

No. 54

Aviación y Comercio, S.A., Languedoc M.B.-161, EC-ANR, accident in the Guadarrama Mountains, 4 December 1958. Report released by the Directorate General of Civil Aviation, Spain.

Circumstances

The aircraft took off from Vigo airport at 1540 hours on a scheduled flight to Madrid, with a crew of 5 and 16 passengers on board. The flight was cleared IFR for cruising level 95. At 1605 the flight advised Madrid D. F. station that it had overflown Guinzo de Limia at 1600, in cloud, and estimated the Salamanca JW radio beacon at 1650. At 1654 the aircraft advised Madrid D. F. station that it had overflown Salamanca at 1650 at level 95 and estimated Madrid at 1730 - also that its VHF equipment was out of order, and it was, therefore, requesting Barajas Tower to stand by on 3 023.5 kc/s. At 1710 Madrid control cleared the aircraft to proceed directly to Barajas radio range, maintaining flight level 95. At 1715 Madrid control authorized the aircraft to switch over to 3 023.5 kc/s and to establish contact with Barajas Tower on that frequency. This was the last communication with the aircraft. Between 1715 and 1720 the aircraft crashed and burst into flames on the peak of "La Rodilla de la Mujer Muerta" which is 1 999 metres, approximately 800 m lower than flight level 95. All aboard were killed, and the aircraft was destroyed.

Investigation and EvidenceThe Aircraft

At the time of the accident, the aircraft had flown a total of 6 301 hours since its major overhaul, and approximately 1 387 hours since its last 1 500 - hour overhaul. Its Certificate of Airworthiness was valid. The take-off weight from Vigo was 20 720 kg, 2 680 kg less than the maximum permissible.

The Wreckage

The state of the aircraft's wreckage led to the conclusion that the aircraft was functioning normally at the time of the crash. It had struck the mountain slope in a normal flight attitude pitched slightly up and inclined to the left. The impact and the rupture of the tanks started a fire; and, because of the slope (25° - 30°), part of the fuel poured down on to the fuselage, causing its complete destruction.

Meteorological factorsThe mountain-wave effect and downdrafts on the lee side.

There was no evidence that these factors could have jeopardized the flight. In spite of uncertainty about the wind data, it cannot be assumed, even under the most unfavourable circumstances, that air flow over the divide of the central system might have reached the force of a 35 kt transversal wind. Even at such a value, however, the aircraft had a sufficient safety margin in the 600 metres at which it was flying over the mountain divide. The sea level pressure was below normal; even so, however, assuming the aircraft was not using QNH, level 95 did in fact correspond to the true altitude of 2 800 metres, as is shown by the upper air observations.

Turbulence

Turbulence was, undoubtedly, present over the mountain divide. At level 95 it would, in general, have been moderate, but short intervals of more severe turbulence might have been encountered when crossing cumuliform clouds.

Nonetheless, taking into account the Languedoc's cruising speed, it is unlikely that such turbulence could seriously have affected the flight's safety.

Icing

At level 95, the air temperature was 3 or 4 degrees below zero. This, together with the prevailing cloud structure, indicates that icing may have been present. The 1800 hour synoptic weather report for the Cogorros indicated fog with rime. Within the stratiform cloud layers, icing would have been light to moderate, however, within cumuliiform clouds, conditions might have been far more dangerous since it is known that the severest forms of icing tend to occur in the upper half of large cumuli congesti, or in clouds just on the point of becoming cumulonimbi - icing in a cumulonimbus proper being far less severe than that occurring before a heavy precipitation which removes most of a cloud's moisture content.

At level 95, had the aircraft penetrated a cumulus congestus, it would have been flying in or very close to the upper half of the cloud mass. At the time of the accident (1715 hours), no heavy precipitation had as yet begun, as is shown by the fact that no snow was found under the wings of the wrecked aircraft, where the ground appeared to be dry. In other words, the accident occurred slightly before the major precipitation phase in the mountains. Thus, it is possible that at the time of the accident the mountain lay under cumuliiform cloud formations at the critical stage, which favours severe icing.

Conclusions

The above leads to the conclusion that if the accident was due to meteorological factors, icing would have been

the factor most directly responsible. It is assumed that during its flight through innocuous stratiform clouds, the aircraft may have encountered a cumulus congestus where sudden severe icing occurred.

The following may have taken place:

a) a sudden change in the aerodynamic characteristics of the aircraft may have caused stalling without giving the captain time to initiate recovery action;

b) the aircraft may have lost height rapidly, down to a level where the downdrafts over the lee slope swept it into a lower zone of erratic turbulence that sent it out of control;

c) when icing occurred, the captain may, in the belief he had already passed the mountain divide, have decided to fly below the freezing level which, as he knew, was to be found at about 2200 metres.

It is possible that in assumptions (a) and (b) turbulence within the cumuli may have been a contributing factor.

Under severe icing conditions, the mechanical de-icing equipment is practically inoperative.

About 40 minutes before the accident, the mountain divide was overflown, also at level 95, by a scheduled Santiago-Madrid flight. This aircraft found nothing unusual to report, since light icing and turbulence are the normal accompaniments of winter weather in a low pressure area. This fact however, in no way precludes the possibility that shortly thereafter conditions of severe icing may have prevailed.

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