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ATSB TRANSPORT SAFETY REPORT
Aviation Investigation AO-2008-006
Final

Breakdown of separation, VH-TQZ

Tamworth Aerodrome, New South Wales

7 February 2008

Abstract

On 7 February 2008 at Tamworth Aerodrome, New South Wales, an air traffic controller issued a take-off clearance to the flight crew of a Bombardier Inc DHC-8-315 (DHC8) aircraft, registered VH-TQZ, for runway 30 Right. At the same time, an airport operations officer was operating a vehicle on that runway.

The controller had previously issued a clearance to the operations officer to conduct bird dispersal activities on the runway. The operations officer was monitoring his radio and heard the DHC8's take-off clearance. He advised the controller that he would vacate the runway. At the same time, the flight crew had observed the vehicle on the runway and did not commence the takeoff. The controller cancelled the take-off clearance until the runway was clear.

While these secondary safety defences effectively prevented any possibility of an accident, the issue of the take-off clearance with the vehicle on the runway constituted a breakdown of separation.

The investigation found that the controller's scan of the runway and flight strip board was not effective as a result of his pre-occupation with the management of current and pending traffic and the associated high volume of radio communications. It was also possible that the controller was experiencing some degree of fatigue at the time. The ATSB's investigation did not detect any safety issues that required consequent safety action.

FACTUAL INFORMATION

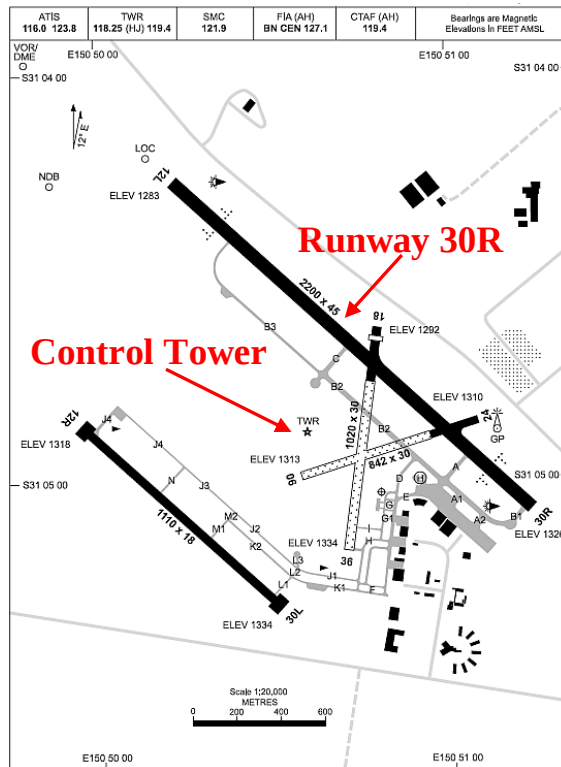
Sequence of events

On 7 February 2008 at about 1033 Eastern Daylight-saving Time¹ at Tamworth Aerodrome, New South Wales, the aerodrome controller 1 (ADC-1) issued a take-off clearance to the flight crew of a Bombardier Inc DHC-8-315 (DHC8) aircraft, registered VH-TQZ. Concurrently, an airport operations officer was operating a vehicle (Car 2) within the runway 30 Right (30R) runway and associated flight strip (Figure 1). ADC-1 had previously issued a clearance to Car 2 to operate on that runway to conduct bird dispersal activities. There was a breakdown of separation because the runway was occupied.

The airport operations officer reported that he was monitoring the ADC-1 radio frequency and heard the take-off clearance being issued to the flight crew. He subsequently advised ADC-1 that he would vacate the runway. The flight crew had observed the vehicle on the runway and did not commence the takeoff. ADC-1 cancelled the take-off clearance.

1 The 24-hour clock is used in this report to describe the local time of day, Eastern Daylight-saving Time, as particular events occurred. Eastern Daylight-saving Time was Coordinated Universal Time (UTC) + 11 hours.

Figure 1: Tamworth Aerodrome



Earlier that morning, the roles of ADC-1 and the surface movement controller (SMC) were combined with one controller performing both functions. At about 1024, a second controller took over the SMC responsibility because ADC-1 was busy managing the following four aircraft in the control zone:

- The DHC8, which was to depart from runway 30R for a right turn to track south to Sydney via Singleton.
- A Twin Comanche aircraft that was conducting a practice instrument approach to runway 12 Left (12L), the reciprocal of runway 30R (Figure 1). This instrument approach involved a left teardrop pattern² and potentially placed the DHC8 and the Twin Comanche in a head-on conflict.
- An Avions Mudry & Cie CAP 10 (CAP 10) that was inbound from the south-west. That aircraft was to initially overfly runway 30R for right downwind. However, when the CAP 10 was at 4 NM (7 km) from the aerodrome, the pilot was

instructed to turn right for left downwind runway 30R.

- The pilot of another aircraft who had been requesting a clearance to enter the Tamworth controlled airspace.

Forty-five seconds after the Twin Comanche pilot reported overhead outbound on the runway 12L instrument approach (a 90-second outbound leg for left turn to final), the DHC8 crew was given traffic information by ADC-1 on the Twin Comanche and cleared for takeoff with a request for an early right turn to remove the potential conflict with the Twin Comanche.

During the morning, the driver of Car 2 had entered runway 30R numerous times to disperse kite hawks that had been hovering over the runway. At 1028, the ADC-1 approved the driver of Car 2 to re-enter the runway. The SMC was also providing assistance to ADC-1 by visually monitoring aircraft and reporting their positions at that time.

Personnel information

The ADC-1 arrived late at work that morning having misread the controller roster. ADC-1 reported rising at around 0630 after about 5 hours sleep the night before. He also reported that he generally doesn't get a good night's sleep.

An examination was carried out on the ADC-1's work and rest data via a number of fatigue modelling programs. The results of that examination suggested that while the controller was not unfit for duty in accordance with Civil Aviation Regulation 115 *Medical unfitness of holder of licence*, the sleep hours obtained may not have been conducive to optimal alertness levels.

Air Traffic Controllers are required to undergo regular performance assessments to maintain currency. ADC-1 had been working at Tamworth tower for about 3.5 years. ADC-1's most recent performance assessment report indicated favourable performance and awarded maximum competency scores for items including runway scanning. Previous assessment reports for the period 2006 to 2007 also rated ADC-1's performance highly.

² A standard procedure flying pattern that is similar to a racetrack, but with one end having a large radius and the other small.

Meteorological information

The Bureau of Meteorology (BoM) reported that at around the time of the incident, the weather conditions in the Tamworth area were relatively fine with a light to moderate north-westerly wind and scattered³ low level cloud with bases between 1,800 and 3,400 ft above ground level (AGL). The BoM indicated that although visibility measurements were not available, the data suggested that there was unlikely to be any fog, mist or other weather conditions that would have significantly reduced surface visibility.

The ADC-1 reported that at the time of the incident, the cloud base was about 4,500 ft AGL and, although this made it more difficult to visually separate aircraft, he had been able to see all of the aircraft in the period leading up to and following the occurrence.

Airport information

Tamworth Aerodrome has two parallel main runways; runway 30R/12L and runway 30L/12R, with two grass runways crossing runway 30R/12L. Runway 30R/12L has a slight dip at the midpoint.

The airspace surrounding Tamworth Aerodrome was classified as Class D⁴ and was activated at 0700 that day. The first controller shift commenced at 0630 to prepare for the opening of the control zone at 0700. The aircraft separation service provided by Air Traffic Control in that airspace relied on procedural⁵ rather than radar⁶ control. The Tamworth tower controllers reported generally using visual separation in the control zone.

3 Cloud amounts are reported in oktas. An okta is a unit of sky area equal to one-eighth of total sky visible to the celestial horizon. Few = 1 to 2 oktas, scattered = 3 to 4 oktas, broken = 5 to 7 oktas and overcast = 8 oktas.

4 Control zones of defined dimensions and associated control area steps having an upper limit of 4,500 ft above mean sea level (AMSL).

5 A term used to indicate that information derived from the air traffic services surveillance system (such as from radar) is not required for the provision of air traffic control services.

6 The control of air traffic based upon position/height information that is supplied by radar.

Airport personnel roles and communication

In the Tamworth tower, there can be up to three air traffic control positions operating at any one time. Two aerodrome controllers (ADCs 1 and 2) were responsible for the respective main runways and the airspace above those runways. The SMC was responsible for taxiing aircraft and the coordination of other traffic on the aerodrome, such as Car 2.

Depending on the volume of traffic and its complexity, the SMC role could be combined (or de-combined/separated) with that of the ADC-1. On rare occasions, the role of SMC was combined with ADC-2.

Aerodrome controller 1

The ADC-1 was responsible for runway 30R/12L, the airspace between the main runways, the airspace to the north up to 8,500 ft, and the airspace above ADC-2's airspace. That included vehicular access to the runway.

The ADC-1's flight strip bay⁷ was divided into three bays to distinguish between:

- Visual flight rules aircraft that were operating nearby but outside controlled airspace (Bay 1).
- Aircraft that were airborne and either within, or had a clearance to enter the Tamworth airspace (placed below the ACTIVE designator), or were airborne but had not received a clearance to enter Tamworth airspace (placed above the ACTIVE designator). A RUNWAY designator was located below the ACTIVE designator and was used to manage aircraft/vehicles that were cleared to use the runway (Bay 2)
- Outbound aircraft that had taxied, pending departure (Bay 3).

One aircraft/vehicle strip was permitted below the RUNWAY designator at any one time to indicate that the runway was occupied. Prior to permitting an aircraft/vehicle to access the runway, the flight strip board was checked for strips below the

7 Control console repository for storing/manipulating flight strips. A flight strip listed an aircraft's flight details and assisted the controllers to manage traffic.

RUNWAY designator, and the runway scanned to verify that it was not occupied.

The ADC-1 later reported that both the DHC8 and Car 2 flight strips were on the console at the time of the occurrence.

Aerodrome controller 2

The ADC-2 was responsible for runway 30L/12R and the south-west quadrant of the control zone from ground level up to 3,500 ft.

Surface movement controller

The SMC was responsible for taxiing aircraft and the coordination of surface movement on the aerodrome. The SMC indicated that the only vehicles that contact him were those wanting to cross runway 06 or runway 18. The SMC may also provide assistance to ADC-1/ADC-2 by sighting aircraft.

Airport operations officer

The Airport Operations Officer's (AOO) role included security, safe operations on the apron and taxiways, general maintenance and bird management activities (bird deterrence and dispersal). Car 2 was fitted with a radio that enabled the AOO to listen to the SMC and ADC frequencies simultaneously.

Preceding events in the tower

The air traffic controllers reported that there was no excess noise or other distractions in the tower at the time of the occurrence.

About 8 minutes before the occurrence, the ADC-1 elected to de-combine the SMC and ADC-1 roles and all three air traffic control positions were staffed and open. The role of ADC-1 was reported to have become very busy after the SMC role was separated, with high traffic levels and 60 radio transmissions in the 8 minutes preceding the occurrence.

ANALYSIS

While not necessarily rendering the aerodrome controller 1 (ADC-1) unfit for duty, the ADC-1's recent work and rest schedule and sleep hours may not have been conducive to optimal alertness

levels. It was therefore possible that the controller was experiencing fatigue at the time of the occurrence, which may have affected his normally high performance standards.

During the lead up to the breakdown of separation, ADC-1's workload was significant and increasing. That workload would have pressured the ADC to quickly process traffic and been exacerbated by the cloud in the area, which increased the difficulty of sighting overflying aircraft. The action by the ADC-1 to open the surface movement controller (SMC) position and to have the SMC assist by sighting aircraft was an attempt to address that risk.

Given the elapsed time from when Car 2 entered the runway, and the complexity of the traffic environment, it was likely that ADC-1 had a very limited awareness of the location of Car 2. Without a final visual scan of the runway and strip bay, ADC-1 would not have been reminded that Car 2 was still on the runway.

The ADC-1's original plan to keep the DHC8 on the ground until the Twin Comanche and CAP 10 were clear would have provided separation assurance. The late change of plan to release the DHC8 was designed to provide an expeditious service and to help facilitate separation between the DHC8 and inbound Twin Comanche.

The ADC-1's scan of the runway and flight strip board was not effective due to his pre-occupation with current and pending airborne traffic deconflictions. Subsequently, the ADC-1 was unaware of the status of traffic on the runway.

Although there was a breakdown of separation on the runway, the recovery defences by the operations officer in Car 2, the flight crew and ADC-1 were effective.

FINDINGS

From the evidence available, the following findings are made with respect to the breakdown of separation that occurred at Tamworth Aerodrome, New South Wales on 7 February 2008 and involved a Bombardier Inc DHC-8-315 (DHC8), registered VH-TQZ and an Airport Operations Officer vehicle. They should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing safety factors

- The aerodrome controller 1's scan of the flight strip board and runway was not effective.

Other safety factors

- The aerodrome controller 1 had limited rest the night before the occurrence and may have been experiencing the effects of fatigue.
- Air traffic communication levels at the time were high with 60 radio transmissions in the 8 minutes preceding the occurrence.

A draft of this report was provided to Airservices, the Tamworth tower controllers and manager, the PIC, the aircraft operator, the airport operations officer, and the Civil Aviation Safety Authority (CASA).

Submissions were received from the aerodrome controller 1, Airservices and CASA. The submissions were reviewed and, where considered appropriate, the text of the draft report was amended accordingly.

Other key findings

- The crew of the DHC8 saw the airport operations officer vehicle on the runway in front of them and did not initiate the takeoff.
- The officer in the airport operations vehicle heard the take-off clearance and vacated the runway.

SOURCES AND SUBMISSIONS

Sources of Information

The main sources of information during the investigation included:

- the aircraft operator
- the pilot in command (PIC) of VH-TQZ
- the involved air traffic controllers
- the Tamworth tower manager
- the airport operations officer
- Tamworth Regional Council
- Airservices Australia (Airservices)
- the Bureau of Meteorology.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003*, the Australian Transport Safety Bureau (ATSB) may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.