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4 October 2020

Crash and Learn

"The Lessons of ValuJet 592" by William Langewiesche discusses the crash of ValuJet Flight 592, which took place in May of 1996. Langewiesche, a former professional pilot and now American journalist, explores the cause of this tragedy and its monumental effects on the airline industry.

ValuJet Flight 592 crashed into a swamp in Florida's Everglades Holiday Park 6 minutes out of its departure from Miami- all passengers, flight attendants, and pilots died on the impact of the crash. Langewiesche illustrates the event by recounting the 911 call placed by a man named Walton Little- also a pilot. Respectfully discussing this tragedy, Langewiesche poses the question: Why did this happen?

The plane went down because of a fire that started in the cargo compartment.

However, Langewiesche argues otherwise. He explains that there are three types of airplane accidents: procedural, engineered, and system accidents. Procedural

accidents are those that, "...result from single obvious mistakes..." and that can be, "...understood in simple terms, and that have simple resolutions" (Langewiesche). Engineered accidents "defy understanding" (Langewiesche) but have a tangible solution. These are often the result of a material or design failure, hence the term 'engineered'. The third type of airplane accident, which according to Langewiesche explains the accident of ValuJet Flight 592, is a system accident. These lie beyond conventional solutions. Charles Perrow, a Yale sociologist, calls these types of accidents "science's illegitimate children" (Langewiesche)- he explains that these accidents are a result of confusion within the organizations that manage these dangerous technologies. In the case of ValuJet Flight 592, this would involve ValuJet, their contractors, and governing entities. The reading explores how this accident has altered the airline industry as it has led to reorganization within the groups involved and to the establishment and enforcement of rules and regulations aiming to improve airline safety.

While there is an abundance to learn from ValuJet Flight 592, I will be discussing two lessons that I took away from this article. The story of ValuJet Flight 592 demonstrates the importance of good leadership and management, and also the importance of due diligence. Allow me to narrow my focus to observing these lessons as they can be applied in the field of software engineering.

Let us begin by considering Walton Little, the pilot who placed the 911 call regarding the crash. In a time of crisis, Little maintained levelheadedness and used his knowledge of planes to inform the call operator about what happened. His coherence allowed emergency personnel to efficiently locate and prepare for the crash site. In the software industry, companies constantly deal with risks and crises. While it might not be a plane crash, situations that require mitigation can be as small as an unachievable deadline or issues among team members, to as big as data breaches or data spills. It is vital for leaders to maintain clarity, especially when a circumstance is overwhelming or stressful. Walton Little exemplifies this quality extraordinarily.

We can turn to David Hinson, the FAA administrator in 1996, as a good example of what not to do as a leader. One of Hinson's biggest mistakes was being inconsiderate of his audience. He did not assess the responsibilities of his position in the situation and dismissed the tragic loss of 110 people in the community. His insensitivity to the crash was motivated by his insistence on being right and making money, which cost him and the FAA the public's trust, and eventually cost him his job. In the context of the software industry, one of the most important things to do as a software developer is to examine your products and services from the perspective of the user. If you do not

have your user's trust and confidence, it does not matter what you believe of the product.

Let us now examine why ValuJet Flight 592 crashed. We can learn from the series of five errors that took place leading up to the incident. It began with the necessity to replace the oxygen canisters in the plane. The first mistake was marking the irreparable, old oxygen canisters with a green sticker, incorrectly indicating that they were repairable. Langewiesche explains that if the mechanics in charge of the canister removal took the time to read the manual, they would have recognized that these canisters were 'unexpended and unserviceable' and would have taken them to a safe space to be initiated. Instead, the generators were stored in boxes. Mistake number two was the supervisors of the operation failing to provide the safety caps to ensure safe storage of the generators, even after mechanics expressed concern. This mistake is an example of what Langewiesche describes as, "...a relaxation of technical standards..." (Langewiesche). According to some mechanics, their concerns regarding the lack of safety caps were not heard, and, "[t]he operation had grown used to taking shortcuts" (Langewiesche). The third error was the mechanics of SabreTech failing to take the appropriate measures to ensure proper storage of the canisters. After discovering that the generators had oxygen in them, no one considered that the boxes of canisters might be shipped, and they proceeded to deliver the boxes to the

shipping area where ValuJet's property was located (an arrangement which in itself is a recipe for disaster). The fourth mistake was when the shipping clerk found the unmarked boxes and decided to ship the boxes to Atlanta on ValuJet Flight 592 in efforts to 'tidy up'. Having known that they were oxygen canisters, but not having understood the difference between storage tanks and generators, the storage clerk was under the impression that it was safe to ship. He also interpreted the green stickers placed on the generators by the mechanics to mean 'unserviceable' (which ironically, they were), but took that to mean that they were empty, therefore not hazardous. The fifth mistake was when the ramp agent, trained to identify unmarked hazardous material, did not pay close enough attention to the cargo and signed off on the shipment load.

We can observe the 'confusion within organizations' that Perrow describes clearly. There was an overall lack of attention to detail and of understanding the importance of the safety measures, the science behind the hazardous material, and even the color-coded labels. The mechanics removing the canisters were heedless of the provided manual. The supervisors disregarded the mechanics who voiced their concerns for safety. The mechanics in charge of storing and delivering the canisters neglected to use proper documentation that the canisters were hazardous, and they did not consider the possibility of the canisters being shipped. The shipping clerk

fundamentally misunderstood the color code of the stickers and the difference between tanks and generators. As the daily routine grew mundane, employees paid less attention to the details of their work. In the moment, those details may have appeared irrelevant, but in combination were paramount to the safety of Flight 592.

This article resonated with me and my experience as a cybersecurity intern at Raytheon this past summer. One of my responsibilities was to research and develop trainings for a new process called Media Sanitization and Release. In my research, I learned why each step and form exists- to ensure due diligence. Every process is checked and rechecked by another person, and only when all persons involved in the process have physically signed off on each other's work is when the release of the media can move forward.

In the software industry, regardless of our role as a software developer or CEO, we deal with a lot of risk, and we must ensure we do our due diligence. The lessons learned from ValuJet Flight 592 are important takeaways that can guide leadership and development in the software industry today.