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The Lessons of ValuJet 592

In May 1996, a ValuJet airplane crashed into the Everglades Holiday Park without any visual damages to the plane itself. There was no smoke, fire, and no debris before the plane crashed, but it was angled to the right with its nose down toward the ground, losing control. It was ruled as a "system accident" and thus, few regulations came from it. The plane was piloted by Captain Candalyn Kubeck and copilot Richard Hazen who were extremely underpaid in comparison to pilots of other airlines even though their qualifications were the same. Just after takeoff, the captain radioed into the Miami airport that they needed emergency assistance, for the cabin and cockpit began to fill up with smoke. The pilot requested air traffic control for the closest airport, but this request was not received. When attempting to return to the airport it came from to land, the plane began to enter a steep dive and the pilots became unresponsive. Suddenly, the plane regained balance and shot back up from its steep dive either due to autopilot kicking in or a pilot regaining control momentarily. Air traffic control soon realized the plane would be unable to make it to the Miami airport and suggested that they reroute to Opa-Locka Airport. Contact was then lost, the plane's last location was logged, and rescue procedures were kicked off.

Soon after the crash, the National Transportation Safety Board began to investigate the crash. The investigation showed that it was not an electrical fire, but that the plane had been loaded with old hazardous chemical oxygen generators that caused the fire. These generators were not a passenger's item, but cargo that ValuJet was transporting for their own use. Oxygen generators are a safety device used to produce oxygen if the cabin becomes depressurized and they produce immense heat when this reaction takes place. They were being transported to equip old planes that ValuJet had purchased and the work was being done by a contracted company, SabreTech, who employed many temporary and overworked employees. They failed to take the necessary precautions when packaging the generators to be transported and this was the cause of the accident.

This accident is one that could have been prevented in many different ways leading up to it. Firstly, SabreTech's failure to follow the safety guidelines provided by ValuJet allowed the oxygen canisters to be packaged unsafely. Secondly, the warnings generated during flight did not provide the pilots with the necessary information to mitigate the damage. Thirdly, the lack of regulations in place and their poor enforcement by the FAA allowed ValuJet to ignore safety standards and violate many codes for years, building to the disaster itself. Lastly, the airline and FAA both handled the after-effects of the disaster poorly by not admitting fault and ensuring that the airline is safe for consumers even though no changes had been made since the accident. This made the public angry and untrusting of the airline and the regulations in place which ultimately led to the company's downfall.

Many of these missteps give us guidance for how to better design and enforce guidelines when it comes to Software Engineering. Ensuring physical safety of passengers on planes relates

to the security and privacy concerns when building software products, since proper regulations must be in place to protect customers in both situations. Multiple times in the past few years, creators of widely used technology products have failed to protect user information which has led to distrust of such platforms. When customers put trust in a company, whether that be to protect their lives or their sensitive information, it is up to the system to act accordingly. Creators of social media, banking, and other technological platforms have the responsibility of only gathering necessary information and taking precautions to ensure that it does not fall into the wrong hands.

A recent example of this failure in technology is Facebook enabling Cambridge Analytica to gather private user information through surveying and using it for political gain. Not only was the information of users who opted into the survey subject to exposure, but also the information of all their friends. This incident is not only an example of a failure to protect users, but also proves that doing so has repercussions beyond information security. Cambridge Analytica used the collected data to target ads in support of the United Kingdom's Brexit legislation as well as Donald Trump's political campaign. By doing so, they threatened democracy in both regions. Even though the way in which the information collected was deemed illegal, if proper regulations were in place to prevent such an oversight, no sensitive information would have been exposed.

Much like the ValuJet accident, nothing was done until it was too late and lives had already been affected. For the safety of consumers, industry standards and regulations must be in place to protect personal information. Individual corporations cannot be entrusted to act morally on their own, for this leads to misuse of consumer trust. When a company stands to gain monetarily from divulging data, they are extremely likely to do so themselves or overlook a third party who is doing so. Strong repercussions must exist for corporations who ignore information security and preventative measures must always be enforced.

In addition to the regulations, or lack thereof, that led to the ValuJet disaster, the incidents that unfolded in the cockpit of the plane could have been prevented as well. During the flight, the pilot and copilot received undetailed warnings that there was an electrical problem which actually ended up being a fire in the storage hold. Had proper warnings been provided, the situation could have been dealt with very differently. In software development, providing proper failure messages is crucial for easy use of products as well as problem diagnosis. This is something every software engineer must learn and act on when building products since we have a responsibility to our end users to keep them safe. At every stage of the development process, engineers must think about their users and how design decisions affect them.

The ValuJet disaster and many others like it warn us against cutting corners and overlooking regulations to save money. At the end of the day, companies design for consumers and the better corporations can instill trust in them, the better off everyone will be.