

Ethical Analysis

Ethics is a major factor in the design of the tram system. It is a requirement that the designers of the system follow what ought to be done, not just what should be done. There are multiple ethical factors that affect the design of the system, mainly political, social, and safety.

Some specifically social concerns needed to be taken into consideration while designing the tram system. The safety of the system, beyond the tram controller, is one of the most important factors. The cost of transportation and the noise created by the construction of the system are also important ethical factors that needed to be taken into consideration. We also considered the opportunities created by the construction of a tram system in a certain town or city in a real world setting.

The entire tram system must have the proper safety features. We considered the safety features that would go beyond our electrical engineering requirements. For instance, each tram car must have proper signage listing certain dangers or what to do in the event of an emergency. The reason why this is important is because the passengers have a right to know how their health might be effected if they ride the train improperly. The doors must have some type of mechanism that prevents them from closing on people while entering or exiting the tram as well as some sort of fail safe mode where the tram will not move if a door does not close. This is also important because it is unethical to harm passengers if it can be prevented beforehand.

Some other safety features include the construction of the proper sized platforms and road crossings if need be. If these safety features are disregarded, injuries could occur. It is unethical to overlook safety features such as the ones mentioned above because ultimately something will go wrong, people make mistakes and it is up to the engineer to take into consideration anything that could possibly happen to a passenger riding this tram system.

There could be some positive and negative ethical aspects to installing this tram system in a certain town or city. It could bring people to the area because it would be a cheaper form of transportation for them and could open up job opportunities. People would be needed to run the tram system and perform specific maintenance tasks. This is a good ethical decision because it positively affects the economy of the area. The increase in population to a certain area as well as the increase in transportation possibilities could benefit businesses.

A negative aspect would be the possible intrusion of the resident's land if the tram system were to be built and/ or the problem with the length of the construction and possible noise disturbances of that nature. This would be unethical because the residents in the area would probably not have a say in the construction or continuous operation of this system near or around their homes. This could therefore cause discontent among those residents.

Our tram design values the health, safety, and welfare of all our passengers along with the surrounding area of the system. Some design features to ensure this safety are a speed control system and an emergency break.

The speed control system provides a good balance rate for quickly transporting passengers from station to station without affecting the health of the passengers. A requirement (ER002) was created to say that the speed of the train will not have an acceleration speed that could cause sickness or dissatisfaction to the passenger. This is an important ethical constraint because if the passengers do not enjoy using the tram system, they will find other means of transportation. It is not ethical to purposely or even unknowingly cause discomfort to passengers but this will ultimately cause a loss of business. Speed control is also necessary for the safety of the surrounding area. If the tram is maintained by a controlled speed it is less likely to lose control and veer off the tracks. It is unethical to engineer a tram that travels too fast because of the potential disturbance and also, the slower and more controlled the tram is traveling the more likely it will be able to stop in a potential emergency. This causes the area around the tracks to be protected.

An emergency break will ensure security during an urgent situation such as a mechanical or electrical malfunction, bad weather, passenger emergency, or rail obstruction by a person, object, or another train. A requirement imposed by the ethical group (ER001) is that trams will not be allowed to crash. This requirement will ensure the safety and welfare of our passengers. This break will immediately stop the train so the situation at hand can be resolved promptly. The reason this is necessary is that it is unethical to cause harm to our passengers. The emergency break is necessary in case of a problem in a tram car that the conductor or tram personnel are not aware of. It gives the passengers peace of mind while riding knowing they can do something in an emergency.

It is crucial for engineers to design not based solely on what can be done, but also what ought to be done. A major form of ethics is politics. It is important for the tram system to be designed in a way that is correct politically with respect to ethical principles. There are three main ways to have the correct political ethical principles, two of these are environmental mainly being RoHS compliant and avoiding pollution, and the other deals with funding for the system.

Design engineers must make sure their product is RoHS compliant. RoHS is a standard which restricts the use of six hazardous materials while creating electronics and electrical equipment. The six materials are lead, mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls, and Polybrominated diphenyl ether. So that the tram system will be RoHS compliant, all ordered parts must be compliant as well. Also, any use of solder must be lead-free. It is important that the tram system be RoHS compliant so as to not damage the earth. It is unethical to cause harm to the earth because although plants and animals cannot always express their emotions, they still experience pain. It is a requirement that engineers protect the environment the same way they protect human lives.

Engineers will work to create a schedule for the tram system to reduce car pollution. There is evidence from the American Public Transit Association that each person riding a tram vs. driving a car for one year reduces hydrocarbon emission by nine pounds, nitrogen oxide emissions by five pounds, and carbon monoxide emissions by 62.5 pounds. The tram would produce nearly 99 percent less carbon monoxide and hydrocarbon emissions per mile than one automobile does. There is not evidence that people ride the tram instead of driving, because in

areas where a tram is built there is not always a decrease in traffic congestion. It is possible that building our tram system with an ideal schedule may reduce pollution (<http://www.stlouisfed.org/publications/br/2003/d/pages/2-article.html>). It is ethical for engineers to protect the environment. By building the tram system it is possible that the environment may be healthier because people may ride the tram system instead of driving cars. Building the tram system could be good politically and ethically because it may help the environment.

A final political ethical issue for building the tram system is its funding. One possible way to fund the system is to increase taxes. This would not be a positive political ethical solution. It will be important to have another way to fund the building of the tram system so as to not increase taxes. Tax increases are not always ethical. It is unethical to force people to pay more money unless society as a whole will benefit. Sometimes individuals may have to suffer slightly for the greater good of a whole society. This follows the basic principle of utilitarianism, that the end, the tram system that an entire society can enjoy, justify the means, a slight tax increase.

Works Cited

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