Aviation Safety Investigation Report 199900003

Boeing Co
B737
Boeing Co
B737-400

04 January 1999

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Aviation Safety Investigation Report

199900003

Occurrence Number:	199900003	**Occurrence Type:**	Incident
Location:	37km SSW Mudgee, VOR		
State:	NSW	**Inv Category:**	4
Date:	Monday 04 January 1999		
Time:	1931 hours	**Time Zone**	ESuT
Highest Injury Level:	None		

Aircraft Manufacturer:	Boeing Co		
Aircraft Model:	737-377		
Aircraft Registration:	VH-CZK	**Serial Number:**	23663
Type of Operation:	Air Transport Domestic High Capacity Passenger Scheduled		
Damage to Aircraft:	Nil		
Departure Point:	Sydney NSW		
Departure Time:	1914 ESuT		
Destination:	Darwin NT		

Aircraft Manufacturer:	Boeing Co		
Aircraft Model:	737-476		
Aircraft Registration:	VH-TJN	**Serial Number:**	24439
Type of Operation:	Air Transport Domestic High Capacity Passenger Scheduled		
Damage to Aircraft:	Nil		
Departure Point:	Melbourne Vic.		
Departure Time:	1843 ESuT		
Destination:	Brisbane Qld		

Approved for Release: Thursday, June 22, 2000

FACTUAL INFORMATION

VH-TJN, a Boeing 737 (B737), was en route from Melbourne to Brisbane and tracking via air route H29 at flight level (FL) 290 and was estimating overhead Mudgee at 1938 ESuT.

VH-CZK, another B737, had departed Sydney at 1914, tracking via Richmond and Nyngan to Darwin on air route T74. The crew had planned to cruise at FL310 and was instructed by Sydney Air Traffic Control (ATC) to maintain FL280 due to airspace requirements in the Sydney area. Air routes H29 and T74 intersected 113 NM north-west of Sydney.

The crew of CZK was transferred from Sydney ATC to the Melbourne Sector 16 controller (SEC16) approximately 45 NM west of Sydney. The controller asked the crew of CZK if they could meet a requirement to climb to FL310 by 100 NM from Sydney. The crew of CZK responded with "... we are showing it 90 miles to run 310". The controller instructed the crew to climb to FL310, as he understood from their reply that the aircraft would reach that level by 90 NM from Sydney. Shortly after, the crew advised the controller that they would reach FL310 about 140 NM from Sydney. The controller then instructed the crew to maintain FL290. The controller advised the crew that they could expect further climb in approximately 25 NM once they were clear of crossing traffic in their 10-o'clock position at 18 NM.

The controller then observed CZK climbing above FL280 as it was passing TJN. The controller asked the crew of CZK to confirm that they were cleared to maintain FL280. The crew advised the controller that they had been cleared to maintain FL290. As CZK had already passed TJN, the crew of CZK was instructed to climb to FL310. Subsequent investigation of the radar recording found that CZK had passed within 2 NM laterally and 500 ft vertically below TJN. The prescribed vertical separation standard was 1,000 ft, and the lateral standard was 5 NM. There had been an infringement of separation standards.

The flight progress strip for CZK had been annotated with "280" to indicate that the crew was initially instructed to maintain FL280. This annotation had two adjacent ticks. The first tick was placed on the flight progress strip after the crew had made the initial call to SEC16, advising that they were climbing to FL280. The controller wrote "310" on the flight progress strip to record the instruction to climb to FL310, and this was ticked following the correct read-back by the crew. After the crew was instructed to maintain FL290 and they had read the instruction back correctly, the controller placed a second tick next to the existing "280" on the flight progress strip. The controller did not annotate the flight progress strip with "290" following the instruction to the crew to maintain FL290.

The controller had been rostered for one familiarisation shift after having spent 5 weeks instructing in the simulator and a further 2 weeks on annual recreation leave. The controller had been operating under supervision for approximately 4 hours of the shift and his supervisor reported that he was performing satisfactorily. He was subsequently certified to operate solo on sector 16. The controller then had a rest period of approximately 1 hour prior to operating the sector 16 position for the last 2 hours of his shift. The separation infringement occurred approximately 20 minutes prior to the completion of his shift.

The crew of TJN which was fitted with a traffic alert and collision avoidance system (TCAS), was conducting training during that flight and was aware of the crossing traffic. However, they thought that CZK was on climb to maintain FL280. As CZK passed behind them, they realised that CZK had climbed above FL280. The crew did not hear SEC16 advise the crew of CZK of the crossing traffic at 18 NM. The crew of TJN advised that they "also had the traffic sighted and on TCAS".

After receiving the query for the FL310 requirement from SEC 16, the crew of CZK had ascertained from the flight management computer that the aircraft would reach FL310 in 90 track NM. The pilot in command stated that he wished to convert this to, and report it as, a distance from Sydney in accordance with the request. The co-pilot advised the controller that they would reach FL310 in 90 NM from their present position. The pilot in command was not satisfied with that response and manipulated the flight management computer to obtain the top-of-climb distance as 140 NM from Sydney. This was then advised to the controller. The crew sighted TJN after the controller had advised them of the crossing traffic. They thought that the crossing traffic was at FL310. As CZK approached the intersection of the air routes, the crew thought that the crossing traffic, TJN, was approximately 1,000 ft above them. The crew of CZK advised that they had sighted the crossing traffic. CZK was not fitted with TCAS.

ANALYSIS

The response from the crew of CZK, "... we are showing it 90 miles to run FL310", led the controller to believe that the aircraft would reach FL310 by 90 NM from Sydney. The controller then issued an instruction to climb to FL310 with the intention of monitoring the separation on radar. When the crew later advised that they would reach FL310 by 140 NM from Sydney, the controller intended to revert back to his original plan and maintain CZK at FL280. The investigation could not ascertain why the controller subsequently issued the instruction to CZK to climb to FL290. The controller thought that he had issued an instruction to climb to FL280. However, he incorrectly instructed the crew to climb to FL290 and did not appreciate the error when the crew correctly read back FL290.

By giving CZK an unconditional clearance to climb to the planned level of FL310, the controller did not apply positive separation assurance. From that point on, the prevention of an infringement of separation standards between CZK and TJN depended on the controller remembering that this potential confliction was still unresolved, and then taking timely and appropriate action to positively separate the aircraft. In the event, when the controller returned to resolve the potential conflict between CZK and TJN, an error was made.

The controller did not advise the crew of CZK of the level of the crossing traffic as he thought that the aircraft were vertically separated. The crew of CZK thought that TJN was 1,000 ft above them. The crew of TJN was discussing training issues and was probably not as vigilant in maintaining their situational awareness as if in a non-training situation. If the controller had mentioned the callsign of the crossing traffic, the crew of TJN may have realised that they were in fact the conflicting aircraft.

SIGNIFICANT FACTORS

1. The response from the crew of CZK to the level requirement was ambiguous and misled the controller into believing the aircraft would reach FL290 by 90 NM from Sydney.

2. The controller cleared the aircraft to the incorrect level and did not recognise the error when the crew read back the level.