No. 52

Yemenite Airlines, DC-3, YE-AAB, accident near Roccatamburo di Poggiodomo, Perugia, Italy, on 3 November 1958. Report released by the Director General of Civil Aviation and Air Transport, Italy.

Circumstances

YE-AAB was on an official government flight from Rome, Italy to Yugoslavia, taking the Under Secretary of Foreign Affairs, Yemen, to Belgrade. Four crew and four passengers were aboard. The flight departed Ciampino Airport (Rome) at 1645Z on an IFR flight plan and was to proceed via Viterbo, Pescara and Split to Belgrade. Due to the fact that the aircraft gave an impossible estimate for its ETA over Viterbo, Ciampino Tower, at 1729Z on its own initiative, notified the aircraft that it was on a bearing of 315°, which indicated that it was to the west of Viterbo. At 1736Z, YE-AAB advised it was over the Viterbo NDB giving its ETA at Pescara as 1817Z. At 1738Z the Tower cleared the aircraft to climb from 8 500 ft to 13 000 ft and requested it to transfer from VHF to HF for further en route navigation messages. The aircraft acknowledged, and this was the last effective radio contact. At approximately 1800Z the aircraft crashed on the western slopes of Monte Porretta at a height of 2 690 ft. All aboard were killed, and the aircraft was destroyed.

Investigation and Evidence

Crew Information

The aircraft carried a pilot-in-command, second pilot, radio operator and flight engineer.

The Yugoslav pilot had a total of 3 165 flying hours by day, 2 125 of which had been on DC-3 type aircraft.

Yugoslav pilots are taken on for 11 month periods of duty with Yemen Airlines. Prior to their being assigned to Yemen Airlines the pilots receive instrument flight checks, link training and medical checks. The Yugoslav Government gives Yemen Airlines a guarantee that these pilots are qualified and holding valid licences. Before commencing duties in Yemen, each pilot is tested by the Chief Pilot of Yemen Airlines with whom he must perform 10 hours of flight with landings at the various airports in Yemen. If the examination is successful, the pilot is issued with a Yemenite commercial licence.

Navigation Aids

All radio aids available along the flight segment Ciampino-Ostia-Viterbo-Pescara were operating efficiently during the flight as was the Viterbo NDB. There were no reports by other aircraft in flight at the same time as YE-AAB of irregular functioning of any radio aids.

Communications

The following frequencies were available to the aircraft: 117.9, 118.1, 119.1 and 121.5. Throughout its flight it used only 117.9 (a military VHF frequency) when in contact with Ciampino Tower. Also, while en route it advised that it could not switch over to Rome Control as it did not have the appropriate frequency - 120.1.

During the time in which the aircraft was in contact, from 1645Z to 1738Z, it

made no mention of difficulties or interference in its airborne equipment, nor did it complain about the efficiency of the Ciampino radio facilities.

All HF communications were normal. HF contacts between the aircraft and Pratica di Mare (Ciampino) were made on 6554-6552 Kc/s.

Weather

Actual weather conditions along the route and in the accident area at the time of the crash

Lazio, Tuscany and Umbria generally overcast with stratocumulus base between 1 900 and 1 500 metres and top at 2 700 - 3 000 metres. Higher up medium clouds with base above 4 500 metres. Visibility was generally good and more than 10 km in all directions.

Winds aloft 1 500 metres, 300°, 10 knots.

Temperature +3 degrees C, winds at 3 000 metres from 300°, 15 - 20 kts, temperature minus 3° C. At 5 500 metres winds 300° 25 kts, temperature minus 18°C.

Statements by eye witnesses indicated that in the accident area, situated at approximately 800 metres above mean sea level, the clouds (stratocumulus) were at the 400 - 500 metre level and were shrouding the nearby peaks overlooking the point where the aircraft crashed - Monte Porretta (1 338 metres) and Monte Maggio (1 416 metres).

The actual weather conditions along the route flown were those given to the pilot in the forecast and in the position and weather reports.

The Wreckage - General

The wreckage was scattered along the west slope of Monte Porretta (1 338 metres) in the Central Apennines, southwest of Monte Vettore (2 478 metres), at an elevation of approximately 820 metres. It lay at approximately 300 - 400 metres from the bottom of the valley, which is surrounded by the high peaks of Monte Porretta and Monte Maggio.

The aircraft had crashed on a slope with a 45° incline and many of the parts that had become detached from it (engines, seats, radio equipment) had rolled down the incline. It was deduced from inspection of the wreckage that the aircraft hit the ground with the wings approximately parallel to the ground, the right wing slightly lower than the left. On impact, the longitudinal axis was probably inclined approximately 10° with reference to the plane of the slope.

The wreckage pattern and distribution of parts over the steeply sloping ground indicated the aircraft's forward motion was probably very small at the moment of impact.

From the condition and the position of the fuselage, the airframe and the power plants, it was deduced that the right engine and the front underpart of the fuselage struck the ground first.

The telescoping of the fuselage indicated that the path of the aircraft was inclined with reference to the ground surface, and its displacement towards the left was indicative of a side motion. This was confirmed by the fact that the engines were found to the left of the point of impact and that the rudder, broken off at the root, was folded towards the left.

The fire which broke out and which destroyed most of the wreckage, extended to a large area around the main group of wreckage and was fed by the large amount of fuel in the tanks. Since all other available evidence tended to exclude any outbreak of fire on board before the accident, it was concluded that fire broke out as the result of impact against the ground, probably starting in the right engine which suffered the greatest fire damage.

The few parts that were found of the controls, control links and control surfaces did not provide any evidence of pre-impact damage or malfunction.

It is assumed that the aircraft instruments, navigation aids and radio equipment were operationally efficient up to the last moment. It must be borne in mind that because of the difficult terrain and the position of the aircraft that it may have been impossible to re-establish radio contact on frequency 117.9, regardless of the status of efficiency of the airborne receiver-transmitter equipment.

Brief description of events

1645Z Departed Ciampino

1655 Aircraft reported over OSTIA at 4 000 ft, was cleared to CIVITAVECCHIA, remained on Tower frequency 117.9 m/c (Rome ACC frequency 120.1 m/c was not carried).

1707 Cleared to fly CIVITAVECCHIA to VITERBO at 8 500 ft. Aircraft gave, on request, ETA VITERBO as 1712. As the accuracy of this ETA was suspected by control two requests were made for confirmation.

1712 Aircraft gave revised ETA VITERBO 1717.

1717 Aircraft gave revised ETA VITERBO 1721 and reported flying in "fog" at 8 500 ft. Control then requested and was given confirmation that aircraft was receiving VITERBO Beacon; then further requested aircraft to transmit for bearing.

1729 Aircraft, on request, reported it had not overflown VITERBO. Control gave it a bearing (class B) from Ciampino of 315° and informed the aircraft that bearing of VITERBO from Ciampino was 328°. The aircraft acknowledged and read back.

1733 Control advised aircraft to contact Monte Argentario on 121.5 m/c. Aircraft acknowledged but apparently ignored the advice.

1735 Control asked aircraft for its heading, aircraft replied 020° and reported all well.

1736 Following Control's message - "you are behind time and should have passed VITERBO" - the aircraft reported - "I'll check again, here we are, over VITERBO NDB now. ETA PESCARA 1817."

1738 Control cleared the aircraft to climb to 13 000 ft and to transfer from VHF to HF. The aircraft acknowledged and this was the last effective radio contact. Just before 1800Z witnesses in the accident area heard the normal engine sound of an aircraft flying low on an easterly heading towards Monte Porretta. They observed the lights which were seen to turn and shortly afterwards the aircraft struck the mountainside and burst into flames.

Reconstruction of flight

The brief description of events indicates the confused nature of the flight and the consequent difficulty of reconstructing accurately the track followed by the aircraft. The Commission considered and discussed at length the relative merits of various hypotheses which may briefly be summarized as follows:-

1. The aircraft's radio compass may have been incorrectly tuned to Bibbona NDB (Call sign IO --/———) instead of VITERBO NDB (Call sign IMV --/——/----).

2. The radio compass may have been tuned to Viterbo NDB then with needle heading towards the beacon the selector receiver may have been placed to ANTenna position

during a check of the call sign and subsequently left in that position.

3. The magnetic compass may have been pre-set to 328° for a direct flight from Ciampino to Viterbo, as indicated in the flight plan. The pilot may not have reset when subsequently cleared to Viterbo via Ostia and Civitavecchia.

Two possible tracks of the aircraft after leaving Civitavecchia (1707) are shown in Fig. 32. During the 22 minutes up to the time of the bearing of 315° from Ciampino (at 1729) the aircraft could have covered, on a constant heading, the unbroken line to point A; or, on a zigzag course, the broken line to point A_1. Then, on being given the bearing, the pilot may have turned on to an easterly heading towards the Adriatic coast. In the time remaining before the crash, namely 29 minutes (up to 1758) the aircraft could have covered, assuming a constant heading, the unbroken track A to C on Fig. 32. If, however, a zigzag course was being followed the aircraft may have flown from A_1 to C during this time and have been on a heading of 020° (between A_1 and B_1) when that heading was reported by the pilot to Ciampino at 1736.

The Commission then discussed the possible reasons for the aircraft being at 2 690 ft at the time of the crash despite the fact that it had been cleared to fly at 13 000 ft in order to give adequate clearance over 9 500-foot mountains en route. The descent could have been caused by malfunctioning of the aircraft or icing or alternatively by the voluntary action of the pilot. It was concluded from the evidence that the latter was more probable for one or more of the following reasons.

The pilot may have descended:

a) to rest after a lengthy instrument flight;

b) to make a visual position check;

c) to eliminate icing.

The pilot may have been under the impression, due to confusion with estimated times, that he had crossed the mountains and was over the Adriatic.

The fact that the estimated flight time along the route Ciampino - Pescara was 73 minutes and that the aircraft crashed exactly 73 minutes after take-off appears to be significant, bearing in mind the special psychological situation of the Yemenite crew under the command of a Yugoslav pilot on a flight to Yugoslavia for the purpose of transporting to Belgrade the Under-Secretary of Foreign Affairs of Yemen on an official trip.

The above circumstances may have influenced the pilot in deciding to act on his own initiative without relying on flight control assistance which, although very valuable, nevertheless was somewhat embarrassing for him, since it pointed to serious errors of navigation on his part; therefore, it cannot be excluded that for reasons of personal pride he may have decided to continue to descend below the clouds at the very moment when, according to his flight plan, he should have been in the area of Pescara and therefore convinced (or perhaps even only hoping) to be beyond the Apennines.

Conclusions

The following conclusions were reached by the Board:

Inadequately trained crew

- faulty use of the radio compass, failure to request assistance of D/F facilities, erroneous estimates.

- The pilot-in-command and the crew had an inadequate knowledge of the Italian and English phraseology to be used in ground-air-ground radio communications.

Inadequate preparation for the flight

- erroneous assessment of adverse weather conditions, particularly at the destination airport, bearing in mind the lack of adequate facilities under such conditions;
- errors in compilation of the flight plan - error of approximately 12 minutes in estimated time for the Rome-Viterbo segment;
- inaccurate indication of frequencies available in aircraft - in actual fact, the control frequency of the Rome ACC (120.1 Kc) was not available although it was essential for flight assistance;
- inadequacy of charts covering the area along the route - it appears that there was no chart of Europe on board and the flight guide which was found in the wreckage was out of date.

Probable Cause

The accident was due to faulty conduct of the flight.

Recommendations

The Board made the following recommendations:

1. Aircraft that do not carry all the equipment prescribed by ICAO regulations should not be permitted to depart.
2. Air crews should hold documentary proof of appropriate IFR flight training, such training to be checked periodically as prescribed.
3. Air crews should be sufficiently familiar with the routes to be followed and the countries to be overflown and should have on board a complete and up-to-date supply of charts.
4. Air crews should have an adequate knowledge of the official languages to be used in radio transmission.
5. The competent authorities of the State concerned should issue appropriate regulations for the adoption of restrictive measures in respect of navigating personnel and of carriers who have been the subject of reports or warnings for infractions likely to constitute a hazard to flight safety.

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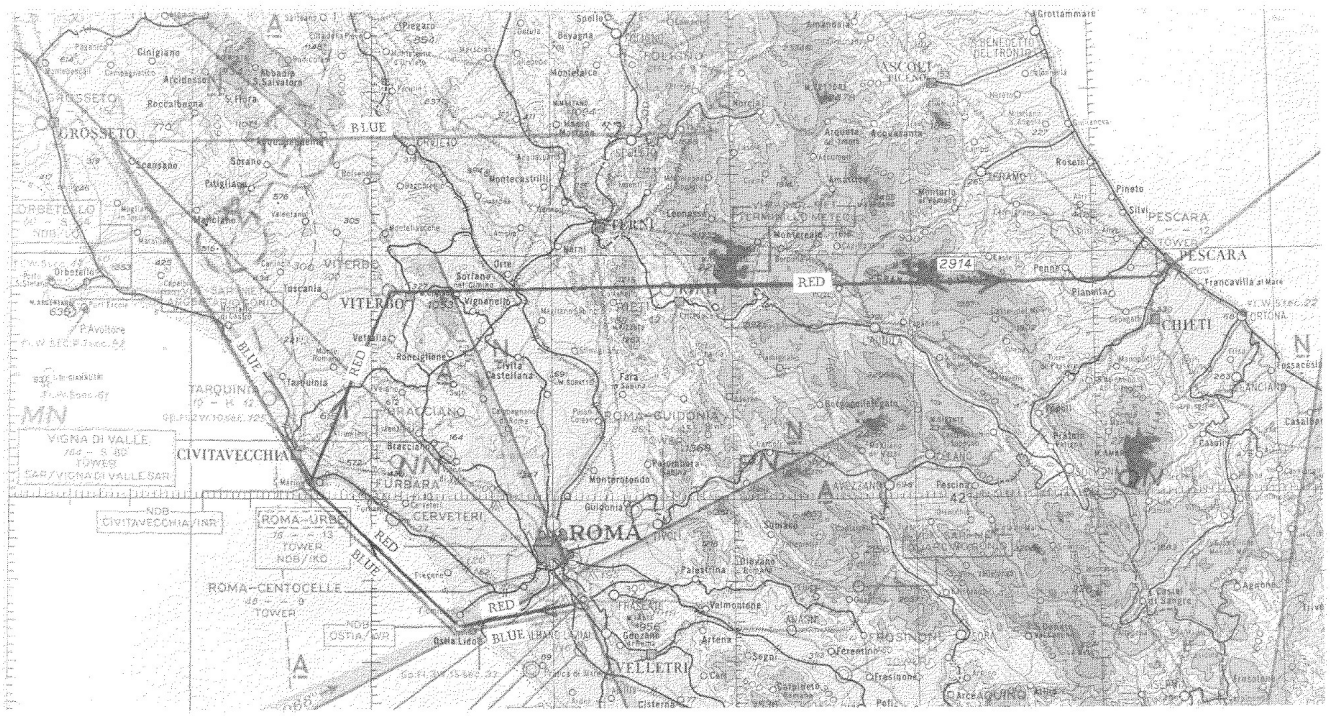

Yemenite Airlines, DC-3, YE-AAB accident, Perugia, Italy on 3 November 1958

FIGURE 32

RED — Route which the pilot should have flown

BLUE — Route which the pilot may have flown (1st hypothesis)

Route which the pilot may have flown (2nd hypothesis)