

Assignment 2

Complete the four simulations presented in Unit 3 and respond to the four questions below. Please reference the instructions in the Assignment 2 description and rubric in LEARN while completing this assignment.

DDT vs. Malaria

In this simulation, you were part of a committee consisting of doctors, chemical and environmental engineers, environmental scientists, and politicians. Your committee was evaluating a developmental aid package targeting larger urban communities in a particular Third World country. They were deciding whether or not to make it conditional on the country ceasing to use the insecticide DDT.

Professional engineers will find themselves in many situations where they are required to weigh environmental impact against economic concerns. You might find yourself on a committee like this or you might find yourself trying to decide which design to propose to your employer – one that costs more but impacts the environment less or vice versa.

You will have ethical obligations both to safeguard the environment AND to safeguard the economic interests of your employer or clients. In a later unit, you will learn that you can be found guilty of professional misconduct if you don't find a way to balance both.

Question 1 (2 marks)

- A) How has the completion of this simulation impacted your understanding of your professional and ethical responsibilities as a professional engineer? (1 mark)

As a professional engineer, the choices that we make regarding ethical dilemmas can cause significant impacts economically and environmentally. Either choices, to use DDT or not, will create significant impact to the human societies that will cause unimaginable consequences for the next decade if not dealt properly. Hence, any choices professional engineer needs to make need to be properly looked through and evaluated before making the final call as engineers are accountable for any decision that they've made.

- B) How might you personally struggle to balance competing obligations? It is expected that the simulation may raise more issues or questions than answers; just be specific about what issues or questions it raised for you. (1 mark)

I find it difficult to make a choice between the two options presented. If DDT is continuously applied in the environment, the spreading of malaria can be effectively controlled. However, the local environment can be significantly impacted as the birth rate of the birds can be drastically impacted. Also, since the toxins can be cumulated within the environment. When it enters the human body, it can also create permanent damages to the body causing irreversible illness.

If DDT is not applied, malaria would spread rampantly, and many lives would be lost. As a result, I believe there would be alternative solutions where DDT is not applied but malaria is eliminated by introducing other ways of eliminating mosquitoes, such as introducing foreign species that would cause little to no environmental impact after careful selection, etc.

Lori Dupont

In this simulation, suppose you were a senior engineer and manager at an engineering firm. One of the technicians reporting to you has come to you with a number of concerns: another engineer has made multiple requests for that technician to work on projects that she's overseeing, even when there are other technicians available who are more familiar with the technology being used.

Question 2 (2 marks)

Do you believe your choices in the simulation fulfilled your responsibility, as a senior engineer in the simulation, to at least make an attempt to intervene and, if necessary, escalate the situation? Why or why not? Justify your answer by referring to a specific clause or clauses of section 72(2) of Ontario Regulation 941 and explain how you would interpret that clause (or clauses) in this context?

I believe my choice in the simulation did not fulfill my responsibility as a senior engineer to prevent the tragedy to occur. After having received the information that Lori Dupont has been constantly stalked and harassed during work by Marc Daniel, immediate actions should be taken to prevent similar activities from occurring again. In fact, according to section 72 of Ontario Regulation 941, "failure to make reasonable provision for the safeguarding of life, health or property of a person who may be affected by the work for which the practitioner is responsible" is included in the definition of "professional misconduct."

The fact that the hospital did very little to intervene or prevent the situation from worsening and the only people who are attempting to alleviate the situation are Lori Dupont's co-workers is concerning, which directly caused the loss of life of Lori Dupont. The situation is absolutely preventable if properly provisions or actions were taken.

Automatic competition cut off

In this simulation, you were the vice-president for research at M&M, a company that makes cut-off systems for water boilers. The boilers in question provide hot water and steam for applications like heating and powering turbines, and they need cut-off systems so the boilers don't run dry (which can lead to an explosion). The standards for cut-off systems like the ones M&M makes are governed by the American Society of Mechanical Engineers (ASME) and prepared by associated committees made up of volunteers from industry and academia.

You are compensated by M&M, and as an unpaid member of the American Society of Mechanical Engineers, you are a member of a public standards organization (among other responsibilities).

The simulation puts you in a conflict of interest. According to [72\(2\)\(i\) of the Regulation of Professional Engineering](#), the specific conflict of interest in this simulation is as follows "Expressing opinions or making statements concerning matters within the practice of professional engineering of public interest where the opinions or statements are inspired or paid for by other interests."

Question 3 (2 marks)

- A) All options within the simulation ultimately result in you being penalized for a conflict of interest. Indicate the path or paths you took (just describe the key decisions you made that led to the revealed outcome; you do not need to describe the context of the simulation itself). How did you feel (positive or negative) when you realized the outcome?
- B) Describe what alternative action you could have taken (either options within the simulation or options that were not offered) that may have resulted in a better outcome. What do you think the better outcome would have been and why?

Path Taken:

After finding out that our competitor, Hydrolevel Corp has developed a competitive product, I decided to communicate with the members at the ASME committee to change the ASME standard to my company's favor in order to out compete Hydrolevel Corp in advertisement. We then took the chair of the ASME committee, T.R., to dinner and convinced him that immediate cut-off was implied, and hence changed the ASME standard without official communications with other members within the committee. When such biased change was discovered by the competitor company, I again used my position to abstain the vote in attempt to maintain the ASME standard to our company's favor. Even in the final drafting response to the competitor company, I've worded the sentences in a way that's beneficial to my company instead of taking the responsibility as now the chair of the ASME committee.

Alternative Action:

One of the reasonable actions that I can take is to drop the title as the member of the ASME committee. This way, I would not be put into a conflict of interest within the simulation since I'm now only working for the interests and benefits of my company M&M. This now means that we are given more pressure when it comes to competing with Hydrolevel Corp. A timed cutoff will not result in explosion, but that doesn't mean it won't result in other slow damages to the material over time. This would be less obvious using immediate cut-off technology, hence allowing our company to still gain an advantage if we were to advertise our product as

such. This way, we can still maintain competitiveness within the market while not having to receive the conflict of interest punishment.

Aircraft Brake Scandal

In this simulation, you were employed at the Gutereich Wheel and Brake Plant in Toronto, ON. Your company had been awarded a contract to supply the wheels and braking systems for the F-35GA, a fifth-generation United States Air Force combat aircraft designed by Lockheed Martin. The aircraft was expected to land on improvised, unimproved landing strips, a capability the current fleet of F-35 aircraft does not have.

Question 4: DEAL Reflection (9 marks)

Reflecting on your experience in the Aircraft Brake Scandal simulation, respond to the prompts below using the DEAL model of reflection. Your reflection should be between 400 and 600 words.

Describe: Describe your first experience in the simulation. What choices did you make and why? What was the outcome? How did you feel about that outcome? (Your choices and the outcome can be described briefly and in point form because your markers know the context; spend more time on the 'why' and how you felt.)

Examine: You might have noticed that the simulation presents many paths leading to the same outcome, but there is at least one that is different. Answer the following questions in your response:

- What seems to be the ethical dilemma this simulation is getting you to face?
- What are at least two factors that you had to weigh? (e.g., who might be benefited or harmed by different decisions – possibilities include yourself, the company, the public, your supervisor, etc.).
- Why was it so difficult to achieve a positive outcome?

Articulate Learning: Describe one key personal takeaway from this simulation experience. Consider the following in your response: What have you learned about yourself and about the ethical challenges/responsibilities you might face as a professional engineer? For example, maybe you learned that there are lines you will or won't cross or things you are or are not willing to sacrifice. Or maybe you did not realize the weight of professional responsibility that an engineer carries. **Be clear and detailed about how your experience and your examination of that experience led to this takeaway.**

INCLUDE YOUR ANSWER TO QUESTION 4 HERE:

Describe

In order to win the bid for the contract from Lockheed Martin, my company purposefully bid low to secure the contract, even though it means losing money on the design work. By bidding low, our company can gain a substantial advantage over other companies, making us way more likely to win the bid, which is what happened. The strategy to gain the money back is to supply replacement parts for F-35GA, this would result in a huge amount of profits for the company. This means that the quality of the products would not be high enough that it might not even pass the requirements set by Lockheed Martin.

I felt very disappointed that the company I'm working for decides to utilize this tactic to win over the contract rather than using the quality of the products, design and service to win the competition. Because very likely, the quality of the product will not pass the Lockheed Martin's requirement can hence the entire company will not gain the money back like they would expect.

Examine

One of the ethical dilemmas in this simulation is that the designed product needs to fulfill Lockheed Martin's standard but at the same time can be made to be replaceable frequently so that the company can profit from it. To make the product quite replaceable, this means the product quality might not fulfill the standard requirement and can put the lives of the passengers in danger. However, if the standard is fulfilled, then the component might not need to be that frequently replaceable and hence the company cannot profit from it.

The company needs to think about how the quality of the design can potentially pose risks on the general public. What if the lives of the general public were affected and this product turns out to be the cause of the issue, is the company able to recover from it financially due to potential lawsuits? Another factor to take into consideration is how would the company or my supervisor regain credibility after the product not passing the standard set by Lockheed Martin?

It would be challenging to achieve a positive outcome due to the previous unethical decision proposed by the company: to win the bid by bidding low and potentially cut corners in the design and manufacturing process to make the product replaceable. It would be difficult to find a balance again where both Lockheed Martin and my company is satisfied with the result of the outcome.

Articulate Learning

One of the biggest takeaways I've received from this simulation is that unethical decisions can cause chain reactions, meaning that one incorrect choice can cause a rippling effect and affect many people's lives including the public, the supervisor or even myself. Therefore, every single step in the engineering design process requires us to be cautious. We cannot let greed or other unethical factors affect the outcome of our decisions.

In my current co-op job, I'm an embedded software developer that's participating in the development of an automated ice blade sharpening machine. Throughout the study of these simulations, I've gained a deeper understanding as to how the engineering design process can cause great impact to the society. If any process in my sharpening machine went wrong that causes the malfunctioning of the machine, it can put people's lives in danger since sharp blade and grinding wheel is being constantly used on this machine. Hence it's crucial that I constantly remind myself of the ethical learnings from this unit.