

Engineering Ethics

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Ethics

- Do we need Ethics in ???
- Politics
- Engineering
- Life

Ethics

- Moral principles that govern a person's behavior or the conducting of an activity
- Moral principles that govern a person or groups behavior
- Rules of behavior based on ideas about what is morally good or bad
- The basic concepts and fundamental principles of decent human conduct



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 honesty, 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:

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

II. Rules of Practice

1. Engineers shall hold paramount the safety, health, and welfare of the public.
2. Engineers shall perform services only in the areas of their competence.
3. Engineers shall issue public statements only in an objective and truthful manner.
4. Engineers shall act for each employer or client as faithful agents or trustees.
5. Engineers shall avoid deceptive acts.

III. Professional Obligations

1. Engineers shall be guided in all their relations by the highest standards of honesty and integrity.
2. Engineers shall at all times strive to serve the public interest.
3. Engineers shall avoid all conduct or practice that deceives the public.
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.
5. Engineers shall not be influenced in their professional duties by conflicting interests.
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.
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.

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.
9. Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.



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IEEE

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IEEE Code of Ethics

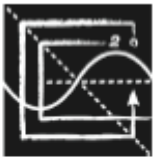
The following is from the IEEE Policies, Section 7 - Professional Activities (Part A - IEEE Policies).

7.8 IEEE Code of Ethics

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

1. to accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;

5. to improve the understanding of technology; its appropriate application, and potential consequences;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.



NCEES

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National Council of Examiners for Engineering and Surveying®

240.15 Rules of Professional Conduct

To safeguard the health, safety, and welfare of the public and to maintain integrity and high standards of skill and practice in the engineering and surveying professions, the rules of professional conduct provided in this section shall be binding upon every licensee and on all firms authorized to offer or perform engineering or surveying services in this jurisdiction.

A. Licensee's Obligation to the Public

1. Licensees shall be cognizant that their first and foremost responsibility is to safeguard the health, safety, and welfare of the public when performing services for clients and employers.
2. Licensees shall sign and seal only those plans, surveys, and other documents that conform to accepted engineering and surveying standards and that safeguard the health, safety, and welfare of the public.
3. Licensees shall notify their employer or client and such other authority as may be appropriate when their professional judgment is overruled under circumstances in which the health, safety, or welfare of the public is endangered.

4. Licensees shall, to the best of their knowledge, include all relevant and pertinent information in an objective and truthful manner within all professional documents, statements, and testimony.
5. Licensees shall express a professional opinion publicly only when it is founded upon an adequate knowledge of the facts and a competent evaluation of the subject matter.
6. Licensees shall issue no statements, criticisms, or arguments on engineering and surveying matters that are inspired or paid for by interested parties, unless they explicitly identify the interested parties on whose behalf they are speaking and reveal any interest they have in the matters.
7. Licensees shall not partner, practice, or offer to practice with any person or firm that they know is engaged in fraudulent or dishonest business or professional practices.
8. Licensees who have knowledge or reason to believe that any person or firm has violated any rules or laws applying to the practice of engineering or surveying shall report it to the board, may report it to appropriate legal authorities, and shall cooperate with the board and those authorities as may be requested. (*Section 150, Disciplinary Action, NCEES Model Law*)
9. Licensees shall not knowingly provide false or incomplete information regarding an applicant in obtaining licensure.
10. Licensees shall comply with the licensing laws and rules governing their professional practice in each of the jurisdictions in which they practice.

B. Licensee's Obligation to Employer and Clients

1. Licensees shall undertake assignments only when qualified by education or experience in the specific technical fields of engineering or surveying involved.
2. Licensees shall not affix their signatures or seals to any plans or documents dealing with subject matter in which they lack competence, nor to any such plan or document not prepared under their responsible charge.
3. Licensees may accept assignments and assume responsibility for coordination of an entire project, provided that each technical segment is signed and sealed by the licensee responsible for preparation of that technical segment.
4. Licensees shall not reveal facts, data, or information obtained in a professional capacity without the prior consent of the client, employer, or public body on which they serve except as authorized or required by law or rules.
5. Licensees shall not solicit or accept gratuities, directly or indirectly, from contractors, their agents, or other parties in connection with work for employers or clients.
6. Licensees shall disclose to their employers or clients all known or potential conflicts of interest or other circumstances that could influence or appear to influence their judgment or the quality of their professional service or engagement.
7. Licensees shall not accept compensation, financial or otherwise, from more than one party for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to in writing by all interested parties.
8. Licensees shall not solicit or accept a professional contract from a governmental body on which a principal or officer of their organization serves as a member. Conversely, licensees serving as members, advisors, or employees of a government body or department, who are the principals or employees of a private concern, shall not participate in decisions with respect to professional services offered or provided by said concern to the governmental body that they serve.

9. Licensees shall not use confidential information received in the course of their assignments as a means of making personal profit without the consent of the party from whom the information was obtained.

C. Licensee's Obligation to Other Licensees

1. Licensees shall not falsify or permit misrepresentation of their, or their associates', academic or professional qualifications. They shall not misrepresent or exaggerate their degree of responsibility in prior assignments nor the complexity of said assignments. Presentations incidental to the solicitation of employment or business shall not misrepresent pertinent facts concerning employers, employees, associates, joint ventures, or past accomplishments.
2. Licensees shall not offer, give, solicit, or receive, either directly or indirectly, any commission, or gift, or other valuable consideration in order to secure work, and shall not make any political contribution with the intent to influence the award of a contract by public authority.
3. Licensees shall not injure or attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other licensees, nor indiscriminately criticize other licensees' work.
4. Licensees shall make a reasonable effort to inform another licensee whose work is believed to contain a material discrepancy, error, or omission that may impact the health, safety, or welfare of the public, unless such reporting is legally prohibited.

Rules of State Board of Registration for Professional Engineers and Land Surveyors

Rule 180-6-.01 General

- (1) In order to safeguard the life, health, property and welfare of the public and to establish and maintain a high standard of integrity, skills, and practice in the professions of engineering and land surveying, the following Rules of Professional Conduct are promulgated in accordance with O.C.G.A. 43-15-6(1). The following rules shall be binding upon every individual who possesses a certificate or a certificate of registration issued by the Board and upon every firm, professional corporation, association, governmental agency, partnership, corporation or other legal or commercial entity offering engineering or land surveying services to the public and to all personnel of such firm, corporation, partnership, association, or entity who act in its behalf in the practice of engineering or land surveying in this state.
- (2) The Rules of Professional Conduct as promulgated herein are an exercise of the police power vested in the Georgia Board of Registration for Professional Engineers and Land Surveyors by virtue of the acts of the legislature. By that investment, the said Board is authorized to establish conduct, policy, and practices in accordance with the powers hereinabove stated.
- (3) All persons registered under O.C.G.A. Chapter 15, Title 43, are charged with having knowledge of the existence of these Rules of Professional Conduct and shall be deemed to be familiar with their several provisions and to understand them. Such knowledge shall encompass the understanding that the practice of engineering or land surveying is a privilege as opposed to a right. The registrant shall be forthright and candid in his/her statements or written response to the Board or its representatives on matters pertaining to professional conduct.

Rule 180-6-.02 Protection of the Public

The engineer or land surveyor shall at all times practice in such a manner as to protect the safety, health and welfare of the public. If a registrant's engineering or land surveying judgment is overruled under circumstances where the safety, health or welfare of the public are endangered, he/she shall inform the proper authorities and his/her employer of the situation as may be appropriate.

Rule 180-6-.03 Rules of Practice

- (1) The engineer or land surveyor shall perform services only in areas of his/her competence. The engineer or land surveyor shall undertake to perform engineering or land surveying assignments only when qualified by education or experience in the specific technical field of professional engineering or land surveying involved.

Rule 180-6-.05. Conflict of Interest

- (1) The engineer or land surveyor shall avoid conflicts of interest. The engineer or land surveyor shall conscientiously avoid conflict of interest with his/her employer or client, but, when unavoidable, the engineer or land surveyor shall forthwith disclose the circumstances to his employer or client.
- (2) The engineer or land surveyor shall avoid all known conflicts of interest with his/her employer or client and shall promptly inform his/her employer of any business association, interests, or circumstances which could influence his/her judgment or the quality of his/her services.
- (3) The engineer or land surveyor 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.
- (4) The engineer or land surveyor shall not solicit or accept financial or other valuable considerations, directly or indirectly, from material or equipment suppliers, or their representatives, for specifying their products.
- (5) The engineer or land surveyor shall not solicit or accept gratuities, directly or indirectly, from contractors, their agents, or other parties in connection with work for which he/she is responsible.
- (6) The engineer or land surveyor in public service as a member, advisor, or employee of a governmental body or department shall not participate in considerations or actions with respect to matters involving him/her or his/her organization's private or public engineering or land surveying practices.
- (7) The engineer or land surveyor shall not solicit or accept an engineering or land surveying contract from a governmental body on which a principal or officer of his/her organization serves as a member.

180-6-.06 Conduct.

(1) The engineer or land surveyor shall solicit or accept professional employment only on the basis of his/her qualifications and competence for proper accomplishment of the work. No engineer or land surveyor may provide a fee proposal to a potential client until he/she (a) established or reviewed the scope of services for the project, (b) determined that, based on his/her review of the scope of services, that he/she is competent to provide the professional services required, and (c) made his/her qualifications known to the prospective client. On proposals including more than one engineer or land surveyor, each individual shall be responsible for complying with this rule for his/her respective portion of the proposal. The engineer or land surveyor shall not offer to pay, either directly or indirectly, any commission, political contribution, gift, or other consideration in order to secure work, exclusive of securing salaried positions through employment agencies.

(2) The engineer or land surveyor shall not falsify or permit misrepresentation of his/her or his/her associate's academic or professional qualifications. He/she shall not misrepresent or exaggerate his/her degree of responsibility for prior assignments in brochures or other presentations for the solicitation of employment. He/she shall not misrepresent pertinent facts concerning employers, employees, associates, joint ventures, or his/her or their past accomplishments with the intent and purpose of enhancing his/her qualifications or work.

180-6-.07 Ethics. Amended.

(1) The engineer or land surveyor shall associate only with reputable persons or organizations. The engineer or land surveyor shall not knowingly associate with or permit the use of his/her name, or firm name, in a business venture by any person or firm which he/she knows, or has reason to believe, is engaging in business or professional practices of a fraudulent or dishonest nature.

(2) If the engineer or land surveyor has knowledge or reason to believe that another person or firm may be in violation of any of these provisions or of O.C.G.A. 43-15, he/she shall promptly present such information to the Board in writing and shall cooperate with the Board in furnishing such further information or assistance as may be required by the Board.

Your Practice is Your Ethics

By: Mr. Jon A. Schmitdt

September 5/12, 2016 – Engineering News Record

- Quote: “Perhaps at least part of the problem is confusion about the nature of engineering ethics. It is simply a set of rules to follow or a group of behaviors to avoid, over and above the technical aspects of the profession? Could there be more to ethics than that – maybe even something positive?”
- Quote: “ I advocate treating ethics as something that is *integral* to practice, not supplemental to it.”
- He goes on in the article to state that this is known as “virtue ethics”

Quote: **“Virtue ethics is less concerned with what someone has done and will do than with what kind of person and engineer someone is and will become”**

Case Study

Advertising—Inclusion of Material on Web Site from Former Employment

Case No. 10-6

Facts:

Engineer A, a licensed professional engineer in private practice, designs low-voltage electrical systems for commercial buildings and other facilities. Recently, Engineer A started his own consulting engineering firm. Engineer A would like to include on his firm's Web site several projects that Engineer A designed over the years, including some work that Engineer A designed while employed with other consulting firms. All Web content would be original and the content would be non-confidential. The content would include a picture of the project building and a short, generic narrative of the work performed. Work performed by Engineer A while under employment with the other firms would be described accordingly. Engineer A would claim credit for the design work only and would not state or imply that clients of other consulting firms are a client of Engineer A. None of the subject projects are covered by any employment agreements with any of Engineer A's previous employers.

Question:

Is it ethical for Engineer A to reference previous projects he has worked on for other employers on his Web site in the manner indicated?

Conclusion:

It would be ethical for Engineer A to use his work while under employment with the other firms in the manner indicated provided there is no misrepresentations or misleading information either expressed or implied and provided there is full disclosure and attribution accorded to the former employer engineering firm. In addition, any references to Engineer A's services either in a resume or on the Web site should also describe the scope and limits of Engineer A's contributions and provide appropriate credit/acknowledgements of Engineer A's former employer (e.g., include a brief synopsis or summary of the nature of the project) so that the former employer is accorded appropriate recognition and Engineer A's contributions are placed in proper context.

Case Study

Drawings, Plans, and Specifications for Industrial Processing Facility

Case No. 15-5

Facts:

Engineer A is retained by Client X to oversee the design of an industrial processing facility, including its manufactured elements. Engineer A prepares the drawings, plans, and specifications and, in doing so, incorporates manufactured equipment into the facility. In preparing the drawings, plans, and specifications, Engineer A includes copies of the drawings, plans, and specifications provided by the manufacturer of the manufactured equipment with his own drawings, plans, and specifications. Engineer A gives full attribution to the manufacturer. Also included within Engineer A's contract with Client X is the provision whereby Engineer A represents that he has reviewed the manufacturer's drawings, plans, and specifications and in his professional opinion believes the equipment will perform as represented, but that Engineer A is not responsible for the performance of the manufactured equipment.

Questions:

1. Was it ethical for Engineer A to include copies of the drawings, plans, and specifications provided by the manufacturer of the manufactured equipment with his own drawings, plans, and specifications, giving full attribution to the manufacturer?
2. Was it ethical for Engineer A to include within his contract with Client X a provision whereby he represents that he has reviewed the manufacturer's drawings, plans, and specifications and in his professional opinion believes the equipment will perform as represented, but that he is not responsible for the performance of the manufactured equipment?

Conclusions:

1. It was ethical for Engineer A to include copies of the drawings, plans, and specifications provided by the manufacturer of the manufactured equipment with his own drawings, plans, and specifications, giving full attribution to the manufacturer.
2. It was ethical for Engineer A to include within his contract with Client X a provision whereby he represents that he will exercise due diligence in his review of the manufacturer's drawings, plans, and specifications and in his professional opinion believes the equipment will perform as represented, but that he is not responsible for the performance of the manufactured equipment.

Case Study

AN ENGINEERING THEORY OF THE VOLKSWAGEN SCANDAL

By [Paul Kedrosky](#)

OCTOBER 16, 2015

The real culprit behind the automaker's woes may be the nature of engineering organizations themselves.

Last week, Volkswagen of America C.E.O. Michael Horn told a House subcommittee investigating his company's ongoing emissions scandal that it wasn't a corporate decision to cheat emissions tests by installing "defeat" software in eleven million diesel cars. Instead, Horn said, it was "a couple of software engineers." His interlocutor, Joe Barton, a Texas Republican, reminded Horn that he was under oath and then asked him when Volkswagen's senior management in Europe learned of the tampering, which reportedly began in 2009. When Horn replied that they found out only this September, Barton expressed incredulity.

"I agree, it's very hard to believe," Horn said.

Indeed, it was hard to believe. A couple of rogue engineers took it upon themselves to write and install software that slashed emissions on Volkswagen diesels, but only when the cars were being tested, then kept it from senior company figures? Sure, rogue financiers get caught up in scandals, but rogue engineers? And rogue *German* engineers, no less, from a culture famously fond of rules? *Sag, dass das nicht wahr ist!*

But on Wednesday, *Spiegel* issued a report, based on one of the many investigations taking place at Volkswagen and around the world, saying that at least thirty managers were involved in the cheating. This squares with Barton's skepticism, not to mention common sense. Volkswagen engineers didn't smuggle in software that allows you to play Tetris on in-car G.P.S. screens. They wrote code that fundamentally changed how the company's diesel cars worked. The altered software affected engine emissions, mileage, cost, and power—all things that auto executives care about. In other words, while it's technically possible to install such software, it's hard to imagine that it could have gone unnoticed. Modern automobile engines are made by teams that design, build, test, and tune everything to produce the desired effect. Companies have been building these engines for more than a hundred years, refining a process that leaves no room for mysteries or magic outcomes. When a car produces more power, there is a reason; when a car produces fewer emissions, there is a reason. And when, at Volkswagen, its diesel engine produced forty times more nitrogen oxide when it wasn't being tested than when it was, many people inside would have known why.

In a powerful book about the disintegration, immediately after launch, of the Challenger space shuttle, which killed seven astronauts in January of 1986, the sociologist Diane Vaughan described a phenomenon inside engineering organizations that she called the "normalization of deviance." In such cultures, she argued, there can be a tendency to slowly and progressively create rationales that justify ever-riskier behaviors. Starting in 1983, the Challenger shuttle had been through nine successful launches, in progressively lower ambient temperatures, across the years. Each time the launch team got away with a lower-temperature launch, Vaughan argued, engineers noted the deviance, then decided it wasn't sufficiently different from what they had done before to constitute a problem. They effectively declared the mildly abnormal normal, making deviant behavior acceptable, right up until the moment when, after the shuttle launched on a particularly cold Florida morning in 1986, its O-rings failed catastrophically and the ship broke apart.

If the same pattern proves to have played out at Volkswagen, then the scandal may well have begun with a few lines of engine-tuning software. Perhaps it started with tweaks that optimized some aspect of diesel performance and then evolved over time: detect this, change that, optimize something else. At every step, the software changes might have seemed to be a slight "improvement" on what came before, but at no one step would it necessarily have felt like a vast, emissions-fixing conspiracy by Volkswagen engineers, or been identified by Volkswagen executives. Instead, it would have slowly and insidiously led to the development of the defeat device and its inclusion in cars that were sold to consumers.

If this was, in fact, the case, then Horn was basically right that engineers were responsible. The scandal wouldn't have been caused by a few rogue engineers, though, so much as by the nature of engineering organizations themselves. Faced with an expensively engineered diesel engine that couldn't meet strict emissions standards, Volkswagen engineers "tuned" their engine software. And they kept on tuning it, normalizing deviance along the way, until they were far from where they started, to the point of gaming the emissions tests by detecting test conditions and re-calibrating the engine accordingly on the fly.

Conclusions:

- **Ethics in Engineering** is of upmost importance
- It is your duty as a Professional Engineer to **“safeguard life, health and property and promote the public welfare.**

- As stated by Luther Cox, P. E.
 - a. Know your limitations, know your subject matter well
 - b. Learn your limitations, learn from your mistakes
 - c. Always check your work

- **Respect** your Professional Engineer License and Stamp, provide Honest Service
- Always do the **RIGHT** and **ETHICAL** things in both your Professional and Personal Life
- Be **Totally Transparent** in all that you do

Questions ???

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