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CMSI 401

Assignment 1

Due: October 2nd, 2019

On May 11th, 1996 a ValuJet airplane flight 592 crashed in the Everglades Holiday Park on its way from Miami to Atlanta. When the aircraft crashed, it was tilted to the right and pointed nearly straight down as it shattered hitting the swamp. A long and thorough investigation was conducted to uncover the cause of this horrible accident. This particular crash seemed to be a system accident, also known as a normal accident. This means it was a fault of the airline, the contractors who serve it, and the government entities who are expected to oversee it.

Immediately after the plane took off, only six minutes outside of Miami, the pilot called in saying they needed an immediate return as there was smoke in the cockpit and cabin. The radar controller gave them permission to turn around however, they did not. Eventually, the plane took a nosedive and there was no radio response. With further investigation and uncovered debris, they concluded that the crash was the airlines fault. The explosion had come from the airplanes forward cargo hold which did not have fire detection or extinguishing systems. They uncovered that this space was filled with five cardboard boxes of old oxygen generators and tires. SabreTech, an outside contractor was hired to complete maintenance for ValuJet, and they in turn also hired other outside contract mechanics on an as-needed basis. Employees who worked with the oxygen generators did not place safety caps over the firing pins even though it was regulation to do so. They were forgotten and ignored as SabreTech's supervising inspectors signed off on the work that had been done, regardless of the missing pieces.

These oxygen generators needed to be sent back to ValuJet in Atlanta, so a shipping clerk boxed them up and labeled them as “aircraft parts”. He then asked a receiving clerk to make out a shipping ticket which wrote “Oxy Canisters empty” as he listed the tires which were in the box as well. A SabreTech driver delivered them across the airport to flight 592 where the ramp agent accepted them even though federal regulations forbade him to do so. The flights pilot, Richard Hazen, also took the cargo although he knew he shouldn’t have. Shortly after takeoff, these oxygen generators must have ignited and as a result, caused the plane to go down.

Overall, there are many things that went wrong which lead to this system failure. ValuJet is a cheap airline and this story can demonstrate the consequences of cost cutting and complacency. The airline underpaid their workers and had them working long, strenuous hours. The article stated that “nearly 600 people logged time working on the three ValuJet airplanes in SabreTech's Miami hangar, and out of these, seventy-two logged 910 hours over several weeks for replacing oxygen generators.” This overworking can lead to carelessness which was demonstrated with the safety caps ignored and signed off, even though this was not the standard. This problem can exist in a software environment as well as developers tend to work long hours. It is important not to sacrifice quality or lean toward brute force methods if the solution is tedious or expensive. Doing so could result in bugs or future errors.

A huge issue pointed out in the article was that there was no fire detection or extinguishers in the cargo area where the canisters had been placed. This can be compared to leaving out tests in a software program to detect issues in code. Failing to include these tests can lead to future problems similar to the fire. An issue can arise, and if there are no tests to catch this, it can go unnoticed, leading to a potential “crash” in the system.

Documentation also seemed to be a clear issue for ValuJet and SabreTech. For starters, ValuJet seemed to fail in supplying clear guidelines for what to do with expired oxygen talks. As a result, many tanks were labeled as having different problems, and it was unclear which should be disposed of. This confusion was another reason the employees may have ignored the step of installing safety caps. The then illegal signing off on the procedures that had been done is an example of poor certification. They were checking off on work which had not been done properly or safely. Although this story and documentation is centered around hardware; similar steps need to be taken in a software environment. Documentation is important in software development and engineering as each progression should be logged. Decision logs are a great strategy as they keep track of what has been done and any decisions or changes that have been made to a program. A supervisor can review this document and make sure everything has been done properly before a launch. Project proposal and Spec documents are also extremely imperative as they deliver the guidelines or rules for a project and how it should get done. These provide a chance to divide up tasks to assign to employees.

This concept from the article that outside workers made many of the mistakes, is also an example of how companies are still responsible for actions that are performed by unknown sources. Although some of these employees at the hangar may have been hired by SabreTech and not ValuJet, it is still their responsibility to create clear communication and documentation to make sure that these people are getting jobs done. The same can be said for any software company or software environment. While you may not be the one doing all the work on a larger project, it is still each person's responsibility to make sure that all tasks are completed correctly. It is especially important that the Program Manager overseeing a software project makes sure that each team member is following directions and completing tasks properly. A company can

set as many standards and procedures as they want, but they are worth nothing if no one is following them, and more specifically, if no one is overseeing that they are being followed properly.

Similar to the problem of following rules and documentation, it seemed as though each individual involved in the loading of the oxygen canisters knew that what they were doing was potentially unsafe. However, they went along because they seemed to think that the person before them would have said something if it was dangerous. This is a horrible way to carry out any project whether hardware or software. I have learned the importance of constantly asking clarification questions throughout projects and assignments. This ensures that each person involved is on the same page and helps the tasks get done smoothly and accurately.

Although hardware and systems focused, this sad story of the ValuJet plane crash has many similarities to software engineering tasks and potential problems. In both cases, cutting cost can lead to consequences. It is important to make sure a potential threat is tested for in hardware, and software. You never know when something may go wrong, so testers are always necessary. Clear documentation and communication skills are crucial to making sure all persons involved are completing tasks correctly. Lastly, asking clarifying questions is fundamental in making sure any project whether hardware or software is carried out smoothly.

Work Cited

Langewiesche, William. “The Lessons of ValuJet 592.” The Atlantic, Atlantic Media Company, 1 Mar. 1998, https://www.theatlantic.com/magazine/archive/1998/03/the-lessons-of-valujet-592/306534/.