

No. 15

Avianca, Douglas DC-3 Hiper HK-161 accident on Tajumbina Peak, Department of El Cauca, Bolivia, on 24 December 1966. Report, undated, released by the Civil Aeronautics Administration, Colombia

1.- Investigation1.1 History of the flight

Flight 729 was a scheduled domestic flight from Bogotá Eldorado Airport to Pasta Cano Airport. It was scheduled to depart Bogotá at 0615 hours local time; however, when the crew reported to the Avianca operations office at 0550 hours they were advised that Eldorado Airport was closed owing to thick fog. The airport was reopened to operations at 0750 hours. At about 0830 hours Flight 729 was observed to have commenced taxiing and entered the runway system without having received a clearance to do so. The flight was then given instructions for Runway 30 but further transmissions on 121.9 mc/s were not acknowledged. The flight was subsequently contacted on 118.1 mc/s and the pilot stated he had confused instructions with those given to another aircraft. Take-off was made on Runway 30 and when over the threshold of Runway 12 the aircraft commenced a very steep turn to the left in a nose-high attitude. Recovery was effected and the aircraft departed at 0838 hours on a VFR flight plan.

After the take-off and climb the flight left the Bogotá tower frequency and subsequently contacted Bogotá Control and Route Control on 5589 Kc/s.

The following position reports were received:

12 500 ft over Guataquí at 0842 hrs, over El Paso at 0902 hrs, over Tuluá at 0924 hrs; at 8 500 ft over Cali, at 0942 hrs, and at 8 500 ft over Santander at 0948 hrs estimating Dos Rios at 1014 hrs. No position report for Dos Rios was received.

The Tuluá position report was transmitted to Cali as follows:

"Tuluá 0922 descending to 8 500, estimating Cali 0942". As the message was very weak the flight was requested to confirm its departure and position; it reported on route frequency 5476.5 Kc/s its departure as 0825/38. The flight was then requested to change to VHF frequency 119.1 for radio contact when approaching Cali. It did so but as its signals were not heard it returned to the route frequency stating that it would remain on that frequency since it had not been able to establish contact on the VHF frequency.

At 1030 hrs Cali requested information on the flight from Pasto, which reported that the flight had not arrived and there was no information about it. From 1030 hrs onwards the aircraft was called on all available frequencies but no reply was received. An alert phase was declared at 1100 hrs and followed by a distress phase at 1125 hrs.

The wreckage of the aircraft was found on 3 January 1967 after 11 days of searching. It had crashed and caught fire at an elevation of approximately 11 600 ft on the southern slopes of Tajumbina Peak (elevation 13 572 ft) in the El Descanse Police Inspectorate. Co-ordinates of the site of accident were 1°20'30" N-76°47'30" W. The accident occurred at approximately 0956 hrs on 24 December 1966.

#### 1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	3	26	
Non-fatal			
None			

#### 1.3 Damage to aircraft

The aircraft was destroyed by the impact and subsequent fire.

#### 1.4 Other damage

There was no other damage.

#### 1.5 Crew information

The pilot-in-command, aged 31, held a valid airline transport pilot's licence with type rating and instrument rating for DC-3s. He also held a flight radio telephone operator licence. His medical certificate was valid until 5 February 1967. He had passed satisfactorily his last proficiency check on DC-3 aircraft on 30 August and 1 September 1966 and was familiar with the route having flown on it many times. He had flown a total of 6 653 hrs including 2 069 hrs on DC-3 aircraft.

His record revealed that on 23 May and 12 December 1966 he had flown over towns at low altitude and action had been initiated by the Administration. On 19 December 1966 he had been fined for having flown 13 days with an expired medical certificate. There was no mention of any previous accidents in his log book.

It was found during the investigation that on the night of 23 December 1966, the day before the accident, the pilot-in-command visited with some friends two clubs and consumed at both places an unspecified quantity of alcoholic drink. He left the latter place at 0400 hrs on 24 December and went directly to the airport reporting to the Avianca Operator's office at 0550 hrs. It was therefore concluded that his physical condition was not satisfactory for flying since he had not had appropriate rest before flying and furthermore had taken alcoholic drinks which had impaired his physical and technical capabilities. Also, in his flying bag which he had forgotten at Eldorado Airport, there was a bottle labelled "Librium 25 - Roche - 25 mgs, 20 pills". It contained three pills. This drug is strictly inadvisable for flight personnel as it may cause somnolence, vertigo, syncope, itching, dermatitis, difficulty in thinking, confusion etc. There was no proof that this drug had been taken by the pilot or that it had been used with any regularity, and this can only be regarded as a possibility.

The co-pilot, aged 25, held a valid commercial pilot's licence with rating as co-pilot on DC-3 aircraft and air-instrumental rating. His medical certificate was valid until 25 June 1967. He had passed satisfactorily his last proficiency check on a DC-3 aircraft on 23 and 24 August 1966. He had flown a total of 1 701 hrs including 1 097 hrs on DC-3 aircraft as co-pilot.

The cabin attendant was also properly certificated and had a medical certificate valid until 8 February 1968.

#### 1.6 Aircraft information

The Certificate of Airworthiness of the aircraft, issued after inspection by an official of the Department of Civil Aviation on 10 September 1966, was valid until 1 September 1967.

The aircraft radio equipment was also inspected on 10 September 1966 and a radio certificate was issued which was valid until 31 August 1967.

The aircraft had been properly maintained in the airline workshop in accordance with the airline maintenance schedule and the regulations of the Department of Civil Aviation. It had flown a total of 28 422 hrs including 8 066 hrs since last major overhaul, 996 hrs since the latest overhaul and 20 hrs since the last service check.

According to the airline passenger and cargo manifests the all-up weight of the aircraft at take-off from Eldorado Airport was 12 202 Kg. This was the maximum authorized for this type of aircraft at sea level. At the time of the accident it was calculated that the weight of the aircraft was approximately 11 764 Kg. The centre of gravity both at take-off and at the time of the accident was at 24 per cent MAC which was within the permissible limits of 20 per cent to 28 per cent.

#### 1.7 Meteorological information

According to the meteorological reports and the report of the pilot-in-command of another aircraft, which flew on the route, as planned by Flight 729, between 0820 hrs and 1014 hrs and returned 30 min. later by the actual en-route weather conditions were good for VFR. The pilot stated in his report that he observed large cumulus and low stratus in the direction of Girardot and that on reaching Dos Rios he observed a fair degree of cloud towards El Eco and the passageway over Taminganco was already hidden. Therefore he continued on a heading of 200° and made a visual entry by Nectar Whisky de Pasto. He further stated that at El Eco and Sierra Echo de Pasto there was bad weather and rain. According to ground eyewitnesses there was a thick cloud formation in the area of the accident.

#### 1.8 Aids to navigation

The aircraft was equipped with two ADF, two HF's and VHF's and dual navigation instruments. There were no navigational aids available in the region over which the aircraft flew after passing Neiva.

#### 1.9 Communications

Most of the communications from the flight were made on HF's (5589 Kc/s), when transmitting the Tuluá position report the flight contacted Cali on 5476.5 Kc/s, the

message was weak and the flight was requested to switch to VHF; however, contact could not be established and the flight switched back to HF (5589 Kc/s). At 0948 hrs it reported as being over Santander at 8 500 ft, estimating Dos Rios at 1014 hrs. Nothing further was heard from the aircraft and subsequent calls by ground stations remained without reply.

1.10 Aerodrome and ground facilities

Not relevant to the accident.

1.11 Flight recorders

Not mentioned in the report.

1.12 Wreckage

After an extensive aerial search involving nearly 360 hrs flying time, the aircraft's wreckage was located, eleven days after the accident on the slopes of the Central Cordillera, on a QDM of 260° from Pasto NDB. The aircraft had struck the mountainside on a heading of 205° in the Río Cascabel Canyon at an approximate elevation of 11 600 ft.

At impact the aircraft was probably banking to the right at an angle of approximately 150 and in a 20° to 30° nose-down attitude. No evidence of a prior impact was found and it was considered that the aircraft may possibly have gone into a stall as a result of an abnormal manoeuvre.

As a result of the impact the aircraft broke up into five main parts: left wing, central section, right wing, passenger cabin and tail unit. No evidence of pre-impact failure of the aircraft or its controls were found. Although it was impossible, because of the impact and subsequent fire, to determine whether the engines had been functioning properly, it appeared that they were operating normally at the time of impact. The undercarriage and flaps were in the retracted position.

1.13 Fire

Fire broke out following impact.

1.14 Survival aspects

It was a non-survivable accident.

1.15 Tests and research

Not mentioned in the report.

2.- Analysis and Conclusions

2.1 Analysis

It was established that when flying from Bogotá to Pasto, the pilot-in-command, instead of using the approved route, sometimes flew via Girardot and Neiva, crossing the Central Cordillera over the "Volcan del Puracé" mountain range (15 240 ft). This was confirmed by the fact that a direct route from Pasto to Girardot at a heading of 37° was traced on a chart found in the flight bag which he had forgotten at Eldorado Airport on 24 December.

As the wreckage of the aircraft was found at an elevation of 11 600 ft on the southern slopes of Tajumbina Peak, in the "Volcan Doña Tuana" mountain range, it was believed that the pilot-in-command was most probably flying the route via Girardot and Neiva and that he transmitted position reports as if he were following the approved route in accordance with his flight plan. The fact that his VHF transmissions, when he reported as being over Tuluá at 0922 hrs descending to 8 500 ft, were not received by Cali appeared to indicate that there were ground obstacles (the Central Cordillera) between the aircraft and Cali at that time. Furthermore, although the flight reported at 0942 hrs as being over Cali at 8 500 ft, the aircraft was not observed. Finally, ground witnesses stated that at approximately 0930 hrs they saw a large aircraft, similar to Avianca's aircraft, coming from the direction of the Río Cascabel Canyon, passing over "El Descance" at low altitude, between clouds, and disappearing in the direction of a place known as "La Eusillada", towards the upper reaches of the Río Cascabel Canyon.

It was concluded that the pilot-in-command flew the aircraft below the minimum safety altitude specified for the Central Cordillera in the Manual of Aeronautical Rules and also he did not comply with the regulations regarding VFR flights.

## 2.2 Conclusions

### (a) Findings

The Certificate of Airworthiness and radio certificate of the aircraft were valid until 1 September 1967.

The aircraft and its power plants had been correctly maintained in accordance with the airline's maintenance schedule, duly approved by the Civil Aeronautics Administration. The aircraft, engines, propellers and equipment were within operating limits as laid down by the respective manufacturers.

The gross weight and centre of gravity of the aircraft were within permissible limits.

The crew members were properly certificated. The pilot-in-command committed serious errors prior to the flight. He had stayed out late and did not take any rest prior to the flight. He had consumed alcoholic drinks within 8 hours of flying, as a result of which his physical fitness and mental faculties were diminished. Also, a drug, strictly inadvisable for crew members on active duty, was found in his flight bag. It was not known how often he had used the drug. The foregoing circumstances constituted violations of the rules in Sections 40.1 21.2 of Part IV and Sections 51.5.1 and 51.6 of Part V of the Manual of Aeronautical Rules. He also committed the following errors during the flight:

- (a) he did not take his flight bag on board;
- (b) after take-off and while over runway end 12, he started a very steep turn to the left, with the aircraft nose up higher than is allowed in the Operations Manual for this manoeuvre;
- (c) he did not follow the reported route, made false position reports and carried out the flight outside the route prescribed in the Colombian Air Routes Manual;

- (d) he was over-confident about his knowledge of the route chosen;
- (e) the available meteorological information indicated that after departure from Eldorado Airport, the flight was continued in visual meteorological conditions (VMC) until it encountered cloud formations along the chosen route, more precisely over the "El Descanse" Police Inspectorate. Subsequently, over the Rfo Cascabel Canyon and in the mountain area the cloud cover was such as to obscure the Cordilleras and the aircraft may have had to fly intermittently between the clouds and to continue the flight in unfavourable meteorological conditions (IMC);
- (f) while flying over El Descanse and because of the cloud formations encountered in the Central Cordilleras, professional caution should have prompted the pilot to transfer from VFR to IFR, and to climb to 16 000 ft, the minimum safety altitude laid down in the Route Manual for crossing Airway 22. By failing to do so, the pilot violated the provisions laid down in Sections 40.6.1.1, 40.5.1, of Part IV and Sections 51.5.1, 52.1 - 52.3, 52.3.5, 52.4.1, 53.1, 53.3, 54.5.4, 54.5.5, 54.5.6 of Part V of the Manual of Aeronautical Rules.

The flight was made via Bogotá, Girardot, Whisky de Neiva, Sierra del Volcán Puracé route and not via the route reported to Cali Radio Control.

The aircraft maintained contact with Cali Radio Control from 0922 hrs local time until 0948 hrs, i.e. approximately eight minutes before the accident, and did not report any malfunction or failure of the aircraft; its engines or equipment.

According to the 0900 hrs and 1000 hrs local time meteorological reports, weather conditions were generally good on the Girardot, Tuluá, Cali, Popayan, Pasto route, but according to another crew flying on the Bogotá - Pasto - Bogotá route there was rain and bad weather at El Eco and Sierra Echo de Pasto. On the route taken by the aircraft there were no weather observation stations from Neiva to the south but according to ground witnesses there was a very thick cloud formation in the area of the accident.

The possibility of an engine failure was eliminated in view of the fact that the aircraft passed over "El Descanse" at about 5 000 ft and climbed to about 6 600 ft in order to enter the mountainous zone of the Rfo Cascabel Canyon. No evidence was found of any explosion or fire during flight. The aircraft crashed at an elevation of about 11 600 ft, possibly in a stall, in a region where the prescribed minimum safety altitude is 16 000 ft.

(b) Cause or  
Probable cause(s)

The accident was attributed to pilot error consisting of inflight indiscipline and rash imprudence on the part of the pilot-in-command of the aircraft for:

1. not having made use of the regulation rest period and having consumed alcoholic drinks a few hours before flying;
2. not having followed the route recommended in the Manual of Colombian Air Routes, which he reported he was taking;

3. having reported positions that did not correspond to reality;
4. continuing a visual flight in unfavourable IFR conditions thereby failing to comply with the standards laid down in Part V of the Manual of Aeronautical Rules;
5. having flown at an altitude below the minimum safety altitude laid down for visual flying in Part V of the Manual of Aeronautical Rules (he flew along the Canon del Río Cascabel and subsequently crashed at an altitude of about 11 600 ft).

A possible contributory cause of this accident was inadequate supervision by the Airline consisting of a lack of control over the flight crews.

### 3.- Recommendations

Recommendations concerning the case were made by the Directorate of the Air Safety Division for company, pilots, workshops and aeronautical personnel so as to avoid the occurrence of similar accidents in the future. It was also proposed that the Department's Committee of Technical Co-ordination take any disciplinary measures that may be necessary.

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