

TerranearPMC Safety Share

Week of September 5, 2011 – Anatomy of a Disaster

As I sit in an airplane, thousands of feet in the air, I find it somewhat amusing that I am about to talk about the worst disaster in commercial airline history. While I have told this story a few times, I think the lessons to be learned from this incident are quite important as the set of circumstances that caused this tragic event presents us with a true-to-life illustration of how accidents occur. Without a doubt, it presents the message that so many of my Safety and Health colleagues already know and have dedicated their professional lives to present: “Safety is no Accident.”

It was March 27, 1977. In its simplest terms, the Dutch Airliner KLM flight # 4805 (a Boeing 747 Jumbo Jet) took off from Los Rodeos Airport (now known as Tenerife) in the Canary Islands. Unfortunately Pan American Flight 1736 (also a Boeing 747) was sitting on the same runway. The result was a total of 583 deaths – this included all 248 passengers on the KLM flight as well as 335 of the 396 people aboard the Pan Am aircraft.

Whenever an airplane disaster occurs in the world or even a near-miss incident that is presented on the news, the main commentator invites an air traffic control expert to discuss the critical events, and quite typically, the expert will make a reference to “Tenerife.”

The fact is, neither plane was suppose to be landing at Tenerife; both were scheduled to land at Gran Canaria International Airport; the main airport for the Canary Islands. However, earlier in the day, a political separatist organization exploded a bomb at this airport and warned of a second bomb. Thus all aircraft that were scheduled to arrive in the Canary Islands were diverted to the smaller airport, Tenerife: a regional airport that was not designed to handle the additional air traffic.

While the KLM plane was waiting for instructions for takeoff, the Pan Am jet was taxiing down the same runway, listening to the directions from the control tower regarding where to park. Because of the large number of aircraft coming into Tenerife Airport, there was inadequate room for all the aircraft to properly park and many were parking on the taxiway, meaning departing aircraft were now taxiing on the runway (this explains the unusual location of the Pan Am plane). What made matters even worse was the deteriorating weather conditions that caused low-lying clouds (i.e. fog), thereby limiting the visual range to about 300 meters (1000 feet). The legal threshold for takeoff was 700 meters (2300 feet) visibility.

As the KLM plane was waiting for takeoff, the Pan Am airliner was instructed to taxi down the runway and “take the third exit” on their left so they would no longer be in the way of the KLM plane. However the crew of the Pan Am plane was unsure of their instructions and asked for clarification. Again, they were told to take the third exit from the runway. Because the exits were not marked the Pan Am crew could only surmise that the control tower meant to start counting from their current position (not knowing that they already passed the first exist due to the intense fog). As a result they stayed on the runway looking for the third exist, which was actually exit C-4 (but they really wanted C-3). Meanwhile the KLM jet was waiting for the go ahead. The pilot instructed the co-pilot to inform the control tower that “they were ready for takeoff” and added, “Waiting for our clearance.” What followed was a series of miscommunications. The control tower then proceeded to give the

KLM pilot and crew the specific route to be taken after takeoff. Because the instructions used the work “takeoff” (but not “cleared for takeoff”), the co-pilot of the KLM, responded, “We are now at takeoff.” This is non-standard communications within the air traffic control profession. However the pilot of the KLM plane interrupted the co-pilot with the comment, “We’re going” (which was only spoken to the crew...not transmitted to the control tower). As noted in a documentary of this event, the co-pilot chose not to embarrass his superior and announce that they did not have the proper clearance to take off.

At the same time, because of the dense fog conditions, the control tower could not see the runway (and therefore, did not see the Pan Am plane on the runway!) and initially responded back to the KLM plane, “OK.” This only reinforced the captain’s misinterpretation that they had takeoff clearance. It is believed that this verbal affirmation was only to acknowledge that the control tower understood that the KLM plane was at the takeoff position and NOT in the process of takeoff. The control tower continued to communicate to the KLM plane with the words, “stand by for takeoff” and had no idea that the KLM crew was actually proceeding to takeoff.

Simultaneous to this KLM communications, was a radio call from the Pan Am plane, which caused interference in the radio frequency with the KLM plane; so the message from the control tower to “stand by for takeoff,” was not clearly transmitted. Meanwhile the Pan Am message to the control tower “we’re still taxiing down the runway,” was also blocked due to the radio interference. If either of those messages were heard by the KLM crew, it would have given the KLM crew time to abort its takeoff attempt.

Due to fog, neither crew could see the other plane. In addition, Tenerife was NOT equipped with radar. As soon as the KLM jet began its takeoff roll, the tower asked the Pan Am crew to inform them when they were clear of the runway. The crew replied, “OK, we’ll report when we’re clear.” Upon hearing this, the KLM flight engineer expressed his concern as asked, “Is he not clear, the Pan American?” To which the KLM pilot responded, “oh yes” and proceeded for takeoff.

By the time both planes spotted each other on the same runway, it was too late.

There were numerous investigations and each one concluded that there were multiple opportunities for this incident to have been avoided. An airport that was not equipped to handle the amount of air traffic, lack of radar, poor weather conditions, poor communications (that included lack of standard terminology and inadequate hardware and talking over during radio transmissions without getting clarifications), and the entire flight crew (mostly the KLM crew) not in agreement as to the circumstances and to not challenge a decision that was not made with sound information, were all pointed out as key reasons for the disaster.

Through this one incident, numerous changes within the air traffic control industry were made. And while it is important to acknowledge the improvements that were made from this one incident, it is still more than just a shame. If the contributing causes were recognized earlier through a strong hazard identification process, this entire tragedy could have been prevented. Instead, a lessons learned was incorporated at a very high price.

Forgiveness is the fragrance that the violet sheds on the heel that has crushed it.

Mark Twain