The Professional Role Of The Engineer

The word "professional" is used in many ways and has many meanings. It can be used in the sense of the skill of a professional actor who receives pay for his/her efforts, as distinguished from an amateur who performs more for the joy of performing. It can be used in the sense of a type of work as in describing a professional job of house painting done by an experienced painter. Also, it can be used merely to describe a degree of effort or line of conduct over a period of time as used in the expression "a professional beggar." However, in the sense that engineers would employ the word "professional," it should be restricted to a particular and specialized group of people, identified by distinguishing characteristics, that separate its members from nonprofessionals.

Within the last century, three groups have emerged with the title "learned professions." These professional groups are law, medicine, and theology. These groups came into being gradually over a long period of time and had certain characteristics in common, among which were higher levels of educational achievement and a sincere desire for performing a service for people. There is no formal naming of a person or group of persons to professional status, nor is there a schedule or procedure to follow to achieve recognition as a professional. Rather the group itself sets standards of training, skills, achievement, and service in order to call itself a professional group, and the public accepts the group's evaluation of itself.

Who is a professional? As generally used in the sense of the learned professions, a professional person is one who applies certain knowledge and skill, usually obtained by college education, for the service of people. In addition, a professional person observes all acceptable code of conduct, uses discretion and judgment in dealing with people, and respects their confidences. Also, professional persons usually have legal status, use professional titles, and associate together in groups. Although engineering has met most of these criteria for a long time, it has been only within the last few decades that legal status has been conferred upon the engineering profession.

The engineer as a professional person

Knowledge and skill above that of the average person is a characteristic of the professional man. Where a workman will have specific skills in operating a particular machine, a professional person is considered able to apply fundamental principles that are usually beyond the range of the average workman. The knowledge of these principles as well as the skills necessary to apply them distinguishes a professional man. The engineer, because of his/her education in the basic sciences, mathematics, and engineering sciences, is capable of applying basic principles for such diverse things as improving the construction features of buildings, developing processes that will provide new chemical compounds, or designing tunnels to bring water to arid areas.

An important concept in the minds of most persons is that a professional person will perform a service for people. This means that service must be considered ahead of any monetary reward that a professional man may receive. In this respect the professional person should, by himself; recognize a need for personal services and seek ways to provide a solution to these needs. Almost all engineering is performed to fill a need in some phase of our society. It may be to develop better appliances for the household, or to provide better transportation facilities, or to make possible a better life in regions of unfavorable climate.

Discretion and judgment also characterize a professional person. In most situations a choice of several methods to accomplish a given task will be available. The engineer must consider the facts available and the principles that apply and make decisions based upon these rather than upon expediency. Consideration must be given not only to the mechanical aspects of a solution but also to the effects that a particular decision will have upon the persons concerned.

A professional person is one in whom confidence can be placed. This confidence is not only in his/her skill and ability but also that his/her knowledge of his/her client's business or trade information or personal matters will not be divulged improperly. The engineer works in a relation of confidence to his/her client or employer not to divulge trade secrets or to take any advantage of his/her knowledge that may harm the client or employer. The public, in general, will have confidence that the engineer's design of buildings, bridges, or power systems will be adequate and safe to use. The engineer must not fail the public in this responsibility.

All professionals adhere to a code of ethical conduct. This code of ethics outlines the standards to which members of the group subscribe and gives an understanding of what the public can expect in its relationship with the profession. The code of ethics also serves as a guide to the members of the profession in their conduct and relations with each other. In engineering, the professional society is the National Society of Professional Engineers. A general code of ethics for professional engineers has been set up by the Society.

Legal status usually is a characteristic of a professional. A medical doctor, for example, has certain rights and privileges afforded by law. Legal recognition of a professional group is afforded by a
Professionalism for Engineer

Professionalism is an individual state of mind. It is a way of thinking and living rather than the development of specific skills or the acquiring of certain knowledge. While the mere acquisition of knowledge may make a person more skilled as a clerk or laborer, knowledge alone does not often promote the desire within oneself to serve or be responsive to the needs of people. It is in this realm of service that the engineer joins with members of other learned professional groups in placing honesty and integrity of action above the legal or minimum level allowable.

Although knowledge and skill often exist apart from professionalism, professionalism can mature only where such competence creates a proper atmosphere. Where competence is an impersonal quality, professionalism, in contrast, is personal. In addition to a state of mind, it is a way of working and living a way of adding something valuable to competence. For the engineer professionalism implies that he/she will make maximum use of his/her skill and knowledge, and that he/she will use his/her competence to its fullest extent:

- With complete honesty and integrity.
- With his/her best effort in spite of the fact that frequently neither client nor employer is able to evaluate that effort.
- With avoidance of all possible conflicts of interest.
- With the consciousness that the profession of engineering is often judged by the performance of a single individual.

Professionalism for an engineer begins with good moral character, because he/she occupies a position of trust where he/she personally must set the standards. Consequently he/she is required to make decisions that sometimes differ from the preferences of his/her company or his/her client. Professionalism for an engineer means:

- Striving to improve his/her work until it becomes a model for those in his/her field, as a minimum using the most up-to-date techniques and procedures.
- Proper credit for work done and ideas developed by subordinates.
- Loyalty to his/her employer or client, always with concern for the public safety in construction, product design, plant operation, and all other phases of engineering.
- Leadership of less experienced colleagues and subordinates toward personal development and an enthusiasm for the profession.
- Activity in technical societies in order to keep current in his/her field, and encouragement of those working under him to improve their technical competence the same way.
- Participation in professional societies, as well as technical societies, thereby demonstrating his/her interest in the profession and encouraging his/her coworkers to recognize the technical and the professional as of equal-ranking importance.
- Registration, not simply because it may be a legal requirement, but more particularly as a demonstration to his/her coworkers and the public that this is one important hallmarks of a professional, a willingness to go beyond the minimum to help and encourage others to realize their full potential.

For engineers in various areas of work, professionalism will include special facets that are more particularly related to a particular field. For example, engineers in industry should be especially conscious of their responsibility in protecting "company proprietary" designs or processes. It also means the establishment of performance standards and safety criteria, which protect the purchaser while maintaining a satisfactory return to the manufacturer.

For the engineer in government or the engineer in private practice, professionalism may mean capitalizing on a special opportunity to project the profession to the public as a constructive force in society. For the engineer in education, professionalism means practicing at the frontier of knowledge in some field and pushing against that boundary, thus impressing on his/her students those boundaries need not be (and are rarely) static.

Professionalism for all engineers means an active participation in community life. Engineering cannot achieve general recognition as a profession unless engineers are publicly visible. It is in the realm of public and social service that professionalism shows up strongest. For this reason service to the public and the community and to those less fortunate is particularly significant.

Professionalism can be taught since it is an acquired condition and is not inherent in one's nature. It is most effectively taught by example by individuals whose lives are themselves models of integrity. The beginnings of a professional attitude for the engineering student should be established in the formative college years since, like character, it grows stronger with reinforcement. In laboratory work, for example, an honest reporting of facts and an intelligent evaluation of results are important ingredients in the development of the student's professional training. Design experiences in general involve many compromises--time, money, materials,
and so on. Ethical consideration should necessarily become a part of each compromise (decision) made by the young engineer. His/her professional career will, in fact, become one of compromise and he/she must prepare himself to face the realities of such a life.

Probably the student will not have achieved a mature professional attitude by the date of his/her graduation. However, responsibility of thought and decision should be firmly established by this time in order that entry into employment will be a continuation rather than the beginning of his/her professional advancement.

After graduation, opportunities for public service will present themselves. The engineer, as part of his/her professional responsibility, should seek and accept places of service in schools, community government, religious organizations, and charitable groups. Not only will he/she be able to contribute his/her talents to these causes, but also he/she will enhance his/her own outlook by contacts with both professionals and non-professional persons. Each individual engineer should recognize within himself the need for a professional attitude and assume the ultimate responsibility for upholding this concept.

To sum up professionalism, engineering may be considered to be a profession insofar as it meets these characteristics of a learned professional group:
- Knowledge and skill in specialized fields above that of the general public.
- A desire for public service and a willingness to share discoveries for the benefit of others.
- Exercise of discretion and judgment.
- Establishment of a relation of confidence between the engineer and client or employer.
- Acceptance of overall and specific codes of conduct.
- Formation of professional groups and participation in advancing professional ideals and knowledge.
- Recognition by law as an identifiable body of knowledge.

With these as objectives, the student should pursue his/her college studies and his/her training in his/her employment so as to meet these characteristics within their full meaning and take his/her or her place as a professional engineer in our society.

**Technical societies**

As suggested above, professionals band themselves together for the mutual exchange of ideas to improve their knowledge, and to learn new skills and techniques. Meeting and discussing problems with others in the same field of endeavor affords an opportunity for the stimulation of thought to improve learning and skills. In addition to the National Society of Professional Engineers, which is concerned primarily with the professional aspects of the whole field of engineering, engineers have organized a number of technical societies in their fields of specialization.

**CODE OF ETHICS FOR ENGINEERS**

**Preamble**

The Engineer, to uphold and advance the honor and dignity of the engineering profession and in keeping with high standards of ethical conduct:
- Will be honest and impartial, and will serve with devotion his/her employer, his/her clients, and the public;
- Will strive to increase the competence and prestige of the engineering profession;
- Will use his/her knowledge and skill for the advancement of human welfare.

**Section 1** The Engineer will be guided in all his/her professional relations by the highest standards of integrity, and will act in professional matters for each client or employer as a faithful agent or trustee.

a. He/she will be realistic and honest in all estimates, reports, statements, and testimony.

b. He/she will admit and accept his/her own errors when proven obviously wrong and refrain from distorting or altering the facts in an attempt to justify his/her decision.

c. He/she will advise his/her client or employer when he/she believes a project will not be successful.

d. He/she will not accept outside employment to the detriment of his/her regular work or interest, or without the consent of his/her employer.

e. He/she will not attempt to attract an engineer from another employer by unfair methods.

f. He/she will not actively participate in strikes, picket lines, or other collective coercive action.

**Section 2** The Engineer will have proper regard for the safety, health, and welfare of the public in the performance of his/her professional duties. If his/her engineering judgment is overruled by non-technical authority, he/she will clearly point out the consequences. He/she will notify the proper authority of any observed conditions, which endanger public safety and health.

a. He/she will regard his/her duty to the public welfare as paramount.

b. He/she shall seek opportunities to be of constructive service in civic affairs and work for the advancement of the safety, health and well being of his/her community.

c. He/she will not complete, sign, 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. If the client or employer insists on such unprofessional conduct, he/she shall notify the proper authorities and withdraw from further service on the project.

Section 3  The Engineer will avoid all conduct or practice likely to discredit or unfavorably reflect upon the dignity or honor of the profession.
  a. The Engineer shall not advertise his/her professional services but may utilize the following means of identification:
     1. Professional cards and listings in recognized and dignified publications provided they are consistent in size and are in a section of the publication regularly devoted to such professional cards and listings. The information displayed must be restricted to firm name, address, telephone number, appropriate symbol, name of principal participants and the fields of practice in which the firm is qualified.
     2. Signs on equipment, offices and at the site of projects for which he/she renders services, limited to firm name, address, telephone number and type of services, as appropriate.
     3. Brochures, business cards, letterheads and other factual representations of experience, facilities, personnel and capacity to render service, providing the same are not misleading relative to the extent of participation in the projects cited, and provided the same are not indiscriminately distributed.
     4. Listings in the classified section of telephone directories, limited to name, address, telephone number and specialties in which the firm is qualified.
  b. The Engineer may advertise for recruitment of personnel in appropriate publications or by special distribution. The information presented must be displayed in a dignified manner, restricted to firm name, address, telephone number, appropriate symbol, name of principal participants, the fields of practice in which the firm is qualified and factual descriptions of positions available, qualifications required and benefits available.
  c. The Engineer may prepare articles for the lay or technical press, which are factual, dignified and free from ostentatious or laudatory implications. Such articles shall not imply other than his/her direct participation in the work described unless credit is given to others for their share of the work.
  d. The Engineer may extend permission for his/her name to be used in commercial advertisements, such as may be published by manufacturers, contractors, material suppliers, etc., only by means of a modest dignified notation acknowledging his/her participation and the scope thereof in the project or product described. Such permission shall not include public endorsement of proprietary products.
  e. The Engineer will not allow himself to be listed for employment using exaggerated statements of his/her qualifications.

Section 4  The Engineer will endeavor to extend public knowledge and appreciation of engineering and its achievements and to protect the engineering profession from misrepresentation and misunderstanding.
  a. He/she shall not issue statements, criticisms, or arguments on matters connected with public policy, which are inspired or paid for by private interests, unless he/she indicates on whose behalf he/she is making the statement.

Section 5  The Engineer will express an opinion of an engineering subject only when founded on adequate knowledge and honest conviction.
  a. The Engineer will insist on the use of facts in reference to an engineering project in a group discussion, public forum or publication of articles.

Section 6  The Engineer will undertake engineering assignments for which he/she will be responsible only when qualified by training or experience; and he/she will engage, or advise engaging, experts and specialists whenever the client's or employer's interests are best served by such service.

Section 7  The Engineer will not disclose confidential information concerning the business affairs or technical processes of any present or former client or employer without his/her consent.
  a. While in the employ of others, he/she will not enter promotional efforts or negotiations for work or make arrangements for other employment as a principal or to practice in connection with a specific project for which he/she has gained particular and specialized knowledge without the consent of all interested parties.

Section 8  The Engineer will endeavor to avoid a conflict of interest with his/her employer or client, but when unavoidable, the Engineer shall fully disclose the circumstances to his/her employer or client.
  a. The Engineer will inform his/her client or employer of any business connections, interests, or circumstances which may be deemed as influencing his/her judgment or
the quality of his/her services to his/her client or employer.

b. When in public service as a member, advisor, or employee of a governmental body or department, an engineer shall not participate in considerations or actions with respect to services provided by him or his/her organization in private engineering practice.

c. An engineer shall not solicit or accept an engineering contract from a governmental body on which a principal or officer of his/her organization serves as a member.

Section 9 The Engineer will uphold the principle of appropriate and adequate compensation for those engaged in engineering work.

a. He/she will not undertake or agree to perform any engineering service on a free basis, except for civic, charitable, religious, or eleemosynary nonprofit organizations when the professional services are advisory in nature.

b. He/she will not undertake work at a fee or salary below the accepted standards of the profession in the area.

c. He/she will not accept remuneration from either an employee or employment agency for giving employment.

d. When hiring other engineers, he/she shall offer a salary according to the engineer's qualifications and the recognized standards in the particular geographical area.

e. If, in sales employ, he/she will not offer, or give engineering consultation, or designs, or advice other than specifically applying to the equipment being sold.

Section 10 The Engineer will not accept compensation, financial or otherwise, from more than one interested party for the same service, or for services pertaining to the same work, unless there is full disclosure to and consent of all interested parties.

a. He/she will not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.

b. He/she will not accept commissions or allowances, directly or indirectly, from contractors of other parties dealing with his/her clients or employer in connection with work for which he/she is responsible.

c. An engineer shall not solicit or submit engineering proposals on the basis of competitive bidding. Competitive bidding for professional engineering services is defined as the formal or informal submission, or receipt, of verbal or written estimates of cost or proposals in terms of dollars, man days of work required, percentage of construction cost, or any other measure of compensation whereby the prospective client may compare engineering services on a price basis prior to the time that one engineer, or one engineering organization, has been selected for negotiations. The disclosure of recommended fee schedules prepared by various engineering societies is not considered to constitute competitive bidding. An engineer requested to submit a fee proposal or bid prior to the selection of an engineer or firm subject to the negotiation of a satisfactory contract, shall attempt to have the procedure changed to conform to ethical practices but if not successful he/she shall withdraw from consideration for the proposed work. These principles shall be applied by the Engineer in obtaining the services of other professionals.

d. An Engineer shall not request, propose, or accept a professional commission on a contingent basis under circumstances in which his/her professional judgment may be compromised, or when a contingency provision is used as a device for promoting or securing a professional commission.

e. While in a salaried position, he/she will accept part-time engineering work only at a salary or fee not less than that recognized as standard in the area.

f. An engineer will not use equipment, supplies, laboratory, or office facilities of his/her employer to carry on outside private practice without consent.

Section 11 The Engineer will not compete unfairly with another engineer by attempting to obtain employment or advancement or professional engagements by competitive bidding, by taking advantage of a salaried position, by criticizing other engineers, or by other improper or questionable methods.

a. The Engineer will not attempt to supplant another engineer in a particular employment after becoming aware that definite steps have been taken toward the other's employment.

b. He/she will not offer to pay, either directly or indirectly, any commission, political contribution, or a gift, or other consideration in order to secure work, exclusive of securing salaried positions through employment agencies.

c. He/she shall not solicit or submit engineering proposals on the basis of competitive bidding. Competitive bidding for professional engineering services is defined as the formal or informal submission, or receipt, of verbal or written estimates of cost or proposals in terms of dollars, man days of work required, percentage of construction cost, or any other measure of compensation whereby the prospective client may compare engineering services on a price basis prior to the time that one engineer, or one engineering organization, has been selected for negotiations. The disclosure of recommended fee schedules prepared by various engineering societies is not considered to constitute competitive bidding. An engineer requested to submit a fee proposal or bid prior to the selection of an engineer or firm subject to the negotiation of a satisfactory contract, shall attempt to have the procedure changed to conform to ethical practices but if not successful he/she shall withdraw from consideration for the proposed work. These principles shall be applied by the Engineer in obtaining the services of other professionals.

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e. While in a salaried position, he/she will accept part-time engineering work only at a salary or fee not less than that recognized as standard in the area.

f. An engineer will not use equipment, supplies, laboratory, or office facilities of his/her employer to carry on outside private practice without consent.

Section 12 The Engineer will not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice or employment of another engineer, nor will he/she indiscriminately criticize another engineer's work in public. If he/she believes that another engineer is guilty of unethical or illegal practice, he/she shall present such information to the proper authority for action.
a. An Engineer in private practice will 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. An Engineer in governmental, industrial or educational employ is entitled to review and evaluate the work of other engineers when so required by his/her employment duties.

c. An Engineer in sales or industrial employ is entitled to make engineering comparisons of his/her products with products by other suppliers.

Section 13 The Engineer will not associate with or allow the use of his/her name by an enterprise of questionable character, nor will he/she become professionally associated with engineers who do not conform to ethical practices, or with persons not legally qualified to render the professional services for which the association is intended.

a. He will conform with registration laws in his/her practice of engineering.

b. He will not use association with a non-engineer, a corporation, or partnership, as a "cloak" for unethical acts, but must accept personal responsibility for his/her professional acts.

Section 14 The Engineer will give credit for engineering work to who credit is due, and will recognize the proprietary interests of others.

a. Whenever possible, he/she will name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.

b. When an engineer uses designs supplied to him by a client, the designs remain the property of the client and should not be duplicated by the Engineer for others without express permission.

c. Before undertaking work for others in connection with which he/she may make improvements, plans, designs, inventions, or other records which may justify copy-rights or patents, the Engineer should enter into a positive agreement regarding the ownership.

d. Designs, data, records, and notes made by an engineer and referring exclusively to his/her employer's work are his/her employer's property.

Section 15 The Engineer will cooperate in extending the effectiveness of the profession by interchanging information and experience with other engineers and students, and will endeavor to provide opportunity for the professional development and advancement of engineers under his/her supervision.

a. He will encourage his/her engineering employees' efforts to improve their education.

b. He will encourage engineering employees to attend and present papers at professional and technical society meetings.

c. He will urge his/her engineering employees to become registered at the earliest possible date.

d. He/she will assign professional engineer duties of a nature to utilize his/her full training and experience, insofar as possible, and delegate lesser functions to sub-professionals or to technicians.

e. He will provide a prospective engineering employee with complete information on working conditions and his/her proposed status of employment, and after employment will keep him informed of any changes in them.

OBLIGATION OF AN ENGINEER

I am an Engineer. In my profession I take deep pride. To it I owe solemn obligations. Since the Stone Age, human progress has been spurred by the engineering genius. Engineers have made usable Nature’s vast resources of material and energy for Mankind's benefit. Engineers have vitalized and turned to practical use the principles of science and the means of technology. Were it not for this heritage of accumulated experience, my efforts would be feeble.

As an Engineer, I pledge to practice integrity and fair dealing, tolerance and respect, and to uphold devotion to the standards and the dignity of my profession, conscious always that my skill carries with it the obligation to serve humanity by making the best use of Earth's precious wealth.

As an Engineer, in humility and with the need for Divine Guidance, I shall participate in none but honest enterprises. When needed, my skill and knowledge shall be given without reservation for the public good. In the performance of duty and in fidelity to my profession, I shall give the utmost.

In the presence of your fellow engineers please sign your name to the Obligation of the Engineer.

*New members read aloud only the parts in italic type.