Australian Government
Australian Transport Safety Bureau

Runway collision with arrestor cable involving Raytheon B200, VH-ZCJ

Tindal Airport, Northern Territory, 9 August 2016

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Addendum

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Runway collision with arrestor cable involving Raytheon B200, VH-ZCJ

What happened

On 9 August 2016 at about 2020 Central Standard Time (CST), a Raytheon B200 aircraft, registered VH-ZCJ (ZCJ), departed from Darwin Airport, Northern Territory (NT), to collect a patient from Tindal Airport, NT, for transfer to Darwin. On board the flight from Darwin were the pilot and one flight nurse.

As the flight approached Tindal Airport, the pilot checked the Tindal ATIS[1] which stated that runway 14 was not available. There was no NOTAM[2] to indicate that was the case, so the pilot contacted Brisbane Centre air traffic control (ATC) to confirm the status of Tindal Airport. Brisbane Centre ATC advised the pilot there was an earlier incident at Tindal that was now cleared and runway 14 would be available for their arrival. The aircraft landed on runway 14 with Tindal ATC still active, at about 2120, then back-tracked runway 14 and parked at the terminal for the patient collection.

The patient was loaded on board ZCJ at about 2250. At about 2300, the Tindal ATC tower closed and procedures for operating at non-controlled aerodromes then applied. The pilot taxied ZCJ for departure at 2309. They entered runway 14 from taxiway echo (Figure 1), lined up for departure ensuring they used the entire runway length available and applied power. At about 70 kt, the pilot performed their 'cross check of airspeed indicators'. At this time there were no warning indications, so the pilot committed to continue the take-off.

At about 85–87 kt, the pilot felt the aircraft nose wheel strike something on the runway with an associated vibration through the rudder pedals. The pilot checked the airspeed, observed the aircraft was continuing to accelerate and there was no change in directional control, so they rotated the aircraft at the lift-off speed of 94 kt.

After departure, the pilot contacted the Tindal Airport emergency services and asked them to inspect the runway to check on the status of the aircraft arrestor cable (refer to *Aircraft Arrestor System* and *Enroute Supplement Australia*). The emergency services inspected the runway and advised the pilot that the arrestor cable was in the raised position, and that they would immediately report this to the Tindal Airport cable barrier crew for rectification.

The pilot continued the flight to Darwin and enroute contacted their company chief pilot to report the incident and discuss options for the management of the landing at Darwin. They also discussed the management of the patient in the event of a landing incident or accident. The chief pilot, in turn, contacted one of the company check and training captains, and notified Darwin ATC. On approach to Darwin, the pilot consulted the checklist for landing with an unsafe landing gear. When they extended the landing gear, there were no unsafe indications, so the pilot considered a blown tyre was the most credible risk for the landing.

The chief pilot then advised the pilot that Darwin ATC had activated their emergency response for the landing. They also suggested that the nurse look outside the cabin windows for any visual indications of damage. The nurse could not see any indications of damage. The pilot conducted their approach and landed at Darwin Airport without further incident. The aircraft was not damaged and there were no injuries.

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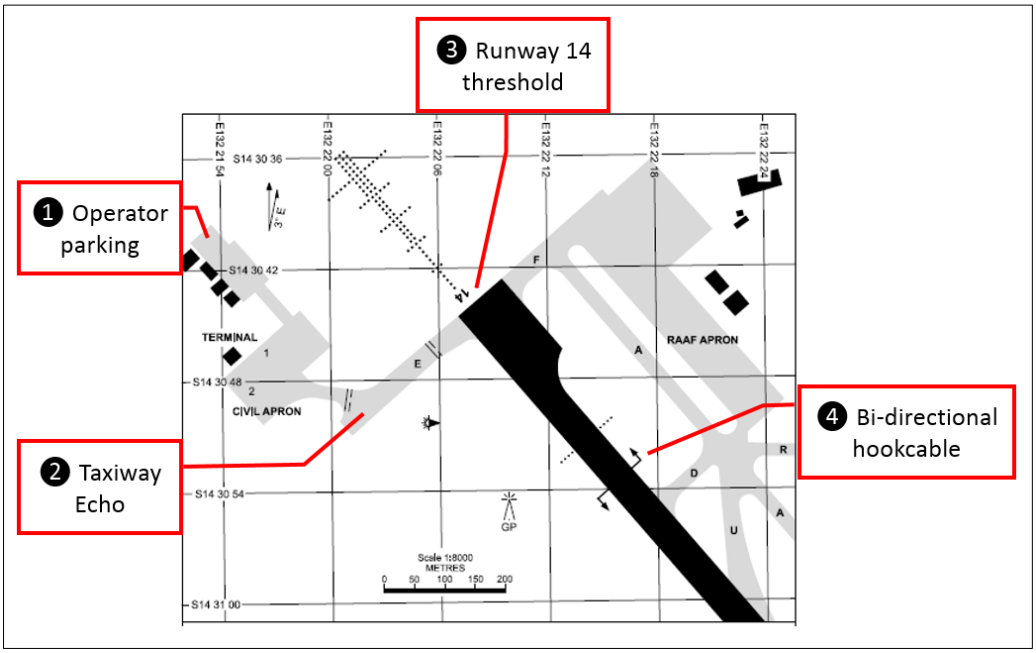
1 An automated pre-recorded transmission indicating the prevailing weather conditions at the aerodrome and other relevant operationsl information for arriving and departing aircraft.

2 A Notice To Airmen advises personnel concerned with flight operations of information concerning the establishment, condition or change in any aeronautical facility, service, procedure, or hazard, the timely knowledge of which is essential to safe flight.

Aircraft Arrestor System

The Tindal Airport aircraft arrestor system (AAS) is used to stop military jets that have a malfunction, which may otherwise cause them to overrun the runway. In this case, the jet will lower a hook at the rear of the aircraft to catch the cable. The AAS includes two cables, one positioned at either end of the runway and displaced from the respective threshold as displayed on the airport diagram of runway 14 (Figure 1).

Figure 1: Tindal airport apron diagram



Source: Airservices, annotated by ATSB

The AAS may be controlled by ATC from the Tindal ATC tower through each cable's control console, or by the AAS barrier crew from the runway site control location. Each location control console feeds into the hookcable control module, which manages the cable position logic (Figure 2). When ATC is active the control of the system is with the Tindal ATC tower. When the tower closes, ATC select the AAS controller to 'maintenance', which switches the control to the runway site control location.

There are four pushbutton selection/indicator lights on the tower control consoles (Figure 2). They comprise two green UP and DOWN pushbuttons, an amber maintenance pushbutton and a red fail pushbutton. The maintenance pushbutton is used to pass AAS control between the tower and runway site control location.

When AAS control is passed to the runway site control, the amber maintenance pushbutton will illuminate to indicate the runway site have control of the AAS. The red fail pushbutton will also flash, and be accompanied by an audible clicking. This is a warning to the tower controllers that they do not have control of the AAS. The warning is cancelled by manually depressing the fail pushbutton. In maintenance control, the tower console UP and DOWN pushbuttons are indicator lights only, which will respond to cable position changes made at the runway location.

Figure 2: Tower control console cable pushbuttons

Source: Tindal Airport

The runway site control has a physical switch, which is selected to either the UP or DOWN position. When control of the cable is passed from the tower to the runway site control, the hookcable control module will command the cable into the position selected on the runway site control switch.

When an aircraft is arrested with the AAS, the barrier crew take control of the AAS from ATC until the aircraft is released and the inspection and servicing of the cable completed. On completion of the cable servicing, the barrier crew lower the cable using the site control switch before passing control of the AAS back to ATC.

On 9 August 2016, at about 2045 CST, the runway 14 AAS was used to stop a military jet. The barrier crew then entered the runway and performed the servicing and reset of the cable. This task required the control of the AAS to be passed from the tower to the runway site control. The servicing and reset also required the cable to be cycled between the UP and DOWN positions. On completion of the reset the barrier crew passed AAS control back to the tower with the runway site control switch selected in the UP position. This deviated from the barrier crew's normal procedures, which required them to lower the cable into the DOWN position before passing control back to the tower.

Tindal ATC did not notice the discrepancy with the handover. They cycled the cable to check serviceability, then continued with normal cable operation for the remainder of ATC services. The cable was in the DOWN position for the arrival of ZCJ. When the Tindal ATC tower closed at 2300, the controller closing the tower performed the procedural steps, which included (1) ensuring the cable is set to DOWN on their control console, and (2) once confirmed DOWN, select AAS control to maintenance. The ATC procedural steps did not include checking the position of the cable after the maintenance selection.

There are no differences in the maintenance and fail pushbutton light indications if the cable changes position after control is passed to maintenance. However, the DOWN pushbutton green light would extinguish after about one second and the UP pushbutton green light would illuminate after about 10–15 seconds.

When the airport emergency services inspected the cable at 2320 they found the cable raised and contacted the barrier crew supervisor. The supervisor inspected the runway site control location and found the switch selected to the UP position.

Enroute Supplement Australia

The Enroute Supplement Australia entry for Tindal airport includes the following information:

> **Physical characteristics:** Recessed bi-directional hookcables installed 1,266 ft from threshold runway 14 and 1,515 ft from threshold runway 32… Distance between cables 6,214 ft… No arrestable aircraft operations or outside tower hours – both ends down. No crossing restrictions in down position... In the event of power failure, cables will rise to a

> height of 10 cm until [power] restored – recommended that aircraft not approved to trample hookcables confine operations to between cables during CTAF.

Enroute Supplement Australia introduction paragraph 22.2 b. states:

> Pilots should refer to the Pilot Operating Handbook of Flight Manual for specific restrictions for each aircraft. In the absence of any reference to trampling in either the Handbook or Manual, trampling is not authorised.

Company procedures for Aircraft Arrestor System

The pilot was unaware of any previous incident or discussion within the company regarding the AAS at Tindal Airport. There is no reference to trampling hookcables in their B200 flight manual and therefore no trample speed approved for the aircraft. The company did not have a procedure in place to require their pilots to avoid the runway length which incorporates the AAS when non-controlled aerodrome procedures apply.

ATSB comment

The ATSB notes that although there was sufficient runway for the pilot to stop the aircraft after trampling the cable, they were already passed their 'airspeed indicator cross check'. After this point, the pilot was mentally committed to continue the take-off and only to abort the take-off for a cockpit warning light.

It is likely that when the Tindal Airport tower closed and passed AAS control to maintenance, the runway 14 threshold AAS cable raised into the UP position in response to the existing site control switch selection, and this was not detected by ATC during the tower closing procedure.

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.

Airport operator

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

Training

The training for barrier crew is to be reviewed to ensure the runway switch is set to DOWN during hand-over procedures. A maintenance assurance inspection is to be investigated for the purpose of verification of switch position within the hand-over procedure.

ATC training is to be reviewed to ensure indication of DOWN position after hookcable is switched to maintenance position.

Aircraft operator

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

Operations notice

The company has issued an operations notice to their flight crew to advise them of the incident and instruct them that if the pilot in command cannot be assured of the cable status, to taxi past the cable prior to take-off, or land long to avoid it on arrival.

Training

The company's pilot training syllabus relating to potential hazards associated with operating at military aerodromes was updated to include arrestor cables.

Safety message

While the outcome of this incident was benign, the actions of the pilot demonstrated how crew resource management skills can be employed to engage assistance from outside the aircraft to effectively manage an unexpected risk. Their decision to contact Tindal Airport emergency services mitigated a potential risk to other operators before the tower re-opened.

General details

Occurrence details

Date and time:	9 August 2016 – 2313 CST	
Occurrence category:	Incident	
Primary occurrence type:	Runway events - Other	
Location:	Tindal airport, NT	
	Latitude: 14° 31.27' S	Longitude: 132° 22.67' E

Aircraft details

Manufacturer and model:	Raytheon Aircraft Company B200	
Registration:	VH-ZCJ	
Serial number:	BB-1853	
Type of operation:	Aerial work – EMS	
Persons on board:	Crew – 2	Passengers – 1
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

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.