

Electrical Engineering and Islamic Ethics

Khan M^{1*} and Khalid Asghar²

¹School of Engineering, University of Management & Technology, Lahore, Pakistan

²Assistant Professor, School of Engineering, Department of Electrical Engineering, University of Management & Technology, Lahore, Pakistan

Abstract

Many projects have been structurally failed and collapsed during the past centuries. Some of these incidents caused a sizable number of human casualties. Probably the failure to follow the right code of ethics caused these incidents.

Electrical engineering professionals face several ethical-related problems which are costly, harmful and affect high ratio of people.

Organizations provide codes of ethics to help the engineers to understand and manage their ethical responsibilities. Islam considers ethics as an important factor to train individuals, communities and society. Islamic ethics are set of moral principles and guidance that recognizes what is right and what is wrong.

The Quran is replete with clear messages about ethics. This research paper intends to highlight the Islamic ethics for solving an ethical dilemma.

Keywords: Organizations; Philosophy; Dilemma; Morality

Introduction

Our actions do not affect ourselves, but it also affect people around us. Many of our professional decisions involve ethics. Ethics is the branch of philosophy, which differentiates actions as right or wrong. It is the study how people should make decisions and how those decisions affects us, other people and environment. In short ethics are the principals of right conduct. Quran stats "The noblest of you in the sight of Allah is the best of you in conduct" (49:13).

Daily people face ethical issues. Some of them include bribery, lying, frauds, violating rules and policies. These ethical issues lead to various disasters like Chernobyl Nuclear Power Plant Disaster, Tacoma Washington Bridge Disaster, Titanic and many others. Electrical engineers should be ethically perfect. As they are responsible for everyone lives.

Islam teaches its followers to earn "Hilal" income. Hilal income is the legal and ethical way of earning. It is earned by honesty and truth. Islam forbids laziness, aversion to work and idleness at all."

Ethical Dilemma

An ethical dilemma, also called moral dilemma, is a situation in which moral precepts or ethical obligations conflict in such a way that any possible solution to the dilemma is morally intolerable [1]. An ethical dilemma is any situation in which guiding moral principles cannot determine which course of action is right or wrong. For example your Company has a firm policy regarding cases of theft of company property. Used company equipment is on a table to be sold by bid each month. You see a valued employee who is 2 months from retirement slip an electric drill from the table and put it in his car before the day of the sale. What do you do?

Ethics and Islam

What is Islam?

Islam is the last religion revealed by God (Allah-the almighty) to people. Islam is the religion which was revealed to messengers of Allah and they had the duty to preach it to their followers. Followers of Islam are called Muslims. Prophet Muhammad PBUH was the last messenger

of Allah. The Islamic book 'Quran' was revealed on Him. Islam is not just a religion; it is a complete code of life [2]. Allah said in Qur'an "This day, I have perfected your religion for you, completed my favor upon you, and have chosen for you Islam as religion" [Quran 5:3]. Qur'an consists of more than 6666 verses; with hundreds of verses focusing on ethical aspects. Islam is basically based on two sources: The Holy Qur'an, the message of Allah revealed on Prophet Muhammad PBUH and Sunnah of Prophet Mohammed PBUH.

What is Sunnah?

The Sunnah is a practical expression of what is in the Quran. This expression takes many forms. Sometimes, it comes as an action performed by the Messenger. At other times, it is a statement that he made in response to something. Sometimes, it takes the form of a statement or action of one of the Companions that he neither prevented nor objected to. On the contrary, he remained silent about it or expressed his approval for it [3].

The Sunnah explains and clarifies the Quran in many ways. It explains how to perform the acts of worship and carry out the laws that are mentioned in the Quran. God commands the believers to pray without mentioning the times that the prayers had to be performed or the manner of performing them. The Sunnah has been recorded in many books. The famous ones include Al-Bukhair, Al-Tirmidhi, Muslim B Hajjaj and Al-Nasi.

The Messenger clarified this through his own prayers and by teaching the Muslims how to pray. He said: "Pray as you have seen me praying".

*Corresponding author: Muhammad Khan, School of Engineering, University of Management & Technology, Lahore, Pakistan, Tel: +92 42 35212801-10; E-mail: muhammad.khan.1993@live.com

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Ethics in Quran

The principles of ethics are often discussed with respect to gains and benefits to society at large. What is good or bad is supposedly determined by the rule of the majority, with little attention given to the principles of morality. Islamic ethics differ from the Western concept as these are derived from God, directly from the Quran, and from the practices of the Holy Prophet (PBUH). It is therefore a set of beliefs and actions that is divine and transcends the limitations of time, place and tradition.

The Quran is replete with clear messages pertaining to ethics (akhlaq), the standards of behaviour that God expects mankind to adopt because He has sent him to this world as His vicegerent. These cover all aspects of truthfulness, honesty, kindness, integrity (that includes being consistent in word and deed), meeting commitments and sincerity [4]. The best example of ethics is in the life of the Prophet himself. When Hazrat Aisha was once asked about the personality of her husband, she had replied: "he was a reflection of the Quran itself".

Quranic Verses Related to Ethics

"Serve Allah and do not commit shirk (associate any partner) with Him, and be good to your parents, kinfolks, orphans, the helpless, near and far neighbors who keep company with you, the travellers in need, and the slaves you own. Allah does not love those who are arrogant and boastful" (4:36).

"Good deeds are not equal to the evil ones. Repel other's evil deeds with your good deeds. You will see that he, with whom you had enmity, will become your close friend." (41:34)

"And fulfill promise, for the promise shall be questioned about" (17: 34).

"And give full measure when you measure out, and weigh with a true balance" (17: 35).

"And seek assistance through patience and prayer, and most surely it is a hard thing except for the humble ones." (2:45).

"And do not mix up the truth with the falsehood, nor hide the truth while you know (it)." {2:42}.

"Except those who believe and do well, and enjoin on each other truth, and enjoin on each other patience." {103:3} (Tables 1 and 2).

Electrical Engineering and Ethics

Electrical engineering is a field of engineering that generally deals with the study and application of electricity, electronics, and electromagnetism. An electrical engineering has the job to invent new electrical gadgets and equipment's, to make life easy and safe. They solve

Ethical Related Terms	Location in Quran
Abstain from Arrogance	{31:18}
Benefiting Others	{16:90}, {4:36}
Courtesy	{4:86}, {25:63}
Enjoining the Good and Forbidding the Evil	{3:104}, {31:17}, {4:85}
Fair Trade	{17:35}
Forbiddance from Backbiting	{49:12}
Humbleness	{25:63}
Justice	{5:8}
Patience	{70:5}, {2:45}
Suspicion	{49:12}
Truthfulness	{2:42}, {103:3}

Table 1: Ethical related terms and their respective location in the Quran.

Electrical related terms	Location in Quran
Atom	{56:5}, {34:3}, {10:61}
Communication	{17:85}
Control	{25:3}, {3:17}
Design	{20:15}, {5:11}
Heat Energy	{13:17}
Light/Optical	{81:1}, {92:1}, {25:61}, {71,16}
Lightning and Thunderstorm	{69:5}, {2:19}, {4:153}, {24:43}
Management	{67:15}, {52:37}
Pollution	{2:222}
Power	{48:3}, {11:80}, {48:21}, {4:158}
Solar Power	{20:119}, {71:16}
Testing/Check	{20:85}, {3:166}

Table 2: Electrical related terms and their respective location in the Quran.

electrical related problems and test equipment's. Electrical engineers mainly deals with electricity, electronics and power generation [5].

Professional organizations are playing a major part in keeping engineering away from unethical practices. They have framed ethical codes and principle for safe and effective engineering. This organization includes IEEE, NSPE, ACM and etc.

Electrical Engineering Related Problems

Safety issues

According to newspaper clipping nearly 45% fire accidents in the city of Hyderabad occurred due to short-circuits and other electrical problems [6,7].

Heat generation leading to global warming

Global warming and climate change are terms for the observed century-scale rise in the average temperature of the Earth's climate system and its related effects [2]. The generation of electricity is the largest source of CO₂ emissions. The combustion of fossil fuels such as coal is the primary source leading to global warming. Coal is the source for generating electricity. Burning coal produces far more CO₂ than oil or natural gas.

Power losses

Electric power losses include losses in power generation and power transmission till end consumers. Power generation involves thermodynamic cycle, which has efficiency of almost 35%. This means that only 35% of energy produced after combustion of fossil will be converted into mechanical energy and then into electricity [8].

Lightning strikes

When lightning strikes a power cable, it increases the amount of current flowing in it. This extra burst of electricity is unable to be controlled by protective gears leading to damage to electrical loads.

Ethical Related Problems for Engineers

Now day's people are more inclined towards earning money rather than keeping in mind humanity and ethics. This rises to many problems like bribing in terms of giving gift and cash in reward for passing or clearing any engineering project or device [9]. Incompetency among the engineers also creates problems. Engineers for sake of personal benefit can disturb privacy of the organization or can sell employer's trade secrets. Lack of time or mismanagement of time cause many problems. Dishonesty, lack of vision, poor supervision, silo mentality

and disobeying commands, policy and code of ethics are some problems among the engineers.

Solution to Problems Faced by Electrical Engineer in Islam

A true Muslim believer will follow Islam and its teachings. He would not be indulged in any unethical way as causing harm to others or environment.

An organization should have strict policy against fraudsters and unethical behavior. CCTV cameras should be placed all around workplace. The organization should arrange workshops and seminars on disadvantages of unethical act [10]. Employer and employee should have good relationships. Praise the good ethics publicly. Empower the employees, so that they can easily raise voice against unethical behavior. Empower them for whistle blowing.

Anyone not full filling duties and rights will be punished on Day of Judgment. It is a sin to practice anything unethical in Islam or harm anyone.

Learn from the Past

Electricity blackouts

There have been numerous blackouts which has affected millions of people around the world. The electric blackout occurred in India in 2012 which lasted for two days and affected 620 million people. Even countries like US, Canada, Italy and Switzerland have also experienced blackouts.

Electric related issues in vehicles

Hyundai in 2015 recalled more than 64,000 Hyundai Sonata. The recall order was imposed after the discovery of a problem with the cars' ABS warning lights [11].

Toyota in 2010 recalled 133000, Toyota Prius over faulty ABS software issue. The recall was made when a Prius had a head to head accident.

Pentium FDIV bug

It was a computer bug that affected the floating point unit of the

early Intel Pentium processors. Because of this bug, the processor could return incorrect decimal results when dividing a number.

Phobos program

The Phobos program was an unmanned space mission consisting of two probes launched by the Soviet Union to study Mars and its moons.

Phobos 1's communication failed due to its failure in controller and which was later traced an error in its software [12].

Phobos 2's communication got lost after entering the orbit of Mars.

Conclusion

Electricity and electrical appliance are the basic need of human beings. They should be made more efficient and safer to use. For this we need to follow Islamic teachings while perform our duties as electrical engineers.

Summing up all it shows every disaster that occurs in the world except natural disasters are all due to ignorance or disobeying ethics and code of ethics. If everyone in the world obeys code of ethics and work towards the benefit of public. Then it will result in more peaceful and healthy world for our next generations.

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