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**CHRISTIAN ETHICS AND THE CHRISTIAN ENGINEER:
A STUDY OF RESPONSIBILITY**

by

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Abstract

The code of engineering ethics which dictates the kind of services provided by the engineer must be honest, impartial, fair and equity and dedicated to the protection of the public health, safety and welfare has similar treatment, that the last five commandments (Ten Commandments) that God had given to Moses to the people, to treat each other fairly. This article will argue that the Christian engineer, keeping the Ten Commandments, will tend to go beyond the code of engineering ethics in their everyday duty as a practicing engineer to the society and environment.

Introduction

Engineering is an important and learned profession. Typically a student will undergo four years of undergraduate training leading to a bachelor's degree in an engineering program. In the United States of America, every engineering program is required to satisfy the criteria of the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET) in order to be ABET accredited. The ABET accredited program includes educating students to meet a list of specified outcomes, including those related to engineering ethics such as students must have: c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability... f) an understanding of professional and ethical responsibility [1].

In engineering profession, there is no overall engineering society that most engineers identify with [2]. Each discipline within the engineering has a professional society, such as the American Society of Mechanical Engineers (ASME), American Institute of Chemical Engineers (AIChE), and the Institute of Electrical and Electronics Engineers (IEEE). The National Society of Professional Engineers (NSPE) is the only Engineering organization which represents professional engineers across all engineering disciplines. An aspect of this professional society is the code of engineering ethics that the NSPE have adopted. The code of ethics, which is representative of the codes for other engineering disciplines, provides a framework for ethical judgment for the professional engineer. The codes of engineering ethics express the rights, duties and obligations of the engineer as they carry out their work.

In biblical arena, God, through Moses, has given us the moral laws, the Ten Commandments, as we live among man. The first four laws direct our attention to the Lord, the creator God; whereas the last six laws basically express how we should treat our neighbor.

Examination of the codes of engineering ethics and the moral laws showed that both have similar views on how to treat our fellow humans. But the Christian engineer, with the love for the Creator God and in keeping the moral laws, clearly goes beyond the codes of engineering ethics in the treatment of fellow beings, the society and the environment.

National Society of Professional Engineers (NSPE) Code of Ethics for Engineers

Members of engineering profession are expected to exhibit the highest standards of honesty and integrity. Since engineering has a direct and vital impact on the quality of life for all people, the services provided by the engineers require honesty, impartiality, fairness and equity, and must be dedicated to the protection of the public health, safety, and welfare. Thus, engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct [3].

The entire Code of Engineering Ethics includes the Fundamental Canons, Rules of practice, and Professional Obligations. The latter two sections amplified the former section [1]. Below are extracts taken from the National Society of Professional Engineers (NSPE) Code of Ethics website given in reference [3]. Only the fundamental Cannons are shown below. The Rules of practice and the Professional Obligations are shown in the Appendix 1.

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.

This code of engineering ethics tends to guide the engineer to develop a more positive social responsibility as well as a commitment to service and civic duty.

The Ten Commandments

The Ten Commandments were given to the Israelites following their liberation from slavery in Egypt. These commandments were considered the moral statutes given by God, through Moses on the Mount Sinai (Exodus 19:23) or "Horeb" ((Deuteronomy 5:2) in the form of two stone tablets, so that the Israelites could enjoy fruitful and holy lives.

These Ten Commandments were later summed up in the New Testament when Jesus was confronted by a lawyer asking Him which was the greatest commandment in the Law. Jesus pointed out that we should love the Lord ... and our neighbor as ourselves as been the two *commandments that sums up the whole law and the Prophets.*" (Matthew 22:36-40).

A reflective reading of Christ's teaching reveals that the first four commandments given to the children of Israel are contained in the statement: "*Love the Lord your God with all your heart and with all your soul and with all your mind.*" It continues that the last six commandments are enclosed in the statement: "*Love your neighbor as yourself*"

Examination of the Code of Engineering Ethics and the Ten Commandments.

Careful examination of any of the engineering codes of ethics, and you will find that they overlapped the Ten Commandments [4]: Each of the canon law, further described using the Rule of the Practice and the Professional Obligation, shows that

they are similar to what the moral laws are telling the children of God what to do or what not to do and are listed below.

1. Hold paramount the safety, health, and welfare of the public.

The Rule of the Practice (see Appendix 1) indicates that if an engineer's 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. This statement clearly shows that the life of an individual or a property should be safe guard. The sixth commandment dictates that an engineer should not murder another human being. This implies that the life of people is precious and needs to be guarded and respected.

2. Perform services only in areas of their competence.

According to the Rule of Practice, engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved. They are not to affix their signatures to any plans or documents dealing with subject matter in which they lack the competence, nor to any plan or document not prepared under their direction and control. This is similar to the ninth commandment that you should not bear false witness, which if stated positively enforces the need for truthfulness.

3. Issue public statements only in an objective and truthful manner

Engineers shall be objective and truthful in their professional reports, or testimony and they may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter. This is again similar to the ninth command not to bear false witness.

4. Act for each employer or client as faithful agents or trustees

With reference to the Rule of Practices, the 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. They 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. Again the ninth commandment points to the engineer not to bearing false witness for the quality of services done.

5. Avoid deceptive acts

Engineers shall not falsify their qualifications or permit misrepresentation of their or their associates' qualifications. 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. Yet again the ninth commandment comes strongly in this canon law.

6. Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

The last of the canon is further expanded in the third section: Professional Obligations as shown in Appendix 1. As worded in the Profession obligation to the society, the engineer basically has to be truthful, do not bear false witness or lie or steal what is not your work or design. All these are again part of the Ten

Commandments.

As pointed out above, there is nothing in the engineering code of ethics that directly conflicts with a Christian understanding of moral responsibility [1]. The Christian engineers certainly want to use their knowledge and skill for the enhancement of human welfare, and to be truthful, faithful, and fair. The emphasis on safety in design work is central to the engineering ethos. It is important to know that engineers without experience of God's saving grace can still do well in this fallen world. But this Codes of Engineering Ethics, which is service oriented, intended to benefit both the provider and the recipient of the service or the community and does not foster values such as faithfulness, diligence, equality, respect, integrity, compassion, Christ-likeness and acceptance.

Christian engineers going beyond the codes of ethics in their service to man and protecting the earth

The Christian engineer would add a value based service that is centered on and informed by Christian values in place of the service oriented commitment to the society and the environment. The bible does promote certain Christian values that become the basis and part of a value-based service. Tankiso Letseli [5] suggests the following characteristics that can be applied to a Christian engineer.

1. Faithfulness: The Christian engineer should instill this value in keeping promises, honoring appointments, submitting accurate reports and not telling lies.
2. Diligence: The Christian engineer should be diligent in carrying out a duty and not just for the sake of meeting the minimum requirement. Diligence also

includes the value of accuracy as we serve a God whose standards of performance are higher than the worldly standards.

3. Integrity: The Christian engineer will continually adhere to the Bible morals and principles. The gospel flourishes when those witnessing for them demonstrate integrity as mentioned in the Bible when Ananias, a devout man, according to the law, having a good report of all the Jew which dwelt there. (Acts 22:12).
4. Compassion: The Christian engineer should have this Christ-like value which causes one to suffer with the suffering.
5. Respect: The Christian engineer should consider others ahead of self. "Do nothing from selfishness or empty conceit, but with humility of mind regard one another as more important than you (Phil 2:3).
6. Acceptance: The Christian engineer, following the example of Christ, should love our neighbor as we love ourselves. As we do not need to buy or earn our acceptance in Christ, our neighbor does not need to earn our love and acceptance.

Besides these characteristics the Christian engineer should also bear in bear in mind the following duties:

Steward for the environment

As a Christian engineer, as a steward of God's earth, in designing of an instrument or machinery, he/she should also consider carefully the effect that the instrument /machinery have on the earth or man or animal in general. At the same time, when the instrument/machinery is to be retired or replaced, the Christian engineer

should think ahead whether the product can be recycled or reuse or can the parts be dismantled off properly without affecting the earth such as in landfills.

The Bible in Genesis 1:26 reads: *“Then God said, ‘Let us make man in our image, according to Our likeness, and let them rule over the fish of the sea and over the birds of the sky, over the cattle and over all the earth, and over every creeping thing that creeps on the earth’”*.

So to be created in the image of God is that God himself is a king and ruler over his creation and that the human is to exercise that role in the world. However, the Bible tells us that the world is important to God, that he upholds it, and that he cares for it. So when this passage talks about man ruling over all the earth, it is not ruling in the sense of subjugation and abuse that is intended, but ruling in the sense of husbanding and caring for the world. Using its resources, yes, but also protecting them and preserving them for future generations [6].

Again, the bible explicitly requires the preservation and protection of the natural environment. For example, in Deuteronomy 22:6 we read:

“If you come across a bird’s nest beside the road, either in a tree or on the ground, and the mother is sitting on the young or on the eggs, do not take the mother with the young. You may take the young, but be sure to let the mother go, so that it may go well with you and you may have a long life.”

The protector of human life

The Christian engineer, in designing or building a project or structure will make sure that the usage of the project or structure will not in any way result in any injuries or death.

The Bible in Deuteronomy 22:8 reads:

“When you build a new house, make a parapet around your roof so that you may not bring the guilt of bloodshed on your house if someone falls from the roof.”

A parapet is a wall-like barrier at the edge of a roof, terrace, balcony or other structure.

Where extending above a roof, it may simply be the portion of an exterior wall that continues above the line of the roof surface, or may be a continuation of a vertical feature beneath the roof such as a fire wall or party wall, according to Wikipedia.

Most houses in biblical times had flat roofs, see figure 1, which were used for storage and drying fruit and people also slept there in summertime [7]. It is also a place and they would entertain people on them, in much the same way that we would use a balcony, patio or a deck. And there is a specific provision here for human safety so that people don't fall off and hurt themselves

Doing what is right and proper in the sight of the Lord

People tend to act with a lack of integrity and often this is because of the personal desire to prosper at the expense of others. Biblically there is nothing wrong with making money. It is the love of money that is the root of all evil (1 Tim 6:10). The 10th commandment forbids an individual to desire the neighbour's possessions for himself/herself. But the problem is, given this propensity of man to be selfish and abuse

others, sometimes the pursuit of money and personal pleasure gets in the way of other considerations so that they are obscured or overridden [6]. All projects will involve some form of money and someone is paying you for your service. That someone, mostly businesses or rich people will want to get the job done fast and it is right at this point that you might find a clash of interests. Dr Michael Flinn [6] provided an illustration of this problem:

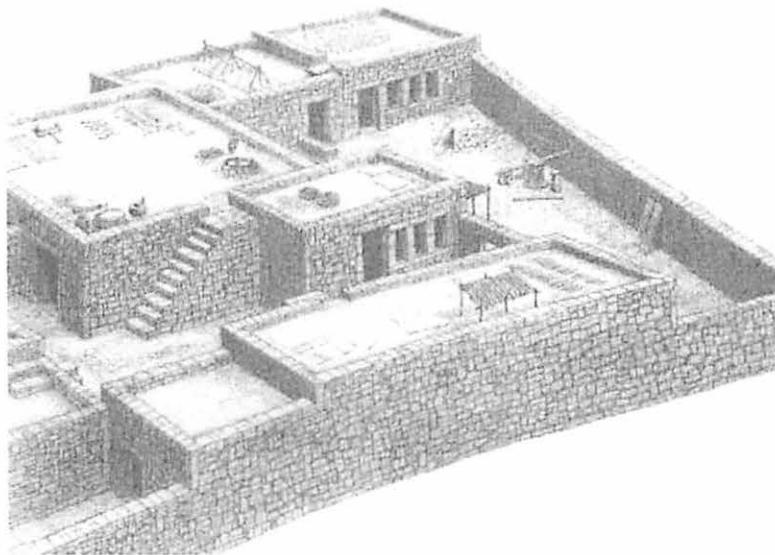


Figure 1, Reconstruction of a 1st century farmhouse complex with oven and olive press (upper right); the courtyard and roof are clearly work areas; the roof has a shaded work space and separate areas for drying flax, farm produce, etc. Image taken from reference [8].

What say the money for the project does not go far enough? You would like to make sure that all the safety regulations are met, but there is a pressure on the funding and you may be asked to cut corners. You are employed. You want to get paid for the job - you want to reach your own financial goals. Will you risk losing a contract because you cannot put your name to a report that overlooks minor safety regulations?

What say your client comes back to you and says that he can go to engineer B down the road and he will design the same building with half the wall thickness and much less steel reinforcing? Again, the pressure comes on for you to trim down your specifications because you don't want to lose the contract.

"He who has the gold makes the rules"? Well, that may be the way that things happen sometimes, but if you are going to maintain your own standards of professional integrity, you must beware of that particular "golden rule".

"All that is gold does not glitter." Money is not everything. Jesus put it in Mark 8:36, "What good is it for a man to gain the whole world, yet forfeit his soul?"

The Christian engineer, following the Master Engineer (God), needs to do what is right and proper and not 'covet that contract' by cutting back on material quality or trimming the specifications to lower the quote for a contract. A Christian engineer will do the right thing because of who they are and what they believe. The Bible points us to Proverbs 21:3: "To do what is right and just is more acceptable to the Lord...", and to Micah 6:8: "He has showed you, O Man, what is good, And what does the Lord require of you? To act justly and to love mercy and to walk humbly with your God". Modifying the words of Richard T. Hughes [9]: a Christian engineer functions as an engineer who is also a Christian, and as a Christian who is also an engineer.

As a Christian, when we give ourselves wholly to God, and in our work follow His directions, He makes Himself responsible for its accomplishment. He would not have us conjecture as to the success of our honest endeavors. Not once should we even think of failure. We are to co-operate with One who knows no failure [10].

Conclusion

Members of the National Society of Professional Engineers (NSPE) are required to adhere to the highest principles of ethical conduct outlined in the Codes of Engineering Ethics. There is nothing in the engineering code of ethics that directly conflicts with a Christian understanding of moral responsibility found in the Ten Commandments.

The Codes of Engineering Ethics, which is service oriented, intended to benefit both the provider and the recipient of the service or the community and does not foster values such as faithfulness, diligence, equality, respect, integrity, compassion, Christ-likeness and acceptance.

The Christian engineer who has the love for the Creator God and kept the Ten Commandments will certainly going beyond the codes of ethics in their service to man and the earth. They will provide value-based service to the society and the environment .and the Christian engineer will have the following characteristics such as faithfulness, diligence, integrity, compassion, respect and acceptance.

The Christian engineer should consider the following roles:

1. Steward for the environment
2. The protector of human life
3. Doing what is right and proper in the sight of the Lord

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Appendix 1

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS (NSPE) CODE OF ETHICS FOR ENGINEERS

Rules of Practice

1. Engineers shall hold paramount the safety, health, and welfare of the public.
 - a. 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.
 - b. Engineers shall approve only those engineering documents that are in conformity with applicable standards.
 - c. 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.
 - d. Engineers shall not permit the use of their name or associate in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise.
 - 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 and sign and seal the engineering documents for the 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' qualifications. 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.

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.
 - Engineers are encouraged to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community.
 - 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.
 - Engineers are encouraged to extend public knowledge and appreciation of engineering and its achievements.
 - Engineers are encouraged to adhere to the principles of sustainable development¹ in order to protect the environment for future generations.
3. Engineers shall avoid all conduct or practice that deceives the public.
 - Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact.
 - Consistent with the foregoing, engineers may advertise for recruitment of personnel.
 - 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.
 - 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.
 - 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.
 - Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.
 - 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.
 - Engineers shall not request, propose, or accept a commission on a contingent basis under circumstances in which their judgment may be compromised.
 - 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.
 - 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.
 - 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.
 - Engineers in governmental, industrial, or educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties.
 - 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, those 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.
 - Engineers shall conform with state registration laws in the practice of engineering.
 - Engineers shall not use association with a 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.
 - Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.
 - 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.
 - 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.
 - Engineers' designs, 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.
 - 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 courses, reading in the technical literature, and attending professional meetings and seminars.