

No. 4

Swissair, DC-3C, HB-IRK, crashed into Lake Constance near Arbon, Switzerland, on 18 June 1957. Report released by the Federal Air Office, Switzerland.

Circumstances

The aircraft took off from Kloten aerodrome at 0857 hours on a training flight. At the same time members of the Swissair planning service were to undertake flight performance tests. At 1020 hours the aircraft went into a spin and crashed into Lake Constance about 4.5 km northeast of Arbon. The aircraft was destroyed, and all nine persons aboard were killed.

Investigation and EvidenceCrew Experience

The pilot-in-command and flight instructor had approximately 2 800 hours flying experience as well as the following licences:

private pilot licence
military pilot licence
commercial pilot licence
airline transport pilot licence - type ratings: C-47, CV 240 and 440
pilot-in-command DC-3
pilot-in-command Convair
flight instructor for commercial pilots

The co-pilot had 263 hours flying experience and the following licences:

private pilot licence (ratings: aerobatics and aero-tow; aircraft types: Fairchild, Cessna 170 and Cessna 172)

commercial pilot licence (ratings: DC-3 and DH-89 Dragon Rapide)

In 1956 he failed IFR rating test and was dismissed by Swissair as airline transport pilot candidate, owing to

unsatisfactory blind-flying performance and on medical grounds. He subsequently re-joined Swissair planning bureau as technician.

Also aboard the aircraft on the flight were five student pilots and two Swissair engineers.

The Flight

The flight was being conducted for two reasons:

1. training of airline transport pilot candidates (VFR flight exercises in cutting of one engine and feathering and unfeathering propellers in cruise);
2. Swissair planning department tests for a revision of the DC-3 flight performance table.

The aircraft left Kloten at 0857 hours and two minutes later informed the control tower by radiotelephony that it intended to operate in the Lake Constance-Schaffhausen area in VFR conditions. That was the last communication received.

The exact flight path could not be determined. However, the statements of numerous witnesses revealed that the aircraft flew in various directions between approximately 1 000 and 3 000 metres above sea level in the Lake Constance area. Furthermore, several witnesses claim to have seen the aircraft operate on one engine.

Shortly before 1020 hours HB-IRK flew in an easterly direction between Romanshorn and Arbon. Several witnesses noticed a brief sinking motion in the level flight,

immediately followed by a climb during which the aircraft suddenly stalled and went into a spin. The aircraft's altitude at the beginning of the spin is estimated at 1 100 to 2 100 metres above ground. There were conflicting statements with respect to the direction of the spin and the number of turns.

The aircraft struck the surface of the water and sank in a few minutes.

Technical Investigation

Thorough investigation of the wreckage revealed no evidence of any technical malfunction.

On impact with the water the aircraft was in the following configuration:- undercarriage fully extended; flaps retracted; trim position impossible to determine; right propeller not feathered; twin RPM indicator showed left engine - 1 550 RPM, right engine - 1 350 RPM.

Discussion of Evidence

At the time of the accident the co-pilot occupied the left pilot seat. Although officially this was in order, it did not correspond to the flight programme. The Investigation Commission believed that the initiative for this change most likely came from the co-pilot.

In the Commission's opinion, the flight performance tests had no connection with the accident.

On the basis of extensive domestic and foreign experience, DC-3 aircraft can be described as relatively spin-proof. No systematic spin checks for transport aircraft of this size and larger are required within the framework of airworthiness tests. Therefore, no official

results are available either from the manufacturer or from the trial authorities. Thorough studies have been conducted in the U. S. A. by the National Advisory Committee of Aeronautics (NACA) with a view to determining the spin characteristics of large transport aircraft as well as the procedure for pulling out of a spin.

According to a number of witnesses, the level flight of HB-IRK first turned into a brief descent immediately followed by a climb, and then suddenly the aircraft stalled and went into a spin dive. Examination of the wreckage revealed that the aircraft struck the surface of the water in a very steep dive, practically without a turn along its longitudinal axis. Statements of witnesses on the number of spin turns vary between four and twelve, and estimates of the altitude before the commencement of the spin range from 1 100 to 2 100 metres above ground.

On the basis of these indications concerning events immediately prior to the crash, the Commission reached the following conclusions: after an unknown manoeuvre over Lake Constance at an altitude of 1 100 to 2 100 metres above ground the aircraft reached a point where its airspeed became too low and thus quite unexpectedly went into a spin. Although the crew were able to stop the spin shortly before impact, it was impossible to level off the aircraft within the altitude available. It was not possible to determine the action taken by the pilots during this sequence of events.

Probable Cause

The accident is attributed to the stalling of the aircraft following loss of airspeed, whereupon it unintentionally went into a spin. In view of insufficient altitude, it was not possible to level off the aircraft.