

No. 5

Schreiner Airways, F-27, PH-SAB, and operated by IAC, accident near Banihal Pass, India, on 7 February 1966. Report No. 1/4/66-AS, dated 7 November 1967, released by the Director General of Civil Aviation, India

1. - Investigation1.1 History of the flight

A Fokker F-27, Series 200, aircraft, PH-SAB, owned by the Schreiner Airways of Holland, and operated by the Indian Airlines Corporation on a charter contract, met with an accident shortly before noon on 7 February 1966. The aircraft was on a scheduled flight from Srinagar to Delhi with intermediate stops at Jammu and Amritsar. It crashed on a hilltop in the Pir Panjal range at a spot 12 miles west of its proper course which lay over the Banihal Pass 33'30" N, 75'14" E (altitude 9 290 ft). All members of the crew and all the 33 passengers on board were killed and the aircraft was totally destroyed.

1.2 Injury to persons

Injuries	Crew	Passengers	Others
Fatal	4	33	
Non-fatal			
None			

1.3 Damage to aircraft

Destroyed by impact and fire.

1.4 Other damage

None.

1.5 Crew information

The crew of the ill-fated aircraft was:

- (i) Capt. B.S. Duggal - Commander
- (ii) Capt. N.V. Singh - Co-pilot
- (iii) Kuldip)
) Cabin attendants
- (iv) Kochar)

Capt. Duggal held a valid pilot's licence with a valid pilot-in-command endorsement. His total experience of flying was 17 312:05 hours on 7 February 1966. The local proficiency checks on DC-3 were carried out by Capt. K. Padmanabhan on 15 November 1965. The route check on F-27 was carried out by Capt. R.K. Sapru on 13 and 14 November 1965, and the instrument rating check was carried out by Capt. Padmanabhan on DC-3 on 15 November 1965. His licence was valid until 11 June 1966, and his certificate of proficiency until 31 March 1967. He had had pilot-in-command checks for day and night flights and the route checks, which were carried out recently, were also satisfactory. His assessment was 'average' and, therefore, the licensing authority could not refuse him a pilot-in-command endorsement.

With regard to Capt. N.V. Singh, he did not appear to have played an important part in the brief flight in question and there is evidence to show that the aircraft was completely under the command of Capt. Duggal. It is only necessary to observe that Capt. N.V. Singh held a valid pilot's licence. He had a total flying experience of 7 729:30 hours up to 7 February 1966. The local proficiency checks on DC-3 were carried out by Capt. Padmanabhan on 27 August 1965. The route check was carried out by Capt. J.S. Gill on DC-3 on 14 March 1965. The instrument rating checks were carried out on DC-3 by Capt. Padmanabhan on 27 August 1965.

The privileges to which the pilot is entitled can only be enjoyed if proficiency checks have been carried out on that type of aircraft.

It is, therefore, felt that all the proficiency checks, including the current ones, carried out by Capt. K. Padmanabhan on 15 November 1965 in respect of Capt. Duggal, and by Capt. Padmanabhan on 27 August 1965, and Capt. J.S. Gill on 14 March 1965, in respect of Capt. N.V. Singh, should have been carried out on F-27 type of aircraft.

From the time Capt. Duggal was given his training on F-27 up to the time he was given the pilot-in-command endorsement, the only report favourable to him was that of Capt. Kapur made on 8 September 1963. This report had little value as it was based on a ratification check carried out when the CA-40B checks had become time-barred.

It is quite clear to the Court that Capt. Duggal's performance on F-27 was not of the standard which is required from a pilot-in-command.

There is no doubt that some people are temperamentally not fit to perform certain types of jobs, and the Court is completely convinced in this case that Capt. Duggal was not made for a successful commander of an aircraft and certainly not of a fast moving aircraft like F-27.

1.6 Aircraft information

The aircraft was owned by Schreiner Airways of Holland and was being operated by the Indian Airlines Corporation in pursuance of a charter agreement. The responsibility for the operation of the aircraft was that of the Indian Airlines Corporation. The aircraft held a valid certificate of airworthiness. It had flown for approximately 1 930 hours since manufacture and was properly maintained.

At the time of take-off, the all-up weight and the centre of gravity of the aircraft were within permissible limits.

The aircraft, the engines and the instrumentation were in serviceable condition. The fuel used was D. ENG.R.D. 2494.

1.7 Meteorological information

When the aircraft took off from Srinagar at 0557 hours GMT to commence its return journey to Delhi, the weather in the valley and over the Banihal Pass was generally cloudy. The flight forecast valid at 0600 hours GMT shows that Srinagar was expected to be overcast, and scattered rain was anticipated. The Jammu airfield was also expected to be overcast. The measure of cloud over Srinagar was stated to be as follows:

Lower layer: 2/8 stratus at 1 000 ft
3/8 stratocumulus at 2 000 ft

Higher layer: 6/8 altostratus at 10 000 ft
4/8 cirrus at 20 000 ft

The surface visibility was assessed at 4 NM. There was no turbulence and no significant winds at relevant altitudes on the route.

Over Banihal, the actual observations at 0500 hours GMT and 0600 hours GMT were as follows:

0500 hours GMT - Overcast, recent rain

Surface wind: 140°/5 kt

Visibility: 10 NM

Clouds: 2/8 stratus at 900 ft
3/8 stratocumulus at 2 500 ft
2/8 altostratus at 10 000 ft
2/8 cirrus at 20 000 ft

0600 hours GMT - Overcast

Surface wind: 140°/7 kt

Visibility: 10 NM

Clouds: 2/8 stratus at 900 ft
3/8 stratocumulus at 3 000 ft
3/8 altostratus at 12 000 ft

The Banihal weather was reported from the meteorological station which is situated on the Jammu side of the Banihal Pass at an altitude of 5 000 ft.

On the Srinagar side, the observation base is situated at Quazigund. The actual observed weather at this station at 0500 hours GMT was as follows:

0500 hours GMT - Weather mainly overcast

Surface wind: 290°/2 kt

Visibility: 5 NM

Clouds: 2/8 stratus at 1 800 ft
3/8 stratocumulus at 4 000 ft
5/8 altostratus at 10 000 ft

At 0600 hours GMT, the observation was substantially the same as at 0500 hours GMT, the only change being the position of 3/8 stratocumulus cloud at 4 500 ft instead of at 4 000 ft.

This information was, according to the usual procedure, communicated to the Jammu, Srinagar, Amritsar and Safdarjung Aerodromes for the purpose of briefing the pilots, as cloud formation continuously alters and the clouds may thin out or suddenly become dense.

The latest available information was furnished by the flight of this very aircraft on its outward journey when Banihal was observed to be easily navigable and, in fact, was navigated. An hour or so earlier, one Indian Air Force aircraft crossed over into the valley and it also found the Banihal Pass navigable although the region was cloudy and there was some sign of precipitation towards the west. The winds forecast at the height of 12 000 ft were not significant as the velocity was 14 kt and wind direction 130°, which is approximately the direction in which the plane was flying.

Flt. Lt. A.K. Verma (Witness No. 51), took an I.A.F. aircraft on the morning of 7 February 1966, from Pathankot to Srinagar, and made a personal observation of the weather at about 0530 hours GMT when he crossed the Banihal Pass.

PH-SAB landed shortly before Flt. Lt. Verma landed at Srinagar. When Verma crossed the Banihal Pass, he noticed that the higher peaks, both on his left and on his right, were touching clouds but there was no sign of precipitation over Banihal. Verma did another sortie on a local flight, taking off at 0600 hours GMT and returning at 0606 hours GMT. On this occasion, he observed that there was an altostratus type of cloud covering almost the whole of Pir Panjal, west of Banihal Pass. Almost all the peaks about 12 000 to 14 000 ft were covered, and there were signs of cloud base lowering. Precipitation was visible in the north-west sector, i.e. in the Baramula direction. The weather conditions to the west of Banihal were worse than over the Pass.

There were clouds over the Banihal Pass and the visibility was expected to be good enough for navigation to be possible. At the same time, rapid changes in cloud formation altered conditions to a very large extent and made the western portion of the Banihal mountain range, which subsequently proved to be the area where the aircraft crashed, invisible to an approaching aircraft or only partially visible, as all peaks about 12 000 to 14 000 ft were covered and clouds showed signs of lowering. In the second place, prevailing winds at the height at which the aircraft was flying, could not have caused a westward drift because the direction of the wind had no appreciable cross-component.

The operational flight plan for the outward as well as the return journey was prepared on the basis of a forecast which was valid from 0100 hours GMT to 0600 hours GMT, although the return flight was scheduled to take off after the expiry of this forecast for all practical purposes. The danger inherent in a procedure which sanctions the drawing up of a flight plan on the basis of a meteorological forecast which is expected to expire before the return journey is undertaken, is obvious. To meet this danger, the crew is expected to check the weather at Srinagar before the return flight. This checking, however, was not carried out by the pilot-in-command or the co-pilot of the ill-fated aircraft.

1.8 Aids to navigation

The following navigational facilities are available at Srinagar:

- (i) A.D. 200
- (ii) M.F. Beacon
- (iii) VOR (Facility provided by the Civil Aviation)

There is an NDB at Banihal village at an altitude of 5 367 ft. This is situated on Jammu side of Pir Panjal mountain range. The evidence shows that this beacon is too weak to provide adequate navigation aid.

At the Jammu Aerodrome the navigational facilities available are:

- (i) NDB
- (ii) A.D. 200

1.9 Communications

The aircraft established normal VHF contact with Srinagar Control Tower.

1.10 Aerodrome and ground facilities

Not applicable.

1.11 Flight recorders

None fitted.

1.12 Wreckage

After impact with the hilltop, 300 ft below the summit, in the Pir Panjal range, the aircraft, which broke into two main pieces, fell on either side of a big rock, while several smaller pieces were broken off and scattered over a considerable area on the hill-side. Some portions of the fuselage were found nearly 3 000 ft below the point of impact. Some parts of the main fuselage were burnt and charred by fire which must have broken out after the crash.

1.13 Fire

Evidence was available that fire had broken out after the impact.

1.14 Survival aspects

This was not a survivable accident.

1.15 Tests and research

None.

1.16 Other pertinent information

The position relating to IAC F-27 flights between Srinagar and Jammu would appear to be as follows:

(i) The Operations Manual specifies that all such flights should be under VMC and the flight-planned level for such flights for F-27 aircraft from Srinagar to Jammu is FL 115 and from Jammu to Srinagar is FL 105.

(ii) It is clear that the interpretation of the requirements as given at (i) above, is, as stated by the Chief Operations and Training Manager and the Chief Pilot, Delhi Area, that the weather conditions must be "absolutely visual contact flight. When the pilot can see the ground down to the hills, up to 3/8th of the cloud."

(iii) However, it has been stated by the Operations Manager, Delhi Area, that the written instructions to the pilots are that they should fly VFR at 10 500 ft above Banihal Pass and when it is cloudy they should fly at 16 000 ft. These instructions were not produced in spite of the Court's directions.

(iv) No change in the flight pattern existing of Dakota operations was effected on the introduction of the Fokkers on the Jammu-Srinagar sector, although the climb and high altitude performance of these aircraft were far superior.

(v) Specifically, advantage of the performance of this aircraft to effect a safe flight profile on this route was not taken and flights continued to be planned at the Dakota flight level.

(vi) For a period of more than a month (27 February to 31 March 1966) after the accident, the Friendship, Series 200, aircraft were operated on the Srinagar-Jammu sector at the increased flight level of FL 155 and above, on the advice of Schreiner Airways, the owners of the aircraft, in the interest of safety.

(vii) According to the evidence of the Operations Manager, Delhi Area, and the Chief Operations and Training Manager, no difficulty was experienced in operating these aircraft at the higher level.

(viii) No appreciable increase in time was involved in operating these flights at the higher flight level. Such a flight level is also in use by Viscount aircraft operating the Delhi-Srinagar services.

(ix) The Corporation's contention that such flights are not practical because of the limited performance of the F-27, Series 200, aircraft, economic factors or inordinate increase in the time in operating such flights at higher level are not acceptable. It is the Court's considered view that in the case of F-27 operations, the Corporation should lay down a minimum safe en-route altitude based on a safe flight profile for the Jammu-Srinagar operations, taking into account the possibility of engine failure at any point on the route. Both the Operations Manager, Delhi Area, and the Chief Pilot, Delhi Area, have accepted that it would be practicable to lay down a minimum safe en-route altitude; the former agreeing that it would be better to do so in the greater interest of public safety.

2. - Analysis and Conclusions

2.1 Analysis

The aircraft started on its outward flight from Palam Airport at 0140 hours GMT, the scheduled time of departure and, after making the usual intermediate halts at Amritsar and Jammu, landed at Srinagar Airport at 0510 hours GMT. The outward flight had, throughout, been normal and no snags were reported.

At 0557 hours GMT, the aircraft took off from Srinagar for the return journey and was cleared to climb VMC. A few seconds later, the Commander reported that he had climbed to 7 500 ft and was turning to starboard. Srinagar Control requested a call while passing 8 000 ft and the request was complied with. The Control then requested a call when passing 15 miles. No message, however, was received and at 0610 hours GMT Control asked for the position of the aircraft. The reply was: "Will be crossing Banihal 2 to 3 minutes." "Roger. Give me a call crossing Banihal" was the next message from the Control and the reply was: "Roger". Contact with the aircraft then ceased, and to repeated calls from the Control, no response was forthcoming.

The pilot-in-command did not make effective use of the navigational aids available at Srinagar. The Banihal NDB is, according to evidence, too weak to have been of any assistance and erroneous navigation took him to a point 12 miles west of his normal route. At this spot, the configuration of the mountain range has a deceptive similarity with the Banihal Pass, and has, because of this similarity, come to be known as "False Banihal". There is an incidence of danger resulting from this deception because the hills near "False Banihal" are several thousand feet higher than the true Banihal, and in cloudy weather, when portions of the mountain range are intermittently hidden behind clouds, an aircraft operating at the flight level adequate for a safe crossing of the Banihal Pass, will almost inevitably crash on the hill-side. This is precisely what occurred in this instance. The pilot must have realized his error and his wrong position too late when he saw the high mountain in front of him on emerging from the clouds. He tried to rise, or it may well be that he had begun to climb when still in the clouds, but before he could clear the hilltop, the aircraft hit the hill making a violent impact with it, about 300 ft below the summit. It broke into two main pieces which fell on either side of a big rock, while several smaller pieces were broken off and scattered over a considerable area on the hill-side. Some portions of the fuselage were found nearly 3 000 ft below the point of impact. Some parts of the main fuselage were burnt and charred by fire which must have broken out after the crash. All persons on board were killed and many of the bodies were so badly mutilated as to be beyond recognition. There can be no doubt at all that at some stage the aircraft was flying through clouds. The pilot was therefore, strictly speaking, guilty of infringing Visual Flight Rules.

Subsequent examination showed that both engines were running at the time of the impact. The examination of the instruments recovered from the wreckage gave no indication of the cause of the accident, and to all appearances the instrument system was operating properly until the moment of impact.

2.2 Conclusions

(a) Findings

The aircraft held a valid certificate of airworthiness.

The instruments and navigation aids on the aircraft were adequate for the flight. The radio and electrical equipment were functioning properly. The NDB at Banihal was too weak to provide adequate navigational assistance.

The aircraft engines were functioning properly at the time of the accident.

There was no evidence of any fuel contamination.

The passenger complement and loading were within permissible limits. The centre of gravity was also within permissible limits.

The weather at the time of the accident was partly cloudy, particularly over the mountain range which had to be crossed.

The IAC Operations Manual categorically laid down that flights over the Srinagar-Jammu sector must be under VMC only. There was an infringement of this direction by the pilot.

No meteorological briefing was obtained by the pilot before leaving Srinagar.

There was no evidence of turbulence or thunderstorms.

The direction and velocity of the wind at the flight level altitude were not such as to cause any unintentional drift of the aircraft.

The pilot-in-command and co-pilot held valid licences.

Capt. Duggal's competence as pilot-in-command was inadequate as he lacked crew co-ordination.

A navigational error took the aircraft 12 miles to the west of its proper course over the Banihal Pass.

The pilot mistook the saddle-shaped configuration in the mountain range known as "False Banihal" for the true Banihal Pass, and flew towards it.

The aircraft, flying at the prescribed altitude of 11 500 ft or a little more, crashed at a point 12 364 ft above sea level, near the top of a high mountain which lay across its path.

All persons on board were killed and the aircraft was totally destroyed.

(b) Cause or
Probable cause(s)

The cause of the accident was undoubtedly a navigational error. The Court was at first tempted to accept the hypothesis that the error was committed deliberately by Capt. Duggal because he wanted to take a short cut over the hills to Udampur, instead of going first to Banihal and then turning slightly right on the prescribed route to Udampur. Some support was lent to this hypothesis by the general assessment of Capt. Duggal character as being hasty and casual and disinclined to pay heed to detail. But after giving greater consideration, it seems to the Court that this hypothesis cannot be accepted and that the navigational error was not intentional.

The configuration of the hill at a spot 12 miles west of the Banihal Pass does not show that the aircraft would have had a clear passage at an altitude of 12 000 ft, because there are hills which are 14 000 ft high as shown by the contour lines on the map. Also, Duggal did reply to the call at 0610 hours GMT when he said that he would be crossing Banihal in two or three minutes. It seems to the Court, therefore, that when flying through clouds at an altitude insufficient to ensure safety, Duggal found himself at a spot which resembled in its appearance the Banihal Pass. He must have steered an incorrect heading on leaving the airfield. Changes in cloud formation and decreasing visibility did not permit a full and clear view of the mountain range which lay across the route. So, when he was near the point where it crashed, he thought that he was going to cross Banihal and sent this message to the airport. In point of fact, he was 12 miles off his track and crashed at a point 12 364 ft above sea level.

A more careful and cautious pilot would, in the circumstances, have made sure of his direction and position by a reference to the Srinagar Airport where, in addition to the VOR, an Automatic Direction Finding facility is available.

3. - Recommendations

It was recommended that:

- (a) greater vigilance and stricter control must be exercised by the operator in the matter of recruiting pilots, training them, conducting their proficiency checks and recommending them for licences and endorsements. In the case of pilots-in-command, proficiency (which includes the capacity for crew co-ordination) must receive considerably more weight than mere seniority. It is not enough to say that a pilot, who is senior for promotion to the post of a pilot-in-command, has not been found unfit. He must prove his competence and his ability to command the type of aircraft which is being put in his charge;
 - (b) detailed reconsideration of the IAC training of pilots and the procedure for issuing licence by the DGCA should be made, so that there can be a more accurate assessment of the competence and proficiency of IAC pilots;
 - (c) the Indian Airlines Corporation should establish a safe flight profile for the Jammu-Srinagar section for each type of aircraft, taking into account the terrain en route and the possibility of engine failure at any stage on the route.
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Scheduled domestic
En route
Collision - rising terrain
Pilot - improper IFR operation