Missile Explosion Ethics Presentation

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SUMMARY OF CASE

It was a cold and dry day in West Germany when many servicemen were killed due to multiple ethics code violations. These servicemen were tasked with removing a solid-state fueled missile from its packing case but continuously failed. After multiple attempts, they succeeded. After the missile was removed, they moved it close to a grounded metal antenna. They were successful, but it came at a big cost...their lives.

Case Facts

- The missile was continuously lifted and placed back into its' case, and this caused friction
- The friction caused the tribo-electric charging of the grounded cradle and the surface of the motor casing, which was not grounded.
- Because of this, the motor casing was turned into a very good insulator.

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Case Facts

- The grounded cradle combined with the very good insulator created the plates of a capacitor.
- As the missile was lifted, the separation of the "plates" increased weakening the capacitor.
- The total charge on the plates stayed the same, so that the voltage on the capacitor increased.
- The voltage on the capacitor exceeded the breakdown voltage of the air and a spark was drawn from the casing to the grounded metal antenna.

Case Facts

- Years prior to this incident, an engineer concluded that the missile could be ignited and informed his supervisor.
- The supervisor said that electrical breakdown of the air was unlikely and if it did occur, it shouldn't cause any problems.
- The engineer and supervisor went to the military procurement officer about the issue where he agreed with them, but nothing was done about it.

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Ethics and Case analysis

Issues Presented

- Military officer negligence(1)
- Avoiding the issue was a conflict of interest (2)
- Instead of continuing launch, engineer and supervisor should have done more testing and research into the potential issue (5)

Relevant sections from IEEE code

- 1: Make decisions consistent with safety, health, and welfare of the public; disclose promptly factors that might endanger the public
- 2: avoid real or perceived conflicts of interest whenever possible, and disclose them to affected parties when they do exist
- 5: to improve the understanding of technology; its appropriate application, and potential consequences.

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Ethics and Case analysis

Issues Presented

- Didn’t properly take criticism about the rocket design (7)
- Injuries were a possibility (9)
- Engineer and Supervisor didn’t follow ethics code (10)

Relevant sections from IEEE code

- 7: Offer honest criticism of technical work; acknowledge and correct errors
- 9: Avoid injuring others and property by false action
- 10: Assist colleagues and co-workers in their professional development and support them in following code of ethics

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Summary of Ethical Question

1. What professional and ethical responsibilities do you think the engineer and his supervisor had?

Answer: The ethical responsibilities that the engineer and supervisor had were :

- To accept responsibility in making decisions consistent with the safety, health, and welfare of the public, which also includes military personnel. Their decision to leave the design as was given their knowledge of a possible risk scenario was negligent.
- They were also responsible to disclose promptly factors that might endanger the public. The engineer and supervisor abided by this responsibility by sharing the possible missile scenario.
- The engineer and supervisor were also expected to improve their understanding of the technology they were developing, its appropriate application, and potential consequences. By not conducting tests, simulations, and further research on this possible missile scenario, they broke the IEEE Code of Ethics.
- The engineer and supervisor did not hold themselves accountable to their findings. They both allowed that the military officer dismiss the problem. Thus, they did not support each other in following the IEEE code of ethics.

2. Does it make a difference to your views that no accident of this type had been recorded at the time they thought of the problem? Why?

Answer: We believe it does not make a difference that there were no recorded similar accidents when they developed the missile. As mentioned in the third bullet point of the previous answer, the engineer and supervisor are expected to improve their understanding of the technology.

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Summary of Ethical Question

3. What do you think of the procurement officer's views about the deployment delay? What about his views on safety and military personnel? What alternative views would you suggest?

Answer: The procurement officer's views are dangerous and detrimental. The design changes could have saved the lives of the personnel during the accident. Moreover, they could have built fail-safe systems or handle the missile in a different manner. His views on the safety of his personnel also break the IEEE Code of ethics of making decisions for the safety, health, and welfare of the public. Alternatively, we believe that the best approach to the problem was to further test and simulate the system, especially with the dangerous scenario that had a possibility of happening.

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QUESTIONS?

REFERENCES

- “IEEE code of Ethics,” *IEEE*. [Online]. Available: https://www.ieee.org/about/corporate/governance/p7-8.html. [Accessed: 26-Feb-2022].

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