Engineering Ethics: Social Responsibility vs. Legal Liability

An Online Continuing Education Course for Engineers

Course Number: ET-1003

Credit: 1 Hour / 1 PDH / 1 CPD

Engineering Ethics: Social Responsibility vs. Legal Liability

EDITOR'S NOTE

We suggest that you personally research the latest laws and regulations prior to beginning any project that requires trench work and that you make the right ethical choices where the regulations may be unclear or less than adequate.

For a complete look at the OSHA regulations on trenches, visit their site at:
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DI RECTIVES&p_id=1659

INTRODUCTION

Trench digging is one of the oldest types of construction work documented in history. Prior to World War II, trenches were dug by hand. As workers dug trenches deeper, the sides of the trench had to be shored, or supported, to keep the walls of the trench from collapsing.

Following the war, innovations were made in cable backhoes, and trench digging disappeared as an established profession. By the 1950s, hydraulically actuated backhoes were developed, making it possible to rapidly dig very deep trenches. As a result of backhoe innovations, and because there were no workers inside the trenches during digging, trench walls were no longer shored.

All trenches have what is known as a stand-up time. The stand-up time is the time that elapses from the time the trench is dug until the trench walls start collapsing. Stand-up time is dependent on many factors, including soil type, water content, trench depth, weather conditions, and whether or not the soil has been previously disturbed. Stand-up times can be as short as zero seconds or as long as several months, and are difficult to predict. Before trenches are dug, someone can take soil samples as a means of estimating stand-up time; however, soil conditions can be dramatically disparate only a few feet from where the soil sample was taken.

After a trench is dug, workers go down into the trench, performing whatever work is necessary, such as laying pipe or telephone lines, welding pipe, or installing valves. If the walls of the trench are not supported, there is the possibility that the walls will collapse and trap the workers

in the trench. Historically, there have been between 100 and 300 people killed in the United States every year due to trench collapses.

PROFESSIONAL RESPONSIBILITY AND THE USE OF TRENCH BOXES

The public has become increasingly aware that industrial progress often has negative side-effects. The place of engineers in protecting the public from these negative effects is a controversial issue. This controversy becomes especially spirited when moral responsibility may appear wider than legal responsibility. The use of trench boxes on construction sites illustrates this debate.

A trench box (also called a trench shield) may be placed in the trench to prevent trench failures from injuring workers. A trench box consists of two large plates, usually made of wood, aluminum or steel, which are parallel to the walls of the trench, and horizontal cross-members which hold the two plates apart. The lower edge of the box rests on the bottom of the trench, and the top edge extends above the top of the trench. The workers stay between the plates of the trench box, so that if the wall of the trench collapses, the dirt will be stopped by the trench box. As work progresses, the trench box is pulled along the trench with a backhoe.

Due to the added expense of using the trench box, many contractors are reluctant to use them. They know that if a worker is killed or injured in a trench wall collapse, Workman's Compensation will cover all medical expenses and reimburse the families of the deceased workers. Barring gross negligence, the families are not even allowed to sue in some states.

The Federal Occupational Safety and Health Administration (OSHA) regulations do not require a trench support system in all cases. The contractor can slope the sides of the trench to a specified angle in accordance with OSHA requirements, thus eliminating the need for a support system. Also, when the trench is shallow or is made entirely in stable rock, then a support system may not be required.

When a construction project requires a large excavation, such as digging the foundation for a tall building, the support structure for the excavated walls is specified in the plans. The main problem involving nonuse of trench boxes occurs in cities, when water or sewer lines are being installed or repaired. The engineer sometimes does not specify the support structure for the trench on the plans, but leaves that to the contractor.

ENGINEERING DESIGN: LITERATURE ON SOCIAL RESPONSIBILITY VERSUS LEGAL LIABILITY

Litigation associated with engineering design has escalated enormously over the last few decades, and has increased the intensity of debates over whether engineers and their companies should give priority to social responsibility or legal liability. Where does a design engineer's and his/her company's responsibility end and the responsibility of the subcontractor, manufacturer and consumer begin? Liability is complicated by the fact that law typically lags behind social costs associated with failed design. In other words, legislation is often after-the-fact, so how can an engineering firm justify its actions based on current legal definitions? If a company's design has adverse affects on the public welfare, laws must be enacted to ensure that appropriate safety standards are met. Or, at the very least, legal suits are filed so injured parties can be compensated and culprits penalized. This phenomenon has become particularly critical regarding litigation involving engineering design and product liability.

The public has become increasingly aware that benefits of industrial progress are often associated with negative side-effects. The responsibility of engineers in protecting the public from these side-effects is the focus of a lively debate. This is intensified by the fact that legal liability and social responsibility may not always coincide.

What should be said about the engineer's and his/her company's social responsibility? Is it not their job to act as society's protector? Should social responsibility not precede any discussion of legal liability? And should a design engineer not take every precaution to ensure his/her company's product is safe before it enters the market? Safety must be an essential design consideration. As Christopher D. Stone notes in *Where the Law Ends: The Social Control of Corporate Behavior*,

> Even if we put aside the defects in the impact of the sanctions, there still remains the problem that law is primarily a reactive institution. Lawmakers have to appreciate and respond to problems that corporate engineers, chemists, and financiers were anticipating (or should have anticipated) long before that the drugs their corporations are about to produce can alter consciousness or damage the gene pool of the human race, that they are on the verge of multinational expansion that will endow them with the power to trigger worldwide financial crises in generally unforeseen ways, and so on. Even if laws could be passed to deal effectively with these dangers, until they are passed a great deal of damage some perhaps irreversible can be done. Thus, there is something grotesque and socially dangerous in encouraging corporate managers to believe that, until the law tells them otherwise, they have no responsibilities beyond the law and their impulses (whether their impulses spring from the id or from the balance sheet). We do not encourage human beings to suppose so. And the dangers to society seem all the more acute where corporations are concerned.

SOCIAL RESPONSIBILITY FOR PUBLIC SAFETY: AN OVERVIEW

With corporate decision-making structures as the focus, we find that many of the difficult ethical choices corporate managers and design engineers must make involve conflicts regarding who is responsible for a given activity. Managers and engineers alike have different obligations depending on their role within the corporation. Managers often perceive themselves as having a special duty to protect the financial well-being of the company. Engineering codes assign to engineers special duty to protect the public. Whether these roles are appropriate and especially whether this narrow conception of the role of managers is adequate is a matter of debate. As one writer has put it, "Corporate role morality takes as given precisely what classical moral theory wishes to evaluate, the worthiness of the duties assigned by one's role."

If engineers do have a special obligation to the health and safety of the public, an engineer must often place his/her social responsibility over the objectives of his/her employer. "Just as we must know the rules of baseball to know what to do with the ball, so we must know engineering ethics to know, for example, whether, *as engineers,* we should merely weigh safety against the wishes of our employer or instead give safety preference over those wishes." Sometimes a cost/benefit analysis is not enough, especially when lives are at stake.

In his "Explaining Wrongdoing," Michael Davis emphasizes the need for professionals to distance themselves from a "microscopic" way of looking at their role within the corporation, to look up from their given tasks to see the larger implications of the work they perform for society. In essence, Davis argues that problems associated with professional ethics center on these fundamental questions of social obligation. Using the famous Challenger disaster as a case study, Davis shows that while no one broke the law in Challenger, there was clearly wrongdoing on the part of Morton Thiokol's managers and engineers: "For an engineer, safety is the paramount consideration. The engineers could not say the launch would be safe. So, Lund should have delayed the launch. Seven people died, in part at least, because he did not do what, as an engineer, he was supposed to do." This is not simply limited to highly publicized disasters. In all fields of engineering, concern over safety, and the engineer's responsibility for ensuring it, is paramount. In his "Safety–An Important Responsibility," Carlton Robinson argues that safety is an especially critical factor for transport engineers and their managers. Given the volume of traffic on roads, safety must come before cost considerations in highway design and construction. Robinson argues that if, at present, increased safety is not the primary goal in engineering design and construction projects, it should be. Safety is a social, not a legal obligation, and engineers and their managers must always keep their obligations to the public welfare at the fore when making design and management decisions.

Another example on the importance of choosing social responsibility over the law involves the

Soldier of Fortune guns-for-hire classified advertising cases. In his article, Don Tomlinson asks whether we are first professionals or first human beings. While placing guns-for-hire advertisements was not illegal, it was immoral, and people died because of the advertisements. *Soldier of Fortune* acted irresponsibly toward the public, and "Law cannot shield anyone from the most basic duty all human beings owe all other human beings: respect for life. Law and ethics are not one and the same. Further, using law as a justification for conduct which is socially irresponsible is socially irresponsible itself." The same duties apply to engineering design and management.

Quality engineering is a necessity. This means there is a need for creative engineering and ethical corporate practice. The American Society of Civil Engineering Code of Ethics states that "engineers must hold the public safety, welfare, health param... use our knowledge and skill for the enhancement of human welf... gers, corporate owners, contractors, subcontract... for their designs, the entire engineering ... ethical engineering practice positively ... fession benefits when ethics are followed ... ved, bad public relations are a possi... neer and the profession in genera...

Professional engineer... ty standards are maintained, and it is i... ir society mandates. Michael Da... ember the place of a code of ethics in th...

> Enginee... s, but should also supp... as it requires and by criticizing ... calling to account those who do not. They shou... pport their profession's code in these ways for at least four reasons: First, engineers should support their profession's code because supporting it will help protect them and those they care about from being injured by what other engineers do. Second, supporting the code will also help assure each engineer a working environment in which it will be easier than it would otherwise be to resist pressures to do much that the engineer would rather not do. Third, engineers should support their profession's code because supporting it helps make their profession a practice of which they need not feel morally justified embarrassment, shame, or guilt. And fourth, one has an obligation of fairness to do his part insofar as he claims to be an engineer and other engineers are doing their part in generating these benefits for all engineers.