

FIRE CASE STUDY

Transportation



TWA 800, New York Flight

July 17, 1996

Statistics

Type of fire

Vapor

Ignition Source

Electrical Spark to flammable air fuel vapour

Duration of fire

Minutes

Number of casualties

18 crew and 212 passengers

Cost to industry

Most costly air disaster investigation in U.S. history
\$5 million

References

TWA Investigation. 1996.[Online]. [Accessed 29 October 2014]. <http://www.nytimes.com/1996/08/27/nyregion>
Prof. Andrews. *The TWA800 incident*. Fire Explosion Prediction & Investigation, October 2014, Weetwood Hall Leeds.

Event

A Boeing 747-131, exploded at 8.31pm over the Atlantic Ocean, the altitude was around 13,700 ft. This occurred just 11 and a half minutes after the plane took off. All 18 crew and 212 passengers were killed. The aircraft suffered some technical problems with sensors and during refueling of the aircraft, the volumetric shutoff (VSO) control was believed to have been triggered before the tanks were full. To continue the pressure fueling, a TWA mechanic overrode the automatic VSO by pulling the volumetric fuse and an overflow circuit breaker. Maintenance records recoded this, although the aircraft is recorded as taking off as normal, this does suggest miss handling during refueling and management of the faulty indication equipment. The investigation reconstruction of the plane and experimental tests suggested the explosion was generated within the center fuel tank, as seen in the image below. It was concluded that a kerosene vapour tank explosion had occurred in the near empty central tank and subsequently this ripped apart the aircraft's structure, leading to the disintegration of the aircraft.

Lessons Learned

Fuel tank explosions can occur at sea level and at altitude. The key factors are, the fuel volatility and the ambient fuel tank temperature. A major reason for the flammability of the fuel / air vapor was the large amount of heat generated and transferred to the CWT by air conditioning packs located directly below the tank, with the temperature raised to a sufficient level, a single ignition source could cause an explosion. Plausible circumstance at the time of the explosion the CWT was empty, however sufficient fuel and vapour were present with a flashpoint of 44.4 – 47.2°C. The fuel said to have been heated by the added heat from the air conditioning packs to 46.1°C or higher this cupped with an ignition initiated the event.

Nationality	No.
United States ^[a]	171
Sweden	1
Spain	1
Portugal	2
Not known	9
Ivory Coast	1
Italy	9
France	36
Total	230