Aviation Safety Investigation Report 199702621

Boeing Co B737 Boeing Co B747-238B

17 August 1997

Readers are advised that the Australian Transport Safety Bureau investigates for the sole purpose of enhancing transport safety. Consequently, Bureau reports are confined to matters of safety significance and may be misleading if used for any other purposes.

Investigations commenced on or before 30 June 2003, including the publication of reports as a result of those investigations, are authorised by the Executive Director of the Bureau in accordance with Part 2A of the Air Navigation Act 1920.

Investigations commenced after 1 July 2003, including the publication of reports as a result of those investigations, are authorised by the Executive Director of the Bureau in accordance with the Transport Safety Investigation Act 2003 (TSI Act). Reports released under the TSI Act are not admissible as evidence in any civil or criminal proceedings.

NOTE: All air safety occurrences reported to the ATSB are categorised and recorded. For a detailed explanation on Category definitions please refer to the ATSB website at www.atsb.gov.au.

## Aviation Safety Investigation Report 199702621

Occurrence Number:	199702621	Occurrence Type:	Incident		
Location:	130km N Melbourne, Aerodrome		4		
State:	VIC	Inv Category:	4		
Date:	Sunday 17 August 1997				
Time:	0730 hours	Time Zone	EST		
Highest Injury Level:	None				
Aircraft Manufacturer:	Boeing Co				
Aircraft Model:	737-377				
Aircraft Registration:	VH-CZO			Serial Number:	24304
Type of Operation:	Air Transport Domestic High Scheduled	Capacity Passenger			
Damage to Aircraft:	Nil				
Departure Point:	Melbourne Vic.				
Departure Time:	0713 EST				
Destination:	Cairns Qld				
Aircraft Manufacturer:	Boeing Co				
Aircraft Model:	747-238B				
Aircraft Registration:	VH-EBS			Serial Number:	22616
Type of Operation:	Air Transport Domestic High Scheduled	Capacity Passenger			
Damage to Aircraft:	Nil				
<b>Departure Point:</b>	Melbourne Vic.				
Departure Time:	0715 EST				
Destination:	Cairns Qld				

Approved for Release: Tuesday, July 21, 1998

## FACTUAL INFORMATION

The B737 had departed from Melbourne on a flight to Cairns, Qld, two minutes ahead of the B747 on the same route. Both aircraft were climbing to an initial altitude of flight level (FL) 200 and the crews had been approved to vary their climbing speed. The crew of the B737 increased their speed to 300 knots and the crew of the B747 were approved to conduct a "high speed climb".

Due to an active restricted area, both aircraft were given a radar vector to take them off track and jurisdiction for the flights was transferred to the Inner North controller. Both crews contacted the Inner North controller whilst on a heading of 010 degrees, with the B747 paralleling the track of the B737 to the right with approximately 8 - 10 NM separation. The closing speed at the time of the transfer was approximately 50 knots. The B737 was then cleared to climb to flight level (FL) 310 and the B747 to FL390.

When the aircraft were clear of the restricted area, the controller issued instructions for both crews to track from their respective positions direct to the reporting point TOBOB, at which they were to intercept their planned route. The planned track to TOBOB was approximately 355 degrees and the instruction would result in a turn of approximately 20 - 25 degrees to the left for both aircraft.

The controller did not realise that the second aircraft was a B747 and thought it was an aircraft of a lower performance. He was not familiar with this type of aircraft on this route and, although he knew that the registration belonged to a B747, did not reconcile that particular type with the traffic situation.

The wind was from the north west, with forecast speeds of 70 knots at flight level (FL) 185.

The crew of the B737 were the first to turn their aircraft in accordance with the controllers instructions and chose an initial heading that was to the north west and directly into wind. This turn had the effect of reducing the ground speed by almost 60 knots. The turn was approximately 55 degrees, more than that required to track direct to TOBOB, and an adjustment was made about 1 minute later.

Because of the position of the B747 relative to the B737, its turn of approximately 20 degrees resulted in a more northerly heading and, as such, the reduction in its ground speed was less than 10 knots.

These changes resulted in a significant increase in closing speed at a time when the Inner North controller became occupied with other work related tasks. Consequently he did not initially notice the reduction in separation.

Shortly after, as he conducted a scan of his area of responsibility, he saw that the B747 was closing rapidly on the B737 and that there was less than the required vertical separation with the B747 below. He immediately attempted to achieve vertical separation by instructing the crew of the B737 to maintain FL210. The intent was to allow the B747, which had a greater rate of climb, to achieve the necessary vertical separation before the horizontal separation standard was infringed. However, it became obvious that this plan would not achieve the objective and he issued a radar vector to the crew of the B747 in order to maintain radar separation.

Before the distance between the aircraft started to increase, the horizontal separation had reduced to 4.2 NM while vertical separation was 200 ft. The required standard was either 5 NM horizontally or 1,000 ft vertically. A breakdown of separation had occurred.

Examination of the radar data indicated that the closing speed had increased to 160 knots for a short period prior to the radar vector taking affect.

SIGNIFICANT FACTORS

1. The Inner North controller assumed that separation would be achieved through differences in aircraft performance without employing separation assurance techniques.

2. The crew of the B737 executed a turn which was greater than that expected by the controller.

3. The Inner North controller did not immediately recognise the combination of events that led to a significant increase in closing speed.