The Tragedy of Flight: A Comprehensive crash analysis

Introduction:

An aviation accident is defined by the Convention on International Civil Aviation Annex 13 as an occurrence associated with the operation of an aircraft, which takes place from the time any person boards the aircraft with the intention of flight until all such persons have disembarked, and in which (a) a person is fatally or seriously injured, (b) the aircraft sustains significant damage or structural failure, or (c) the aircraft goes missing or becomes completely inaccessible.Annex 13 defines an aviation incident as an occurrence, other than an accident, associated with the operation of an aircraft that affects or could affect the safety of operation.

A hull loss occurs if an aircraft is damaged beyond repair, lost, or becomes completely inaccessible.

The first fatal aviation accident was the crash of a Rozière balloon near Wimereux, France, on June 15, 1785, killing the balloon's inventor, Jean-François Pilâtre de Rozier, and the other occupant, Pierre Romain.[3] The first involving a powered aircraft was the crash of a Wright Model A aircraft at Fort Myer, Virginia, in the United States on September 17, 1908, injuring its co-inventor and pilot, Orville Wright, and killing the passenger, Signal Corps Lieutenant Thomas Selfridge.

The first aircraft accident in which 200 or more people died occurred on March 3, 1974, when 346 died in the crash of Turkish Airlines Flight 981. As of April 2020, there have been 33 aviation incidents in which 200 or more people died. The aircraft, registered TC-JAV, was a McDonnell Douglas DC-10 that crashed into a forest situated northeast of Paris. The London-bound plane crashed shortly after taking off from Orly airport; all 346 people on board died. It was later determined that the cargo door detached, which caused an explosive decompression; this caused the floor just above to collapse. The collapsed floor severed the control cables, which left the pilots without control of the elevators, the rudder and No. 2 engine. The plane entered a steep dive and crashed. It was the deadliest plane

crash of all time until the Tenerife disaster in 1977.[5] It is currently the deadliest single-aircraft crash with no survivors.

The top 10 countries with the highest number of fatal civil airliner accidents from 1945 to 2021 are the United States, Russia, Canada, Brazil, Colombia, United Kingdom, France, Indonesia, Mexico, and India.[6] The United Kingdom is noted to have the highest number of air crashes in Europe, with a total of 110 air crashes within the time period, and Indonesia is the highest in Asia at 104, followed by India at 95.

The largest loss of life on board a single-aircraft is the 520 fatalities in the 1985 Japan Airlines Flight 123 accident, the largest loss of life in multiple aircraft in a single accident is the 583 fatalities in the two Boeing 747's that collided in the 1977 Tenerife airport disaster, while the largest loss of life overall in a collective incident is the 2,996 fatalities in the coordinated terrorist destruction of airplanes and occupied buildings in the 2001 September 11 attacks.

September 11 attacks:

The deadliest aviation-related disaster, regarding fatalities on both the aircraft and the ground, was the destruction of the World Trade Center in New York City on September 11, 2001. On that morning, four commercial jet airliners traveling on transcontinental flights from East Coast airports to California were hijacked after takeoff. The four hijacked aircraft were subsequently crashed in a series of four coordinated suicide attacks against major American landmarks by 19 Islamic terrorists affiliated with Al-Qaeda. American Airlines Flight 11 and United Airlines Flight 175 were intentionally crashed into the North and South Towers of the World Trade Center, respectively, destroying both buildings in less than two hours. The World Trade Center crashes killed 2,753, the vast majority of fatalities being occupants of the two towers or emergency personnel responding to the disaster. In addition, 184 were killed by the impact of American Airlines Flight 77, which crashed into the Pentagon in Arlington, Virginia, causing severe damage and

partial destruction to the building's west side. The crash of United Airlines Flight 93 into a field in Somerset County, Pennsylvania, which occurred as passengers attempted to retake control of the aircraft from the hijackers, killed all 40 passengers and crew aboard the aircraft. This brought the total number of casualties of the September 11 attacks to 2,996 (including the 19 terrorist hijackers). As deliberate terrorist acts, the 9/11 crashes were not classified as accidents, but as mass-killing. The events were treated by the United States and the member nations of NATO as an act of war and terrorism. The war on terror was subsequently launched by the United States and NATO in response to the attacks, leading to the death of Al-Qaeda leader Osama Bin Laden, who had ordered the 9/11 attacks.

Tenerife disaster:

The Tenerife airport disaster, which occurred on March 27, 1977, remains the accident with the highest number of airliner passenger fatalities. 583 people died when a KLM Boeing 747 attempted to take off and collided with a taxiing Pan Am 747 at Los Rodeos Airport on the Canary Island of Tenerife, Spain. All 234 passengers and 14 crew of the KLM aircraft died and 61 of the 396 passengers and crew of the Pan Am aircraft survived. Pilot error was the primary cause, as the KLM captain began his takeoff run in the mistaken belief he had obtained air traffic control clearance.[7][8] Other contributing factors were a terrorist incident at Gran Canaria Airport that had caused many flights to be diverted to Los Rodeos, a small airport not well equipped to handle aircraft of such size, and dense fog. The KLM flight crew could not see the Pan Am aircraft on the runway until immediately before the collision.[9] The accident had a lasting influence on the industry, particularly in the area of communication. An increased emphasis was placed on using standardized phraseology in air traffic control (ATC) communication by both controllers and pilots alike. "Cockpit Resource Management" has also been incorporated into flight crew training. The captain is no longer considered infallible, and combined crew input is encouraged during aircraft operations.[10]

Japan Air Lines Flight 123

520: The crash of Japan Airlines Flight 123 on August 12, 1985, has the highest number of fatalities for any single-aircraft accident:[11] 520 people died onboard a Boeing 747. The aircraft suffered an explosive decompression from an incorrectly repaired aft pressure bulkhead, which failed in mid-flight, destroying most of its vertical stabilizer and severing all of the hydraulic lines, making the 747 virtually uncontrollable.[12] Pilots were able to keep the plane flying for 32 minutes after the mechanical failure before crashing into a mountain. All 15 crew members and 505 of the 509 passengers on board died.[13] Japanese military personnel inaccurately assumed, during a helicopter flyover of the impact site, that there were no survivors. Rescue operations were delayed until the following morning. Medical providers involved in rescue and analysis operations determined that several passengers likely survived the impact and probably would have survived the incident had rescue operations not been delayed. Four passengers survived the incident in its entirety, meaning that they were alive when discharged from the hospital.

Other crashes with death tolls of 200 or higherDouglas MD-11, Swissair Flight 111, carrying 215 passengers and 14 crew from New York City to Geneva, Switzerland, crashed into the Atlantic Ocean near Halifax, Nova Scotia, Canada, killing all aboard. After a lengthy investigation, an official report stated that flammable material used in the aircraft's structure, specifically the Personal TV Systems recently installed in the Business Class Cabin, allowed a fire to spread, resulting in a loss of control.

228: On June 1, 2009, an Airbus A330-203, Air France Flight 447, carrying 216 passengers and 12 crew, was en route from Rio de Janeiro, Brazil to Paris, France, when it crashed into the Atlantic Ocean. The aircraft's flight recorders were not recovered from the ocean floor until May 2011, and the final investigative report was released in July 2012. It determined that the disaster was likely due to the aircraft's pitot tubes being obstructed by ice crystals, causing the autopilot to disconnect. The crew reacted incorrectly, leading to an aerodynamic stall from which the jet did not recover.

228: On August 6, 1997, a Boeing 747-3B5, Korean Air Flight 801, crashed on approach to the international airport in the United States territory of Guam, killing 228 of the 254 people aboard. Contributing factors in the crash were fatigue and errors by the flight crew, inadequate flight crew training, and a modification of the airport's altitude warning system that prevented it from detecting aircraft below a minimum safe altitude.

227: On January 8, 1996, an Antonov An-32B aircraft with six crew members on board overshot the runway at N'Dolo Airport, Kinshasa, Democratic Republic of Congo, and plowed into a market place. Four on board survived but 225 people on the ground were killed and an estimated 500 were injured (estimated 253 seriously injured). It is the crash with the most non-passenger ground fatalities (not including 9/11). It is usually known as the 1996 Air Africa crash.

225: On May 25, 2002, a Boeing 747-209B, China Airlines Flight 611, bound for Hong Kong International Airport in Hong Kong, disintegrated in mid-air and crashed into the Taiwan Strait 20 minutes after takeoff from Chiang Kai-shek International Airport (now Taiwan Taoyuan International Airport) in Taiwan. It was determined that the crash, which killed all 206 passengers and 19 crew members aboard the plane, was caused by improper repairs to the aircraft 22 years earlier when the aircraft encountered a tailstrike.

224: On October 31, 2015, an Airbus A321-231, Metrojet Flight 9268, crashed in the Sinai Peninsula after departing Sharm el-Sheikh International Airport, Egypt, en route to Pulkovo Airport, Saint Petersburg, Russia. All 217 passengers and

seven crew members were killed. A branch of the Islamic State of Iraq and the Levant claimed responsibility for bringing down the jet, and a Russian investigation concluded that a bomb was detonated inside the plane at a high altitude.

223: On May 26, 1991, a Boeing 767-3Z9ER, Lauda Air Flight 004, broke up in midair over a remote area of Thailand due to an uncommanded deployment of a thrust reverser on one of the plane's engines, killing all 213 passengers and 10 crewmembers aboard. The flight, which originated at Kai Tak Airport, Hong Kong, and made a stopover at Don Mueang International Airport in Bangkok, Thailand, was en route to Vienna International Airport, Vienna, Austria, when the accident occurred.

217: On October 31, 1999, a Boeing 767-366ER, EgyptAir Flight 990, flying from Los Angeles International Airport, United States, to Cairo International Airport, Egypt, with a stop at John F. Kennedy International Airport, New York City, crashed into the Atlantic Ocean south of Nantucket Island, Massachusetts, killing all 203 passengers and 14 crewmembers. The National Transportation Safety Board determined that the probable cause of the crash was deliberate action by the relief first officer in response to his removal from international service within Egyptair, a finding disputed by Egyptian authorities who maintain another cause of the accident.

213: On January 1, 1978, a Boeing 747-237B, Air India Flight 855, crashed into the Arabian Sea just off the coast of Bombay, India, killing all 190 passengers and 23 crew on board. An investigation concluded that the captain became disoriented after the failure of one of the flight instruments in the cockpit, leading to "irrational control inputs" that caused the plane to crash.

203: On February 16, 1998, an Airbus A300B4-622R, China Airlines Flight 676, en route from Ngurah Rai Airport in Bali, Indonesia, to Chiang Kai-shek International Airport (now Taoyuan International Airport), Taiwan, crashed into a

road and residential neighborhood in Taoyuan, Taiwan, killing 182 passengers, 14 crew, and seven people on the ground. An investigation determined that when the control tower ordered the pilot to abort his landing and "go around" for a second attempt, the pilot, who had unintentionally released the plane's autopilot, did nothing to take control of the plane for 11 seconds as he apparently thought the autopilot would initiate the go around. As the aircraft approached the airport, the pilot executed a sudden steep ascent that a stall and crash. China Airlines was also criticized for "insufficient training."

200: On July 10, 1985, a Tupolev Tu-154B-2, Aeroflot Flight 7425, on a domestic Karshi–Ufa–Leningrad route, crashed near Uchkuduk, Uzbek SSR, Soviet Union, on the first leg of its route. All 191 passengers and nine crew were killed. An investigation concluded that the plane went down due to pilot error. The air crew used an inappropriately low airspeed, causing vibrations that they incorrectly interpreted as engine surges. As a result, they further reduced engine power, causing the aircraft to stall and crash.

Owing to superstition, it is common for an airline to cease using the flight number of a fatal crash. For example, following the shootdown of Malaysia Airlines Flight 17, the flight number was changed to MH19.[86] However, that is not always the case. For example, China Southern Airlines continued using the flight number 3456 even after a fatal crash in 1997.