No. 14

Alitalia, DC-8, I-DIWD, accident 7 miles northwest of Junnar, Poona District, India on 6 July 1962. Report of the Court of Inquiry, dated 20 February 1963, released by the Department of Communications and Civil Aviation, Ministry of Transport and Communications, India.

(Comments by the State of Registry of the aircraft appear at the conclusion of the summary.)

1. Historical

1.1 Circumstances

Flight AZ-771 was a scheduled international passenger flight between Sydney and Rome via Darwin, Singapore, Bangkok, Bombay, Karachi and Teheran.

It departed Bangkok for Bombay on 6 July at 1516 hours GMT, carrying 9 crew and 85 passengers. Routine messages were exchanged with the appropriate air traffic control units during the flight. The following excerpts are based on messages on HF/RT up until 1820 - thereafter they are from the transcript of a tape recorder:

1720 First contact with Bombay FIC ... off Bangkok 1516 ... ETA Bombay 1845. Flight level 360, request weather forecast for the ETA.

1747 landing forecast 1730 GMT passed

1801 at flight level 350

1814 Akola 1813, flight level 350, estimating Aurangabad 1826. Request descent clearance at 1826.

The aircraft changed to Bombay Approach frequency at 1820.

1820 Aircraft requested to start descent when over Aurangabad, (AU) down to flight level 200. Approved.

1822 1800 weather provided and acknowledged.

1824:36 ... leaving flight level 350 down to 200, Bombay at 45.

1825 cleared down to 4 000 transition level, flight level 55 ..., altimeter 29.59 inches ...

1828:04 weather passed, QNH 29.58 inches

1829 wish to land on runway 27

1838:34 771 was asked whether it would be makinga three sixty over the marker or coming straight in from the outer marker for the landing

1838:49 "O. K. ", it replied.

1838:54 "771 is leaving now five thousand three six zero on the outer marker"
"771 say again your last message"

1839:09 "Say again please. "
"771 unable to make out your last message, will you please repeat. "
"771 please say again. "
"771 request your intentions - Are you coming straight in from the outer marker for landing runway two seven or making a three sixty over the outer marker then reporting leaving outer marker inbound over? "

1839:38 771 replied: "O. K. clear to the outer marker runway two seven make a three sixty on the outer marker then report the outer marker inbound for runway two seven. "
"Roger understand you will be making a three sixty over the outer marker. Report leaving outer marker while proceeding making a three sixty. "

1839:58 "Roger will do Alitalia seven seven one. "

This was the last contact with the aircraft. Failing to establish further communication with the aircraft, search and rescue action was initiated. The wreckage was eventually located on Davandyachi hill* at an elevation of approximately 3 600 ft amsl.

1.2 Damage to aircraft

The aircraft was completely destroyed.

1.3 Injuries to persons

All 9 crew members and the 85 passengers were killed in the accident.

2. Facts ascertained by the Inquiry

2.1 Aircraft information

The aircraft was constructed in 1962 and had flown a total of 964 hours 34 minutes.

The aircraft had valid Certificates of Registration and Airworthiness, and its Certificate of Maintenance was signed by the pilot-in-command on 6 July 1962. No defects in the working of the aircraft had been reported.

It carried sufficient fuel for the subject flight, and its weight and centre of gravity were within the prescribed limits at the time of departure from Bangkok.

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* Approximately 52 NM 077° from Bombay Airport (Santa Cruz), on the Bombay - Aurangabad route.

2.2 Crew information

The crew of 9 consisted of 3 flight crew (the pilot-in-command, a co-pilot and a flight engineer) and 6 cabin crew.

The pilot-in-command was 50 years of age and had been a pilot since 1939. He had flown a total of 13 700 hours, 1 396 of which had been on DC-8's. During the 90 days preceding the accident he had flown 206 hours on this type of aircraft. He had passed his last medical examination in June 1962 and was in good health.

The pilot-in-command had met the Alitalia requirement for route qualification by undergoing a familiarization flight on this route prior to operating in command on the subject flight from Bangkok to Bombay. Previously he had made a few flights on DC-6/DC-7 piston-engined aircraft from Rome to Bombay in 1959 and in 1960, but he had not operated east of Bombay. His familiarization flight was in May 1962 with an Alitalia checkpilot. On that occasion he flew from Rome to Bangkok via Teheran-Karachi-Bombay. The familiarization flight over the Bombay-Bangkok-Bombay sector was of 7 hr 41 min duration of which 3 hr 57 min were at night. The flight was made in fair weather conditions. Following this familiarization flight, he appears to have flown on other routes, and on 1 July 1962 he flew in command from Rome to Karachi, and thereafter on 5 July 1962 on the route Karachi-Bombay-Bangkok, commencing the return flight from Bangkok on the night of 6 July 1962.

The checkpilot had made only one familiarization flight on the Bombay-Bangkok-Bombay route prior to his flight in May with the pilot-in-command of I-DIWD.

The checkpilot stated in his evidence, recorded on 7 August 1962, that the pilot-in-command of the subject flight was the only pilot who undertook the familiarization flight with him in May and that he had briefed him on all aspects of the sector. He also said that it was raining in the vicinity of Bombay during the flight. Later evidence showed that there had been other pilots on board during the checkflight, (although in what capacity could not be established), that no inclement meteorological conditions had prevailed, and that the weather at that time was fair to fine.

Because of the above-mentioned circumstances it was difficult to establish whether the minimum requirements in Chapter 9 of Annex 6 to the Convention on International Civil Aviation had been fully complied with.

The co-pilot, age 33 years, had been flying since 1956. His total flying hours amounted to 3 480 of which 1 672 had been on the DC-8 as co-pilot. Within the last 90 days before the accident he had flown 219 hours on the DC-8. He had had no familiarization flight nor previous experience on the route Bombay-Bangkok-Bombay. His last medical examination was in January 1962.

The flight engineer, age 31 years, had 4 070 hours to his credit including 386 on the DC-8 and 192 hours within the 90 days preceding the accident.

The pilot-in-command and co-pilot were both trained as navigators and had passed tests as such. No specialist navigator was carried.

2.3 Weather information

The weather information in the aerodrome forecasts and the flight forecast did not tally with the weather information supplied by the Bombay Meteorological Office.

A detailed analysis was made of the conditions existing around the time of the accident.

A chart providing thunderstorm and rain data for 6/7 July, between 1200 and 0300 hours GMT showed no thunderstorm activity in the accident area.

Messages were continuously exchanged between the Alitalia aircraft and ATC Bombay from the time when first contact was established near Jharsuguda. None of the messages indicated the aircraft was encountering bad or critical weather.

A report from an Indian Airlines DC-4 aircraft operating on the same route one hour later did not indicate any abnormal weather.

Three witnesses from villages in the vicinity of the accident site stated that the night of the accident was dark and that there was light rain but no thunder or lightning.

From all the information available it was concluded that the weather conditions were not hazardous and could not have been a factor contributing to the accident.

2.4 Navigational Aids

The aircraft carried the following radio navigation equipment:

VHF navigation receiver VOR-LOC (2)
receiver glide slope (2)
marker beacon receiver (2)
ADF receiver (2)
Loran receiver
radar
doppler
transponder

No malfunctioning of any equipment was reported by the aircraft.

The following aids were available at Bombay, Aurangabad and Poona:

Bombay	RSP (responder beacon), VOR, VDF (Visual), a locator beacon and a non-directional beacon
Aurangabad	VDF and a non-directional beacon
Poona	VDF, a non-directional beacon and a responder beacon

The navigation aids at Bombay, Aurangabad and Poona were working satisfactorily. Neither I-DIWD nor any other aircraft reported any malfunctioning of the aids available.

2.5 Communications

There was no failure of communications between the aircraft and Air Traffic Control, and the messages exchanged were all understood with the exception of a message at 1838:54, that the aircraft was leaving 5 000 ft and would make a 360° turn over the outer marker, which was not heard by the Approach Controller.

2.6 Aerodrome Installations

Surveillance radar was available at Bombay as well as an ILS (instrument landing system).

2.7 Fire

No fire occurred prior to impact.

There was no evidence of a concentrated fire on any of the major components of the aircraft although there were indications of localized fires.

2.8 Wreckage

The first impact of the aircraft was with the slope of a ridge of Davandyachi hill, approximately 5 ft short of the top. Its heading at time of impact was 240°M, about 5 NM to the left of the normal route.

Various figures were considered for the height of the spot where the aircraft had crashed. The altitude of 3 600 ft, the reading indicated by the co-pilot's jammed altimeter, was accepted as the correct height. That would be the altitude available to the pilot of the aircraft immediately prior to the crash.

From the marks on the ground it was clear that at the time of the initial impact the aircraft was almost in a level attitude, laterally as well as longitudinally. Soon after the initial impact, the aircraft must have bounced into the air and simultaneously disintegrated. This was also deduced from the trajectory followed by the wreckage after the disintegration.

Damage to all main components of the structure was very extensive, and the wreckage was scattered ahead over a wide area. All major components of the aircraft were accounted for.

3. Comments, findings and recommendations

3.1 Discussion of the evidence and conclusions

At Bangkok, the Alitalia station manager, who is also the flight dispatcher, personally obtained information from the meteorological authorities at Bangkok before he prepared the operational flight plan (hereafter referred to as the company flight plan) for the subject flight. He also stated that a copy of the company flight plan was handed over to the pilot-in-command. It was admitted that the pilot-in-command had not signed the plan to show his acceptance. In the absence of such a signature, a compulsory requirement according to the Alitalia Operations Manual, it was not possible to determine whether a copy of the flight plan was, in fact, handed over to the pilot-in-command or was available to him on board the aircraft. No such document was recovered from the wreckage. Apart from the evidence of the station manager, the company had no records to establish that the flight plan was received by the pilot-in-command.

The chief pilot for Alitalia and other Alitalia officials stated that they did not consider the company flight plan to be an indispensable document, although it was admitted that it must be on board.

According to the station manager, he accompanied the pilot-in-command to the meteorological office at Bangkok for briefing. In answer to a letter dated 30 August 1962, the Deputy Director General, Meteorological Department, Bangkok, replied that the pilot-in-command, co-pilot and dispatcher "did not come to the weather forecast station for briefing" and that "no briefing was made because neither the pilot nor the dispatcher came up for briefing."

It appears that the official flight plan, transmitted by Bangkok ATC, was prepared by the station manager after he had prepared the company flight plan. Both flight plans mentioned flight level 360 for the route after Nagpur - this should have been 350 to conform with quadrantal separation rules.

There was a major difference between the two flight plans on the point of commencement of descent:

official flight plan - the aircraft was to continue a level flight until 7 minutes after Aurangabad and the descent phase was to commence from the control area (100 NM) and take 13 minutes.

company flight plan - the aircraft would continue to fly level for 3 minutes after Aurangabad and a descent phase of 17 minutes was contemplated.

Actually, the pilot-in-command requested a descent from Aurangabad (152 NM), thus departing from both flight plans.

Furthermore, the official flight plan filed at Bangkok Air Traffic Control, mentioned the total number of persons on board as 98. The load sheet submitted along with the company flight plan showed the number of passengers as 86 and crew as 9.

It was contended that due to the shortcomings in the flight planning and briefing at Bangkok, the pilot-in-command could not have had any flight plan with him on the aircraft. The absence of a flight plan on board undoubtedly would have resulted in an additional workload for the pilot as no separate navigator was carried on board. However, though the circumstances created a doubt, it was not possible to prove that there was no flight plan on board the aircraft.

The messages exchanged during flight, the attitude of the aircraft when it struck the ground, and the subsequent inspection of the wreckage threw no suspicion on the structural integrity of the aircraft. Malfunctioning of the aircraft can, therefore, be ruled out as a possible cause of the accident.

No flight recorder was installed on the aircraft.

The suggestion that in the control area (Bombay) the minimum navigational aids were not available was without warrant. The complaint that the compulsory reporting points for the entry to and the exit from the control area on the route Bombay - Aurangabad were placed many miles from the radio aids and, consequently, it was not possible to evaluate accurately the position of the aircraft, was also without substance as shown by evidence of one of the captains testifying. He pointed out that a pilot can ascertain his position by using the facilities available on the route and taking cross-bearings from Aurangabad, Poona and Bombay. His evidence showed that the argument that the navigation aids on this route were inadequate could not be accepted. However, additional navigational facilities would assist pilots and air traffic controllers.

It was stated that the organization and operation of the ATC services in Bombay were defective and specifically that the Area Control Service was operating:

1) without its own frequencies;

2) without pre-established procedures and consequent instructions;

3) without the minimum adequate facilities for the control (operational benches - strips and designators - control charts);

4) with personnel inadequately trained for the service.

The Court considered that even assuming these defects existed, they would not constitute the cause of the accident.

As far as deficiencies in the training of ATC officers were concerned, however, no evidence supported this contention. The approach controller concerned had received ATC training both in India and the U.S.A. and was rated as above average.

It had been suggested that the approach controller was absent from the tower when the crucial clearance of descent to 4 000 ft was given and that his absence at this time prevented him from taking proper action when he took charge of approach control and sent subsequent messages to the aircraft. Evidence on record did not support this theory.

The aircraft, approaching Bombay from Aurangabad, had to fly over the Western Ghats. The highest point on this sector is indicated by a spot height of 5 400 ft, approximately 13 miles to the north of Aurangabad/Bombay track, 55 miles away from Bombay. The main contention in this inquiry was as to whether the clearance given by ATC to the aircraft to descend to 4 000 ft at 1825 GMT was in any manner incomplete, ambiguous or misleading and contrary to the ICAO regulations.

It was contended that the clearance so given was premature and without jurisdiction as it was passed at a time when the aircraft was outside the control area. It was established, however, that it is the normal practice for jet aircraft to commence descent outside the control area, and it is an accepted ATC procedure to permit them to do so. Such clearances are valid.

It was also contended that within the controlled area ATC was bound to take into consideration the terrain in giving its clearances and, therefore, the clearance to descend to 4 000 ft given by ATC in the present instance was wrong and contrary to the ICAO regulations as there was higher intervening terrain. It was not denied that

prevention of collision with terrain was the primary responsibility of the pilot, but it was contended that ATC also had a parallel responsibility regarding prevention of collision with terrain within the controlled area and that responsibility was not fulfilled by ATC in this case. On the other hand, it was urged that terrain clearance was not the responsibility of the ATC but of the pilots exclusively and that, in giving clearances, the ATC fulfilled its primary objective of ensuring prevention of collision with other aircraft in flight and maintenance of a continuous and expeditious flow of air traffic.

In support of these respective stands reliance was place on the following documents:

i) ICAO documents

- Annexes 2, 4, 6 and 11 to the Convention on International Civil Aviation;
- PANS-RAC (Doc 4444-RAC/501/7) and PANS-OPS (Doc 8168-OPS/611);
- Regional Supplementary Procedures (Doc 7030);
- Jet Operations Requirements Panel (Doc 7828, JOR/3-2 and Doc 8035, JOR/4);
- Report of the Joint Middle East/South East Asia Regional Air Navigation Meeting (Doc 7967, MID/SEA);
- Circulars 26-AN/23 and 33-AN/28.

ii) Indian and Italian documents

- Indian Aircraft Rules, AIP India, Notams No. 6 (1954), No. 22 (1960) and No. 34 (1960), Instrument Approach charts;
- AIP Italy, Alitalia Route Manual and radio facility charts.

Having carefully considered the arguments given in support of the two conflicting views and having studied in detail the various references, it was concluded by the Court that the theory of parallel responsibility of pilots and of ATS personnel regarding terrain clearance during the initial approach descent could not be sustained. The Court also concluded that the clearance given by ATC to the aircraft to descend to 4 000 ft was neither premature nor incorrect and did not relieve the pilot from his responsibilities for ensuring that clearances received from air traffic control were safe in relation to the prevention of collision with terrain and the minimum height prescribed by the Operator.

The pilot failed to ascertain his correct position after he commenced the descent. Messages showed that he understood the clearance. As for the aircraft being at 5 000 ft six minutes before its ETA, it was suggested that perhaps the pilot thought he was nearer Bombay than he actually was.

He commenced the descent at 1824:36 hours from Aurangabad, leaving flight level 350 approximately 20 minutes before the ETA at Bombay. He reached an altitude

of 5 000 ft at 1838:54, i. e. in about 14 minutes, approximately 6 minutes before the ETA of 1845 GMT at Bombay as against the company flight plan, which listed a descent of 13 minutes at 100 miles in the entry appearing against Bombay control area. In coming down to 5 000 ft and descending further to 3 600 ft the pilot-in-command not only contravened the minimum safety altitude of 9 000 ft prescribed by Alitalia but also went below the initial approach altitude of 4 000 ft given in the clearance. His message that he was leaving 5 000 ft for 360° over the outer marker would indicate that he thought the aircraft was in close proximity to the outer marker over which he intended to carry out a 360° turn presumably to lose speed gradually. The heading of the aircraft, the altitude of 3 600 ft, and the fact that he had left the direct track in the direction of the outer marker all indicated his intention to position the aircraft for a straight-in approach to runway 27. This resulted in the aircraft's flying into high terrain.

The radio facility charts were available for ready reference. Chart No. 21 only provided one spot height of 5 400 ft within the control area, 13 miles to the north of the track, and gave no indication of the height of other terrain nearer the route. An orographic map, which indicated the high terrain along the route, was found in the wreckage, however, it did not appear that the captain had used it.

It was contended that the pilot-in-command committed several serious errors on the flight which must have been due to his not being "in his senses" because of having consumed liquor on board the aircraft. According to the Indian Aircraft Rules "no person ... carried in an aircraft for the purpose of acting as pilot ... shall have taken or used any alcoholic drink ... within 12 hours of the commencement of the flight or take or use any such preparation in the course of the flight." This rule applies even to foreign aircraft which are airborne for the time being in or over India. The evidence showed that it was permissible for Alitalia pilots on flights over and in India to take drinks within 12 hours before the flight, or during the course of the flight, provided it was not done in the presence of passengers. It was, however, concluded that intoxication on the part of the pilot could be ruled out as a contributory cause of the accident.

The most important issue to be decided by the Court in this inquiry was the responsibility of the pilots and the air traffic controllers regarding terrain clearance. There is no doubt that, at present, the responsibility for ensuring terrain clearance rests with the pilot. However, it does appear that there is an impression amongst some pilots, possibly familiar with radar and other specialized procedures, that the clearances issued by air traffic control all over the world would take terrain into consideration. It was considered that such an impression is a dangerous one.

According to ICAO's Annex 6, Chapter 4, paragraph 4. 2. 4 "An operator shall establish the minimum safe flight altitudes for each route flown. These minima shall not be less than any that may be established by the State flown over except when specifically approved by that State". The note to this paragraph reads - "This standard does not require a State to establish minimum safe flight altitudes for routes over its territory". Some States have specified figures for the minimum safe altitudes of various sectors. India has also laid down such requirements in Notam No. 6 of 1954 which would be observed by the ATC for the en route stage. However, this does not safeguard aircraft against collision with terrain in the descent-to-land or climb-after-take-off stages. These stages will of necessity be covered by the rule of the air requiring a 1 000 ft clearance over terrain.

The exchange of R/T messages and the manoeuvres of the aircraft immediately preceding the crash were found indicative of the pilot's belief that he was in the vicinity of the outer marker. The Court considered that it was incumbent on the pilot not to have descended below the minimum safe altitude unless he had positively established the position of the aircraft for a straight-in approach. Furthermore it stated that it would not be desirable for a State to prohibit such approaches at all aerodromes, but wherever they are permitted they should be made under the restrictions mentioned in Recommendation No. 1 which follows:

3.2 Probable cause

The accident was attributed to a navigation error which led the pilot to believe that he was nearer his destination than he actually was and, therefore, caused him to make a premature descent in instrument conditions for a straight-in approach to land at night. The aircraft, consequently, crashed into high terrain.

Contributing causes were:

1. Failure on the part of the pilot to make use of the navigational facilities available in order to ascertain the correct position of the aircraft.

2. Infringement of the prescribed minimum safe altitude.

3. Unfamiliarity of the pilot with the terrain on the route.

3.3 Recommendations

The Court recommended the following:

1. (a) It should be stressed on pilots and air traffic controllers that in instrument meteorological conditions an aircraft cannot be descended below the minimum safe en route altitude until over a known aid at the airport, the only exception being when the position of the aircraft is positively established within the initial approach area where the initial approach altitude or sector altitudes would apply.

   (b) Straight-in approaches in instrument meteorological conditions should be permitted only if the position of the aircraft has been positively established by reference to radar/radio aids at a point from where it can safely descend below the minimum en route altitude.

The air traffic control clearances should be based on such procedures.

2. The instrument approach charts should highlight the fact that the minimum en route altitude applies right up to the initial approach - a practice which is already current in some published charts.

3. Radio facility charts (radio navigation charts), which are used for navigation purposes, should contain significant spot heights along the route to be followed. If this is impracticable, a reference to the spot heights in these charts should be completely eliminated to avoid any possible misconception on the part of the pilots.

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ICAO Ref: AR/779

COMMENTS OF THE STATE OF REGISTRY

The following comments have been made by the Italian authorities on the causes of this accident as set out in the Indian report:

In accordance with 5.3 of Annex 13 to the Convention (Chicago 1944) an accredited representative of Italy and qualified technical advisers to assist him participated in the inquiry.

The accredited representative of Italy and his technical advisers participated actively in the inquiry with a view to contributing to ascertain the real causes of the accident; this was done in accordance with the ICAO recommendation that the State of Registry should be permitted to make its participation effective (Annex 13, paragraph 7)

The accredited representative of Italy presented some relevant factual and circumstantial evidence of primary consideration, pertaining to the circumstances of the accident. However, no record of this appears in the official report containing the findings of the inquiry.

This causes the meaning of the aforementioned ICAO recommendation that the State of Registry should be permitted to make its participation effective, to be void of any significance.

In connexion with the foregoing, it is, therefore, deemed desirable to enumerate here the fundamental elements that the accredited representative of Italy submitted to the Court of Inquiry, as it is thought that they are of primary significance to the ascertainment of the causes of the accident under review.

The elements referred to above relate to certain deficiencies in the training of the ATC officers, the defective organization of the ATC Services in Bombay, and their ground aids to air navigation.

Such deficiencies can be summarized as follows:

- the defective organization of the ATC Services;
- inadequate facilities for Control;
- inadequate ground aids to air navigation;
- inadequate training of ATS personnel;
- absence of the Approach Controller on duty on 6/7 July 1962.

Furthermore, a fundamental element has been established, namely that a wrong descent clearance was given. This clearance was contrary to the specific rules issued by the responsible Indian Authorities under Notam No. 6 dated 1954.

The above Notam specifies that the minimum safe altitude along the route Aurangabad - Bombay is 6 400 ft. Aurangabad is 152 NM away from Bombay Airport. Along the route Aurangabad - Bombay there is an obstruction 5 400 ft high about 50 miles from Bombay Airport.

When the aircraft was over Aurangabad, a clearance to descend to 4 000 ft was given to the pilot. In this respect consideration should be given to the fact that no radio aids are available between Aurangabad and Bombay Airport, in spite of the existence of the above-mentioned significant obstruction.

This is why Notam No. 6 of 1954, issued by the Government of India, specifies that the minimum safe altitude is 6 400 ft. It is also relevant that the flight was taking place at night under cloud conditions.

It is true that the pilot had the option of not accepting the clearance, however we cannot but recognize that the pilot's action was determined by the reliance he placed upon the Air Traffic Control Service in Bombay.

In conclusion, the Italian Administration feels it necessary to point out that the accident was brought about mainly by an error (wrong clearance) by the Indian ATC Service, to which we must add, as a concurrent cause, the reliance of the pilot upon said clearance.

In fact, had the proper clearance been given to the pilot, i.e. consistent with Notam No. 6 of 1954, the aircraft would have descended, as provided in the same Notam for that section of the route, to 6 400 ft at the most.

An additional point, to which considerable importance should be attached, is that the Control authorized an aircraft flying in IMC to a straight-in approach without first previously and positively establishing the position of the aircraft in spite of both the presence of a significant obstruction along the route and the rules contained in the above-mentioned Notam.

It may be stated that the clearance for a straight-in approach, under the above flying conditions, as given to the pilot of the aircraft must be considered as one of the main causes of the accident.

The Court of Inquiry, in its final conclusions, recommended the following:

a) it should be stressed on pilots and air traffic controllers that in instrument meteorological conditions an aircraft cannot be descended below the minimum safe en route altitude until over a known aid at the airport, the only exception being when the position of the aircraft is positively established within the initial approach area where the initial approach altitude or sector altitudes would apply;

b) straight-in approaches in instrument meteorological conditions should be permitted only if the position of the aircraft has been positively established by reference to radar/radio aids at a point from where it can safely descend below the minimum en route altitude.

The air traffic control clearance should be based on such procedures.

In reality the foregoing words assume and apply to factors and causes which should justify the recommendations themselves. Therefore these causes should obviously have been included and pointed out in the first part of the final conclusions, where the factors contributing to the accident are listed.

In conclusion, according to the Italian Administration, because of the facts which were ascertained during the inquiry with regard to the deficiencies in both the aids and the personnel of the Indian ATC Service and above all because of the evident improper clearance, the main causes of the accident should be attributed to these negative elements and also to the reliance that the pilot placed upon the clearance given him by ATC.

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