University of Technology
Department of Materials Engineering
Fourth Grade
Dr. Zinah Alabdali
Zinah.Alabdali@uotechnology.edu.iq
Second semester- Second Lecture

2. Environmental Ethics

One of the most important political issues of the late 20th and early 21st centuries has been environmental protection and the rise of the environmental movement. This movement has sought to control the introduction of toxic and unnatural substances into the environment, to protect the integrity of the biosphere, and to ensure a healthy environment for humans. Engineers are responsible in part for the creation of the technology that has led to damage of the environment and are also working to find solutions to the problems caused by modern technology. The environmental movement has led to an increased awareness among engineers that they have a responsibility to use their knowledge and skills to help protect the environment.

Sometimes an engineer's responsibility for the environment is denoted with phrases such as "sustainable design" or "green engineering." These concepts incorporate ideas about ensuring that our designs do not harm the environment. By using sustainable design principles, engineers will help to maintain the integrity of the environment and ensure that our quality of life can be sustained. Sustainable design includes not only ensuring that a product has minimal environmental impact during its use, but also that it can be manufactured and disposed of without harming the natural world. These concepts have been incorporated into some of the engineering codes of ethics which specifically use the word "sustainable."

As concern about the environment has grown, ethicists have turned their attention to the ethical dimensions of environmentalism. In the late 1960s, an area of study called

environmental ethics was formulated, seeking to explore the ethical roots of the environmental movement and to understand what ethics tells us about our responsibility to the environment.

Regardless of the goal (i.e., either protecting human health or protecting the overall health of the biosphere for its own sake), there are multiple approaches that can be taken to resolving environmental problems. Interestingly, these approaches mirror the general approaches to ethical problem solving. The first approach is sometimes referred to as the "cost-oblivious approach". In this approach, cost is not taken into account, but rather the environment is made as clean as possible. No level of environmental degradation is seen as acceptable. This approach bears a striking resemblance to rights and duty ethics. There are obvious problems with this approach. It is difficult to uphold, especially in a modern urbanized society. It is also very difficult to enforce, since the definition of "as clean as possible" is hard to agree on, and being oblivious to cost isn't practical in any realistic situation in which there are not infinite resources to apply to a problem.

A second approach is based on cost benefit analysis, which is derived from utilitarianism. Here, the problem is analyzed in terms of the benefits derived by reduce the pollution—improvements in human health, for example—and the costs required to solve the problem. The costs and benefit are weighed to determine the optimum combination. In this approach, the goal is not to achieve a completely clean environment, but rather to achieve an economically beneficial balance of pollution with health or environmental considerations.

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There are problems associated with the cost–benefit approach.

First, there is an implicit assumption in cost–benefit analysis that cost is an important issue. But what is the true cost of a human life or the loss of a species or a scenic view? These values are difficult, if not impossible, to determine.

Second, it is difficult to accurately assess costs and benefits, and much guesswork must go into these calculations.

Third, this approach doesn't necessarily take into account who shoulders the costs and who gets the benefits. This is frequently a problem with the siting of landfills and other waste dumps. The cheapest land is in economically disadvantaged areas, where people don't necessarily have the political clout, education, or money required to successfully oppose a landfill in their neighborhood. Although dumps have to go somewhere, there should be some attempt to share the costs as well as share the benefit of an environmentally questionable project.

Finally, cost–benefit analysis doesn't necessarily take morality or ethics into account. The only consideration are costs and benefit, with no room for a discussion of whether what is being done is right or not.

Given the complexity of these issues, what then are the responsibilities of the engineer to the environment? When looking at the environmental aspects of his work, an engineer can appeal to both professional and personal ethics to make a decision. Of course, the minimal requirement is that the engineer must follow the applicable federal, state, and municipal laws and regulations.

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Professional codes of ethics tell us to hold the safety of people and the environment to be of paramount importance. So clearly, engineers have a responsibility to ensure that their work is conducted in the most environmentally safe manner possible. This is true certainly from the perspective of human health, but for those who feel that the environment has moral standing of its own, the responsibility to protect the environment is clear. Often, this responsibility must be balanced somewhat by consideration of the economic well-being of our employer, our family, and our community. Our personal ethics can also be used to determine the best course when we are confronted with an environmental problem. Most of us have very strong beliefs about the need to protect the environment. Although these beliefs may come into conflict with our employer's desires, we have the right and duty to strongly express our views on what is acceptable. An engineer should not be compelled by his employer to work on a project that he finds ethically troubling, including projects with severe environmental impacts.

In trying to decide what the most environmentally acceptable course of action is, it is also important to remember that a basic tenet of professional engineering codes of ethics states that an engineer should not make decisions in areas in which he isn't competent. For many environmental issues, engineers aren't competent to make decisions, but should instead seek the counsel of others—such as biologists, public health experts, and physicians—who have the knowledge to help analyze and understand the possible environmental consequences of a project