

No. 19Panair do Brasil S. A. , DC-8, PP-PDT, accident at Galeão Airport,
Guanabara State, Brazil on 20 August 1962. Report released by
the Brazilian Air Ministry (SIPAer).1. Historical1.1 Circumstances

The aircraft was on a scheduled international flight from Buenos Aires to Rio de Janeiro (Galeão Airport) and Lisbon. It arrived at Galeão Airport following an uneventful flight. Another crew took over for the last segment of the flight. From testimony and the readout of the flight recorder tape, which was recovered from the wreckage, the take-off was reconstructed as follows. The take-off run began at 2303 hours GMT from runway 14. The aircraft's acceleration appeared to be normal. The pilot-in-command declared that, at a speed between 100 and 135 kt (V_1), he noted that the control column was too far back and pushed it forward. At this point the co-pilot released the controls, which is normally done when the aircraft reaches V_1 . It is believed that in fact an attempt to rotate the aircraft was made around 132 kt. The aircraft continued to accelerate normally. The co-pilot announced 148 kt, the rotation speed (VR), and the pilot pulled back on the control column. However, the aircraft did not respond, so he pushed it forward again. No indication of this rotation attempt was revealed by the flight recorder reading. He and the co-pilot then pulled back on the control column, however, the nose of the aircraft did not rotate since the pilot had already reduced power 14 seconds after reaching VR. Also, the tape reading indicated that the brakes were used for 5 seconds prior to any power reduction. The first marks of braking were found approximately 2 300 m from the threshold. (See Figure 5) The pilot realized that the aircraft could not be stopped on the remaining portion of the runway so he turned the aircraft off the runway to the right and fully reduced power. The brakes were applied but not reverse thrust. Heavy and steady braking marks started 2 600 m from the threshold. Of his own accord, the co-pilot applied full power for reversion and tried to operate the spoilers but could not do so because of the bumps. The right wing lowered, dragging engines No. 3 and 4. The left wheels of the landing gear sank into the sand, and engines No. 1 and 2 also began to drag. All four engines lost their ejectors and reversion cones, causing the aircraft to accelerate. It continued moving at a high speed, hit the airport wall, crossed the adjoining highway, lost engines No. 1 and 2 and the left landing gear and finally came to rest in the sea, 50 m from shore. It drifted 100 m while floating and then sank to a depth of 8 m.

There were no lights on board the aircraft when it came to a stop as the automatic emergency lighting system did not function. One cabin attendant used one of the two flashlights available. The darkness increased the panic and confusion. The passengers could not use the main door as an exit because it would open into the sea. They did not know where the emergency exits were. However, the exits were then opened and most of the passengers left the aircraft on the starboard side. The fact that the four exits were all in the central part of the fuselage hampered the evacuation as the number of passengers (94) was considerable. The crew left the aircraft via the cockpit windows. No instructions had been given on emergency procedures and therefore the passengers and most of the crew did not take their life jackets with them when leaving the aircraft. Although the aircraft was equipped with six life rafts, no crew member tried to use them.

Three small Search and Rescue motorboats, with insufficient capacity, assisted in the rescue operations. Few life jackets were available. The smallest of the boats reached the site five minutes after the accident and twelve life jackets were distributed. The two other boats, based at Santos Dumont Airport, arrived much later. Twenty-five minutes after the accident, the aircraft had submerged completely.

1.2 Damage to aircraft

The aircraft was damaged beyond repair.

1.3 Injuries to persons

Of the 11 crew and 94 passengers aboard the aircraft, 1 crew member (a stewardess) and 14 passengers drowned. Seven crew and 27 passengers were injured.

2. Facts ascertained by the Inquiry

2.1 Aircraft information

The aircraft had a certificate of airworthiness valid up to 30 September 1962. Maintenance on the aircraft was up-to-date on the day of the accident. No abnormalities concerning the aircraft were reported by the crew who flew the aircraft just prior to the subject flight. The aircraft was involved in a minor accident on 9 July 1962 but had been repaired and returned to service. The accident of 20 August was in no way related to the previous one.

The aircraft's centre of gravity position was at 23%, i. e. between the permissible limits of 17.5% and 32%. At take-off the gross weight of the aircraft was approximately 305 000 lb. This is less than the maximum allowable of 315 000 lb for a DC-8 taking-off from Galeão Airport in the prevailing weather conditions.

2.2 Crew information

The pilot-in-command had adapted well to jet aircraft and was considered to be a studious pilot. He had a total of 13 504 hours flying experience, and all his ratings were valid. His time on DC-8 aircraft was 812 hours. He had not flown during the 43 days prior to the accident. He was examined on ditching procedures in 1957, and he had not been checked on them since that time.

The co-pilot was also considered to be a competent and well-experienced pilot having flown 14 643 hours including 223 hours on DC-8 aircraft. During the 30 days before the accident he flew 45 hours. His training on ditching procedures ended in May 1956, and he had not been checked on them since.

The flight engineer had 7 508 hours of flight experience including 906 hours on DC-8's. His most recent flight was five days before the accident.

2.3 Weather information

The weather conditions were good at the time of the accident.

2.4 Navigational Aids

Not relevant to this accident.

2.5 Communications

Radiocommunications with the aircraft were normal prior to the accident.

2.6 Aerodrome Installations

Runway 14 is 3 300 m long. The aerodrome lighting was operating normally at the time of the accident.

2.7 Fire

Although fuel spilt by the aircraft on the ground and the water caught fire, the aircraft itself did not catch fire. The ground fire was first fought by airline and airport employees with portable fire extinguishers. Subsequently, firemen took over. The flaming fuel on the sea was, fortunately, carried away from the wreckage by the sea's current.

2.8 Wreckage

The left landing gear and engines No. 1 and 2 had been torn off. The nose wheel, the right landing gear and engines No. 3 and 4, which were all badly damaged, had remained with the aircraft.

Underwater dives were carried out to check the position of certain components of the aircraft and subsequently the aircraft was floated and removed to the beach in order that the damage could be studied further. The aircraft had been damaged first by the accident and then by salt water corrosion.

3. Comments, findings and recommendations

3.1 Discussion of the evidence and conclusions

From examination of the wreckage and subsequent tests, the following conclusions were reached:

- the controls were free and operating normally up to the time of the accident;
- the autopilot was not in operation;
- the stabilizer, which had been set at 3° nose-up prior to take-off was at a setting of 1-3/4° nose-down at the time of impact;
- no evidence of mechanical failure, short circuit or malfunction was found in the stabilizer's mechanism.

Although the cause of the change in the stabilizer's setting could not be definitely determined, the most likely hypothesis for this change was inadvertent action by the pilot on the servo motors electric control switches located on the control column wheel. This caused the stabilizer to assume a full nose-down position. As the stabilizer's position indicator is not easily seen at night, and as there is no warning device indicating an abnormal setting, the pilot was unaware of the situation. When the aircraft failed to take off after three attempts, the pilot believed that the stabilizer was not operating, and he decided to abort the take-off.

This decision was taken approximately 9 seconds after reaching the rotation speed (VR) and by that time the aircraft had reached a speed of 170 kt and was about 1 100 m from the end of the runway.

The following acceleration-stop distances were calculated for a normal emergency stop procedure and taking into account the prevailing weather conditions at the time of the accident:

	IAS at which decision to abort take-off is taken		
	148 kt (VR)	160 kt (V_2)	170 kt ($V_2 + 10$)
Acceleration distance	1 700 m	1 970 m	2 150 m
Stop distance	732 m	782 m	840 m
Total distance	2 432 m	2 752 m	2 990 m

However, the pilot-in-command did not use correct emergency stop procedure. He first started to apply brakes and reduced power 5 seconds later when the aircraft was only 700 m from the end of the runway. He did not reverse thrust, which was done later on by the co-pilot, and the spoilers were not used. Furthermore, he did not inform the crew of his decision to abort the take-off, which resulted in considerable confusion in the activities of the crew.

Regarding the non-operation of the emergency lighting systems of the aircraft at the time of the accident, the Panair maintenance division assumed that -

- 1) when checked 60 hours before the accident, the batteries on the aircraft had already reached their lifetime, or
- 2) they failed during the last 60 hours before the accident.

It was observed that inadequately manufactured batteries require frequent replacement. Also, as a result of failure to comply with instructions, unnecessary use is made of the emergency lights at flight terminals.

It was also considered that the pilot's lack of flying experience during the 43 days before the accident had a bearing on the accident.

3.2 Probable cause

The take-off was discontinued when the aircraft would not rotate at a speed of 175 kt because the stabilizer setting had switched from 3° nose-up to 1-3/4° nose-down.

Contributing factors to the accident were the delayed decision of the pilot to abort the take-off and the incorrect compliance with the standard procedure used for emergency stopping.

3.3 Recommendations

The following were recommended following the investigation of the accident:

To the manufacturer

- a change in the stabilizer control system to reduce the possibility of unintentional handling;
- a warning device to indicate the wrong position of the stabilizer;
- improvement of the conspicuity of the stabilizer's indicator, especially for night flying;
- a study to improve the distribution of emergency exits to allow for speedy evacuation;
- better lighting to show the location of emergency exits;
- further study of the emergency lighting system;

To operators

- review of procedures for instructing passengers before take-off on emergency procedures and use of aircraft survival equipment;
- mandatory compliance with crew briefing requirements before take-off;
- strict surveillance of pilots who have not flown within the last 30 days;
- systematic re-study of emergency lighting systems;
- use of flashlights by stewards during night take-offs and landings.

To the Air Ministry

The Accident Investigation Board should follow up the studies recommended by the General Inspectorate to:

The Directorate of Civil Aviation

The Directorate of Air Routes

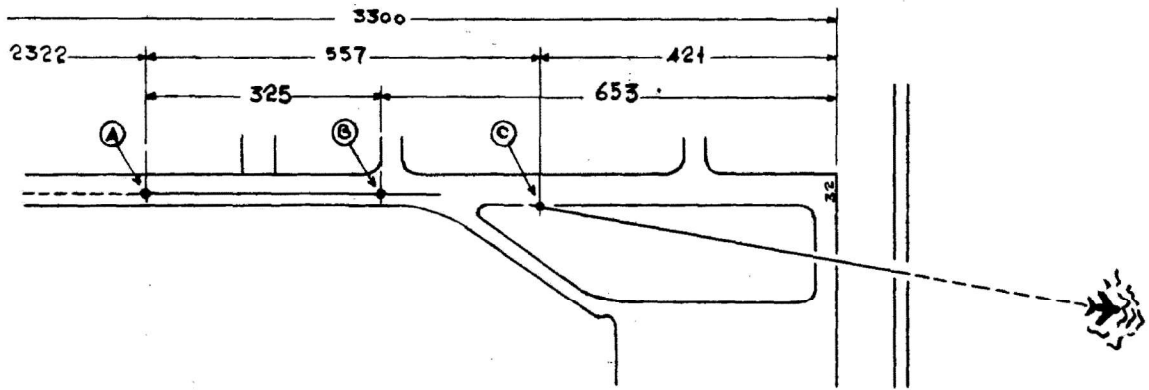
The Directorate of Health

The Directorate of Engineering

concerning data obtained during all investigations which may be of interest as far as flight safety is concerned.

The Accident Investigation Board should ask foreign organizations for reports on accidents to jet aircraft in order to disseminate their findings to Brazilian airlines.

ACCIDENT TO DC-8, PP-PDT OF PANAIR DO BRASIL S. A. AT GALEAO AIRPORT, BRASIL



CORRELATION WITH THE MARKS FOUND ON THE RUNWAY

- A - FIRST BRAKE MARKS
- B - BEGINNING OF VIOLENT BRAKING
- C - POINT WHERE THE AIRCRAFT LEFT THE RUNWAY

FIGURE 5