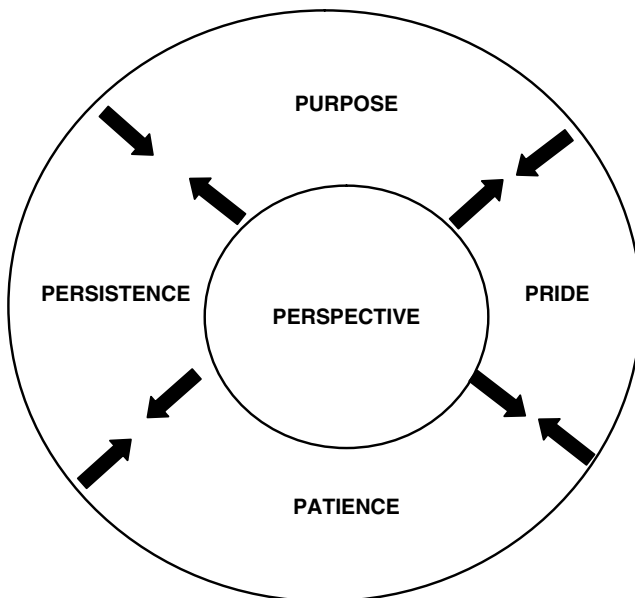


Figure B-1 The interrelationships among the five P's [4].

If the answer to the first question could be interpreted as “NO, it is not legal,” then there is no need to proceed to the second and third Ethics Check list questions. However, if the solution is indeed legal and does not violate the company policy, then the second question raises the flag that a decision that greatly benefits one individual or company will eventually come back to haunt that individual or company. The last question is directed to prompt our sense of fairness and to ensure that our self-esteem is not diminished through an unethical decision.

In addition to the checklist, Blanchard and Peale discussed the five P's that can be considered in analyzing the solution: Purpose, Pride, Patience, Persistence, and Perspective.

The Five P's

Purpose: What is the objective for which you are striving? Are you comfortable with that as your purpose? Does your purpose hold up when you look at yourself in the mirror?

Pride: Can you take pride in the solution your have developed? Is there any false pride or self-doubt involved?

Patience: Have you taken the time to think through all the ramifications of your solution?

Persistence: Are you sticking to your guns and not being dissuaded by other demands? Have you given up too soon on finding a solution that is fair and balanced to all concerned?

Perspective: Have you taken the time to focus inside yourself to be sure everything fits with your ideals and beliefs? How does the solution fit into the “Big Picture?”

Figure B-1 shows the interrelationships among the five P's. Perspective is the fifth P, the hub around which the other P's rotate. Part of Perspective is the inner guidance that is awakened from the other P's that helps us see things more clearly [4].

The various codes of conduct in this appendix should enable the engineers to make the correct decisions which can be identified by the use of a heuristic. The correct decision is one that is [2]

1. Consistent with the engineer's moral principles.
2. Consistent with the general accepted codes of engineering conduct.
3. Consistent with obligations that the engineer has accepted.
4. Consistent with the law.
5. Consistent with the applicable code of ethics.

Although it is possible that an individual decision may not be acceptable to another individual, ultimately the correct decision is one that individual can live with. The ability to make one's own ethical decisions is known as moral autonomy.

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