

Application and Practice of Sustainable Development in Engineering

Hassan Badkoobehi
National University, San Diego, CA

Abstract— In recent years there has been an ever increasing need for sustainable design. However sustainable design sometimes may be in conflict with existing design standards. The topic that this study addresses is the ethical dilemma between design standards and Sustainable design. This is a newly arising conflict resulting from the recent “green” Movement. This is a new challenge facing the modern engineer. This is a problem that the new generation will have to learn to understand and deal with.

Index Terms—sustainability, renewable energy, waste minimization, and green building.

I. INTRODUCTION

The duty of an engineer first and foremost is always the health and safety of the public. Specifically Canon 1 which states “Engineers shall hold paramount the safety, health and welfare of the public and shall strive to comply with the principles of sustainable development in the performance of their professional duties.” In general design standards have been written and constructed to help engineers uphold this standard of protection of the public either by negligence or unethical conduct. However the duty of the engineer goes well beyond health and safety. A major concern in the modern world is the sustainability of our modern life style. This is where the term “Sustainable Design” comes from. The Government Sustainable Administration (GSA) has defined sustainable design in the following manner: “Sustainable design seeks to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments. Sustainable design principles include the ability to: optimize site potential; minimize non-renewable energy consumption; use environmentally preferable products; protect and conserve water; enhance indoor environmental quality; and optimize operational and maintenance practices. Utilizing a sustainable design philosophy encourages decisions at each phase of the design process that will reduce negative impacts on the environment and the health of the occupants, without compromising the bottom line. It is an integrated, holistic approach that encourages compromise and tradeoffs. Such an integrated approach positively impacts all phases of a building's life-cycle, including design, construction, operation and decommissioning”[2].

II. METHODOLOGY

It may arise as an ethical dilemma torn between conflicting principles of design standards and sustainable design. The Internet Encyclopaedia of Philosophy defines Ethic in the following manner: “The field of ethics, also called moral philosophy, involves systematizing, defending, and recommending concepts of right and wrong behaviour. Philosophers today usually divide ethical theories into three general subject areas: Met ethics, normative ethics, and applied ethics. Met ethics investigates where our ethical principles come from, and what they mean. Are they merely social inventions? Do they involve more than expressions of our individual emotions [3]? Met ethical answers to these questions focus on the issues of universal truths, the will of God, the role of reason in ethical judgments, and the meaning of ethical terms themselves. Normative ethics takes on a more practical task, which is to arrive at moral standards that regulate right and wrong conduct. This may involve articulating the good habits that we should acquire, the duties that we should follow, or the consequences of our behaviour

on others. Finally, applied ethics involves examining specific controversial issues, such as abortion, infanticide, animal rights, environmental concerns, homosexuality, capital punishment, or nuclear war[1]. By using the conceptual tools of met ethics and normative ethics, discussions in applied ethics try to resolve these controversial issues. The lines of distinction between met ethics, normative ethics, and applied ethics are often blurry. For example, the issue of abortion is an applied ethical topic since it involves a specific type of controversial behaviour. But it also depends on more general normative principles, such as the right of self-rule and the right to life, which are litmus tests for determining the morality of that procedure” [4]. This paper is an examination of the key issues in the ethical conflict that may arise in the ever growing need for sustainable design. Some key ethical issues must first be highlighted before exploring the more specific ethical issues surrounding sustainable design. Let us first explore the 2nd Canon in the ASCE Code of Ethics “Engineers shall perform services only in areas of their competence”[5]. This represents a dilemma quite often and over a range of circumstances. The ethical conflict comes either from over zealously seeking work in an area that the engineer is not qualified, or from ignorantly accepting work without properly researching the qualification required to aptly perform the task. There is one very notable caveat to this rule, an engineer who is wholly incompetent should perhaps seek another line of work that they are qualified for [2]. In the Fundamental Principles of the ASCE Code of Ethics the third principle reads “Engineers uphold and advance the integrity, honour and dignity of the engineering profession by striving to increase the competence and prestige of the engineering profession”. This particular passage especially applies to those engineer who find themselves in a position of instructing and training young and aspiring or student engineers and is one of particular weight and importance. There is another area of this ethical dilemma to explore. That is the duty of the engineering firms to educate their engineers in the newly evolving sustainable design technology as it becomes available. Programs such as “The Leadership in Energy and Environmental Design” (LEED) certification are often supported by employers. Many firms will foot the bill for taking the LEED exam and becoming a LEED Accredited Professional.

III. RECOMENDATIONS

Sustainable design is an inseparable, dynamic, concentrated, and necessary effort to continue the modern way of life. The United States Green Building Council(USGBC) explains sustainable design in the following way “The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ encourages and accelerates global adoption of sustainable green building and development practices through the creation and implementation of universally understood and accepted tools and performance criteria.”⁵ It is through programs such as LEED that engineers can confidently move into sustainable design and avoid ethical issues with out of date design standards. LEED is the forefront in sustainable “green” design. Many design firms are onboard with sustainable design, it has in fact become a selling point for consultant services. LEED is at this point in engineering history the first system to allow for engineers to have standards for sustainable design. The ethical conflict will diminish with time as standards are developed, amended and revised to reflect the need for sustainable design [1].

IV. CONCLUSION

Why do engineers focus with such zeal on "engineering ethics?" Ethics are ethics. Have we, by creating a set of ethics for our professional lives as engineers, made the concept of ethical behaviour so complex and confusing that we fail to act in ways consistent with moral principles when faced with an ethical dilemma? Studies show that there is a set of guiding universal principles that if properly applied would provide guidance for dealing with ethical dilemmas. In theory, the study of engineering ethics should not be necessary if engineers were well founded in the application of these principles. Because of the complexities involved in ethical dilemmas, engineers must develop their ability to apply moral intelligence (knowledge of what is right) when we are under pressure in real-life situations. The way we learn to apply this moral intelligence is by studying ethics so that when we are faced with an ethical dilemma we can reply in a manner that is consistent with these universal principles” [5].

V. REFERENCES

- [1] <http://www.sillmanwright.com/page2.html> Sillman Wright Architects web page ASCE Canons and Ethics, 2003.
- [2] http://www.gsa.gov/Portal/gsa/ep/contentView.do?contentId=8154&contentType=GSA_OVERVIEW, The Leadership in Energy and Environmental Design, 2007
- [3] <http://cweb.salisbury.sa.gov.au/manifest/servlet/page?pg=10527> The Mawson Centre, Environmental Ethics, 2006
- [4] <http://www.iep.utm.edu/e/ethics.htm> Internet Encyclopedia of Philosophy “Ethics” Page Introduction Sustainability, 2008
- [5] <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222> “LEED, 2005