



Australian Government

Australian Transport Safety Bureau

Near collision involving Hawker Beechcraft Corporation B300C, VH-NAO, and an airport work safety officer

Sydney Airport, New South Wales, 16 August 2016

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Published by: Australian Transport Safety Bureau
Postal address: PO Box 967, Civic Square ACT 2608
Office: 62 Northbourne Avenue Canberra, Australian Capital Territory 2601
Telephone: 1800 020 616, from overseas +61 2 6257 4150 (24 hours)
Accident and incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6247 3117, from overseas +61 2 6247 3117
Email: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

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Addendum

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Near collision involving Hawker Beechcraft Corporation B300C, VH-NAO, and a work safety officer

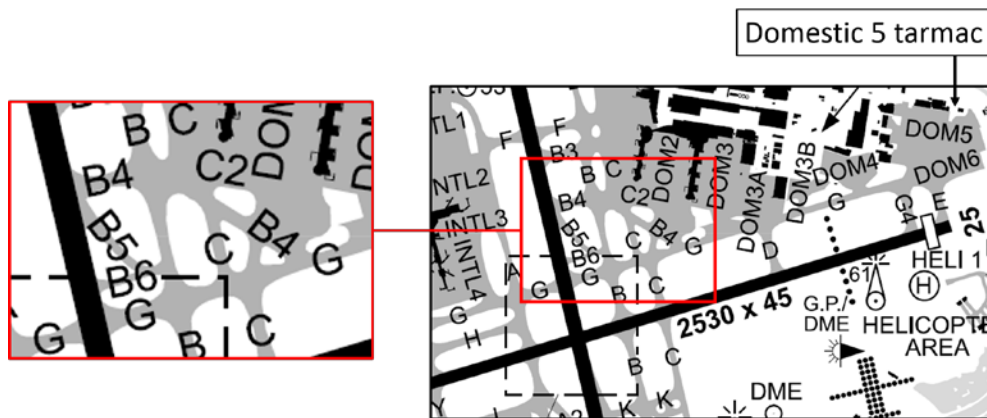
What happened

At about 2310 Eastern Standard Time (EST), a Hawker Beechcraft Corporation B300C, registered VH-NAO (NAO), taxied at Sydney Airport, New South Wales (NSW) for a flight to Coffs Harbour, NSW to retrieve a patient. On board were the pilot and three medical staff. The weather was fine and clear.

The pilot made a taxi call and air traffic control (ATC) cleared NAO to taxi from the domestic 5 apron where the aircraft was parked, with a requirement to give way to an inbound company aircraft (taxiing to the domestic 5 apron) and hold short of taxiway delta.

At about the time that NAO taxied, activities commenced in association with planned aerodrome works near the intersection of taxiways golf, charlie and domestic 2 (see Figure 1). Two work safety officers moved to the area in separate vehicles to establish the worksite. Establishment of the worksite included placement of red lights across affected taxiways and covering (taping over) existing green taxiway centre-line and lead-in lighting. Placement of red lights and covering of existing lights was intended to delineate the closed areas of affected taxiways.

Figure 1: Excerpt from aerodrome chart showing the location of the relevant taxiways



Source: Airservices, modified by the ATSB

Other aerodrome works activities required the closure of runway 16R, north of golf. Associated with that work, the controller switched off the runway lights north of the intersection of the runway with golf. Additionally, runway 07/25 was closed.

Once the inbound company aircraft was clear, the pilot of NAO was given further taxi clearance. The cleared route was intended to take the aircraft around the worksite that was being established, and to approach runway 16R at the point from which the aircraft could depart. The pilot was cleared as follows:

...taxi golf, bravo 4, and then left at bravo to the golf holding point runway 16R, just to go around the worksite.

After placing red lights at the eastern and western ends of the worksite on golf, a safety officer moved to the northern end of the worksite on charlie. The safety officer parked the vehicle on the centreline of charlie, facing west across the taxiway, and commenced placing red lights across the

taxiway between the position of the vehicle and where charlie meets bravo 4. By then, NAO was on bravo 4, and the safety officer was aware of the location and expected taxi route of the aircraft.

Soon after the safety officer commenced placing red lights across charlie, the pilot contacted ATC to confirm the instruction to turn left into bravo, then back onto golf. The controller advised the pilot that they were 'just crossing charlie now, so bravo is just coming up on your left, about 50 m, and then you'll be right into golf'. At that point, the pilot believed that they had already passed charlie, and were now required to make a sharp left turn into bravo, following the green taxiway lights.

The pilot turned left, believing that they were entering bravo, where in fact, the aircraft was entering charlie, in the area where the safety officer was in the process of placing red lights. As the pilot made the turn, they were not aware of the position of the safety officer, who by then had placed four of seven red lights across charlie. The safety officer saw that NAO had turned onto charlie and waved at the pilot believing that the aircraft would stop. The pilot did not report seeing the safety officer, but saw the vehicle and manoeuvred the aircraft to the western side of the centreline to pass the vehicle. The left wing tip of the aircraft passed about 2 to 3 m from the safety officer who moved further out the way as the aircraft passed. At the time, the vehicle warning beacon was operating and the headlights were on. The safety officer was wearing a high visibility vest.

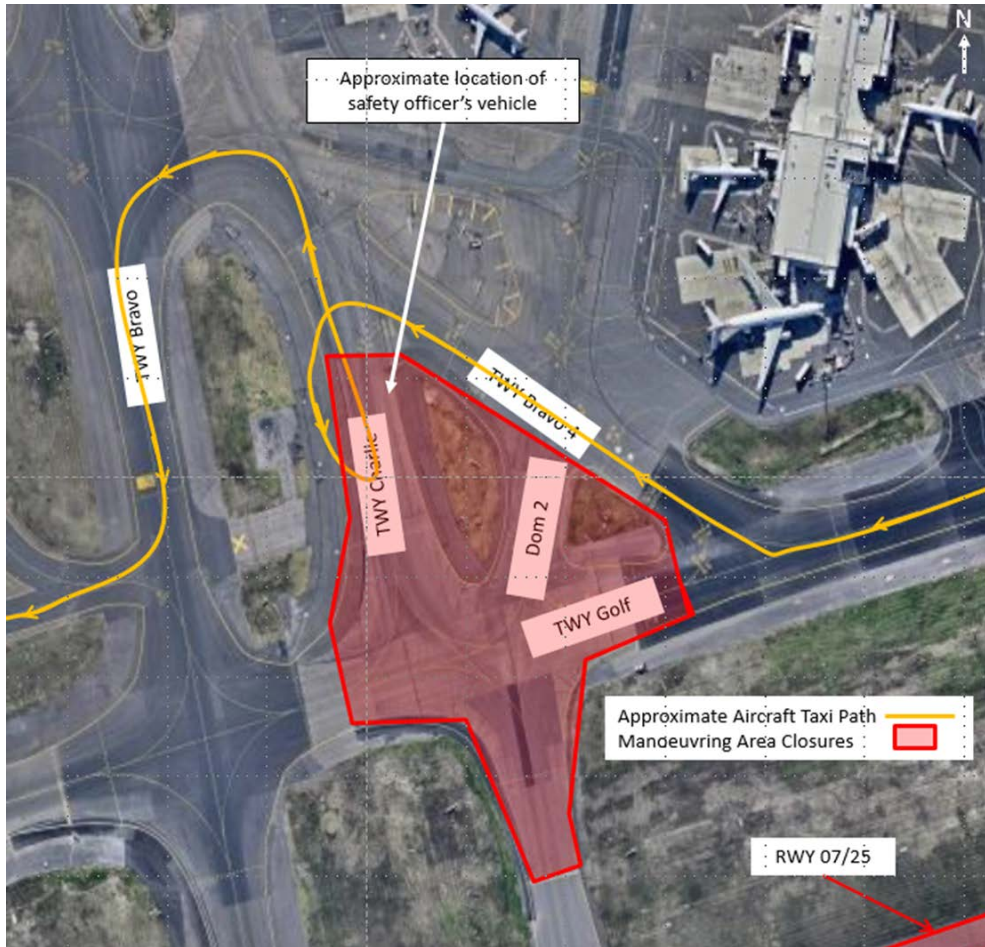
About ten seconds after advising the pilot of NAO that they were crossing charlie, and that bravo was a further 50 m ahead, the controller observed the aircraft turning into charlie. The controller immediately advised the pilot that the aircraft was heading towards the worksite, and restated the requirement to 'continue to the north-west on bravo 4, and then bravo will be on your left'. The pilot advised the controller that the situation was 'confusing' and that they would turn around. The controller informed the pilot that there were safety vehicles in the area that could provide assistance if required. The pilot declined that offer, and advised the controller that they would 'just get round this one', confirming that the safety vehicle on charlie was sighted.

The pilot made a 180 degree turn on charlie and headed north, back towards bravo 4. The safety officer saw that NAO was returning and moved the vehicle off the centre line. The pilot passed the vehicle and taxied onto bravo 4, before making a left turn onto bravo, as initially intended. The approximate taxi path of the aircraft and the position of the safety vehicle at the time the aircraft entered charlie are shown in Figure 2.

The pilot taxied southward on bravo, but turned right towards runway 16R on bravo 6, contrary to the clearance which was to taxi to the runway holding point on golf. ATC advised the pilot that the aircraft appeared to be entering bravo 6, and that golf was the taxiway 'just to the south'.

With the aircraft on bravo 6, ATC checked with the safety officer managing the runway 16R closure to confirm that the aircraft could enter the closed part of the runway at that point without causing any concerns, to which the responsible safety officer replied 'affirm'. The pilot asked ATC if they required the aircraft to reposition, but ATC was able to provide a clearance to enter the runway at the bravo 6 intersection. ATC cleared the aircraft to enter at bravo 6 and taxi south on the runway to the point at which golf intersects the runway (the runway was available for take-off south of that intersection). The aircraft taxied forward then took off from runway 16R without further incident.

Figure 2: Approximate aircraft taxi path and location of safety officer’s vehicle



Source: Aircraft operator, modified by the ATSB

Safety analysis

Aerodrome works

Aerodrome works on golf had been underway at Sydney aerodrome since early in 2016, and were undertaken during the aerodrome curfew period. Aircservices Australia Aeronautical Information Circular (AIC)¹ H38/15 provided a summary of the works, including a statement that ‘operational restrictions will be advised by NOTAM’². On the night of the occurrence, the relevant NOTAM came into effect at 1300 UTC (2300 EST), and included the following operational restrictions:

TWY RESTR DUE WIP
 TWY G BTN TWY B AND TWY B4 NOT AVBL
 TWY C BTN TWY B4 AND RWY 07/25 NOT AVBL
 TWY DOM2 BTN TWY B4 AND TWY G NOT AVBL

Although the pilot was aware of the aerodrome works, they were unaware of this particular NOTAM.

¹ Aeronautical Information Circular (AIC) is information for personnel concerned with flight operations that is of an administrative nature and not directly concerned with the present conduct of flight operations, but may have implications for the future (Aeronautical Information Publication (AIP) GEN 3.4).

² A NOTAM is a notice that the timely knowledge of is essential to personnel concerned with flight operations that contains information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard (Aeronautical Information Publication (AIP) GEN 2.2).

Taxi route

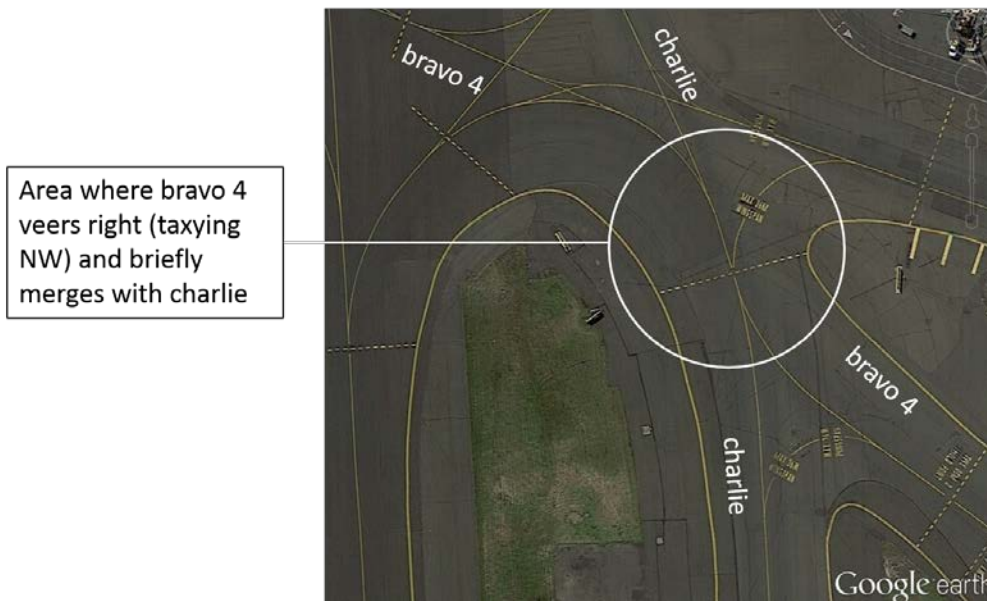
The taxi route by which the pilot was cleared was uncommon. The pilot had considerable experience operating at Sydney, but could not recall having followed the taxi path previously, either during the day or at night. Under normal circumstances, the pilot would have expected to taxi to runway 16R via golf. At the time of the occurrence, taxi via golf was not available because of the works. Similarly, runway 07/25 was also unavailable for taxi.

Aerodrome lighting conditions and taxiway markings

The taxi paths through the open space at the junction of bravo 4, charlie and charlie 2, are complex. Numerous guidance markings and lights complicate the area, and bravo 4 merges with charlie for a short distance as the two taxiways cross (Figure 3). A curve in bravo 4 as it meets charlie may have given the pilot the impression that the aircraft had arrived at the intersection of bravo 4 and bravo, being the point at which a sharp left turn was required. This expectation by the pilot may have been reinforced by the fact that the aircraft had just passed domestic 2, which the pilot may have misinterpreted as charlie.

The potentially confusing characteristics of the taxiway junction would have been exacerbated at night. At the time of the occurrence, additional vehicle lights were moving about the area, some steady (head/tail lights) and some flashing, and the partially established worksite lighting would have further complicated the environment. The pilot expected that some lights may have already been covered or turned off, which added to the potential for confusion over taxiway identification.

Figure 3: Taxiway intersection showing the area where bravo 4 veers right (taxying NW) and bravo 4 and charlie merge for a short distance



Source: Google earth, modified by the ATSB

At the time of the occurrence, the lead-in lighting to charlie and the charlie taxiway lighting had not yet been covered. This may have given the impression that the taxiway was still available, perhaps further reinforcing in the pilot’s mind that they had already passed charlie, and reached bravo. The taxiway signage was not affected by the works and was illuminated at the time of the occurrence. The pilot commented that their mental picture of the area was different to what they encountered at the time of the occurrence.

For similar reasons, as the pilot turned into bravo 6 (from bravo) to approach runway 16R, they were initially under the impression that they had reached golf.

Electronic charts

The operator had recently installed electronic charts (e-charts) in the aircraft. Using GPS information, e-charts can provide near real-time on-aerodrome positional information. At the time of the occurrence, the pilot was using paper charts, because they were more comfortable with paper charts and had not been trained in the use of e-charts. The use of e-charts was not mandated by the operator.

ATSB Comment

Continuing aircraft operations in the vicinity of a worksite while that worksite is only partially established, can be problematic. Operational considerations should be carefully balanced with the safety implications of allowing aircraft to continue to operate near a partially established worksite.

Under some circumstances, particularly where other complicating factors exist (such as poor ambient lighting conditions), it may be prudent to identify a transition period, and temporarily restrict aircraft movements until the worksite is fully established. The transition period would essentially be the time from which ATC release control of an area to a safety officer, until the safety officer then advises that establishment of the worksite is complete.

Airservices provided comment in relation to establishing a transition period, advising that the potential for a transition period to cause additional confusion around the availability of the work surface, or create additional disruption during times of high traffic levels would need to be taken into consideration. They consider the current process of instructing pilots with detailed taxi routes, as was the case in this occurrence, is effective. ATC will treat work areas as unavailable once an area is released to the work safety officer.

Findings

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

- The pilot was unaware of relevant taxiway closures until advised by ATC as part of their taxi clearance.
- The pilot became confused about the position of the aircraft as they taxied past the worksite on bravo 4, probably due to a combination of factors, including:
 - The pilot was not familiar with the taxi route, and the taxi route took the aircraft through a complex junction of taxiways at night.
 - The worksite was only partially established (not all red lights were in place, and some existing taxiway lighting had yet to be covered).
- The pilot was not familiar with the use of e-charts, which may have assisted with their orientation under the circumstances.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Aircraft operator

As a result of this occurrence, the aircraft operator has advised the ATSB that they are considering the following safety actions:

- Implementation of a training program to cover some contributing factors identified in the internal company report dealing with the occurrence, including the use of e-charts and other similar technologies.

- Development or acquisition of safety promotional material for staff, dealing with aircraft operations near worksites.

Safety message

This occurrence highlights the potential hazards involved when mixing aircraft operations with aerodrome works. The potential for misunderstanding or confusion is significant, particularly at night and in complex movement areas. The potential for confusion is further elevated when a worksite is in the process of being established. Relevant authorities are encouraged to carefully consider the risks involved and implement appropriate risk management strategies to minimise the likelihood of a misunderstanding or confusion.

Additionally, pilots are encouraged to stop and seek clarification from ATC if there is any doubt about the cleared taxi route. Similarly, ATC officers are encouraged to direct an aircraft to stop if they have any doubt about the intentions of the pilot, or there is any evidence that taxi instructions have been misunderstood. Timely and effective communication is essential to a shared understanding in a dynamic operational environment, particularly when the environment is complicated by unusual circumstances.

General details

Occurrence details

Date and time:	16 August 2016 – 2316 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Near collision	
Location:	Sydney Airport, New South Wales	
	Latitude: 33° 56.77' S	Longitude: 151° 10.63' E

Aircraft details

Manufacturer and model:	Hawker Beechcraft Corporation B300C	
Registration:	VH-NAO	
Serial number:	FM-49	
Type of operation:	Aerial work - EMS	
Persons on board:	Crew – 4*	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

*Crew includes the pilot and three medical staff.

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.