

Florida bridge collapse from a utilitarian perspective



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Throughout recent years, Engineering is becoming one of the most sought out career choices for many. It is a rigorous major with daunting work associated with it. With the rapid increase in technology in recent years, there is a high demand for Professional Engineers, to help create the next big thing or to help make life that much easier. Although, like renown superhero movies state, “ with great power comes great responsibilities.” Therefore, as a society, we need to take into consideration the inevitability of human error that should be predicted when given such great responsibilities as the ones that engineers take on when they begin projects. We are looking at the Florida International University pedestrian bridge collapse which killed six people from a Utilitarian perspective. Shortcuts were taken when making this bridge and it was specific to the aesthetic portion of its build. We can look at this disaster as a learning experience and recommend solutions that will help prevent issues like these in the future, including a final strengths test. We can look at the ethical dilemma of how not enough testing and detail went into checking the strengths of each beam and how it would hold up with the new design and find rules that will address the issue. First, the engineering firm that helped construct the Florida International University pedestrian bridge is known as the FIGG Bridge Engineers Inc. and designed the bridge with aesthetics in mind. This led to a change in materials which later lead to the failure of the bridge’s infrastructure and its collapse. Secondly, data testing new materials and strengths is especially important when new designs are being made, since public welfare is put in serious risks if they are not done properly. Thirdly, the change of standard infrastructure without proper testing is likely due to short and unethical timelines that are given to the design team and engineers; even though the mistake had been <https://assignbuster.com/florida-bridge-collapse-from-a-utilitarian-perspective/>

reported and documented before the bridge collapse there was a tight window in which the engineering team had to finish the project.

We are looking at the Florida Bridge collapse from a Utilitarianist view to clarify a proper solution when looking at the ethical dilemmas that took place when building the bridge in ordinance with the Florida Department of Transportation (FDOT). According to the Florida Department of Transportation, “ 3. 5. 4 ELEMENT INSPECTION: This section will have each element inspected for this inspection event and will include the element condition states and element inspection notes.” [1] Which states that prior to the opening of the bridge there should have been a minimum of two inspections of the bridge that had to take place before it was able to be open to the public. According to The Wall Street Journal, “ Two days before a new pedestrian bridge collapsed... one of the project engineers called a Florida transportation official to report cracks in the structure.” [2] From a Utilitarianism perspective the decision for maximizing happiness was not taken into consideration. Sure, the school probably benefited from having a good-looking bridge in a timely fashion, but with the cost of having it structurally unsafe. We have seen how the stakeholders in this specific bridge design were affected by it. Leading ultimately led to the least amount of overall happiness. As engineers, we serve as public servants and are required to maintain the public’s safety as our utmost responsibility. The Engineer who inspected the bridge and found cracks could have easily solved the issue with overall happiness in mind. The given information could have led to a realization, that lives of people and the reputation of stakeholders were at risk.

To begin, the engineering firm FIGG Bridge Engineers Inc. prioritized form over function, which led to a change in materials and the following of poor planning and testing of these new materials. These design changes were not in the interest of stakeholders. There were many red flags when the design was laid out that would have been obvious if the plans were tested and even looked over a few more times. According to independent engineers consulted by the Miami Herald, “ The support structures of the FIU bridge was an aesthetic choice meant to line them up with the steel pipes above that gave the impression of a cable-stayed bridge. Too much stress was placed on the junction between the No. 11 beam.”[3] This was one of the main faults that the structure had with its integrity and why it may have collapsed. The way in which the structure’s main support was designed was with aesthetics in mind over the actual safety of the bridge. There was a standard design that would have reduced the amount of stress that was placed on beam No. 11. The issue also had to do with the change of materials used by FIGG Engineers, they used steel pipes instead of the proposed and standard steel cables that the bridge was supposed to use. This again shouldn’t have been a problem if the proper testing was set into place that would have been able to make the bridge design functional as well as aesthetic. It was a mistake that tarnished their reputation along with putting stakeholders at risk. This violates the first canon of the engineering code of ethics which states that engineers should hold paramount the safety, health, and welfare of the public.

Secondly, data testing new materials and strengths is especially important when new designs are being made, since public welfare is put in serious risks

if they are not done properly. Miami Herald independent engineers state that “ Beck and Howell, who say they did their own simpler calculations to back-check the numbers used by FIGG, concluded the figures in the firm’s calculations significantly under-represent the forces.” [3] This was adding an overload of force on the steel rebar reinforcements that were added to the bridge. These were things that should have had multiple calculations and tests before they were implemented. They went against their professional obligations which meant that they believed that a project was not going to be successful. [4] They are not maximizing happiness but making sure that the project will be done in time with the bridge looking aesthetically pleasing. Utilitarianism, in this case, was seemingly veered towards a visual pleasing bridge that was pleasing to the eyes, but in retrospect, many people became severely injured or died due to the lack of overall happiness and safety of the people.

Thirdly, the change of standard infrastructure without proper testing is likely due to short and unethical timelines that are given to the design team and engineers; even though the mistake had been reported and documented before the bridge collapse there was a tight window in which the engineering team had to finish the project. According to Risk Management Society Publishing, Inc., “ The bridge was built using a technique called “ accelerated bridge construction” in which many of the components are pre-fabricated. [5] The new technique of building the bridge was to diminish the time that the bridge was going to be built in. There have also been multiple lawsuits that were filed against the company primarily based on the fact that they accelerated the construction process which leads to the lack of proper

testing and the failure of the bridge. The stakeholder valued the bridge at an estimated: \$14. 2 million dollars, it was also built to withstand the foreseeable hurricanes which occur in Florida. [5] The bridge was estimated to last a total of 100 years and it collapsed on the fifth day, which recalls a similar case study that occurred with the Ford Motor Company. Utilitarianism vs Cost-Benefit Analysis of the Ford Motor Company in juxtaposition with the Florida bridge collapse we can find similar issues and solutions. A quick rundown of Ford Motor Company case study was that they were developing a new car, named the Ford Pinto and it was experiencing some issues with having the engine of the car too close to the gas tank which was causing the car to explode. The engineers who inspected the issue weighed the pros and cons of the design and wanted to maximize happiness with its stakeholders and themselves. In contrast with the Florida bridge collapse, it makes the same mistake to base their decisions on a faulty infrastructure. In Ford's case, they released a car which would explode and possibly kill the individuals in and around the car. In the case of the Florida Bridge collapse, engineers were working around a short time frame to release a bridge that was not safe for the public or its stakeholders. In actual Utilitarianism, we look at the short- and long-term benefits of development. The FIGG engineers were making sure that the bridge was going to be aesthetic and innovative without making sure that it had the structural integrity in time. Some solutions that could prevent these things from occurring in the future would be to increase the testing and strengths of bridges in the future. The Florida Department of Transportation should require an additional testing of their bridges and transportation roads that include a final strength test to be performed after the structures are completed.

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