Aviation Safety Investigation Report 199500249

Boeing Co
B747-238B

02 February 1995

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Occurrence Number: 199500249 **Occurrence Type:** Incident
Location: 40km SSE Cairns
State: QLD **Inv Category:** 4
Date: Thursday 02 February 1995
Time: 1030 hours **Time Zone** EST
Highest Injury Level: None

Aircraft Manufacturer: Boeing Co
Aircraft Model: 747-238B
Aircraft Registration: VH-EBR **Serial Number:** 22614
Type of Operation: Air Transport High Capacity International Passenger Scheduled
Damage to Aircraft: Nil
Departure Point: Brisbane QLD
Departure Time: 0905 EST
Destination: Cairns QLD

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	ATPL 1st Class	6000.0	11000
Co-Pilot/1st Officer	ATPL	11000.0	17000
2nd Officer	ATPL	2500.0	8500
Flight Engineer		10000.0	14000

Approved for Release: Monday, August 24, 1998

FACTUAL INFORMATION

During the descent, the second officer was the pilot flying from the right seat. The pilot in command was in the left seat, and he was monitoring and performing support duties including communication with air traffic control (ATC). The co-pilot was monitoring the approach and assisting with support duties.

The aircraft had been cleared by the Cairns Sector Controller for descent to 7,000 ft tracking inbound on the Cairns VOR 153 radial. After communications were transferred to Cairns Approach, the aircraft was cleared to continue descent to 6,500 ft. The controller told the crew to expect a straight-in approach to runway 33, and to report when in visual meteorological conditions (VMC).

At 32 DME the pilot in command requested further descent "as per the DME steps." The controller then issued a clearance "from two zero DME descend to three thousand not below the DME steps." The clearance was correctly acknowledged. (The clearance required the aircraft to remain at 6,500 ft, the last cleared altitude, until reaching 20 DME.)

The pilot in command said that after receiving a clearance to descend to 3,000 ft "not below the DME steps", he had set 5,400 ft in the altitude-select window and permitted the second officer to commence the descent in VMC. The pilot in command stated that the aircraft was maintained in VMC, but because he could not see the runway, he instructed the second officer to return the aircraft to 6,400 ft. ATC also issued a climb requirement at the same time. The pilot in command stated that at no time was the aircraft in instrument meteorological conditions.

The co-pilot had been absent from the flight deck when the clearance to descend to 3,000 ft was issued. When he returned he noted that the altitude alert window had been set to 5,400 ft, and he queried the flight engineer. The flight engineer replied that they had been cleared for a visual approach. The co-pilot was satisfied with the situation as the aircraft was in VMC. The flight engineer later said that he had some difficulty hearing the flight deck conversation and monitoring the radio transmissions at the same time.

At the time of the occurrence, the DME arrival procedure specified a lowest safe altitude of 6,400 ft from 32 DME to 20 DME and 5,500 ft from 20 DME to 16 DME. In this instance, the crew had been instructed to remain at 6,500 ft until 20 DME and then descend in accordance with the remainder of the DME Arrival procedure.

The radar data showed that the aircraft left 6,500 ft on descent at 33 NM, passed through the lowest safe altitude of 6,400 ft at 32 NM, and levelled at 5,600 ft at 29 NM. This altitude was maintained to 25 NM when the aircraft climbed to 6,500 ft.

When the aircraft was at 25 NM, the approach controller noticed that the transponder altitude readout indicated 5,700 ft. This placed the aircraft below the minimum safe altitude for the step of 6,400 ft and the controller instructed the crew to climb to 6,500 ft, which was carried out. When the crew subsequently reported "visual" approximately 30 seconds later, the aircraft was cleared to descend from 6,500 ft to 2,500 ft. The co-pilot resumed his position in the right seat when the aircraft was descending through 4,000 ft.

ANALYSIS

Crew resource management (CRM)

The first officer was absent from the flight deck during a period when crucial descent clearance information was received. The flight engineer was not adequately monitoring the situation as the exchanges between the pilot in command and the second officer were not clearly audible.

DME arrival

There have been reported occurrences where an error was made by the crew in reading and applying the DME arrival procedure such that a descent was initiated to the sector level one step too early, thereby descending below the lowest safe altitude. In this occurrence the aircraft followed a descent profile which was consistent with this error; specifically, the aircraft was descended towards 5,500 ft, which was the lowest level for the next sector.

SIGNIFICANT FACTORS

1. The crew misinterpreted the clearance and initiated a descent below their cleared level.

2. The altitude alert window was incorrectly set to 5,400 ft.

3. The co-pilot was absent from the cockpit when the clearance to descend to 3,000 ft was issued and was told incorrectly that the aircraft was cleared for a visual approach.

4. The aircraft descended below the lowest safe altitude before the crew reported visual.

SAFETY ACTION.

The Bureau of Air Safety Investigation is currently investigating a perceived safety deficiency that has been identified as a result of this and a number of similar occurrences. The deficiency relates to the presentation of distance and descent altitudes on DME/GPS arrival charts that may be misinterpreted by flight crew.

Any recommendation issued as a result of this investigation will be published in the Bureau's Quarterly Safety Deficiency Report.