Case Study 2 - Hyatt

The Hyatt Regency hotel disaster, the collapse of the second and fourth floor walkways, was due to a design change. This disaster cost 114 people their lives and injured over 200 others. “The original design by Jack D. Gillum and Associates called for three pairs of rods running from the second floor all the way to the ceiling. Investigators eventually determined that this design only supported 60 percent of the minimum load required by Kansas City building codes.” (wikipedia) Havens Steel Company, the contractor, disputed the original design, because it made assembly more complicated by requiring the nuts to be threaded the entire length of the rod. The contractor proposed an alternate plan where “two separate sets of tie rods would be used: one connecting the fourth floor walkway to the ceiling, and the other connecting the second floor walkway to the fourth floor walkway” and submitted shop drawings. It was determined that the load on the bolt at the 4^{th} floor would double with this design.

The drawings submitted by Jack D. Gillum and Associated were interpreted as finalized drawings even though they were preliminary sketches. Because of an immense lack of communication between the engineering firm and the contractor, the changes proposed by the contractor were made and accepted without recalculations being performed by the engineering firm. In court, the contractor claimed he called and received approval for change; however, the engineering firm denied that the call took place. Interestingly enough, 10 days after 42 shop drawings were submitted for approval; they were stamped and approved for construction.

Prior to the catastrophic failure of the walkways, more than 2700 sq ft of the atrium roof collapsed during construction. This was due to connection failure at the roof. In court, the engineering firm stated that they informed the owner that they wanted to perform on site inspections to check all fabrication during the construction phase three times. The owner did not allow this because of the extra costs.

After the roof collapsed, the owner had inspections executed only for the roof collapse. No inspections for any other design work or any engineering was performed. The owner also hired an individual engineering firm to inspect the origin of the roof collapse. The engineering firm responsible for the design wrote the owner stating that as a result of the atrium roof collapse, in addition, to the roof connection, “**all** steel connections” (Humphreys) would be checked. The owner received a variety of reports from the engineering firm “assuring the overall safety of the entire atrium” (Humphreys).

There was also a failure to adequately design the structure in the first place. According to the Kansas City building codes, the design of the walkways only supported 60 percent of the minimum load required. Another safety issue is on the owner, for not following the recommendation for inspections to be executed as the engineering firm recommended after the atrium collapse. The engineering firm also should have carried out the inspections specified to the owner even though the firm would not get paid for them. Especially after the failure of the atrium indicated that there may be a cause for concern. Insufficient knowledge of the existing building codes resulted in the design where only 60 percent of the minimum required load was supported. This shows that the engineering firm and engineers did not have the knowledge or

experience necessary to do the design. Stating in court that they (the engineers and engineering firm), did not approve the changes to the design and that they did not get the phone call suggesting the change is an act of deception. There was evidence of the approval on some of the drawings. Failure to adequately check the submitted shop drawings, the atrium after collapse, in addition to the remaining steel connections as "promised" to do is not in the best interest of the employer/client. By not accepting responsibility for the walkway collapse, the engineering firm did not act in a way that would be considered honorable, responsible and ethical. There is also the issue of perjury which is unlawful. These actions do not improve the reputation or value of the profession.

Many people were affected by this disaster. It is obvious that the people who were in the building during the collapse were affected. The friends and family left behind by those that did not survive as well as those that were injured were touched. As a result of legal suits settled out of court, $140 million was paid out to families involved in the disaster. The engineering firm and contractor had to go to court to determine who was at fault. It was determined that the engineering firm was responsible for the collapse. Two engineers were found guilty of gross negligence, misconduct, and unprofessional conduct and they lost their license to practice engineering in Missouri and Texas. The engineering firm had its certificate of authority as an engineering firm revoked. ASCE adopted a statement that structural engineers are fully responsible for design projects.

The biggest ethical issue is that of the safety of the public. The people involved did not consider that their actions were endangering the health, safety and welfare of the public. Had this been taken into consideration, the loss of life would not have occurred. The engineers would not have lost their license to practice engineering in Missouri and Texas, and the engineering firm would not have had its certificate of authority as an engineering firm revoked. There would not have been a 26 week trial or a multi-million dollar settlement.

The engineers took an oath to protect the health, welfare and safety of the public. By not checking the changes suggested by the contractor, the engineers failed to follow through with this duty, which resulted in great casualties. Under the idea of deontology, the decisions that took place do not constitute the right action, over the good. The right action is to protect the public, while still making the company a profit.

A person of high moral integrity would have put the public's safety first, because this would have given that person a clear conscience to sleep well at night. Knowing that there may be people in jeopardy of losing their lives would not allow a person of high caliber to perform actions of this type. To live purely is the only way to live a good life.

The consequences the owner suffered as a result of the safety issue may have been negative publicity, which could result in difficulty getting others to work with the owner. The duties by the owner are to pay for and hire any inspectors indicated as necessary for the project. The failure to do so cost many people pain and even death. The owner now has to live with the fact that because of this disaster lives were lost, and their reputation may have had irreparable damage sustained.

The engineering firm also had consequences to pay, for the events that took place. They lost the permission to operate as an engineering firm, millions of dollars were paid to the families of those involved in the incident, and they were publicly humiliated. They had a duty to the public to provide services that would not endanger the well-being of the public. They denied responsibility in the court even though there was irrefutable evidence. They dishonored the name and managed to perform a disservice to the engineering profession.

Another ethical issue is that of the design. According to the KC building codes, the original design was inadequate in the first place. This would lead one to assume that the required knowledge or investigation necessary to complete the structure was not present. The consequences of this lack of knowledge and/or experience were death for innocent individuals and the loss of license for the engineers and engineering firm. There is a responsibility on the part of the engineer to perform services only in areas of competence. It seems clear that there was, at the very least, incompetence in the familiarity of the KC building codes. Otherwise the original design would not have been under designed. If the engineers responsible for the original design had a disposition to go the extra mile in everything they do, they would have ensured that the design of the structure at least met the minimum requirements per the KC building codes.

Perjury is the outcome of trying to get away with covering one's hide when in the court of law. It is not only against the law, but it is unethical and gives engineers and engineering firms unscrupulous reputations. Promising to check all steel connections and then not doing so also results in humiliating the engineering profession. There are also the duties, as stated in the NSPE code of ethics, to avoid acts of deception, act in the best interest of the employer and protect the reputation of the profession. By claiming in court that there was not a phone call or stamped drawings indicating and authorizing the approval of the changes, and not checking the connections as promised these duties have not been fulfilled. Not fulfilling the duties as stipulated in the code of ethics lets down the engineering profession, and is unethical if one is following the deontology way of thinking. These are not good traits to possess, and do not result in a good life.

By knowing what is required by the building codes, this disaster could have been avoided. If the engineers involved in the design of the building would have taken the time to familiarize themselves with the building codes, they would not have designed a structure that was not even meeting the minimum standards. This act would have kept the safety of the public in the forefront and would have ultimately saved lives. The consequences of determining the codes would have been at the profit margins, which is in the best interest of the company. Even if there are more employees at this company than, because there were people killed or hurt, based on the idea of negative utilitarianism, preventing harm to the greatest number of people is more important then pleasing the greatest number of people. Thus the consequences would have resulted in an overall positive feel, and thus the engineers and engineering firm would have the pleasure of knowing that their lives are good and saving the lives of others would bring about great satisfaction.

Another solution to the ethical dilemmas would be to recalculate the design. This again would have consequences that would have been seen at the profit margin and thus the above mentioned reasons for doing so far outweigh the reasons for not recalculating the design. If the recalculation

would have been conducted, as it was promised after the atrium failure, the change in the walkway design would have been found. This could have been corrected, and thus the preservation of life and reputation would have occurred. Following through with what is said to take place would have also eliminated the loss of life. The design errors would have been found and could have been corrected – again with an added expense to the company for the oversight in the first place. If one made a promise to conduct a thorough check of all steel connections and then does not, then one is not living the life where the correct action is always taken.

Not relying on the contractor, taking action when no one else seems to be and taking responsibility, when it is one's to be taken are other possible actions that can be carried out. The argument can be made that the contractor should be able to follow the design, and if they believe there needs to be changes then they can make them. After all, it is their job and only they specialize in this type of work, so they should know what is best. This type of passive attitude toward the design is why it ended in disaster. The contractor is going to do what is in their best interest. They are going to get the job done as fast as possible. Cutting the most corners that they think they can get away with, so they can make the most profit. This is unethical, but not in the realm of this discussion. A trend however can be seen in which profit is the driving force in the making of many decisions.

The same goes for taking action when no one else seems to be. Especially if there may be lives at risk. This goes back to the first fundamental canon to protect the safety of the public. Even though the owner would not authorize the inspections recommended by the engineering firm, the inspections should have been done anyway. Inspections are conducted to prevent and identify any possible problems that may arise during the construction process. Inspections cost money and the owner is responsible for paying for the inspections. If they would not authorize the inspections the engineering firm probably could have reported them for jeopardizing the project. However, if the inspections were not specified until after the collapse of the atrium then there was a failure on the part of the engineers and engineering firm. If inspections were conducted by the engineers/engineering firm and the inadequacies were not discovered, then it would make perfect sense that the owner would not want to pay for more inspections just because they were not handled properly in the first place. It is probable that the engineers/firm did not perform the recommended inspections, because they wanted to get paid for them.

So far the above mentioned solutions result in the best possible outcome for the most people involved. It is also a duty per the NSPE code of ethics, and thus must be followed according to the theory of deontology. Plus an engineer following these solutions would be doing the right thing for one's self, and would be able to have a guilt free conscience and have peaceful dreams at night. Greed is the identified problem with these solutions, which is not a morally right solution to any problem.

Accepting responsibility when it is one's to be accepting, has its consequences, but the reward of living a life that one can be proud of is worth more. Facing the truth, even when it would be much easier to blame others, is very difficult. It is especially difficult if there are others involved that can and should be sharing some of the responsibility, but are not. There is a duty as an engineer to uphold the respect and honor of the profession and owning up when one is at fault would be fulfilling that duty. Plus it would give great pleasure to everyone in the profession

knowing that there are people that live their lives by choosing the correct action even when it is difficult.

It has been brought to my attention that taking this action would probably result in a sentence of manslaughter. I have looked extensively through webpages of articles about engineers receiving jail time for one reason or another. Most of the articles that I found, where an engineer went to jail was for some reason other than faulty design. I did find one article where there was a faulty code design, but the users – radiation physicists – were sentenced to four years in prison and are not allowed to practice in their profession for another four years (http://www.us.design-reuse.com/news/news9234.html).

Even if this is the case and they will be sentenced to prison, under all three methods for ethical analysis, I cannot determine how it would be acceptable for the engineers to act in such a manner. First, let's examine the ideas of utilitarianism, which uses the concept that morally right answers, actions and behaviors produce good consequences. The fact that the design was stamped and approved for construction indicates that they were at least looked at by the engineer. The consequences of stamping the drawings without doing the calculations did result in the loss of life and licensure. Under the idea of deontology, the major duty is to the safety of the public per the NSPE code of ethics. And finally with the concept of virtue, avoiding the act of deceit, honor and a good reputation will result in living a good life and thus those actions are not considered virtuous.

Another reason that the recalculations and thorough checks that were promised to be done may not have been done is, because the boss may have told the engineers that they will do no such thing. If this is the case then how is one supposed to act? By the theories of virtue and utilitarianism one has a responsibility to perform the tasks anyway. But by way of deontology, one has an obligation to follow his boss's orders, even though those orders may jeopardize lives. By not following through with the orders one would be putting one's life and family at risk if the loss of the job is the consequence of not doing what you are told. It could have also been that there were too many projects demanding the engineers' time, and the neglect on this project was overlooked and at the time may have even seem minimal and insignificant.

I feel that the way this should have been handled would have been to put the safety of the public first, even over that of the profit of the company. If my bosses told me that I had to cut cost/corners to keep the profit margin high, even after I explained that the safety of the public is in danger, I would quit and report them. Denying that the changes were submitted was probably done as a form of self-preservation for the engineers and the engineering firm. The engineers probably did this so that they would only run the risk of losing their license in a minimal number of states. Performing deeds in the best interest of the one making the decision does not meet the concept of utilitarianism or virtue; nor are there any laws or rules that would obligate one to make such decisions.