THE ETHICAL DILEMMA REGARDING THE USE OF CONFLCIT MINERAILS IN COMPUTER PROCESSORS

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INTRODUCTION

In the field of engineering, the goal is to design and create excellent products in order to further transform the world into a more efficient place. Engineers see a system of parts working together and immediately try to find the best way to optimize the system. This line of thinking is pretty sound, but sometimes situations arise where the solution to a problem is not obvious and maybe not even possible. Not every circumstance is devoid of a moral or ethical dilemma.

Many of the decisions engineers have to make on a daily basis contain some kind of sensitive choice that must be made during the design or implementation of a product or service for their clients. Luckily, engineers have a long code of ethics that they are able to refer to when making difficult moral decisions. This does not always solve the discrepancy, however. Some choices that must be made still do not have a clear best outcome, even after the code of ethics has been review and applied to the given situation. In those instances, engineers have to rely on their best judgment to decide on what to do.

The Scenario

At a fictitious company named "Apdoxtech," we specialize and pride ourselves in producing the most current, up-to-date central processing units possible. We are constantly working hard to provide our clients with the best CPUs to use in their latest devices around the world. We have always strived to meet this goal and we have had great success for the entire twenty year life of Apdoxtech. However, recently one specific ethical dilemma has begun to plague to our efforts.

Our processors require the best components in order to perform at the level of efficiency that our clients have come to know and expect from Apdoxtech. In an effort to continue this tradition, we have made the transition over time to some of the the most sought after resources in the world. Specifically, the four main materials are tin, tungsten, tantalum, and gold, also known as "conflict minerals." These four resources cause an ethical dilemma due to the areas in which they are mined. Once they are found in "conflict zones," the minerals are sold and the money is used to perpetuate war in the area. Until we come up with a solution to this moral predicament, Apdoxtech will not be able to produce CPUs without backlash from "conflict-free mineral" advocates.

CONFLICT MINERALS

The use of conflict minerals in electronic devices has been a discussion point since the late 1990s, but has been given a surge of life recently due to the most infamous conflict zone, the Democratic Republic of the Congo. The eastern provinces of the Congo have been noted to be the target region. Cassiterite for tin, Wolframite for tungsten, coltan for tantalum, and gold are extracted in these areas by armies and rebel groups and sold for money to fund the war over these precious minerals. In modern day CPU production, these resources are vital, but this dilemma may result in the use of alternate materials [1].

Each one of these materials are used in the production of a processor. Tin is often used to connect the processing chip to the package that carries it and then connect the package to the electronic device's motherboard. Tungsten and tantalum make up the wiring that connect the transistors together and the materials also act as a wall to preserve the integrity of the transistors. Gold is a very conductive substance, so it is used in wires and thin films in order to establish and maintain a solid connection between the processors internal components [2].

CODE OF ETHICS FOR ENGINEERS

All engineers must make choices based on a strict code of ethics decided on by the National Society of Professional Engineers. The NSPE sets the list of guidelines to ensure that the profession of engineering continues to be an important and learned position in society. The codes are put in place with honestly, impartiality, fairness, and equity in mind. They are majorly present to provide protection of public health, safety and welfare [3].

These types of rules and regulations that an engineer must follow are involved in the professional's job every day. Each decision that is made must adhere to the code of ethics. However, in some instances the code m However, in some instances the code may not provide a clear solution. As previously stated, these trouble spots are when the engineer needs to make a "best choice" decision.

SPECIFIC CASE STUDIES

There are many case studies available that illustrate the process by which engineers have to go through in order to make these difficult decisions. Most of these studies result in some sort of outcome that is not completely devoid of ethical

malpractice, but if certain situations this is just going to have to be the case. Not all of these studies have to be exactly the same in topic to apply either. Because the code of ethics is applied to engineers in all types of disciplines, one case study can potentially be similar to another even in the two differ entirely in discipline area.

Delay in Addressing Fire Code Violations

In a case study done by the NSPE Board of Ethical Review, a fire protection engineer was hired to inspect an old apartment building that may need updated fire protection equipment. After the fire alarm test, it was understood that the alarm could not be heard be all of the residents which was a violation of the local fire code in the area. The alarm had not been replaced since 1978, so the engineer advised his client to upgrade the alarm. Later, the engineer is told by the client that the client is unable to fix the alarm due to insufficient funds, but that he would replace it when funds are made available [4].

The question in the study is, "What are the engineer's obligations under the circumstances?" In section II.1 of the NSPE Code of Ethics, it states, "Engineers shall hold paramount the safety, health, and welfare of the public [5]." Now, in this instance, according to section II.1, the engineer should have acted differently in his decision making process. If he really had the residents who lived in the apartment building in mind, then he should have made the owner update the fire alarm system immediately in order to prevent any possibly disaster in the time prior to the owner replacing it. This is just one reason, however. Some engineers may have seen a different way to look at the situation with a client like this one.

In any outcome, this specific case study loosely relates to the dilemma facing Apdoxtech. In the company's case, the consuming public is not affected, but the producing public is affected. The war that runs the extraction and trafficking of the conflict minerals hurts many in the region. While these acts are not directly caused by Apdoxtech, they must still be conscientious and find a way to stop the violence over the minerals in order to follow the code of ethics.

10 Years of Impact in the Electronics Supply Chain

The Business for Social Responsibility organization conducted a case study that began in 2004 in an attempt to explore the rapid growth of the information and communications technology industry. The ICT found thought that it could become more powerful if different players from across the value chain came together. The ICT wanted to implement the new Electronics Industry Code of Conduct. After its launch in 2008, it became known as the Electronic Industry Citizenship Coalition. BSR helped to establish the EICC and did everything they could to ensure that is grew big enough to represent large companies [6].

One of the challenges that BSR faced was finding a way to overcome the initial phase of a young organization trying to establish itself and grow into something bigger. This study had more to do with reviewing the results of the outcome and it did not necessarily focus on any real dilemmas. However, it did have a few big impacts on the topic of conflict minerals.

After the formation and growth of the EICC, issues like the conflict minerals dilemma and many others became easier and more efficient to find solutions for. With this now in place, many more issues could pass through and be given a worthy outcome. Overall, the EICC relates well to the NSPE.

Pinocchio's Nose

In this case study, a student attending a prestigious university makes up a story to get out of handing in a paper on time. He knows that the professor will believe him, so the student says that he and his twin brother were in a bad car accident over the weekend and he could not hand in the assignment because he had been in the hospital with his brother. Later in the year, the student finds himself in the same plight and is faced with the same decision [7].

In this instance, the student makes the mistake of lying to his professor, which only causes more problems than it solves. In section III.1 of the NSPE Code of Ethics, it states, "Engineers shall be guided in all their relations by the highest standards of honesty and integrity [8]." Obviously, the student did not act with honesty and integrity in this situation. Hopefully the second time he was caught in that position, he thought better and did the right thing.

Now, this applies to the Apdoxtech instance because if the engineers are going to work with honesty and integrity, then they need to be truthful about the materials they are using in their processors and where those materials come from. Then, after they admit where the resources are from, they need to have the integrity to say that they do not want to buy minerals from areas of the world that perpetuate war and result in over 5.4 million deaths [9].

FINAL DECISION AND SOLUTION

So, we at Apdoxtech have a big decision to make. Either we stay with the conflict minerals and produce great CPUs like we have been doing with backlash and guilt from "conflict-free mineral" advocates, or we go "conflict-free mineral" ourselves and find other materials to use in our processors. I think the right choice is pretty obvious. We need to stop funding the war in the conflict zones, specifically in the Congo. It goes against many of the engineering codes of ethics in one way or another and it cannot continue to go on. A stop must be put to our use of these conflict minerals in our processors.

There are two solutions that I can see. The first would be to not change the internal components of the processor, still using the minerals, but we work hard to create a conflict-free

supply chain from the Congo. This way we can still use the same minerals and keep improving, but the warlords are taken out of power and the funding goes towards positive things in the once conflict zones.

The second option would be to cut ties with the supply chain from the Congo all together, and focus on reinventing the processor from the inside out. This could be a bit more difficult, but there would be no doubts about the corruption in the Congo. The amount of effort that it would take to find replacements for the four major minerals would be extremely difficult, but if that is what it would take then maybe it should be done.

CONCLUSION

In short, it is an engineer's duty to design and create products on a daily basis in an attempt to change the world for the better. Whatever technical problems they run into along the way, they are able to examine and fix. They do their best to make the system that they are working on as efficient as possible. Not every difficulty is a technical question, however. Sometimes, the engineer arrives at a sensitive moral issue that requires more careful thought.

The field of engineering is a profession in which a great deal of ethical reasoning must take place on a regular basis. Nothing is ever straightforward when it comes to a decision with moral dilemma within it. If what an engineer is designing poses a moral question, then it is the engineer's responsibility to understand his options, refer to the code of ethics, and make the best decision possible. If the professional does not follow this process, then they need to rethink their approach to their occupation.

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