

Analytical Report on Ethiopian Airlines Boeing 737 Max Crash 2019

Introduction

As more than 45000 daily flights are handled by the FAA [1], aviation safety issues become more important. Thus, every plane accident will be investigated deeply in order to prevent the same tragedy from again. However, not all accidents are preventable, and hence our job is to analyze the case and minimize the number of catastrophes. This is illustrated in the exceptional tragedy that happened in 2019, a plane crashed near the town of Bishoftu, Ethiopia, causing 157 deaths [2]. This report will investigate the causes of the accident, which are the Automation system in the plane, and the lacking a backup plan and training. Accompany by what ethical codes did the accident violate and lead to the crash.

Causes and Ethical Issue

Failure of Maneuvering Characteristics Augmentation System (MCAS)

First and foremost, the failure of the maneuvering characteristics augmentation system (MCAS) is the immediate cause of the crash. MCAS is a flight system developed by Boeing to prevent the nose from moving higher than the angle of attack. There are two sensors to sense whether the angle of the nose is safe or not. When the nose moves too high, the system can provide a downward force to the plane in order to counter the upward force of the plane [3]. As mentioned above, the system required two sensors, it is the key to the accident. After the plane take off, the sensors generated a misleading signal to the system and hence the plane starts moving downward and leading to the crash [4]. Therefore, the error signal delivered by MCAS was the immediate factor leads to the crash.

The most important ethical issue is the manufacturers (Boeing) did not abolish MCAS. A similar accident happened 5 months before the accident. The plane also implemented MCAS. But Boeing didn't remove it from the other plane. According to the Rule of Conduct from HKIE (3.4, 4.1) [5], it mentioned that the advice from the engineers should be concerned if they are overruled by non-technique authority, and they should seek protection for the wealth of the public. It shows that the manufacturers violated the rules and failed to provide a safe environment to the public. To avoid the same accident happening again, the manufacturer may collaborate with other manufacturers and develop a new model. Moreover, before implementing the system into the plane, the system should be checked carefully without any mistakes. If MCAS had been removed, the second crash would have been prevented.

No Backup Plan

Moreover, there is no alternative system that can replace MCAS that was prepared while it was not completed. There was a similar accident 5 months before the accident, and the failure of MCAS was considered one of the immediate causes. However, the system was not removed from the plane and made improvements. The same system was still implemented without any replacement, and it leads to the crash finally.

The priority of aerospace engineers is to ensure the safety of the public as each plane contains hundreds of lives. However, they failed to follow the rules of conduct. According to HKIE (2.3, 3.5) [5], engineers should help trainees in their professional development, and they should advise their employer about the consequence of certain development within their field. It shows that it is their responsibility to inform the manufacturer and the pilots about the potential dangers of MCAS and removed it from the plane until it was fully fixed. Moreover, they can provide some training for the pilot and fully explain everything about MCAS. It is important for the pilot to understand all functions of a system inside the plane so that they can give respond immediately when an error occurred. If the pilot fully understand the system, and it was well-developed, the crash would have been prevented.

Lacking Safety Drilling and Experience

Last but not least, one of the causes is the pilots do not have enough experience in B737-8 MAX. According to a report, the flight experience of the first officer on B737-8 MAX was 56 hours only. [6] However, ATP Flight School stated that it takes 250 hours of flight experience to get a Commercial pilot Certificate. [7] It shows that the pilot may be familiar to be a pilot, but he was not familiar with the specific model of the plane. So that he may not be able to respond quickly right after the error of MCAS occurred.

The ethical issue of this factor is that pilots are supposed to be responsible to the crew on the plane and the public. But they failed to ensure their safety, and this violated the Rule of Conduct from HKIE (4.1). There are some alternative solutions that can be implemented in the future to lower the chance of the happening of tragedy. For an instant, more Precise flight simulation and training can be implemented for pilots. Such as using a high-end computer to calculate the wind speed, air resistance, and visibility of some specific route. With this simulator, pilots can get familiar with some models without risking the public's life.

Conclusion

To conclude, although there are different factors that lead to the accident, such as lacking experience and backup solutions, the most significant factor is the failure of MCAS because it leads to the accident directly. It is hoped that the system will only be adopted only if the system was finalized.

(908 words)

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