

Revision	Date	By	Revisions
1.0	01 Jul 2020	C Stokes	First release

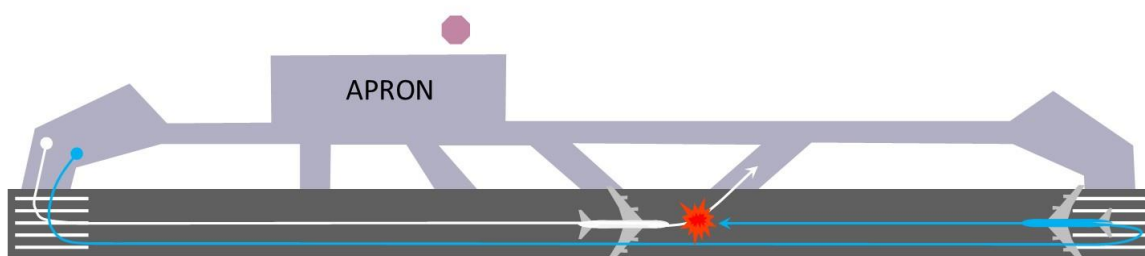
Introduction:

On the 27th of March 1977, two Boeing 747s collided together as one was taking off at the Los Rodeos International Airport, on the island of Tenerife in the Canary Islands. At the time, this was the worst aviation disaster, totalling 583 fatalities from the two aircraft. Today, it ranks behind only the September 11 terrorist attacks as the worst aviation related disaster by number of lives lost. The collision occurred when KLM Flight 4805 attempted to take off while Pan Am Flight 1736 was still taxiing along the same runway.

Timeline:

The following timeline describes the critical events that led to the collision and subsequent loss of life. This is not an exhaustive reconstruction. The information in this timeline was sourced from the Air Line Pilots Association (ALPA) aircraft accident report, the Aviation Safety Network and Wikipedia.

- On 27 March 1977, KLM Flight 4805 and Pan Am Flight 1736 were on route to Las Palmas International Airport de Gran Canaria. Both aircraft were diverted to Los Rodeos International Airport after a bomb exploded in a terrorist incident in the terminal at Las Palmas. Authorities, who feared another attack at Las Rodeos, diverted all incoming flights to Los Rodeos.
- While an international airport, Los Rodeos was a much smaller airport than Las Palmas and at the time of the diversions, it was not designed to handle the number of flights that were diverted during the bombing incident. Los Rodeos had one runway and one main taxiway that connected the apron to the runway. Four short taxiways connected the main taxiway to the runway. Due to the number of diverted aircraft, the main taxiway was being used to store aircraft and was therefore not able to be used as a taxiway. A plan of the airport and aircraft movements prior to the crash are shown below.



- Once the bombing incident at Las Palmas had been cleared, the KLM and Pan Am aircraft were allowed to leave Los Rodeos. While the Pan Am was ready to leave before the KLM, the KLM

was refuelling and blocking the path of the Pan Am. The KLM was therefore the first aircraft to taxi for departure.

- The KLM aircraft was instructed to taxi down the entire length of the runway and perform a 180 degree turn to line up for takeoff. Shortly after the KLM started to taxi, the Pan Am aircraft was instructed to taxi down the same runway and exit on taxiway C-3, in order to join the main taxiway and wait for clearance to re-enter the runway following takeoff of the KLM. The crew of the Pan Am aircraft were initially confused with which taxiway they should use to exit the runway.
- The weather conditions at Los Rodeos were rapidly changing. At the time of taxiing down the runway, visibility was estimated to be less than 100 metres. The flight voice recorder picked up the Pan Am crews' talk of sighting the first two taxiways, but the crew did not mention sighting the third taxiway, designated taxiway C-3, along which they were instructed to exit the runway. After the crash, investigators concluded that the Pan Am 747 was too large to make the two 148 degree turns that would be required in order to exit along taxiway C-3. Unlike taxiway C-3, taxiway C-4 was determined to be suitable for the 747 to use. At the time of the crash, the Pan Am aircraft was past C-3 and close to taxiway C-4.
- Once the KLM was lined up for takeoff, the first officer radioed the air traffic controller for ATC clearance and the captain throttled up and started rolling down the runway. The air traffic controller replied by reading the flight clearance and in doing so, used the word takeoff, but did not give specific instruction to takeoff. The first officer replied by repeating the clearance and then said, "we are now at takeoff". The air traffic controller replied by saying "Ok" and "stand by for takeoff, I will call you". Neither of the statements "we are now at takeoff" and "Ok" were standard terminology.
- After the KLM started its roll for takeoff, the air traffic controller radioed the Pan Am to "report when clear of the runway". The Pan Am crew replied by saying "Ok, will report when we're clear". Upon hearing this, the KLM first officer expressed concern that the Pan Am was still on the runway. The KLM captain replied "oh, yes" and continued with the takeoff.
- The air traffic controller's statement "stand by for takeoff, I will call you" to the KLM after reading the flight clearance was made inaudible by a simultaneous radio call from the Pan Am crew saying "We're still taxiing down the runway...". Instead of hearing either of these calls, the KLM crew instead heard three seconds of radio interference.
- Upon seeing the KLM proceeding down the runway, the Pan Am's crew turned left onto the grass and applied full throttle in an attempt to clear the runway. Upon seeing the Pan Am, the KLM's crew attempted a premature rotation, causing the KLM to tailstrike the runway. At the time the KLM left the ground, it was within 100 metres of the Pan Am.
- The KLM nose gear cleared the Pan Am, but the left engines, main gear and lower fuselage collided with the Pan Am's upper fuselage. The KLM ripped through the Pan Am above its wings, with the KLM's right engines going through the Pan Am's upper deck, immediately behind the cockpit.
- The KLM remained airborne for a brief amount of time before stalling. The KLM hit the ground about 150 metres from the point of collision. The full load of fuel onboard ignited and consumed the entire aircraft. This fire could not be extinguished for hours after the crash. All 248 passengers and crew died. Of the 396 passengers and crew aboard the Pan Am, 71 initially survived, though nine passengers later died from their injuries.
- Rescue crews took substantial time to arrive at the Pan Am aircraft, as they had concentrated on attending the KLM aircraft, which was several hundred metres down the runway, and were not initially aware that the second Pan Am aircraft had been involved in the crash.

-
- According to the ALPA accident report, of the majority bodies of which the cause of death could be identified, most were due to thermal injuries rather than traumatic injuries. These thermal injuries were most likely caused by fires that engulfed both aircraft.
 - According to the ALPA report, the KLM crew were concerned about their duty time, and whether they could depart Los Rodeos, arrive at Las Palmas (once the bombing incident had been cleared) and make it back to Amsterdam within their allowed on-duty time. Contemporary regulations allowed flight crews only a certain amount of time between rests, and going over this came with personal repercussions for the flight crew. To save time, the KLM crew had decided to depart Los Rodeos with enough fuel to make it back to Amsterdam without the need to refuel at Las Palmas.

Sources

Aviation Safety Network (n.d.), *Tenerife-Los Rodeos International Airport*, viewed 13 Apr 2020, <https://aviation-safety.net/database/record.php?id=19770327-0&lang=fr>

Aire Line Pilots Association (n.d.), *Aircraft accident report: Pan American World Airways Boeing 747, N 737 PA, KLM Royal Dutch Airlines Boeing 747, PH-BUF, Tenerife, Canary Islands, March 27, 1977*, Engineering and Air Safety, Washington, D.C.

Wikipedia (2020), *Tenerife airport disaster*, viewed 13 Apr 2020, https://en.wikipedia.org/wiki/Tenerife_airport_disaster