



BUSINESS CASE

# KLM FLIGHT 4805

*by Jan U. Hagen*

## The burden of speaking up

## KLM flight 4805: in a hurry

Air accidents have been occurring ever since the Wright brothers made the very first powered flight in 1903. Despite this, state-of-the-art planes and experienced, highly qualified crews have always been seen as the key to safety in the air. If this thesis had not been in doubt before, it was rocked to its core on March 27, 1977. On that day, two Boeing 747s collided on the runway on the island of Tenerife and burst into flames, killing 583 people. It remains the worst disaster in the history of civil aviation. The accident occurred after a Boeing 747 belonging to Dutch airline KLM began its takeoff before a Pan Am Boeing 747 had time to leave the runway. Both planes were in the hands of extremely experienced crews. In the beginning, it was impossible to grasp how this dreadful accident could have happened.

For captain Jacob Veldhuyzen van Zanten (50), KLM flight 4805 from Amsterdam to Las Palmas on Gran Canaria was a welcome change from his management responsibilities.<sup>53</sup> As director of the KLM Flight Training Department, he had spent the past six years in charge of training and testing KLM pilots. As a result, he only flew normal scheduled flights if there was a staff shortage.

For the two other members of the crew, it was a flight like any other. With 9,200 flying hours under his belt, first officer Klaas Meurs (32) was nearly as experienced as captain van Zanten, despite being 18 years younger. The only thing that made the flight slightly out of the ordinary for Meurs was the fact that, two months previously, van Zanten had been his check pilot for his type rating for the Boeing 747. For flight engineer Willem Schreuder (48), who had already completed 15,000 flying hours, it was a completely routine assignment.

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<sup>53</sup> All the following information on the accident is based on the Aircraft Accident Report drawn up by the Air Line Pilot Association, the accident report of the Comisión de Investigación de Accidentes e Incidentes de Aviación Civil and the investigation report by the Netherlands Aviation Safety Board. Roitsch, P.A. et al. (1979), Comisión de Investigación de Accidentes e Incidentes de Aviación Civil (1979), Netherlands Aviation Safety Board (1977).

The events leading to the tragedy began when KLM 4805 headed from Amsterdam to Gran Canaria with 234 passengers on board. While they were over the Atlantic, the police in Las Palmas received a worrying call just after 1 p.m. local time. The call warned of a bomb planted in the airport by Canarian separatists. As a result, Gando Airport in Las Palmas was closed and the people inside were ordered to evacuate. At 1:15 p.m., a small bomb exploded in the airport's only terminal, injuring eight people. With fears of further explosions, the airport remained closed and all planes that were due to land there were forced to divert to other airports.

For KLM 4805, that meant changing course and heading toward the much smaller Los Rodeos Airport on Tenerife. The flight landed there at 2:38 p.m. Due to the lack of space, it and many other planes had to park on a taxiway rather than pull into assigned spaces on the apron. Forty minutes later, another Boeing 747 arrived – Pan Am flight 1736, which had been en route from New York to Las Palmas when it was also diverted to Tenerife. The crews of both planes hoped that Las Palmas would open again soon so they could land there and offload their passengers.

The uncertainty about when they might be able to leave Tenerife was a particularly unwelcome development for captain van Zanten. Around three months before, the Dutch aviation authority had introduced new stricter flight time limits for pilots. Any pilot exceeding the maximum permitted flight time risked a fine, loss of license, or even prison. Aware of these restrictions, van Zanten started consulting with KLM's flight planning department in Amsterdam after landing. If the crew was to stay within the permitted time limits, the plane would have to start its return flight from Las Palmas to Amsterdam no later than 8 p.m. local time. Otherwise, it would be impossible to embark on the return flight and the airline would have to organize hotel rooms for more than two hundred passengers in Las Palmas.

Although the airport on Gran Canaria was expected to reopen soon, van Zanten was worried that all the diverted flights would cause significant delays. With that in mind, he decided to instruct the passengers to disembark so that he could refuel the plane at Los Rodeos for the return flight to Amsterdam. This would save time later in Las Palmas. Just as the KLM Boeing 747 started refueling at 3:30 p.m., Las Palmas reopened. Unlike most of the other planes, KLM 4805 was now stuck where it was. It took until 5:45 p.m. to finish refueling and get all the passengers back on board.

Now, however, there was another problem. The weather conditions had deteriorated and low clouds were moving in over the high plateau where Los Rodeos Airport stood, creating a cloak of fog on the airfield. Van Zanten became impatient and urged his crew members to hurry. "Hurry, or else it will close again completely."

At 5:56 p.m., KLM flight 4805 in Los Rodeos was cleared to taxi (Figure 1.12). As large sections of the taxiways were still blocked by parked planes, KLM 4805 was told to taxi over runway 30 to reach its position on the other side of the airfield. Shortly after, Pan Am 1736 was also cleared to taxi via the same runway, following the KLM flight. With the fog now much thicker, the Pan Am crew soon lost sight of the KLM plane in front.

Both planes were supposed to leave the runway via the third taxiway (C3) and follow the usual taxiway, B, to their position on runway 30. However, both the KLM and Pan Am crews had difficulty finding C3. Bear in mind that the pilots in a Boeing 747 are nearly 28 feet above the ground. At a small airport with limited signage, and in thick fog, it is hardly surprising that the crews found it hard to spot the taxiway.

In response to a question from the tower, the KLM flight reported that it had just passed the final taxiway (C4). The tower instructed the crew to continue taxiing to the end of the runway. There, they were to turn the plane 180° and wait until the Pan Am flight had left the runway via taxiway C3.

At 6:03 p.m., KLM 4805 was standing ready on runway 30. Meanwhile, the Pan Am flight was still creeping through the thick fog. Unlike the KLM flight, the Pan Am crew had managed to spot taxiway C3. However, due to the narrow curve radius, it was almost impossible to make the turn with a Boeing 747. The crew decided to taxi forward to C4, where the curve radius was more suitable for such a big aircraft.

In the KLM plane, captain van Zanten was waiting impatiently for clearance to take off. Due to his decision to refuel, the onward flight had been delayed further. It was going to be even more difficult to stick to the latest possible takeoff time of 8 p.m. for the flight from Las Palmas to Gran Canaria: on arrival at Gando Airport in Las Palmas, the passengers from Amsterdam would disembark; then the plane would be cleaned as planned before a new set of passengers boarded for the return flight to Amsterdam; and meals for the flight had to be brought on board. Every additional delay

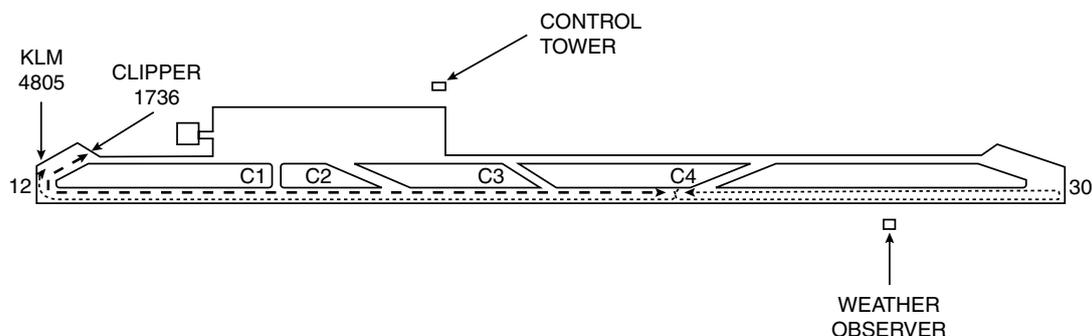


Figure 1.12 Los Rodeos Airport and runway 12/30

in Tenerife was shaving precious minutes off the available turnaround time. For a pilot used to scheduled flights, this was not an unusual situation to be in. Particularly during the winter months, delays or even cancellations due to poor weather were part and parcel of the job. However, for the past six years, van Zanten had only flown such flights in exceptional cases and was no longer used to such disruptions. As a check pilot,<sup>54</sup> he also spent a lot of time in flight simulators. Consequently, he was used to *creating* situations rather than finding himself stuck in them.

At 6:04 p.m., van Zanten instructed first officer Meurs to run through the pre-flight checklist. Immediately after Meurs completed the checklist, van Zanten began to push the thrust levers and prepare the engines for takeoff. He had given no further instructions to the crew, nor had the controllers in the tower cleared the flight for takeoff. Meurs intervened and said, “Wait a minute, we do not have an ATC clearance.” Van Zanten replied impatiently, “No, I know that, go ahead, ask.”

Meurs contacted the tower to report that the plane was ready for takeoff and to request clearance. The tower duly responded, “KLM eight seven zero five [sic], you are cleared to the Papa beacon. Climb to and maintain flight level nine zero. Turn right after takeoff. Proceed with heading zero four zero until intercepting the three two five radial from Las Palmas VOR.”<sup>55</sup> This gave van Zanten his instructions for the flight path after takeoff but, crucially, did not issue a takeoff clearance. Nevertheless, he uttered a relieved “Yes.”

While Meurs repeated the information over the radio, van Zanten applied thrust once again. Even if Meurs did not see what the captain was doing, he would have heard the tone of the engines changing. However, this time he said nothing. Meurs radioed the tower. “We are now – taking off.” This message could have meant either that the KLM flight was in the takeoff position or that the plane was already on the move. After initially acknowledging this message with an “okay,” the controller in the tower then added, “Stand by for takeoff. I will call you.” Unfortunately, the second part of this message was drowned out by a radio call from the Pan Am crew, who were worried that the KLM flight might try to take off while they were still taxiing on the runway. If two messages are sent simultaneously on the same frequency, then the signals become superimposed, creating shrill static noise. This static can only be heard by third parties and

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54 The official title is Type Rating Examiner.

55 VOR: Very High Frequency Omnidirectional Radio Range – a radio range used for navigation.

generally makes it impossible to understand any of the messages transmitted. Crucially, those directly involved are unaware that their transmissions have been affected. Consequently, the KLM crew only heard the “okay” from the controller, followed by an incomprehensible whistling noise. For their part, the tower controller and the Pan Am crew would have assumed their messages had been heard and understood. The frequency now became free again. The controller asked the Pan Am crew to confirm if they had left the runway. Up till now, he had addressed the crew with “Clipper,” the normal call sign for Pan Am flights. On this last call, however, he used the more unusual “Papa Alpha.”<sup>56</sup> Although the Pan Am crew would have understood it, it is possible that the KLM crew did not.

Due to the fog, neither of the two crews could see that their planes were on a collision course. Even so, flight engineer Schreuder was concerned enough to ask, “Is he not clear then?” Busy trying to keep the accelerating Boeing 747 in the center of the runway in foggy conditions, van Zanten did not catch what he said. “What did you say?” he asked. “Is he not clear – that Pan American?” repeated Schreuder. “Oh, yes,” said van Zanten and Meurs.<sup>57</sup>

The Pan Am crew was now worried by the radio transmission from the KLM plane saying, “We are now – taking off.” Captain Victor Grubbs growled, “Let’s get the f – – out of here.” First officer Robert Bragg added, “Yeah, he’s anxious, isn’t he?” Flight engineer George Warns also chipped in, “Yeah, after he held us up for an hour and half, that f – -.” At that moment, captain Grubbs spotted the outline of the KLM plane racing toward them and shouted, “There he is – look at him – f – – that – that f – – is coming!” Bragg cried, “Get off! Get off! Get off!” In an effort to get his plane off the runway, Grubb gave full power on both right engines.

Meanwhile, in the cockpit of the KLM plane, Meurs reported that they had reached V1.<sup>58</sup> That meant the takeoff could no longer be aborted. Four seconds later, van Zanten saw the Pan Am plane, which had just managed to get its front wheels on to the grass. “Oh, f – – ,” was all he said. His plane was still not going fast enough to take off. Nonetheless, van Zanten attempted to fly up and over the Pan Am plane. KLM 4805 did manage

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56 The flight number of the Pan Am plane was PA 1736. In radio transmissions, however, Pan Am flights were always addressed with the call sign “Clipper” (in this case “Clipper 1736”).

57 The cockpit voice recorder transcripts deviate with regard to this quote. While the Spanish accident report and the Air Line Pilot Association Report mentioned only van Zanten speaking, the Dutch report also showed Meurs saying “Yes.”

58 Once V1 is reached, the remaining stretch of runway is no longer long enough to halt the takeoff, and there is no choice but to proceed.

to lift off the ground before reaching the Pan Am flight, but it was too little, too late. Part of its landing gear caught the rear of the Pan Am cabin, while the engine on the far right ripped off the roof of the Pan Am cockpit. The KLM plane flew for about another 500 feet before crashing into the runway and bursting into flames. All 234 passengers and 14 crew members were killed instantly. The Pan Am plane was also in flames – 317 passengers and nine crew members died. Only 63 Pan Am passengers in the front section of the plane and seven crew members survived the disaster.<sup>59</sup>

Due to the fog, the two controllers in the tower initially only saw an explosion. Then they began to receive radio messages from other flight crews and realized something terrible had happened. The airport fire service reached the burning wreckage of the KLM plane first and tried to extinguish the fire. At first, because of the fog, they failed to see the burning Pan Am plane lying 500 feet away. The full extent of the disaster only became apparent when the fire crew started seeing people who had escaped the Pan Am wreckage (Figure 1.13).



Figure 1.13 **Wreckage of the KLM 747**

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59 A further nine passengers died later due to the severity of their injuries.

The accident on Tenerife was the subject of a detailed investigation by the Spanish, Dutch, and US aviation authorities. The catastrophic accident was caused by a number of factors. One of them was that the Spanish controllers' radio transmissions deviated from standard procedure. However, there was *one* individual who played a central role in the fatal events: captain van Zanten. He made the disastrous decision to go for takeoff without waiting for clearance from the tower controller.

During the investigation, it naturally emerged that the captain of the KLM flight was no ordinary pilot, but the head of flight training and safety. Aviation experts were left dumbfounded by this revelation. Following the analysis into the cause of the crash, the investigators also summarized the factors that contributed to van Zanten's poor decision.<sup>60</sup> It became clear that, although he was in charge of pilot training, it had been a long time since he himself had had any practical experience with scheduled flights. He must have found the bomb explosion at Las Palmas and the subsequent disruption to his flight extremely stressful. Plus, he had become unfamiliar with the routine involved in scheduled flights. It was obvious that the pressures caused by the restrictions on flying time made him increasingly impatient. As we all know, rational thinking often goes out the window when an emotion or feeling takes hold. In these situations, mistakes can happen. In this case, what was no more than clearance for departure was hastily misinterpreted as clearance for takeoff. However, one question remains: why did the other two members of the KLM crew not intervene?

Let us take a closer look at the cockpit team. The KLM plane was in the hands of a hierarchically structured team, with captain van Zanten at the head. His authority was even more absolute given his status as the man in charge of flight training. Although he was not responsible for disciplining other pilots, he did oversee their stipulated six-monthly check flights. These flights determined whether a pilot's license was extended. Van Zanten was also responsible for training and issuing licenses to new pilots. In this role, he had supervised Meurs' check flight for his license to fly the Boeing 747. Even so, the KLM cockpit recordings indicated that the atmosphere was very focused, but by no means overly tense. Like van Zanten, Meurs was also well aware of the time pressure. Both of them wanted to get off the ground as soon as possible. When, after turning the plane, van Zanten applied thrust before clearance was granted, Meurs tried to intervene and said, "Wait a minute, we do not have an ATC clearance." Clearly irritated,

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<sup>60</sup> Weick provides an excellent summary of the investigation reports; cf. Weick, K.E. (1990).

van Zanten snapped: “No, I know that, go ahead, ask.” This may be when the mood in the cockpit changed. The next time, when van Zanten applied thrust after receiving departure instructions but no clearance for takeoff, Meurs did not object. He simply contacted the tower to report “We are now – taking off.” Maybe he hoped the tower controller would stop them. In truth, the situation remained unresolved. Van Zanten saw things differently. For him, everything was crystal clear. His plane would shortly be in the air and he would be on his way to Gran Canaria, then Amsterdam. If he expected his crew to dispute his actions, their silence would have confirmed his belief that he was right.

Unlike the previous cases, we are dealing here not just with the authority of a superior, but also his *mood*, which set the tone for the rest of the crew. As we saw in the Birgenair incident, the mindset of the captain can become the be-all and end-all. In van Zanten’s case it was his emotional state that dominated events and influenced the crew. Van Zanten was impatient, and the other two were probably keen not to rile him further, but wanted to prevent his impatience from escalating and turning to anger.

Once again, we can empathize with the way our protagonists behaved. After all, such scenarios are familiar to all of us. In fact, we start internalizing these behaviors as children. We all had parents or teachers whose moods and feelings made it clear to us whether they were pleased or annoyed with us. If they were pleased, we learned to be happy and grateful. If they were annoyed, we felt ill at ease. Equally, we discovered how we could induce happiness and avoid generating anger. Interestingly enough, we rarely seem to be able to detach ourselves from this causality. In later life, we unquestioningly seem to transfer it to our roles as managers and employees. As a result, a manager’s mood dictates the atmosphere among his employees, even if he does not consciously intend it to. By the way, it is not just negative feelings that can influence others – a visibly good mood can have the same effect. Just think of the sense of euphoria generated by a new project with potential for success. In this situation, what employee would point out problems and thus rain on the parade, particularly if the rest of the staff is equally caught up in the general high?

In all the examples we have looked at, the tendencies to submit to authority, worry about possible reactions, or fear what will happen if the authority figure gets annoyed ultimately had fatal consequences. All that the copilots had to do was ask, give a warning, issue a correction, or – as we saw in the last case – insist on compliance with a specific regulation. This would have reminded van Zanten that he was not allowed to take off without explicit permission from the tower. It is possible that criticism would

not even have annoyed the captains in our case studies. Even if it had, the crews would hardly have found themselves in situations any worse than the accidents that subsequently unfolded. Yet the fact remains that they did not intervene, as they lacked the confidence to correct someone higher up the hierarchy. It was only later, with the advent of the CRM model that *safety, checking, and double checking* became the highest authorities in any cockpit communications.

The teaching case (written by Ulf Schäfer, Christoph Burger, and Jan U. Hagen) can be found at <https://www.esmt.org/mr-klm-c-jaap>