

No. 10

Línea Aérea Nacional, DC-3, CC-CLDP, crashed into Lástima-Pejerrey Hill, 44 km southeast of Linares, Chile on 3 April 1961. Report, dated 8 May 1963, released by the Directorate of Aviation - Chilean Air Force Headquarters, Chile.

Circumstances

The aircraft was on a scheduled passenger and cargo flight (LAN 210) from Castro (Chiloé) to Santiago, with stops at Puerto Montt and Temuco. Departure from Temuco on the last segment of the flight was at 2230 hours GMT in IFR conditions. The flight was to follow airway 45 or 40 south at an altitude of 8 500 ft and the trip was estimated to be of 2 hours 30 minutes duration.

At 2345 hours the pilot requested clearance from Santiago Control, through Concepción radio and Santiago radio, to descend to a lower altitude due to icing. Santiago Control did not authorize descent in view of conflicting traffic (LAN 205) on airway 45, and the aircraft maintained 8 500 ft, estimating Curicó at 2357 hours.

Santiago control cleared LAN 210 to turn back on airway 45 and then descend to 6 500 ft on the same airway, pass over Curicó at 6 500 ft and continue on airway 40 south at the Santo Domingo radio beacon.

Santiago radio failed to establish direct communication with the aircraft, and the instructions were transmitted to Concepción radio, which relayed them to the aircraft, but no acknowledgement was received.

The descent clearance request was the last communication heard from LAN 210, and contact with the aircraft was lost.

On 10 April it was confirmed that the aircraft had crashed and was completely destroyed. All 24 persons aboard (4 crew and 20 passengers) were killed.

There were no eyewitnesses to the accident.

Investigation and EvidenceThe Aircraft

Its certificate of airworthiness was valid, and maintenance work on the aircraft had been routine. The aircraft was authorized to operate with a total of 32 seats, including crew, and with a maximum take-off weight of 26 200 lb. Its total flight time was 18 299 hours.

The aircraft's de-icing equipment, fitted to the leading edges of the wings and the fixed tailplanes, had been removed because of maintenance difficulties. The airline's operations manual clearly stipulates that no aircraft may operate under icing conditions.

The airborne radio equipment had been repaired, and it is considered that, owing to the weather prevailing on the day of the accident, this equipment may have failed.

The Crew

The pilot-in-command held a senior commercial pilot's licence and had flown a total of 6 012 hours, of which 714 were on instruments and 364 hours by night.

The co-pilot held a commercial pilot's licence with a total of 489 hours, of which 8 were on instrument flight.

The flight radio operator's licence had expired.

Airway 45

It begins in the south at Victoria and extends towards Chillán, Curicó, Melipilla and Santiago through the central part of the country. Radio beacons are located in

Victoria, Curicó, Melipilla and Santiago, in addition to the Los Angeles beacon, 48 miles north of Victoria and the Concepción beacon on the coast, a quarter of a mile from Chillán and about 50 miles from Los Angeles.

A radio beacon, which should be located at Chillán, is lacking on the 205-mile Victoria-Curicó leg. The distance from Curicó to Melipilla is 75 miles, and from Melipilla to Santiago about 28 miles.

Investigation showed that military aircraft were not using this airway because the range of the Curicó and Victoria radio beacons and the receiving conditions of the aircraft radio compasses were not sufficiently reliable for adequate flight control. In addition, the commercial radio stations used as a control supplement were not sufficiently reliable for continued operations, and the prevailing winds were westerly - all of which made this airway unsafe.

A check revealed that the range of the Victoria and Curicó beacons is some 50 miles.

#### Hypothesis - reconstruction of the flight

The aircraft took off from Temuco at 2230 hours and engaged on airway 45 at an altitude of 9 500 ft. Because of icing on the wings, which were not fitted with de-icing equipment, the pilot requested clearance through Concepción radio to descend because his equipment, through failure or lack of power, failed to establish direct communication with Santiago Control. Clearance to descend was not granted owing to the presence of another aircraft (LAN 205) on a lower level, but the aircraft was authorized to turn back and descend to 6 500 ft.

The aircraft was flying the 205-mile Victoria-Curicó leg. It may be assumed that the radio beacons did not fully cover the area and, therefore, the aircraft either lost contact with them or their signals were too weak to be perceived. These circumstances, together with the strong westerly

wind blowing at that altitude contributed to the aircraft's drift towards the mountain range. On receiving the authorization to turn back, the pilot initiated a turn to the right, i.e. towards the mountains into which the aircraft crashed at 7 000 ft.

#### Support for this hypothesis

Before impact the aircraft made a turn to proceed on a southwesterly heading, followed by descent, a manoeuvre attributed to the following:

- a) decision by the pilot in order to counter the ice formation;
- b) compulsory manoeuvre resulting from the aircraft's loss of aerodynamic properties through ice formation;
- c) possibility of direct reception of Santiago radio during its transmission of the authorization requested by the pilot;
- d) compulsory manoeuvre caused by a downward current in the Andes.

The position and orientation of the wreckage proved that the aircraft was on a southwesterly heading.

Factors which may have affected the airborne compass bearings -

- the distance separating the radio beacons along the segment
- cloudy sky with tendency to ice formation
- impending storm

The 50-mile range of the radio beacons left a distance of about 105 miles over which the pilot flew IFR without any ground aids.

Concepción radio, which was in touch with the aircraft, heard no reports of mechanical failures or emergency calls.

Transmissions reached the aircraft after a 14-minute delay.

The upper wind conditions were:

at 7 500 ft	240°/25 kt
at 9 500 ft	250°/35 kt

Reasons against the hypothesis

Airway 45 had been regularly used by this airline, and no comments had been sent to the Directorate of Aviation.

There are two radio beacons in the Victoria-Curicó segment of airway 45, and both functioned normally on the day of the accident.

Wreckage examination

The aircraft crashed on La Gotera Hill, which is part of the Lástima-Pejerrey range.

From the wreckage's position it was determined that the flight was on a south-west heading, although owing to the aircraft's being entirely destroyed and burnt out it was not possible to state its speed or altitude, or whether the left engine had failed. At impact it appeared that the right engine was functioning normally.

It was not possible to determine the cause of the accident from the navigation instruments or the wreckage.

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