# The accident research paper examples

Engineering, Aviation

\n[toc title="Table of Contents"]\n

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2009 Hudson River Mid-air Collision

## Introduction

It was in 2009 on 8th August, one of the worst air accidents in the history of New York took place when a Piper airplane and a sightseeing helicopter collided over the Hudson River, killing all the 9 people on board. Thousands of people witnessed this low-altitude accident as the airplane collided into the helicopter with both of them breaking into parts and falling into the river. Though both the pilots were properly certified and trained as per with federal regulations and the aircrafts properly equipped and maintained, the accident occurred due to insufficient regulations, the see-and-avoid concept, errors by the pilots and an air traffic controller (Brown and Holloway 2012). This paper will analyze the accident and the related safety issues in depth and then provide recommendations on how to avoid such future air crashes.

On 8th August, 2009, just shortly before noon, an airplane named Piper PA-32R-300 and a helicopter named Eurocopter AS350BA collided midair, killing all the 7 passengers and two pilots aboard over the Hudson River near Hoboken, New Jersey. Piper PA-32R-300 which took off from Wings Field Airport, Philadelphia was heading towards Municipal Airport, Ocean City, New Jersey with a short stopover at Teterboro Airport (TEB), Teterboro, New Jersey to pick up a passenger while the Eurocopter AS350BA was on a sightseeing tour from the West 30th Street Heliport (JRA), New York with five passengers (Brown and Holloway 2012).

## Investigation Report

The investigation carried out by the National Transportation Safety Board (NTSB) came up with a report which revealed much factual information regarding the accident. First of all, both the pilots were properly trained and certified under federal regulations. Both the aircrafts were properly maintained, certified and well-equipped in compliance with federal regulations. Weather was good enough for both the pilots to conduct visual inspection of their surroundings.

The pilot of the airplane while leaving Teterboro Airport (TEB) contacted the air traffic control tower (ATCT) at TEB. When the controller asked the pilot about which route he was planning to reach Ocean City, the pilot responded that he would like to take the route over the Hudson River. This choice of route mandated for the pilot to take authorization for climbing into Class B airspace from the controllers of Newark Liberty International Airport (EWR), Newark in New Jersey (NTSB 2010). Before takeoff, the TEB controller informed the pilot of the airplane about a helicopter in close vicinity. After

the Piper took off, the TEB controller entertained a personal phone call and while still on the phone, he gave direction to the Piper pilot to make a turn towards the Hudson River and maintain an altitude of 1, 100 feet or below (NTSB 2010). But he didn't advise the pilot to make self-announcement of the airplane's position on the common traffic advisory frequency (CTAF). The TEB controller was still on phone when he advised the Piper pilot to make contact with the EWR ATCT on 127. 85 megahertz frequency which the Piper pilot read incorrectly. The TEB controller contacted the EWR controller who requested to have all the communications transferred for the flight and have the airplane on a heading of 220° to avoid the traffic over the Hudson River. The helicopter took off at 11. 52 a. m. planning to take a tour down the Hudson River at 1, 000 feet altitude towards the Statue of Liberty. Since it was planned sightseeing tour, the Eurocopter pilot was not supposed to contact ATC. The Piper and the helicopter collided at 11. 53 a. m. when both of them were at 1, 100 feet altitude. Though starting about 40 seconds before the collision, conflicts alerts were made repeatedly for 11 times but reportedly neither the TEB controller nor the EWR controller heard or saw any of these alerts (Brown and Holloway 2012).

## Analysis of the Causes and Safety Issues

As per the NTSB report, the most likely causes that contributed to this fatal accident were the following:

1. The see-and-avoid concept has some limitations which made it difficult for the Piper pilot to notice the helicopter until the last moment when the collision was unavoidable. As per the directives of FAA advisory circular (AC), the see-and-avoid concept requires an all-time vigilance by each pilot

operating an aircraft irrespective of whether the flight is conducted in accordance with visual flight rules or instrument flight rules (NTSB 2010). The pilots in order to be aware of the traffic movement in the surrounding area within their sight should make a visual scan of the area outside of their aircrafts. They are also required to remain attentive to the information gathered from traffic advisory systems. However, see-and-avoid concept has some limitations including environmental factors, a pilot's ability to make visual scans, the blind spots of aircrafts and competing operational demands (Brown and Holloway 2012). In case of the Eurocopter, few such limitation were the procedures followed for sightseeing tour and FAA-approved air tour safety plan which made it obligatory for the Eurocopter pilot to fly the aircraft at an altitude of 1, 000 or lower feet.

2. The TEB controller's attending to a personal phone call and remaining distracted while giving instructions to the Piper Pilot. It is the duty of an air traffic controller to guide aircrafts safely by giving constant advisory reports and transferring communication between another ATC and a pilot in a timely fashion. But the TEB controller remained distracted by a personal call and delayed the transfer of communication between the Piper pilot and EWR controller. A timely transfer of communication could have enabled the EWR controller to divert the course of the Piper away from Hudson River traffic. Furthermore, the TEB controller failed to correct the Piper pilot's erroneous reading of EWR tower frequency (Bennett 2010). If the Piper pilot’s erroneous read of frequency could have been corrected, then the EWR controller would have been able to move the Piper away from the Hudson River traffic. Front line managers have the duty to ensure that all the

controllers within their purview are behaving correctly. The TEB controller's useless engagement to personal call would not have taken place at such critical time when the Piper pilot required his assistance and constant guidance if the front line manager would have corrected the behavior of the TEB controller (Bennett 2010).

3. Both the pilots failed to use the information that they got from their aircraft's electronic traffic advisory system to remain aware of any nearby aircraft. Since the Piper pilot was flying into an unfamiliar airspace, he was required to make a visual inspection of his surrounding area for any nearby aircraft but since he didn't receive any advisory from the TEB controller upon the need of making a self-announcement of his presence over the radio, he presumed the area to be clear of traffic. His presumption of the area to be free of traffic prevented him from making a visual inspection of the surrounding area. The helicopter flying on his left against the backdrop of a city made it difficult for the Piper pilot to spot it until the last moment (Brown and Holloway 2012). Below is given the picture capturing the simulated views that were available to the Piper pilot moments before the air crash:

Fig 1: Simulated Views derived from the Piper cockpit (Brown and Holloway 2012)

The Eurocopter pilot besides flying the helicopter was simultaneously being a tour guide which might have prevented him from making a visual inspection of his surrounding area. Furthermore, the helicopter pilot didn't effectively use the traffic information system to trace a nearby aircraft.

4. FAA or Federal Aviation Administration procedures were inadequate for transferring communication among ATC facilities near the Hudson River

Class B area exclusion area (Bennett 2010).

5. The traffic information service of the FAA which assists pilots in their flight through an automatic display of traffic information generated by radar in the cockpit to make them aware of a possible collision is erroneous. The aircraft which receives TIS alerts is called client aircraft and the aircraft generating the alerts is called intruder aircraft. When an intruder aircraft enters into the pathway of a client aircraft, these alerts are generated. Both visual and aural alerts are generated by TIS when an intruder aircraft comes within a 0. 5-nm radius and ± 500 feet of a client aircraft. TIS can provide alerts of maximum 8 intruder aircrafts at a time if located within 7 nautical miles (nm) horizontally and +3, 500 feet/-3, 000 feet vertically (NTSB 2010). However, one limitation of the TIS is that due to traffic congestion many a time numerous nuisance alerts are generated, leading to pilots not taking these alerts into serious account. NTSB's interviews with many pilots revealed that pilots preferred to visually inspect the surrounding area than looking at the mini display screen on the cockpit.

5. FAA regulations failed to provide sufficient vertical separation for aircraft operating in the Hudson River class B exclusion area (Bennett 2010). The current technical standards of FAA approved electronic traffic advisory systems are unable to tell apart different types of aircrafts whether or not a particular aircraft is a helicopter or a fixed wing airplane and therefore the efficacy of these system is limited aboard helicopters.

## Recommendations

The FAA Advisory Circular 'Pilots’ Role in Collision Avoidance' is in serious need of an overhauling as many things that were in practice in 1983 when

the AC came into existence have changed considerably over the years. The AC provides guidance on operation within terminal control areas, airport traffic areas and terminal radar service areas which have become out of date after the reclassification of North American airspace in 1994 (Katz 2011). Taking all the factors into account, NTSB has come up with the following recommendations to fix all the problems that led to the fatal crash.

1. First and foremost, NTSB recommended FAA AC to be updated to reflect the modern day aircraft operations. For example, the AC should provide adequate description of airspace classifications and the current National Airspace System (Bennett 2010). It should provide guidance to the pilots operating under see-and-avoid concept on the effective use of electronic traffic advisory systems.

2. Electronic traffic advisory systems should be developed to convey information regarding flight characteristics including the structures of the aircrafts, size, airspeed, altitudes and so on. Nuisance alerts should be reduced so that only the critical alerts are paid attention to.

3. All the standard operating procedures for air traffic facilities should be revised so that better coordination across ATC facilities can be established so that whenever a pilot requests for a route that requires entry into Class B airspace, he receives ATC clearance as soon as the traffic permits. Controllers need to mandatorily instruct the pilots whose flights will be operating the Class B exclusion area of the Hudson River to switch communications to CTAF and make a self-announcement of their presence over the radio (NTSB 2010). All the air traffic controllers and their supervisors

should be briefed about the performance deficiencies related to this accident so that they become more serious and careful about their responsibilities.

## Conclusion

One of the worst air accidents took place in New York on 8th August 2009 when a Piper airplane went into collision with a sightseeing helicopter over the Hudson River, killing all the 9 people who were on board. Though both the pilots were properly trained and certified and both the aircrafts regularly maintained and well-equipped, the accident took place because of many reasons. The first reason was the failure of both the pilots to implement see-and-avoid concept. They also did not effectively use the information derived from the electronic traffic advisory systems. The TEB controller showed a lack of professionalism and irresponsibility by being engaged to a personal phone call and missing out on important notification and advisories. The front line manager was equally responsible for not correcting the improper behavior of the TEB controller in a timely manner. Federal Aviation Administration procedures were inadequate for transferring communication across all the ATC facilities and establishing coordination. TIS alert system is equally faulty as due to the generation of many nuisance alerts, critical alerts are often overlooked by the pilots. Furthermore, FAA regulations fell short of identifying different flights characteristics and their altitudes. On the basis of the investigation and its findings, NTSB has made a slew of recommendations to avoid such critical air crashes. If all the recommendations are followed and implemented effectively, then this type of fatal air accidents can be prevented in near future.

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