



Checking the data of Airbus plane crash in flight 447

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Abstract: The function of a machine or a device without any error is a key factor to approve the safety of that. The testing process includes many steps for any new manufactured airplane. By checking every single part, we make sure that the airplane functions normally and its ready to be used by any airline around the world. However, it is not possible to predict and prevent all possible problems so sometimes airplanes crash which leads onboard people to danger. It is the reason that we check procedure of any crash to solve the mistakes and reduce any error including abnormal procedure or human error and so on, as a result, in this article we will take a look at what had happened to air France flight 447 and why this airplane crashed.

INTRODUCTION

The Airbus A330, a wide-body aircraft designed and produced by Airbus company, did its first flight on the second November of 1992. Some of its difference compared to a340, is having two main landing gear legs instead of three or lower weights and there are many airlines that are using this type of aircraft. However, almost any type of aircraft in the world, has experienced bad accidents once and which a330 experienced that on during France flight 447. As a result, here in this article we are going to check the exact details of aircraft performance during that flight and find out whether the system error was the crash reason or human error.

THE PRIMARY INFORMATION ABOUT ACCIDENT

This crashed involving a 4-year-old Airbus A330-203, with manufacturer serial number (MSN) 660, with register number of F-GZCP, occurred on first of June 2009. Its departure time was from Rio de Janeiro–Galeão International Airport on 31 May 2009 at 22:29 UTC, and it was scheduled to arrive at Paris-Charles de Gaulle Airport on 09:03 UTC but unfortunately the last voice contact was just around 3 hours after departure which was around 01:35 UTC. Actually, the aircraft crashed with 216 passengers and 12 crew on first of June, 2009 in Atlantic Ocean.



Figure 1. Flight AF447 crash site (N2.98 W30.59)

Anyway, any single case should be analyzed in order to prevent more crashes with the same cause so in the following sections we will check any available information to find the real reason for the crash of this airplane.

What had happened during flight?

from takeoff everything seems to be fine but around 2:00 UTC, plane entered a thunderstorm where failures show themselves. Three to two minutes before 02:09 UTC, in order to penetrate turbulence, airplane has decreased its speed from Mach 0.82 to 0.8, which was the recommended. At 02:10 UTC the aircraft started to roll to the right due to turbulence. After that, airplane stalled for a few seconds but crew reacted and pushed the nose down to gain some speed. But again, the aircraft speed decreased which caused by a rapid increase in airplane angle of attack, consequently, aircraft began to climb above its cruising altitude of 35,000 ft and the aircraft experienced a peak in its vertical speed near 7,000 feet per minute. Airplane climbed to its highest altitude at 02:11:10 UTC which was around 38,000 feet, at this time thrust levers was fully forward and angle of attack was 16 degrees. However, aircraft started to descend and the angle of attack reached 30 degrees. There was no lift as a result airplane was leading to experience stall situation. The angle of attack reached 40 degrees and never reduced to less than 30 degrees from the time that it stalled until its impact into the Atlantic Ocean. Anyhow, by considering the available data that author of this research has presented in the following, we will approach to the actual reason of this crash to have a clarified and simple crash report for Air France 447 flight.

Analyzing the flight involving black box data

In this section, the author of this article moves step by step by analyzing the basis information that has been written previously and check out the obtained data from black box.

The first important activity is decrease in airspeed from 0.82 to 0.8 Mach which is nominal to enter thunderstorm. But after that, it can be seen that there are a lot of Oscillation in airplane performance, for instance the airplane began to go right, as a result, it can be concluded that the auto pilot had disengaged! Also, black box records confirm this. By taking a look at the stall warning data that achieved by extracting the

black box details, obviously it can be seen that at 02:10:10 UTC, stall warning has turned on. It is the exact time that the airplane experiences a rapid increase in its altitude and its speed decreased. It was the exact reason that co-pilot said: "I have the control". Co-pilot pulled the nose up a little and then he pushed it down in order to gain some speed. According to the black box data, the cockpit displays were showing inconsistent speed reading too! Definitely it can be concluded that the plane speed indicators were not working well. However, after first stall warning and the co-pilot reaction, charts shows that the airplane climbed again and airplane stalled again. At a same time, not only co-pilot pushed the nose down, but also, he was trying to climb. Based on the cockpit voice recorder, just a few moments before airplane impact into the ocean, pilot realized that the co-pilot is not controlling the plane appropriately when the Co-pilot was whispering "climb, climb" and suddenly the pilot shouted "No no no, don't climb! No no no!". But unfortunately, it was too late to recover.

Although human error played an outstanding role in this crash but it must be realized that why the speed indicators corrupted? Co-pilot could probably determine and realize that the airplane doesn't have enough speed to fly and it had been stalled. Because it seems that the engines are working, in addition, plane is losing altitude while angle of attack is more than what it has to be. however, the stall warning function is based on speed indicators too so it's important to find why it didn't work.

Technical problem of airspeed indicator

Airspeed indicator, is an instrument that shows the speed of an aircraft. airspeed indicator measures dynamic pressure that caused by aircraft movement through the air. The first device that should do its job, is pitot tube. It is a U-shaped apparatus with two openings, one perpendicular to the flow of air past the aircraft and one facing directly into the flow. There are two columns in airspeed indicator system, and when static and ram pressure are equal, they

have a same height but increasing in the ram pressure, pushes back the mercury of the other side of the tube. The difference between the two columns can be calibrated and then the speed can be measured. Look at the following figure where some information has presented:

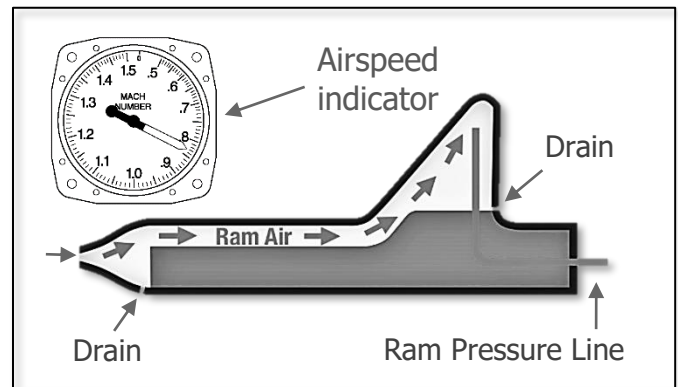


Figure 2. A pilot tube and a simple machmeter

There can be several reasons for inconsistent speed reading in cockpit, but according to the NTSB investigations, the airspeed indicator system had no problem, it seems that devices inside cockpit are working correctly, so the problem comes from the first involved parts like pilot tube or so on.

Based on the available information about weather condition at that time, the weather was cold, also, the plane has entered a thunderstorm before crash. By proving the same weather situation and putting the pilot tube in this experiment, it has been investigated that the crystals had blocked the Pilot tubes so they couldn't perform correctly.

CONCLUSION

In conclusion, the author of this essay is happy to say that analyzing this crash, like any crash report, will improve the aviation industry safety and reduce the mistakes as time goes forward. So finally all of these occurred accident will be a key element in the future of humanity.

Acknowledgment

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