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Pre-flight preparation event involving Airbus A320, VH-VNC

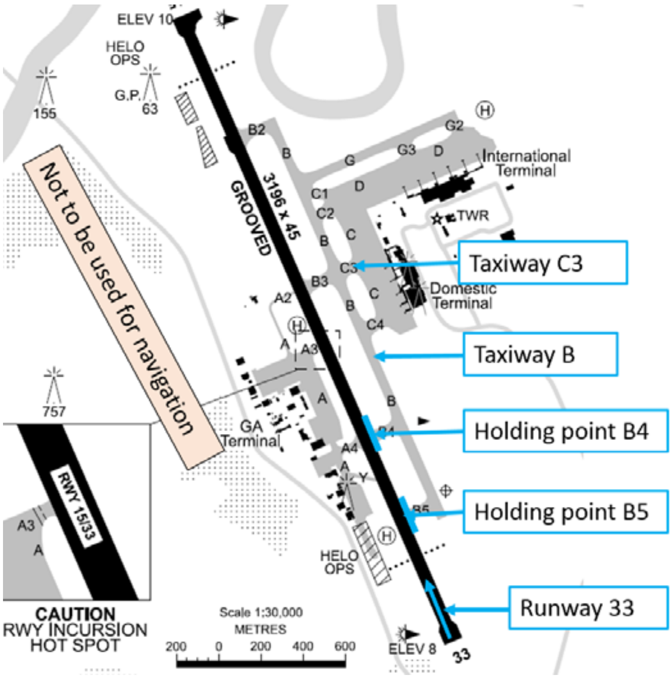
What happened

On 21 January 2017, the crew of an Airbus A320 aircraft, registered VH-VNC (VNC), prepared to conduct Tigerair flight 491 (TT491) from Cairns to Brisbane, Queensland. The flight crew consisted of a training captain and a first officer under supervision. The first officer was in the role of pilot flying for the sector and the captain was pilot monitoring.[1]

The flight crew conducted a take-off and departure briefing based on the environmental conditions and runway in use, expecting to commence the take-off roll from the B5 taxiway intersection (Figure 1). They entered the take-off data into the iPad application and loaded the data into the flight management guidance computer.

At about 1511 Eastern Standard Time (EST), the surface movement controller (SMC) cleared the flight crew of a de Havilland DHC-8 (DHC-8) aircraft that had been parked on an adjacent bay to VNC, to taxi using taxiway C3 (and B) to holding point B4. About 30 seconds later, the SMC cleared the flight crew of VNC to taxi using taxiway C3 (onto taxiway B) to holding point B5, which was the clearance they had expected. The crew had briefed each other on that taxi route.

Figure 1: Cairns Airport diagram extract



Source: Airservices Australia – annotated by ATSB

VNC then taxied behind the DHC-8 along taxiway B. As the DHC-8 turned onto the runway at B4, the first officer of VNC inadvertently also taxied to holding point B4. After completing the 'above the line' pre-take-off checks (see *Pre-take-off checks*), at about 1515, the captain of VNC advised the aerodrome controller (ADC) that they were ready for take-off. The ADC cleared VNC to line up

[1] Pilot Flying and Pilot Monitoring: procedurally assigned roles with specifically assigned duties at specific stages of a flight. The PF does most of the flying, except in defined circumstances; such as planning for descent, approach and landing. The PM carries out support duties and monitors the PF's actions and the aircraft's flight path.

on the runway and, as the first officer taxied the aircraft onto the runway, the flight crew completed the ‘below the line’ pre-take-off checks.

About 1 minute later, the ADC cleared VNC for take-off. Immediately after the captain read back the take-off clearance, the ADC advised the crew that they were lined up at the B4 (not B5) intersection. The crew did not respond, so the ADC cancelled the take-off clearance and instructed them to hold position. The captain then confirmed that they needed to commence the take-off from B5. The ADC cleared them to turn around on the runway, exit using B4 and taxi to B5. The aircraft subsequently took off from the B5 intersection and the flight continued without incident.

There was a 403 m difference in available runway length, between the B4 and B5 taxiway intersections.

Pre-take-off checks

The pre-take-off checklist consisted of two parts: ‘above the line’ and ‘below the line’. The crew complete the first part (above the line) before reporting ready for take-off, and the second part (below the line) after the aircraft enters the runway.

Tower comment

The captain contacted the Tower controller after the flight to thank the controller for intervening, and was advised that there had been a similar incident the previous day. The ATSB could find no record of any similar occurrences at Cairns Airport.

Safety analysis

Following the DHC-8

As the DHC-8 taxied immediately ahead of VNC, the flight crew may have been distracted by following the DHC-8 to B4. Although VNC had pushed back first, the DHC-8 flight crew had received their taxi clearance and commenced taxiing before VNC. There was no specific instruction to the flight crew of VNC to follow the DHC-8.

Cabin readiness

As the first officer turned the aircraft onto taxiway B4, the captain’s attention was on communicating with the cabin crew and observing their positions on the cabin video.

One of the items on the pre-take-off checklist (above the line) is ‘cabin ready’. The captain, as pilot monitoring, temporarily handed over responsibility for ATC communications to the first officer (as pilot flying), while they confirmed the status of the cabin. Because the captain had not heard the initial indication that the cabin was ready, they looked at the cabin video to check the cabin crew were seated and called the cabin crew on the interphone, who confirmed that the cabin was secure for take-off.

The captain then took back responsibility for ATC communications, and returned their focus to cockpit activities. As the captain was busy liaising with the cabin crew as the aircraft turned onto B4, the likelihood that they would notice that the aircraft was approaching the runway on the incorrect taxiway was reduced.

Training flight

The first officer had completed 11 sectors and was under the supervision of the training captain. The first officer assessed their workload at the time as moderate. This was the first officer’s second flight into Cairns since joining the operator. The captain also commented that runway 33 was not the usual runway in use at Cairns (due to the prevailing winds). A lack of familiarity with the runway may have reduced the flight crew’s ability to detect the incorrect runway position when the aircraft was lined up on the runway.

The captain commented that the first officer was taxiing slightly faster than optimal coming up to the holding point. The captain may have been focused on monitoring the progress of the aircraft to ensure the aircraft stopped before the holding line, which may have distracted them from noticing the B4 taxiway sign (to the left of the taxiway).

Normally, the pilot flying would have completed the flight controls check earlier in the taxi and well before the holding point, but the first officer completed checking the controls as the aircraft approached the turn onto B4. The captain commented that the checks were all completed correctly and in the correct order, but slightly later than normal due to the relative inexperience of the pilot flying.

Pre-take-off checklist

The relevant 'below the line' check to confirm that the aircraft was prepared to take-off on the correct runway, was for the pilot flying to state 'runway 33 confirm', then the pilot monitoring to respond 'runway 33 confirm'. While this checklist item provided confirmation of the runway, reference to an intersection was not part of the verbal check/response.

The first officer commented that confirming the intersection as well as the runway during the pre-take-off checks may prevent a similar incident occurring.

Potential overrun

The aircraft operator reviewed the ramifications of a departure from the B4 intersection with B5 performance take-off data. Initial calculations showed that in the event of a rejected take-off, either with all engines operating or one engine inoperative, would have resulted in a runway overrun.

Findings

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

- The first officer taxied the aircraft to the runway holding point B4 instead of B5 and may have been distracted by following the DHC-8, which taxied immediately ahead of them and took off from the runway intersection with taxiway B4.
- The captain was communicating with cabin crew and looking at the cabin video as the aircraft turned onto taxiway B4, which probably distracted them from verifying that they had turned into the correct taxiway.
- Neither member of the flight crew recalled seeing the B4 holding point sign (to the left of the aircraft) at any time.
- The first officer was under training and had only been to Cairns once previously, and runway 33 was not the usual runway in use. Lack of familiarity with runway 33 may have reduced the flight crew's ability to detect the incorrect runway position when the aircraft was lined up on the runway.
- The air traffic controller saw the aircraft at the incorrect intersection after clearing it for take-off and alerted the crew.
- There was potential for a runway overrun in a rejected take-off situation if the aircraft had commenced the take-off run from the B4 intersection.

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 safety action in response to this occurrence.

Aircraft operator

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

Safety awareness

Tigerair has distributed a Flight Training Notice to alert training and checking crew on both the A320 and B737 fleets to the event. Tigerair Safety will be publishing the event in their next Safety Spotlight newsletter.

Safety message

This incident highlights the importance of confirming that an aircraft is lined up for take-off at the correct intersection, or position on the runway, as well as the correct runway. Confirmation of runway heading is done by checking the aircraft's magnetic heading with the runway direction once the aircraft is lined up on the runway. The intersection should be checked before the aircraft enters the runway.

Although this incident involved the use of an incorrect intersection rather than a wrong runway, a study conducted by the US Federal Aviation Administration in 2007, *Wrong Runway Departures,* outlines some relevant and important points. A class 2 electronic flight bag, which shows the aircraft's location on a moving map display, is a technological enhancement described in the study as a safety enhancement to mitigate the risk of aircraft taking off from a wrong runway. The study identified a number of factors that contributed to aircraft taking off from an incorrect runway including:

- a similar layout, with one taxiway leading to an area with multiple runway thresholds located in close proximity to one another
- a short distance between the airport terminal and the runway
- a complex airport design
- the use of a runway as a taxiway
- a single runway that uses intersection departures.

General details

Occurrence details

Date and time:	21 January 2017 – 1516 EST	
Occurrence category:	Incident	
Primary occurrence type:	Flight preparation/navigation	
Location:	Cairns Airport, Queensland	
	Latitude: 16° 53.15' S	Longitude: 145° 45.32' E

Aircraft details

Manufacturer and model:	Airbus A320	
Registration:	VH-VNC	
Operator:	Tiger Airways	
Serial number:	3275	
Type of operation:	Air transport high capacity – passenger	
Persons on board:	Crew – Unknown	Passengers – Unknown
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

Landing on the left side of the runway strip involving British Aerospace AVRO 146, VH-NJW

What happened

On 20 January 2017, a British Aerospace AVRO 146-RJ85, registered VH-NJW, conducted a charter flight from Perth to Darlot, Western Australia (WA). There were four crew and 58 passengers on board the aircraft. The captain was the pilot flying (PF), seated in the left seat, and the first officer was the pilot monitoring (PM), seated in the right seat.[1]

The aircraft departed from Perth Airport at about 0630 Western Standard Time (WST), and tracked towards Darlot. Prior to the top of descent, the flight crew obtained the local weather from Leinster Airport, situated about 28 NM (52 km) from Darlot. The Leinster aerodrome weather information service (AWIS)[2] indicated a strong easterly wind, so the PF positioned the aircraft to join a 5 NM (9.3 km) straight-in approach to runway 14.

Darlot Airport had an unsealed runway with no electronic approach path guidance with a published RNAV-Z (GNSS) runway 14 approach. The procedure for the crew to monitor their descent profile was to crosscheck the distance and altitude information from the published approach chart, which provides a 3° descent on final approach. Three white cones, located on the left and right side of the runway strip and 300 m in from the runway threshold, provided the pilot with their visual aiming point markers for the landing. Therefore, on short final, the PF would change their flight path guidance cue from distance and altitude to the aiming point markers for the aircraft landing.

When the aircraft joined the final approach leg, the PF noticed dust in the vicinity of the runway and commented to the PM that there could be a vehicle on the runway. At about 2.5 NM (4.6 km) from the runway, the PF concluded the dust was not from a vehicle and that it was a line of dust from the strong easterly wind, which extended the length of the runway strip,[3] on the southern side of the runway. At about the same time, the PF visually identified the runway[4] markers.[5] On short final, the PF transitioned from the distance-altitude information to the aiming point markers located on the left side of the runway strip.

The aircraft landed without incident. However, as the aircraft slowed to taxi speed, the PF observed cones and runway lights on the right side of the aircraft, but only cones on the left side of the aircraft. The PF then noticed that the raised dust on the right side of the runway strip covered both the runway markers and runway strip (Figure 1). They had landed the aircraft on the graded area of the runway strip to the left of the runway. The PF manoeuvred the aircraft back onto the runway, taxied to the apron and shutdown without further incident. The aircraft was not damaged.

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1 Pilot Flying (PF) and Pilot Monitoring (PM): procedurally assigned roles with specifically assigned duties at specific stages of a flight. The PF does most of the flying, except in defined circumstances; such as planning for descent, approach and landing. The PM carries out support duties and monitors the PF's actions and the aircraft's flight path.

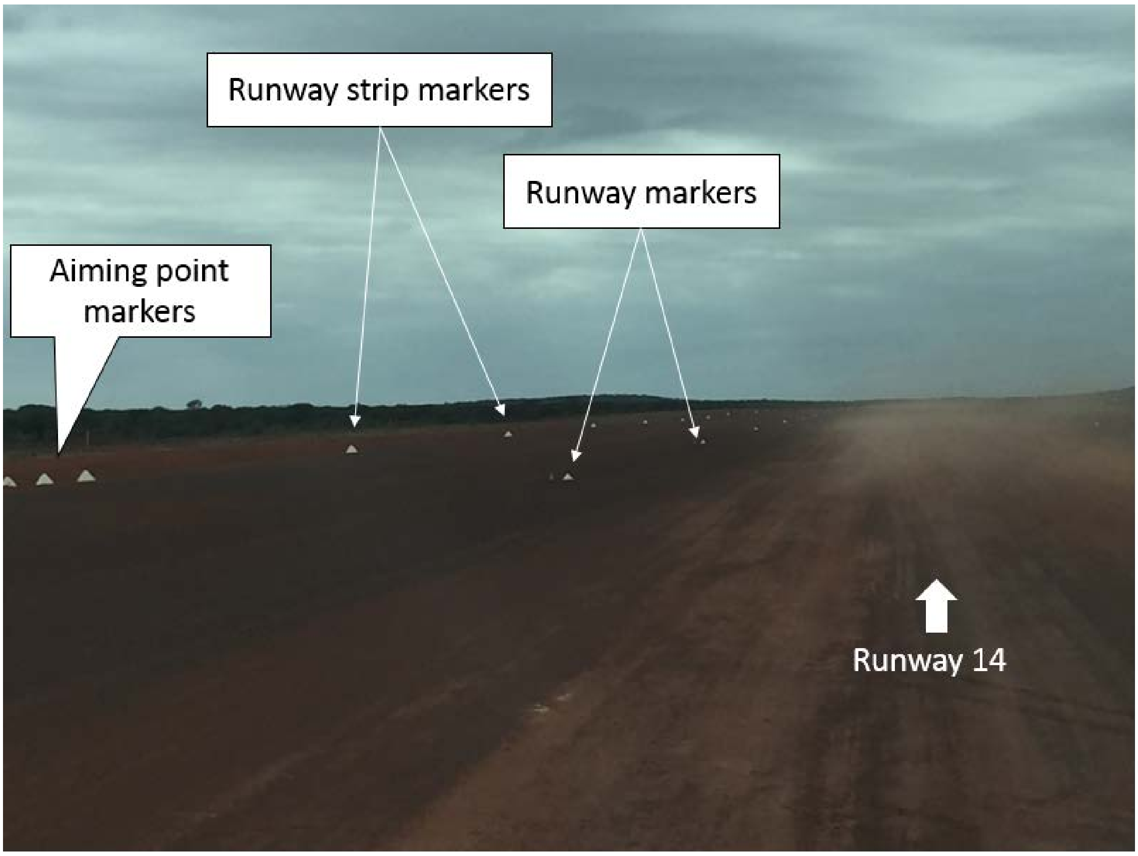
2 Aerodrome weather information service (AWIS): actual weather conditions, provided via telephone or radio broadcast, from Bureau of Meteorology (BoM) automatic weather stations, or weather stations approved for that purpose by the BoM.

3 A runway strip, for a runway without an instrument approach, includes a graded area around the runway and stopway, intended to: (1) to reduce the risk of damage to aircraft running off a runway; and (2) to protect aircraft flying over it during take-off or landing operations.

4 The runway is a defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

5 An aerodrome marker is an object displayed above ground level in order to indicate an obstacle or delineate a boundary.

Figure 1: Darlot Airport runway 14



Source: Pilot, annotated by ATSB. Image depicts Darlot Airport runway 14 and left side of runway strip as viewed from the right seat of the aircraft with white frangible cones used as markers. Raised dust extends from the centre of the runway across the southern side of the runway strip.

Aerodrome markers

The Manual of Standards (MOS) Part 139 – *Aerodromes*, provided the standard for aerodrome markers. In accordance with MOS 139 paragraph 8.2.1.1, 'markers must be lightweight and frangible; either cones or gables.'

Runway markers

Darlot Airport used identical white frangible cones as markers for both the runway and the runway strip. The runway was 30 m wide and 1,969 m long. The runway strip was 90 m wide. Therefore the lateral spacing of the cones for the runway and the runway strip either side of the runway were equidistant.

Aiming point markers

In accordance with MOS 139 paragraph 8.3.7, on sealed runways, aiming point markers are conspicuous stripes painted on the runway surface. If a visual approach slope indicator system (VASIS) is used, then the VASIS is located within the runway strip and the beginning of the aiming point marking must coincide with the origin of the visual approach slope.

Where aiming point markers are not required, such as on unsealed runways, the airport operator can elect to 'implement an aiming point marking by providing an appropriate marking.' Darlot Airport used three frangible white cones, either side of the runway on the edge of the runway strip, as aiming point markers (Figure 1).

Objects on runway strips

MOS 139 paragraph 6.2.24 stated 'A runway strip must be free of fixed objects, other than visual aids for the guidance of aircraft or vehicles. All fixed objects permitted on the runway strip must be of low mass and frangibly mounted.'

Location of aiming point markers

The aircraft operator provided services to three other airports with unsealed runways. Following this incident, the operator reviewed the other airports and found that at two airports the aiming point markers were located inside the runway strip (one used gable markers and the other cones), either side of the runway (Figure 2), and at the third airport the aiming point markers had been removed. Therefore, the aiming point markings were inconsistent between all four airports.

Figure 2: Gable aiming point markers within the runway strip (different airport used by the operator)

Source: Aircraft operator

In 2015, the Darlot Airport operator consulted with the Civil Aviation Safety Authority about the position of the aiming point markers. It was determined that they were not standard markings. Therefore, the airport operator could request a dispensation from MOS 139 to place them in the runway strip next to the runway, or alternatively, place the markers outside the runway strip without a dispensation. The airport operator passed this information on to the aircraft operator and it was agreed to place them outside the runway strip, in lieu of requesting a dispensation.

Visual illusions

According to the Flight Safety Foundation, visual illusions occur 'when conditions modify the pilot's perception of the environment relative to his or her expectations, possibly resulting in spatial disorientation or landing errors.' The key factors and conditions which result in visual illusions are the airport environment, runway environment and weather conditions.

Further information on visual illusions is available from the Flight Safety Foundation approach-and-landing accident reduction tool kit *Briefing Note 5.3 - visual illusions.*

Safety analysis

The PF advised that the final approach to land at Darlot, was a period of high workload because the aircraft was flown manually with cross-checks of distance and altitude used to manage the descent profile. On the incident flight, the PF's attention was initially captured by raised dust, which indicated to the PF that there could be a vehicle on the runway. About halfway down the final approach, the PF discounted the presence of a vehicle, but then incorrectly identified the left runway strip markers as the left runway markers because the right runway and runway strip markers were obscured by the raised dust. This was confirmed in their mind by the presence of the aiming point markers on the left side of the runway strip. The PF was seated in the left seat and therefore used the aiming point markers on the left side as their visual guidance cue for the aircraft landing.

The siting of aiming point markers at airports with unsealed runways used by the aircraft operator was not standardised with respect to the type of markers used or the position of the markers relative to the runway. The pilot had experience, from operating into other unsealed runways, of aiming point markers positioned in the runway strip next to the runway. Therefore, the position of the aiming point markers on the left side of the runway strip markers was not recognised by the PF as an indicator that the aircraft was landing to the left of the runway.

ATSB comment

On approach to land, the PF must scan between the near end and far end of the runway for their visual judgement of flare height and alignment of the aircraft with the runway centreline. A greater amount of visual processing is dedicated to the central region of the retina (fovea) than to the peripheral regions of the retina. Consequently, central portions of a visual image are seen to a higher resolution than peripheral portions.

For a pilot focused on the runway centreline, the aiming point markers will move from central vision to peripheral vision at three times the distance for markers laterally displaced 45 m in lieu of 15 m from the runway centreline.

The ATSB notes that the aiming point markers are a visual guidance cue for the PF. Increasing the lateral displacement of the markers from the runway may divert the PF's scan further from the runway centreline at a critical stage of flight.

Findings

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

- The PF landed the aircraft in the runway strip to the left of the runway due to raised dust obscuring the markers on the right side of the runway and runway strip.
- Aiming point markers were employed in a non-standard manner at the unsealed runways used by the operator, which may have contributed to the PF landing the aircraft left of the runway.

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.

Operator

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

Internal investigation and review

The operator has conducted their own internal investigation of the incident, which included a review of the unsealed runways they operate the AVRO 146 into.

Discussion paper

The operator submitted a discussion paper to the Civil Aviation Safety Authority on the provision of aiming point markers for unsealed runways. The paper proposes the standardisation of aiming point markers in accordance with the system previously tested by the United States Federal Aviation Administration.

The results of the testing can be found in ‘Marking and Lighting of Unpaved Runways – Inservice Testing’: *DOT/FAA/CT-84/11*.

Safety message

Following the incident the pilot reported that, in hindsight, the raised dust they observed on the runway strip should have led to a go-around manoeuvre, but their visual cues led them to believe they were aligned to land on the runway. The Flight Safety Foundation briefing note 5.3 provides strategies for pilots and operators to mitigate the risk of a visual illusion incident during approach and landing.

General details

Occurrence details

Date and time:	20 January 2017 – 0735 WST	
Occurrence category:	Incident	
Primary occurrence type:	Depart/Approach/Land wrong runway	
Location:	Darlot Airport, Western Australia	
	Latitude: 27° 52.42’ S	Longitude: 121° 16.30’ E

Aircraft details

Manufacturer and model:	British Aerospace PLC AVRO 146-RJ85	
Registration:	VH-NJW	
Serial number:	E2329	
Type of operation:	Charter – passenger	
Persons on board:	Crew – 4	Passengers – 58
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

Aircraft loading event involving Fokker F28, VH-NHZ

What happened

On 26 January 2017, a Network Aviation Fokker F28, registered VH-NHZ (NHZ), conducted a flight from Perth Airport, Western Australia (WA), to Newman Airport, WA. On board the flight were two flight crew, three cabin crew and 31 passengers.

The aircraft was initially pushed back from the parking bay at about 1600 Western Standard Time (WST), for the Perth-Newman-Perth service. However, another company aircraft, scheduled to operate the Perth-Karratha-Perth service, became unserviceable and the company elected to return NHZ to the gate and reschedule NHZ to operate a Perth-Newman-Karratha-Perth service. This required the flight crew to re-plan the flight while ground staff transferred passengers and baggage from the unserviceable aircraft to NHZ. In addition to the transfer of passengers and baggage from the Perth-Karratha service, there were 30 bags, which had been offloaded from another Perth-Karratha service due to weight restrictions, which were planned to be loaded on board NHZ for the rescheduled service.

During the flight planning process, the flight crew were presented with an amended load instruction sheet (LIS) and two customer management (CM) summaries. The LIS indicated the number of bags to be loaded and the distribution of the load between the baggage compartments. The CM summaries were produced by the passenger check-in system and provided the total passenger number and distribution of passengers, along with the total number of bags and their weight.

The LIS indicated there were 28 bags to be loaded in compartment A and 30 bags to be loaded in compartment B, for a total of 58 bags. The first CM summary, annotated as 'Acceptance not finalised', indicated there were 34 passengers with 30 bags at a total weight for the bags of 388 kg. The second (final) CM summary indicated there were 31 passengers with 28 bags at a total weight for the bags of 365 kg.

The flight crew entered 58 bags with a total weight of 388 kg (correct number of bags, but 365 kg less than the actual weight) and 31 passengers (the correct number of passengers) into their electronic load sheet for departure. The flight departed Perth and landed at Newman without incident. After arrival at Newman, the ground staff informed the flight crew that the actual baggage weight appeared to be greater than what they expected. The Newman ground staff weighed the baggage, which was found to be 755 kg (planned load 388 + 365 = 753). The flight crew worked with the Newman ground staff to resolve the discrepancy and the flight continued to Karratha and Perth without further incident.

Check-in system

According to the operator, there was some difficulty getting the paperwork to the flight crew when the flight was re-scheduled to include the Karratha service. At the time the decision was made to amalgamate the services, the check-in system had recorded that the services to both Newman and Karratha had departed. The first CM summary, annotated 'Acceptance not finalised' with boarding time 1725, was delivered to the flight crew by the gate staff for the purpose of planning their flight. When the flight closed, the final CM summary with boarding time 1820 was generated from check-in and then delivered to the flight crew with the passenger manifest. The flight crew then crosschecked the final CM summary with the figures entered into the electronic load sheet (see *Electronic load sheet*) and the completed LIS.

Each CM summary delivered to the flight crew supersedes any previous CM summary. The second CM summary was the final CM summary and had the correct number of passengers.

However, both CM summaries had incorrect baggage data. The operator considered it possible that the attempt to amalgamate the services, which were both recorded as departed in the check-in system, resulted in incorrect baggage data on the final CM summary. The final CM summary had the correct number of passengers and their baggage, but did not take into account the extra bags, which had been off-loaded from the earlier flight.

Electronic load sheet

The flight crew had electronic flight bags (iPads), which were used to produce the electronic load sheet from the data provided from the LIS and CM summary.[1] The electronic load sheet was produced with the total number of bags in accordance with the LIS, the baggage weight of 388 kg in accordance with the first CM summary marked 'Acceptance not finalised' and the number and distribution of passengers in accordance with the final CM summary.

Flight crew comments

The captain reported that they performed a crosscheck of the paperwork and that they commented to the first officer that they needed to be extra careful due to the number of changes that were occurring during the process of re-planning the flight.

Safety analysis

During the flight planning process, the crew received several items of paperwork for the re-schedule of the service to include Karratha. It is likely that the first CM summary contained the 30 bags offloaded from an earlier flight. The final CM summary received by the flight crew contained incorrect information on the total number and weight of bags loaded in the aircraft, but was in accordance with the passengers' checked-in baggage.

It is likely that when entering the information into the electronic load sheet, the crew entered the baggage weight from the CM summary annotated 'Acceptance not finalised' during the planning stage. It is likely that the crosscheck of baggage weight entered into the electronic load sheet from the first CM summary (388 kg) with a final CM summary (365 kg) resulted in an incorrect assumption that the planned baggage weight was acceptable in the mind of the captain.

While the LIS has the total number of bags and their distribution between the cargo compartments, it does not include the weight of baggage. Hence, the LIS may be used for entering and crosschecking baggage numbers, but it cannot be used for entering or crosschecking baggage weight. It is probable that the flight crew did not crosscheck the total number of bags on the LIS against the final CM summary.

Findings

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

- The final CM summary provided to the flight crew contained incorrect baggage data, which was possibly the result of an attempt to amalgamate two services already recorded in the check-in system as departed, and did not include the extra baggage, which was previously offloaded from an earlier Perth-Karratha service.
- It is probable that when completing the electronic load sheet, the flight crew entered the total number of bags from the LIS and the baggage weight from the CM summary annotated 'Acceptance not finalised'. This weight was probably checked against the final CM summary and considered acceptable in the mind of the flight crew.

[1] The data entered into the electronic flight bag is used to calculate aircraft performance. The ATSB did not receive a flight crew report of aircraft performance or handling issues associated with this incident.

- The total number of bags on the LIS was probably not crosschecked with the final CM summary, resulting in the crew not detecting the error and the aircraft departing with the incorrect weight and balance calculations.

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.

Operator

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

Advisory bulletin

The operator issued an advisory bulletin to communicate to their staff the aircraft loading system requirements, including the interface requirements between departments for aircraft dispatch. This includes the point that the baggage crosscheck is the final CM summary number of bags versus number of bags on the LIS.

General details

Occurrence details

Date and time:	26 January 2017 – 1630 WST	
Occurrence category:	Incident	
Primary occurrence type:	Loading related	
Location:	Perth Airport, Western Australia	
	Latitude: 31° 56.42’ S	Longitude: 115° 58.02’ E

Aircraft details

Manufacturer and model:	Fokker Aircraft B.V. F28 MK0100	
Registration:	VH-NHZ	
Operator:	Network Aviation	
Serial number:	11515	
Type of operation:	Air transport high capacity - passenger	
Persons on board:	Crew – 5	Passengers – 31
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

Aircraft loading event involving Fokker F28, VH-NHV

What happened

On 3 February 2017, a Network Aviation Fokker F28 Mk 0100, registered VH-NHV (NHV), conducted a scheduled passenger flight from Perth to Kalgoorlie, Western Australia (WA). On board the aircraft were two flight crew, three cabin crew and 17 passengers.

The service to Kalgoorlie was originally scheduled in another company F28, registered VH-NHQ (NHQ). However, a fault occurred in NHQ after the aircraft was pushed back from the terminal for departure. The fault resulted in the aircraft returning to the terminal and the operator replacing NHQ with NHV for the service to Kalgoorlie.

The flight crew moved to NHV to start their pre-flight duties and took the certified load instruction sheet (LIS) for NHQ with them. After the flight crew boarded NHV, they received the customer management summary and passenger manifest with the registration NHQ. The crew identified the incorrect registration and rejected the paperwork. Subsequently a person, whom the captain believed was the loading supervisor for the ramp team loading the aircraft, entered the flight deck and inspected what the captain believed was the new LIS, again with the registration NHQ.[1] The captain asked this person if NHV was to be loaded as per NHQ and the response they[2] received satisfied them that that was the case. The captain then pen amended their LIS from NHQ to NHV.

The F28 has two cargo compartments forward of the wing, compartments A and B, and two compartments aft of the wing, compartments E and F. The flight to Kalgoorlie was planned to be loaded with 197 kg of freight and 272 kg of baggage (469 kg in total), distributed between compartments A and B.

The aircraft departed from Perth and landed at Kalgoorlie without incident. However, when the cargo compartments were opened after arrival at Kalgoorlie, there was no load on board the aircraft and the cargo nets were undone. The load was subsequently found to be on board NHQ in Perth, which had been towed into the operator’s hangar for maintenance.

Load instruction sheet

Both of the aircraft involved in this incident, NHQ and NHV, were classified as Group-A F28 aircraft, therefore the same LIS instructions applied to both aircraft for weight and balance purposes. When NHQ developed a fault, the maintenance watch staff in the operations control centre[3] identified NHV as the alternative aircraft for the Kalgoorlie service. The operator’s terminal staff produced an amended LIS for NHV and sent a copy of the LIS to their contracted ground handling service provider. The LIS was marked as edition 1, but should have been marked as edition 2. However, post-incident, the ground handling service provider reported to the operator that they did not receive a copy of the LIS for registration NHV.

The normal process for the LIS is, once it is certified by the loading supervisor that the aircraft is loaded in accordance with the LIS and all cargo compartments inspected, it is passed from the loading supervisor to the flight crew. The incident LIS was certified for NHQ, which the captain amended to NHV after consultation with a person whom they believed was from the loading team.

1 The captain reported that they were a relatively new employee to the company and had not observed this prior to this incident.
2 Gender-free plural pronouns: may be used throughout the report to refer to an individual (i.e. they, them and their).
3 The operations control centre includes staff from the operations and maintenance departments. Staff from the maintenance department are referred to as maintenance watch.

Pen amendments were a permitted practice at the time of the incident. The captain believed it was the correct LIS, but with the incorrect registration.

The LIS was also used by the operator themselves to prepare the offload instruction report for the destination airport. To prepare the offload report, the operator's ramp personnel would normally contact the contracted ground handling staff to retrieve the details from the final LIS.[4] However, in the absence of a loading team, they could also check the LIS that was on the flight deck.

Management of changes within ground services

The conduit for information within the ground handling service provider is their movement control (MOCO). For ramp loading activities, MOCO contacts the ground resource allocator/coordinator who allocates the ramp loading tasks. Tasks are related to flight numbers and the task for loading flight number 1608 (NHQ) was completed prior to the aircraft change to NHV. Any further loading tasks related to this flight number, were required to be manually generated.

The LIS amended to NHV, sent (faxed) from the operator to their ground handling service provider had edition 1 for flight number 1608, as did the previous LIS for NHQ. The ground handling service provider reported to the operator, after the incident, that they did not receive an LIS for the registration NHV and therefore no team was allocated the task to transfer the freight and baggage from NHQ to NHV.

Weight and balance

The operator reported that the F28 has a 'very aft' empty weight centre-of-gravity due to the location of the engines near the tail of the aircraft. However, the majority of the passengers (16 from 17) were seated in the forward rows and therefore the aircraft did not exceed weight and balance limits on the incident flight.

Previous incidents

On the 26 January 2017, the operator experienced an incident in which paperwork with errors were delivered to the flight crew (AO-2017-018). Incorrect cargo weight data was entered by the flight crew, but there was no reported effect on the handling of the aircraft.

Safety analysis

Following the unserviceability of NHQ, the operator re-allocated the Perth to Kalgoorlie service to NHV. The operator's contracted ground handling service provider was responsible for loading the aircraft in accordance with the operator's LIS.

The operator verbally notified their ground handling services provider of the unserviceability, but not of the replacement registration. The ground handling service provider allocated tasks with reference to the flight number and the task for flight number 1608 had been completed in their system. The replacement registration was identified on the amended LIS, but the LIS inadvertently indicated that it was edition 1.

It is probable that a team was not allocated to the task of transferring baggage and freight from NHQ to NHV because the LIS sent to the ground handling service provider, marked as edition 1, was for a task recorded as already completed.

The operator was responsible for producing the offload instruction for the destination. It is therefore possible that the person who entered the flight deck of NHV, while the flight crew were preparing for flight, was there only for the purpose of confirming the offload figures from the LIS because they could not make contact with the loading supervisor. The captain was a relatively new employee and had no prior experience of this practice. Consequently they misunderstood the role of this person and the reason for their inspection of the LIS. The captain then pen amended

4 This process ensures last minute changes to the aircraft loading are captured for the offload report.

the aircraft registration on the LIS from NHQ to NHV under the assumption that the LIS was actually for NHV. This was a permitted practice at the time, which resulted in the flight crew believing they had a certified LIS for the loading of NHV.

Findings

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

- After NHQ became unserviceable, the operator sent the ground handling service provider a new load instruction sheet for NHV with the same flight number and edition as NHQ.
- NHV was not loaded because no team was allocated to the task of transferring the freight and baggage from NHQ to NHV.
- The policy of permitting flight crew to pen amend the load instruction sheet resulted in the aircraft departing with the flight crew believing they had a load instruction sheet certified for the loading of NHQ.

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.

Operator

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

Advisory bulletin

The operator issued an advisory bulletin to their staff, to communicate the aircraft loading system requirements, including the interface requirements between departments for aircraft dispatch. Note 3 of the bulletin states that 'after a significant change, such as an aircraft change, a new LIS will be issued with an updated edition number, previous editions should be placed so as not to be referenced in error.'

General details

Occurrence details

Date and time:	3 February 2017 – 2100 WST	
Occurrence category:	Incident	
Primary occurrence type:	Loading related	
Location:	Perth Airport, Western Australia	
	Latitude: 31° 56.42’ S	Longitude: 115° 58.02’ E

Aircraft details

Manufacturer and model:	Fokker Aircraft B.V. F28 Mk 0100	
Registration:	VH-NHV	
Operator:	Network Aviation	
Serial number:	11482	
Type of operation:	Air transport high capacity - passenger	
Persons on board:	Crew – 5	Passengers – 17
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

Turboprop aircraft

Flight control system event involving an Embraer 120, VH-YEI

What happened

On 25 October 2016, at about 0640 Central Daylight-saving Time (CDT), an Embraer-120 ER aircraft, registered VH-YEI (YEI), departed from Adelaide Airport, South Australia (SA), for a chartered passenger flight to Challenger, SA with 4 crew and 29 passengers on board.

During the initial climb, the pilot attempted to fully retract the flaps (flaps 0) from their take-off position (flaps 15). The crew received a flap disagreement warning from the outboard pair of flaps. The other two pairs of flaps (inboard and nacelle) retracted without issue. A flap disagreement fault is triggered when one flap within a pair is unable to move to its selected position. To prevent wing asymmetry and control issues, the pairing flap will also not move. The crew reported no noticeable aircraft handling or control issues as a result.

The crew contacted air traffic control (ATC) to notify them of the fault and requested a climb to 4,000 ft on their current heading. After levelling off and reducing power to a cruise setting, the crew consulted the quick reference handbook, which advised cycling the flaps to their original position and back again. The fault cleared when the flap control was lowered to 15 degrees, but occurred again upon retraction.

The captain and first officer discussed the situation and agreed to return to Adelaide. The crew then informed ATC. The first officer continued flying the aircraft, burning off fuel to reduce landing weight. The captain conducted the landing calculations and determined that they had sufficient runway to land with flaps 15, in case they were unable to deploy further.

During approach, the flaps fully extended (flaps 45) and the aircraft landed without further incident. The flaps were retracted after landing, and all three pairs moved to flaps 0 without the fault reoccurring. The crew visually inspected the flap and immediately identified a damaged bracket and fibreglass shroud.

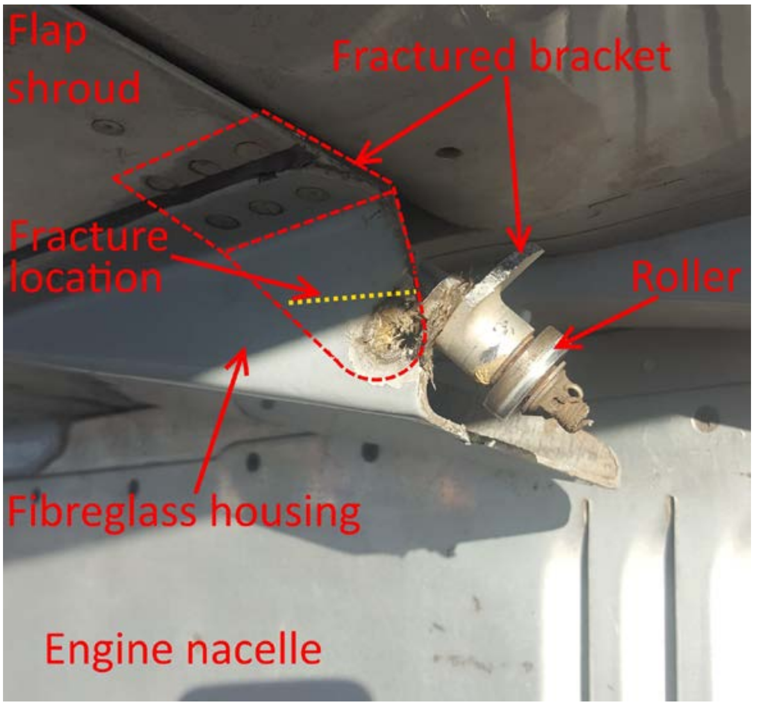
There were no injuries as a result of the occurrence and the aircraft sustained no damage beyond the fractured bracket and shroud.

Component Failure

The failed bracket secured a roller to the underside of the wing. This roller supported the inboard side of the left hand outboard flap shroud, and was used to guide the flap shroud as it was deployed and retracted. Figure 1 shows failed the bracket, still fixed to the aircraft after it was identified by the flight crew.

The support of the roller pictured was not required for the flaps to actuate. This was apparent after landing, when the flaps were successfully retracted, despite the bracket fracture. It is likely that a portion of the bracket or its fibreglass housing obstructed the flap, preventing it from fully retracting during flight.

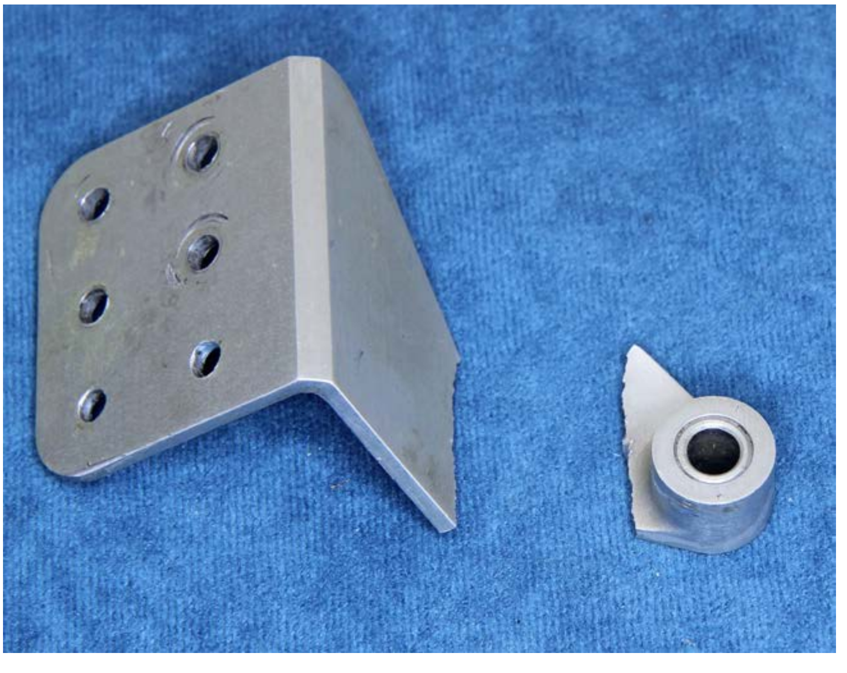
Figure 1: Bracket on the aircraft after it had failed. Most of the bracket is obscured by the fibreglass housing. Its outline is shown by the dotted red line.



Source: Flight crew

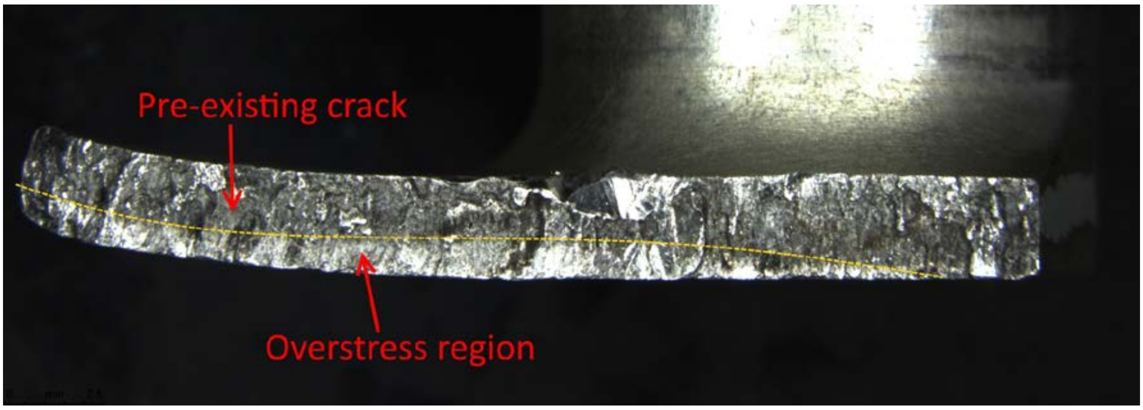
Figure 2 shows the failed component after it was removed from the aircraft. Figure 3 shows the fracture surface on the smaller of the two fragments. Two distinct regions were visible on the fracture surface. The upper region was tarnished and had likely been exposed to the atmosphere for a longer period of time. It was probable that this was the result of a pre-existing crack, and the stress in the remaining section resulted in failure of the component during normal operation.

Figure 2: The failed bracket after it had been removed from the aircraft.



Source: ATSB

Figure 3: Fracture surface illustrating the pre-existing crack and the overstress region, which fractured when the bracket finally failed.



Source: ATSB

Aircraft Maintenance

YEI was manufactured in 1992 and, at the time of the incident, had accumulated 41,961 hours total time in service. The aircraft was being maintained by a Civil Aviation Safety Authority (CASA) approved maintenance organisation and the most recent comprehensive inspection was approximately 600 service hours prior, in November 2014. No problems with the outboard flap shroud or bracket were identified at that time.

Similarly, no problems were identified during the more recent line checks and daily inspections. However, the maintainer believes that the location of the bracket and the positioning of the shroud would make it difficult to see any cracks during this type of inspection.

Similar Occurrences

The CASA Service Difficulty Report (SDR) database shows two other reports of unserviceable flaps on EMB-120s. Both involved the left hand outboard flap, however the fault in both cases was unrelated to the inboard bracket or flap track. Likewise, no reports of issues with this part could be found in the US Federal Aviation Administration (FAA) SDR database.

Safety analysis

A pre-existing crack on a partially concealed bracket propagated to the point where it failed in overstress during normal operation. The origin and age of the crack could not be determined, so it is not known whether there was an opportunity for it to have been detected during a base check conducted in 2014.

As a result of the bracket failure, the left hand outboard flap could not be fully retracted during climb and a flap disagreement warning occurred. It was unclear exactly how the failed bracket prevented the flap from retracting, but it may have been caused by a bracket fragment physically obstructing the flap.

While there were no adverse control or handling issues, the flight crew returned the aircraft to Adelaide Airport. The flaps extended for landing without any further problems.

All risk controls during this incident worked well. The aircraft's flap monitoring system identified the misalignment of the outboard flaps and prevented an asymmetry occurring. The crew were then adequately warned of the fault and advised ATC of the situation. The crew followed the quick reference handbook in an attempt to rectify the problem, but when the fault could not be cleared, returned the aircraft to Adelaide Airport. A contingency plan was formulated in the event the flaps could not be extended, but ultimately it was not necessary.

Findings

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

- Pre-existing cracking and subsequent fracture of a bracket supporting the left, outboard flap shroud prevented the flap from being fully retracted during climb and resulted in a flap disagreement warning.

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.

The Operator

Following the identification of the failed bracket, the operator inspected similar parts on YEI as well as the rest of their Embraer-120 fleet. No further damage or signs of cracking were identified.

Safety message

This incident highlights the importance of comprehensive maintenance inspections in maintaining aircraft airworthiness. However, when technical failures occur in spite of rigorous maintenance procedures, it is important to have adequate risk controls in place, as well as trained crew capable of adjusting plans to account for unforeseen circumstances. In such an event, a positive outcome can be achieved by maintaining composure, planning ahead, and communicating with other crewmembers, ATC.

General details

Occurrence details

Date and time:	25 October 2016 – 0640 CDT	
Occurrence category:	Incident	
Primary occurrence type:	Flight control system event	
Location:	Adelaide Aerodrome	
	Latitude: 34° 56.70' S	Longitude: 138° 31.83' E

Aircraft details

Manufacturer and model:	Embraer-Empresa Brasileira De Aeronautica EMB-120 ER	
Registration:	VH-YEI	
Serial number:	120.269	
Type of operation:	Charter - Passenger	
Persons on board:	Crew – 4	Passengers – 29
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

Piston aircraft

Collision with terrain involving de Havilland Canada DHC-2, VH-AWD

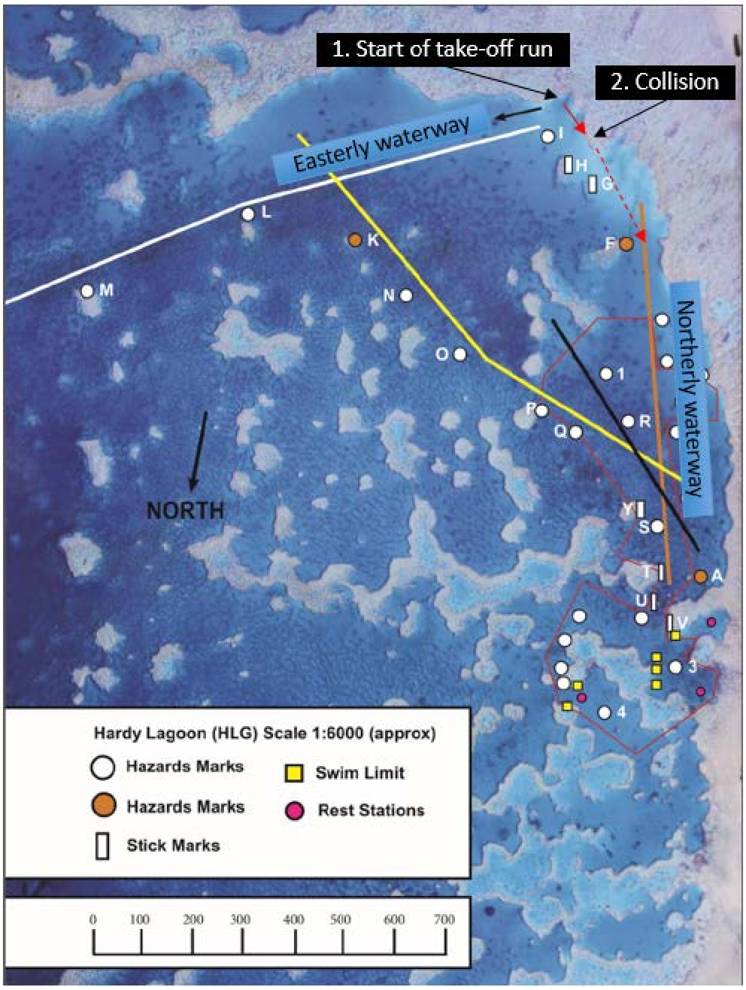
What happened

On 13 March 2017, at about 1700 Eastern Standard Time (EST), a de Havilland DHC-2 seaplane, registered VH-AWD, taxied at Hardy Lagoon aircraft landing area (ALA), for a charter flight to Shute Harbour, Queensland. On board the aircraft were the pilot and five passengers.

Hardy Lagoon had four waterways, marked by buoys, for take-off and landing. The company preference for take-off was to use the most into wind waterway. The wind strength was about 8 kt with a low sun, calm to smooth water surface and low tide at 0.6 m. The pilot positioned the aircraft between the northerly and easterly waterways (Figure 1) and started the engine with the water rudders retracted to allow the aircraft to weathercock into wind.

The wind effect on the aircraft indicated to the pilot that the northerly waterway was the most into wind waterway. In order to maximise the take-off distance available the pilot applied power to start the take-off run from a position to the south-east of the northerly waterway, while aiming to join the waterway at buoy F (Figure 1). Shortly after applying full power, and before the aircraft entered the northerly waterway, both floats struck submerged reef, which brought the aircraft to a stop.

Figure 1: Hardy Lagoon (north pointing downwards)



Source: Operator, annotated by ATSB (black, yellow, white and orange lines indicate the dimensions of the waterways)

The pilot shut down the aircraft and assessed the passengers for injuries and the aircraft for damage. The passengers were uninjured and the aircraft was stuck on the reef at the point of low tide. After relaying a message to their[1] company, via an airborne helicopter, the pilot elected to transfer the passengers to one of the boats used for reef tours in Hardy Lagoon. About 20 minutes after transferring the passengers to the boat, another company aircraft arrived and was able to return the passengers to Shute Harbour before last light.

The following day the aircraft sank in 3 m depth of water after several attempts were made to keep it afloat. The aircraft was subsequently salvaged.

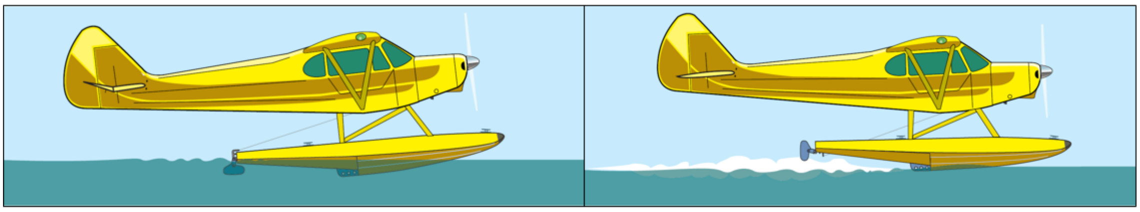
Seaplane take-off

The application of power to start the take-off pushes the centre of buoyancy aft, due to increased hydrodynamic pressure on the bottom of the floats. This places more of the seaplane's weight towards the rear of the floats which sink deeper into the water. This results in a higher nose attitude, reduced forward visibility, and creates high drag, which requires large amounts of power for a modest gain in speed (Figure 2 left). This phase of the take-off is known as in the plow.

As speed increases, hydrodynamic lift on the floats and the aerodynamic lift of the wings supports the seaplane's weight instead of the buoyancy of the floats. This allows the pilot to lower the nose attitude, which raises the rear portions of the floats clear of the water (Figure 2 right). This is the planing position, which reduces water drag and permits the seaplane to accelerate to lift-off speed. The pilot reported this was about 25-30 kt for the DHC-2.

For further information about seaplane operations, see the United States Federal Aviation Administration handbook: *Seaplane, skiplane, and float/ski equipped helicopter operations handbook.*

Figure 2: Seaplane in the plow (left) and planing (right)



Source: US Federal Aviation Administration

Environmental conditions

The tide was at 0.6 m at the time of the collision, which occurred outside of the waterways. When the tide is above 2.5 m, the aircraft can manoeuvre around Hardy Lagoon outside of the dimensions of the ALA without striking reef. Below the 2.5 m tidemark, it was known that the reef could be struck when manoeuvring the aircraft outside the dimensions of the ALA. However, the pilot believed that their chosen track from buoy I to buoy F, where they would join the northerly waterway, was clear of underwater terrain. There were no hazard marks on the left side of their track towards buoy F, but this was outside the prescribed waterway.

The collision occurred at 1700 and sunset was about 1820, with the associated low sun angle. When the sun angle is low, more light is reflected off the water than refracted through the water and consequently it is more difficult to see objects underneath the surface.

The pilot described the water conditions in the lagoon as smooth to calm. Prior to the accident, and while still on the boat, the pilot received a phone call from the chief pilot to check on conditions. This was in response to light winds affecting an earlier take-off. They both agreed that with an eight knot northerly wind, take-off could be achieved without the need to reduce weight.

[1] Gender-free plural pronouns: may be used throughout the report to refer to an individual (i.e. they, them and their).

Recent experience

The pilot had extensive flying experience, which included 127 total landings on and take-offs from Hardy Lagoon, 17 under supervision. They had operated at Hardy Lagoon the previous day. At the time of the collision, they were in their ninth-hour of their duty for the day. Earlier in the day, they experienced two unsuccessful take-off attempts in which the aircraft did not get into a planing position, which they attributed to light winds and high aircraft weight.

Safety and survivability

The pilot received annual training from the operator in emergency and life-saving equipment and passenger control in emergencies, in accordance with Civil Aviation Order 20.11. Prior to flight, passengers receive a video briefing on the safety aspects of the aircraft and are required to wear life jackets for the flights. A personal locator beacon and first aid box are carried on board the aircraft.

Search and rescue time (SARTIME) is managed by the operator. On approach to Hardy Lagoon, by about 500 ft above sea level, the pilots notify their operator of their arrival, at which point the operator starts a SARTIME for the aircraft's departure from Hardy Lagoon of arrival time plus 2.5 hours. The operator has two boats moored at Hardy Lagoon with a mobile phone capable of contacting the mainland.

Previous similar accidents

On 25 June 2015 a de Havilland Canada DHC-2, registered VH-AWI, struck reef while attempting to take-off from Hardy Lagoon. While attempting a take-off manoeuvre to maximise the take-off distance available, the aircraft inadvertently drifted out of the waterway and struck reef.

For further information refer to ATSB report *AO-2015-069*.

Safety analysis

At the time that the pilot attempted the accident take-off, they had experienced two failed take-off attempts earlier in the day, which they believed were the result of light wind and high aircraft weight. As the wind was still light and the aircraft was relatively heavy, the pilot decided to start the take-off from a position outside the dimensions of the waterway, to increase the take-off distance available.

At the time of the attempted take-off, the tide was close to the low point, but the reef struck by the aircraft was still submerged. The sun angle was low, which increased the amount of sunlight reflected from the water surface. At the speed of the collision, the aircraft nose attitude was at the highest angle for the take-off run, which combined with the sunlight reflection to severely restrict the pilot's ability to detect submerged reef.

Findings

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

- The light wind conditions and aircraft weight led the pilot to initiate the take-off run from outside of the dimensions of the waterway in order to maximise the take-off distance available.
- The aircraft struck submerged reef, which was obscured by the sunlight conditions and high nose attitude of the aircraft, before it entered the waterway.

Safety message

The pilot commented that there were a number of factors, specific to their own operation, which could minimise the risk of a similar occurrence. They noted there are too many variables in the operation to identify all possible scenarios when in training. Their most important lesson was the need to ask ‘am I safe’, particularly in ambiguous conditions, and ‘if I continue on this plan, will I remain safe?’

General details

Occurrence details

Date and time:	13 March 2017 – 1700 EST	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	70 km NNE Hamilton Island, Queensland	
	Latitude: 19° 48.03’ S	Longitude: 149° 16.05’ E

Aircraft details

Manufacturer and model:	de Havilland Canada DHC-2	
Registration:	VH-AWD	
Serial number:	1066	
Type of operation:	Charter - passenger	
Persons on board:	Crew – 1	Passengers – 5
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Substantial	

Helicopters

Main rotor anti-flap stop failure involving Sikorsky S-92, VH-ZUQ

What happened

On 10 November 2016, a Sikorsky S-92A helicopter, registered VH-ZUQ (ZUQ), was scheduled to fly from Broome Airport, WA, to an offshore facility. The flight crew consisted of a pilot flying (PF) in the right crew seat, and pilot monitoring (PM) in the left crew seat[1]. The PM was undergoing conversion training on the S-92A.

During the start procedure, the flight crew reported feeling abnormal vibrations in the airframe. The crew believed this might have been the result of a crosswind or recent maintenance work performed on the aircraft, and the PF attempted to minimise it by adjusting the cyclic control.

At approximately 1215 Western Standard Time (WST), a member of the ground crew showed the pilots an anti-flap stop that had broken off the main rotor head. Figure 1 shows the recovered anti-flap stop and securing hardware. Figure 2 shows the anti-flap stop attached to the main rotor hub. The helicopter was subsequently shut down. Further inspection revealed that two anti-flap stops had been sheared off the main rotor head during start-up. One of the stops landed next to the aircraft, while the other struck one of the main rotor blades and narrowly missed a member of the ground crew. It was recovered 45 metres from the aircraft.

Figure 1: Anti-flap stop and securing hardware.

Source: Operator

[1] While roles may vary between operations, the pilot flying is primarily responsible for handling the aircraft. The pilot monitoring monitors the pilot flying and is usually responsible for other tasks such as radio calls.

Figure 2: Anti-flap stop secured to the main rotor hub.

Source: Operator

The damage to the anti-flap stops was found to have been the result of the PM not lowering the collective control lever at the appropriate time during the engine start. The raised collective resulted in the blades lifting upward, placing abnormal stresses on the anti-flap stops (which are designed to limit upward movement of the blades). This behaviour resulted in the vibrations experienced by the crew.

Events leading up to the broken anti-flap stops

The flight crew had flown together on each of the three days leading up to the serious incident. In all three flights, the pilots were acting in the opposite roles compared with the incident flight. The PM on the day of the incident had never flown an S-92 in that role before.

On the day of the serious incident, the crew arrived approximately two hours before the scheduled take-off. This was in accordance with base instructions that required at least 90 minutes for flight planning and pre-flight inspections. However, the PM was required to make a phone call to the company's flight operations department and the crew were then involved in a discussion regarding the PM's further training requirements.

The flight crew were also required to 'shadow plan'[2] and perform the pre-flight inspection on a second aircraft, to ensure the flight could proceed in the event that ZUQ was unable to fly. According to the operator's daily flying roster, the base pilot-in-command (PIC) was originally rostered on to be part of the backup crew. However, client obligations on the base prevented the PIC from being available in the event of the backup crew being required. The PF and PM were not aware of this prior to arriving that day, so they had not given themselves additional time to prepare a second aircraft before departure.

Prior to departure, the PF was tasked with pre-flight inspections of ZUQ as well as the backup aircraft, but they were delayed as maintenance activities were still being conducted on ZUQ. In addition, flight data from ZUQ's previous flight had not yet been downloaded and analysed, further delaying the PF.

Flight crew comments

Both the PF and PM felt time pressure compounding from the morning's events. Given that, in accordance with the base rules, 90 minutes is required to prepare for a single flight and

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2 Shadow planning refers to creating a completely separate flight plan for another aircraft.

considering the number of distractions and delays encountered that morning, the crew felt that more time was required to adequately plan and prepare for both flights. As a result of feeling rushed and to ensure that they were fully prepared for the flight, they completed a second threat and error review, rechecked the flight plan together, rechecked the helicopter's technical log and walked to the helicopter together.

The flight crew perceived a significant amount of pressure from the operator's client for this flight. They believed that this client, more than any other they were aware of, required flights to adhere to strict schedules.

Engine start procedures

For engine starts with the rotor brake off, as were normally performed by this operator, the collective must be lowered as part of the start sequence. According to the operator's standard operating procedures, the PF starts the number 1 engine first, and brings the throttle to idle. When the rotational speed of the main rotor is over 20%, and the hydraulic pressure reaches an appropriate level, the procedures state that the collective is to be moved to the full down position. The PF then starts the number 2 engine.

The S-92A was the only helicopter in the operator's fleet that required the collective to be lowered as part of the start sequence. It was also the only helicopter where responsibility for controls was split between the two pilots. The operator's procedures did not designate the task of lowering the collective to either the PM or PF. However, the operator's parent company uses procedures that specifically assign the role to the PM. Despite not being contained in the operator's procedures, both pilots understood that it was the role of the PM to lower the collective during engine start and this had been briefed prior to the engine start.

Operator's investigation

Immediately after the serious incident, the operator commenced its own safety investigation. It identified that the PM had not lowered the collective at the appropriate time during the start procedure. A number of factors were identified. Some of these are listed below:

- Within the operator's fleet, the requirement that the PM, rather than the PF, lower the collective is unique to the S-92A.
- During the S-92A start procedure, there is no documented requirement for a call out and challenged response between the flight crew to ensure the collective is lowered.
- The PM had been serving as PF for the last three flights the crew carried out together.

Safety analysis

Almost immediately after they arrived at work in the morning, the flight crew began experiencing steadily increasing time pressure. The crew had more work than expected which resulted in less time in which to plan their flight. This pressure was great enough that the flight crew discussed it prior to the flight.

On the incident flight, the PM was flying for their first time in that particular role on a S-92A. This meant that the PM had never been tasked with lowering the collective on a S-92A during start-up. This was the first helicopter that the PM had flown where the responsibility for controls (collective, cyclic and anti-torque pedals) was split between the two pilots. In addition, there were no other helicopters in the operator's fleet in which the collective must be lowered during the start-up procedure. The PM's lack of experience in this particular role may have contributed to the collective not being lowered at the appropriate time.

The operator's standard operating procedures required the collective to be lowered during the start-up procedure. However, there was no requirement on either pilot to "call out" in order to check/verify the collective position. If a call out had been required by the procedures, it is possible that the PF would have noticed it had not been lowered and the incident might have been avoided.

There was no division of labour specified between the PF and PM in the operator's documentation. In this particular instance, both the PF and PM were aware of their responsibilities prior to start-up, so this likely did not contribute to the incident. However, this ambiguity in the operator's procedure has the potential to cause similar problems in future.

Findings

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

- A series of events resulted in the flight crew having more tasks to complete than originally planned, and less time in which to complete them. This resulted in time pressure on the crew.
- The PM's unfamiliarity with the unique starting procedures in the S-92A compared with other helicopters contributed to the collective not being lowered in time.
- The operator's standard operating procedures did not require any call outs for the lowering of the collective, which probably contributed to the collective not being lowered in time.
- With regard to start-up, the operator's standard operating procedures do not provide an explicit division of tasks between the PF and PM.

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.

The Operator

The operator's investigation into this incident produced 17 recommendations, some of which include:

- a review of S-92A start procedures, addressing as a minimum:
  - flight crew division of duties with specific regard for the collective control lever
  - standardised calls relating to the position of the collective control lever
  - the use of the rotor brake for the start procedure[3]
- changes to the engine start procedures, the section on lowering the collective is currently written in a 'Note', this will be changed to a 'Caution' to highlight its importance to flight crew
- a review of the policy and procedures used for shadow planning be undertaken, addressing as a minimum all hazards and risks associated with shadow planning inclusive of whether flight crew undergoing training should be exposed to the requirement.

Safety message

This incident is an example of what can occur when pressure associated with on-time departures is compounded with the absence of clear operating procedures. It is important that pilots have detailed and specific instructions on which to fall back when they feel pressure beginning to build.

[3] Rotor brake starts make it easier for a single pilot to operate all controls, as the engines can be started before control input is required.

General details

Occurrence details

Date and time:	10 November 2016 – 1215 WST	
Occurrence category:	Serious incident	
Primary occurrence type:	Incorrect configuration	
Location:	Broome Aerodrome	
	Latitude: 17° 56.98' S	Longitude: 122° 13.67' E

Aircraft details

Manufacturer and model:	Sikorsky Aircraft S-92A	
Registration:	VH-ZUQ	
Serial number:	920205	
Type of operation:	Charter	
Persons on board:	Crew – 2	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Minor	

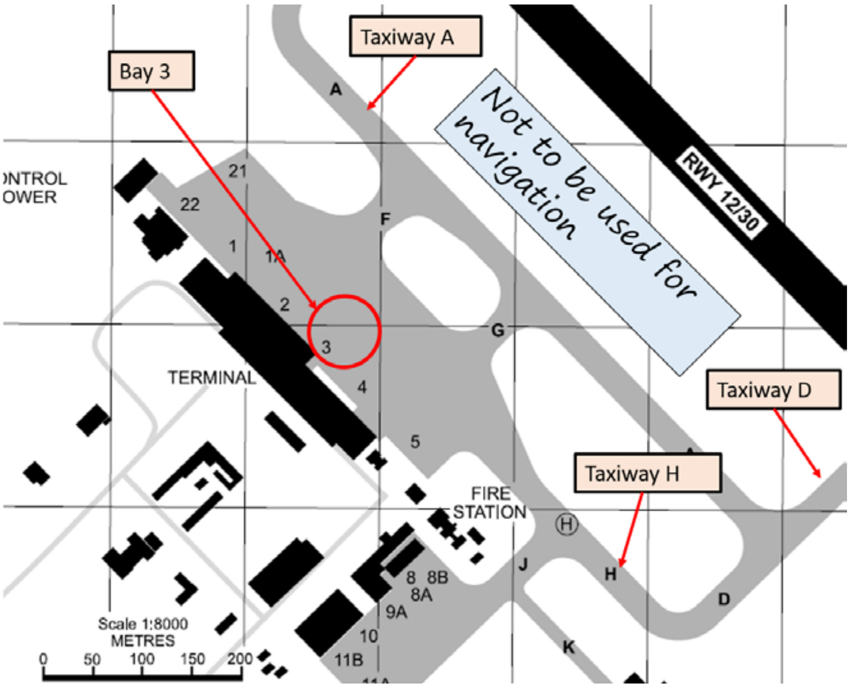
Separation Issues

Taxiing collision involving Boeing 737s, VH-YFT and VH-VUP

What happened

On 7 December 2016, a Boeing 737-8FE aircraft, registered VH-YFT (YFT) was parked on bay 3 (Figure 1) at Hobart Airport, Tasmania, as the crew prepared to conduct Virgin Australia flight VA1531 to Sydney, New South Wales. The flight crew consisted of a captain and first officer, and a check captain seated in the jump seat between them.

Figure 1: Hobart Airport – aerodrome diagram



Source: Airservices Australia annotated by ATSB

At about 0945 Eastern Daylight-saving Time (EDT), another Virgin Australia Boeing 737-8FE aircraft, registered VH-VUP (VUP), landed at Hobart Airport and parked on bay 2, adjacent to and north of YFT. The bays required that the aircraft departs using a power-out taxi[1], as there were no tug facilities available at Hobart Airport.

By 0950, the flight crew of YFT had received the final load sheet[2] electronically via the aircraft communications addressing and reporting system (ACARS). Due to an issue with printing a copy of the load sheet on the ACARS printer, the crew requested, and received, a paper copy of the load sheet from the dispatcher.[3] This issue caused a slight delay in pre-flight preparations. After starting the engines, the captain gave the dispatcher the instruction to disconnect their headset from the aircraft, which the dispatcher did, then exchanged thumbs up to indicate all was clear. The dispatcher then walked to the left wingtip of the parked aircraft (VUP), and stood with their arms out and thumbs up to indicate YFT was clear of obstacles, particularly the wingtip of VUP.

At 1012:12, the first officer of YFT contacted the Hobart surface movement controller (SMC) on Ground frequency, and requested a clearance to taxi. The SMC then instructed the crew of an

1 'Power-out taxi' are where the aircraft is taxied out rather than pushed back using a tug.

2 Aircraft weight and balance data for the flight.

3 Ground crew responsible for assisting in loading (and unloading) and preparing aircraft for departure.

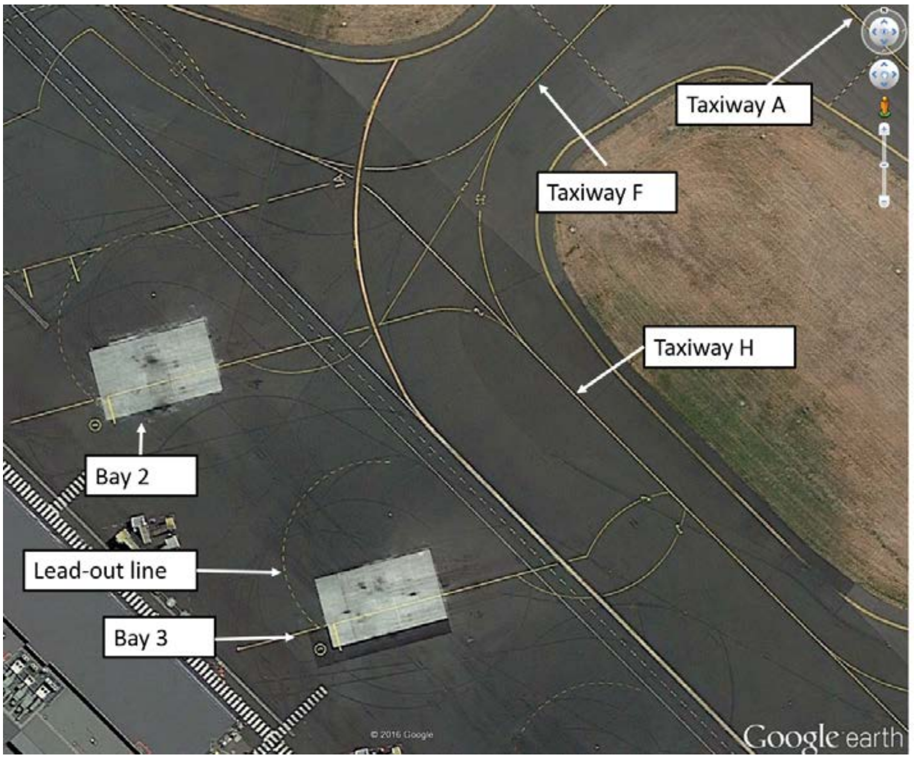
Airbus A320 aircraft that had commenced taxiing from bay 4, to vacate the apron area via taxiway H (Figure 2).

Figure 2: YFT starts taxiing from bay 3 at Hobart Airport

Source: Airport operator annotated by ATSB

The SMC then advised the crew of YFT that the A320 on their 'left hand side' was taxiing out via H and that they were to follow that aircraft via H (and D) to holding point D for runway 30. The first officer read back 'follow Jetstar A320 behind, behind him via hotel holding point delta runway 30'. At about 1013, the captain commenced turning the aircraft to the right, out of the bay, with the nose wheels just inside the marked lead-out line (Figure 3).

Figure 3: Hobart apron area showing the lead-out line on bay 3



Source: Google earth annotated by ATSB

At that time, another A320 aircraft had landed and was taxiing in towards the parking bays from the north. During the initial turn out of the parking position, the captain became aware of the inbound A320 on taxiway A and became uncertain as to which A320 the controller had instructed them to follow, and whether the inbound A320 would taxi past them via taxiway F. The first officer had also seen the A320 taxiing down A towards F and pointed it out to the captain.

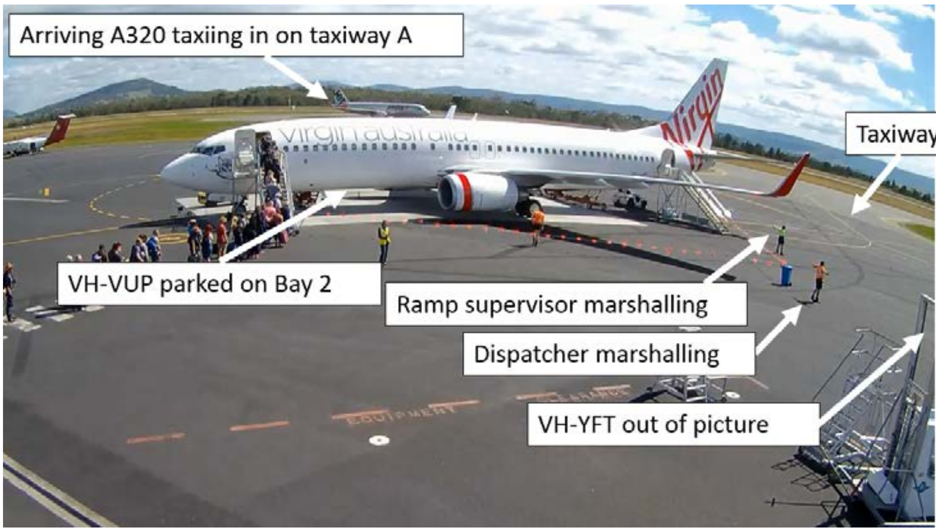
The captain elected to stop the aircraft and clarify their taxi clearance. YFT stopped part way through the turn, about 90° from its parked position (Figure 4). At that time, the nose wheels were inside the lead-out line, and the aircraft was pointing towards the left wingtip of VUP.

Figure 4: YFT stopped taxiing during the turn out of bay 3

Source: Airport operator annotated by ATSB

The ramp supervisor[4] was at the far side of the parked aircraft (VUP) preparing it for departure, when YFT stopped. The ramp supervisor saw that YFT had stopped during the turn out, which was unusual, therefore moved to a position near the dispatcher, who was at the left wingtip of VUP, to where they could communicate with the flight crew if required and have line of sight to check for wingtip clearance between the two aircraft (Figure 5).

Figure 5: VUP parked on bay 2 with ground crew marshalling and A320 inbound



Source: Airport operator annotated by ATSB

When YFT had stopped, the flight crew noticed that they had inadvertently omitted to write the automatic terminal information service (ATIS)[5] reference letter on their take-off data card. The first officer switched their radio to the appropriate frequency to listen to the ATIS, while the captain

4 Supervisor of ground crew loading and unloading aircraft.

5 The ATIS (Automatic Terminal Information Service) is an automated broadcast of prevailing airport weather conditions that may include relevant operational information for arriving and departing aircraft.

temporarily took over responsibility for communications with air traffic control (ATC) on Ground frequency.

At 1014:00, after seeing YFT stop during the turn, the SMC instructed the crew of YFT to 'continue to taxi via taxiway H, you are number one to inbound traffic and the other traffic is well clear'. About 20 seconds later, after confirming the clearance with the captain (and switching the radio back from the ATIS to the Ground frequency), the first officer acknowledged the clearance with the call sign 'Velocity 1531'.

By the time the first officer acknowledged the clearance, the captain had recommenced taxiing, while watching the A320 on taxiway A to make sure that it was going to hold its position. After stopping, the captain removed their hand from the tiller, which caused the nose wheels of YFT to centre. Therefore, the aircraft moved forwards in a near straight line for about 2 seconds and crossed the lead-out line, before the right turn resumed.

As the aircraft recommenced taxiing, the dispatcher initially observed the wingtips of the two aircraft clear each other. However, as YFT then tracked towards the tail of the parked aircraft as it started to turn, the ramp supervisor assessed that a collision between the left wingtip of YFT and left horizontal stabiliser of VUP was imminent. The ramp supervisor commented that they then lowered their arms towards a crossed position to show that clearance between the two aircraft was reducing,[6] and attempted (unsuccessfully) to make eye contact with the flight crew (Figure 6).

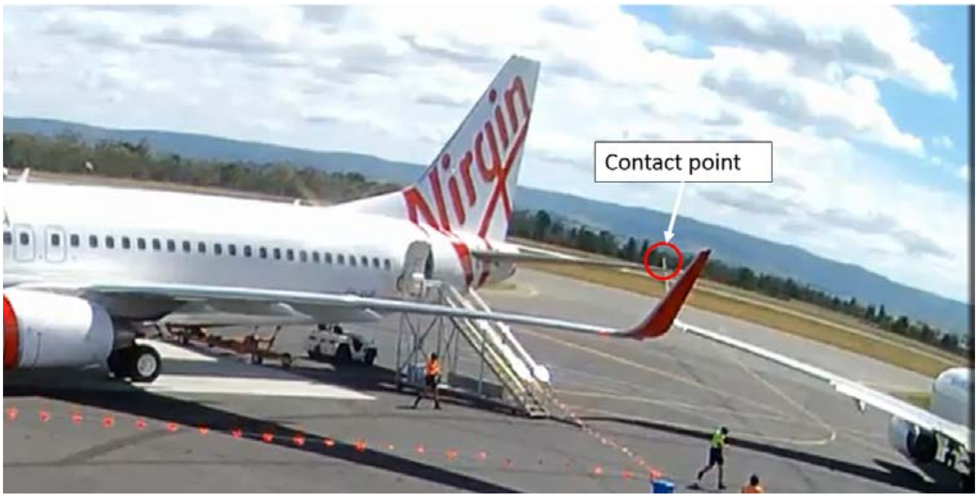
Figure 6: Collision imminent

Source: Airport operator annotated by ATSB

About 30 seconds after recommencing the taxi, as YFT continued to turn, the left wingtip collided with the horizontal stabiliser (tailplane) of VUP (Figure 7).

[6] However, this was not evident in the CCTV footage.

Figure 7: Contact between YFT left winglet and VUP left horizontal stabiliser



Source: Airport operator annotated by ATSB

The winglet of YFT was damaged (Figure 8) as was the horizontal stabiliser of VUP (Figure 9). No one was injured.

Figure 8: Damage to YFT left winglet

Source: Aircraft operator

Figure 9: Damage to VUP left horizontal stabiliser

Source: Aircraft operator

Safety analysis

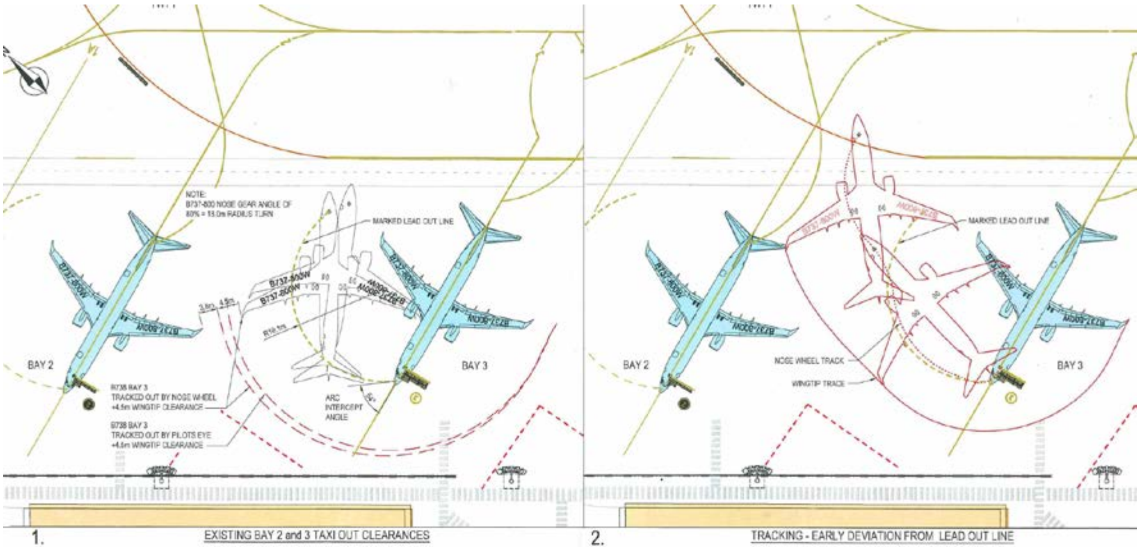
Parking bays

The Hobart Airport operator reported that the bays were surveyed regularly to ensure they met the required standards. The airport operator constructed a schematic diagram of the aircraft's taxi path from the CCTV footage and the aircraft dimensions on the surveyed apron markings (Figure 10).

The flight crew commented that the design standard for the parking bays meant that they were far too close to be comfortably safe to conduct a power-out taxi when there is an aircraft in the adjacent bay. Furthermore, a bit more spacing between the bays may prevent a similar incident occurring. The captain also commented that consideration of operational acceptability criteria, in addition to technical design specifications, prior to the commissioning of any parking bay and its associated taxi guidance line would facilitate required changes to the bay and mitigate additional threats peculiar to the local environment.

The captain commented that the (power-out) bays in Hobart are not aligned at right angles to taxiway H. This tends to give a false sense of being clear of adjacent aircraft once the cockpit is well past the aircraft and heading towards taxiway H, as the wingtips are so far behind the flight deck and outside the normal viewing arc of the pilots.

Figure 10: Airport survey markings showing B737 aircraft taxi track with nose wheel on lead-out line (left) and approximate incident taxi path (right)



Source: Airport operator

Position of VUP

VUP was parked with the nose wheels approximately 450 mm aft of the stop mark on bay 2, and the main landing gear was offset longitudinally (relative to the aircraft's heading on the bay) about 380 mm left of the bay centreline. These were well within allowed tolerances and the aircraft was assessed by ground crew to be parked in the correct position. The crew of VUP had been guided to the parking position by ground marshals.

However, the position of VUP's tail slightly left of centreline and aft (measured after the accident), reduced the available clearance between the two aircraft.

Turning geometry

When the aircraft stopped, the nose wheels straightened and the aircraft subsequently taxied outside the marked turning circle.

When the captain releases the tiller on a Boeing 737 aircraft[7] during taxi, it will tend to centre the nose-wheel steering and straighten the nose wheels. When the aircraft then starts to move, the captain cannot immediately turn the nose-wheel steering before the aircraft moves without considerable use of thrust and excessive load on the nose landing gear. As the aircraft starts to move forwards, the captain turns the tiller in the desired direction and the nose wheels will start to turn the aircraft.

When YFT stopped, the nose wheels were inside the lead-out line. If the nose wheels track on (or inside) the lead-out line, the wingtip will clear a correctly parked aircraft on the adjacent bay, but it is necessary to keep a continuous turn going. The check captain commented that if you stop the aircraft, particularly if it is heavy, a significant amount of thrust is required to then keep the aircraft on the line. The captain commented that they used caution with the thrust setting because of passengers boarding the aircraft on the adjacent bay. The check captain also stated that there was not a lot of manoeuvring room with 'power-out' bays. There is a risk that the aircraft has to go straight ahead for 2-3 m to get the turn going again and there is no allowance made for that in the geometry of the bay.

The captain commented that there is an inherent error in determining where the nose wheel is tracking in relation to a taxi guidance line, in the Boeing 737, during turns. The nose wheel is

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[7] The aircraft has only one tiller – and therefore can only be taxied from the captain's seat.

behind and laterally offset from the captain's seating position. As such, its position in relation to the line can only be estimated. On power-out bays, flight crew cannot see the position of the aircraft on the lead-out line at any time.

After stopping, the captain could no longer see the lead-out line, which was then beneath and behind the cockpit. The aircraft taxied forward across the lead-out for about 1–2 seconds then turned to the right towards the H taxiway line. There was no marked line connecting the lead-out line with taxiway H.

Ground crew interpretation of taxi track

When the aircraft stopped, the dispatcher noticed that the nose wheels were inside the line, which was normally an indication that the aircraft would stay well clear of an aircraft parked on bay 2. The aircraft then proceeded for about 2 seconds at an angle that was not normal, and both the ramp supervisor and the dispatcher thought the aircraft may have been heading towards taxiway A via the exit (F) behind bay 2 rather than continuing to turn to the right and along the normal path onto taxiway H.

The dispatcher reported that they were not initially concerned about the aircraft's track, because a bit of momentum was needed to turn the aircraft and get moving. When the wingtip of YFT taxied clear of the wingtip of VUP where the dispatcher was standing, they assumed the aircraft would continue turning and exit the bay, but instead it kept going towards the parked aircraft, which they commented was very unusual.

Communication between ground crew and flight crew

In accordance with normal procedures, the dispatcher unplugged their radio connection to the flight crew before the aircraft commenced taxiing.

The dispatcher commented that they were unsure as to why the aircraft had stopped during the turn, but assumed it was because the flight crew were communicating with ATC. The ground crew radios are not on the ATC frequency and therefore they cannot hear transmissions between ATC and flight crew.

When the aircraft stopped, the ramp supervisor moved to where they could see if the flight crew flashed the nose-wheel lights to indicate a reconnect (of ground-air crew radio communications) was required, but they did not. There were also no hand signals from the flight crew to indicate they needed to reconnect. The ramp supervisor is the only person in the ground crew with a ground-to-air licenced, hand-held radio, so they wanted to get into position to communicate with the flight crew if they requested a reconnect.

As the aircraft continued its turn off the bay, YFT's wingtip clearance was decreasing due to its proximity to the tailplane of VUP, although it had safely cleared the wingtip of VUP. The dispatcher was then no longer in sight of the flight crew. The ramp supervisor was unable to make eye contact with the captain (seated in the left seat), and commented that the captain appeared to be looking directly forwards.

The ramp supervisor commented that they lowered their arms towards a crossed position to indicate reducing clearance, but that action was not apparent on the CCTV footage of the accident. The check captain commented that lowering of the arms to the crossed position as stated by the ramp supervisor was not shown in the operator's manual as a procedure to show reduced wing tip clearance.

According to the manual, the correct signal for requiring the aircraft to stop was 'arms repeatedly crossed above head (the rapidity of the arm movement should be related to the urgency of the stop (i.e. the faster the movement, the quicker the stop)'.

The captain commented that they had seen the thumbs up from the wing walker at the wingtip of the parked aircraft (the dispatcher) and the wing walker near the tailplane of the parked aircraft (the ramp supervisor). They were the only signals the captain sighted and assumed therefore that they were clear of the parked aircraft. If there was any doubt about their clearance from the parked aircraft, they would contact ground staff via radio on their company operations frequency and request assistance, but they did not have any doubt. They had received the all clear signal from the ground crew and thought that they were clear of the parked aircraft and safe to continue.

The captain commented that it would be better to have verbal communication with the marshallers all the way out of the parking bay to have immediate communication if the clearance is insufficient. A verbal warning would be an immediate trigger to stop.

Training

The check captain commented that they consider the turning bays at Hobart to be tight. When training new captains, they always encourage them to ensure that they apply sufficient tiller during the turn out, and that sufficient thrust is applied to keep the aircraft turning. In addition, they suggest using the technique of using slightly more thrust on the outside engine to assist in keeping the aircraft turning.

The check captain also stated that there was no standard procedure in the company for training captains to taxi the aircraft. Training captains instil the importance of using a minimum radius turn out of the bay, appropriate power application and tiller technique, and instruct how to go about requesting assistance with marshaller guidance. Captains are instructed on the visual (hand) signals and where there is any doubt about clearance, to rely on the marshaller and keep a good lookout. If unsure of the clearance from any obstacle, they should stop, but in a turn it is also important to keep the turn going – if you do stop you potentially have a problem.

When taxiing out of a power-out bay, they try to turn inside the lead-out line to ensure adequate clearance.

Role of ground crew

The operator commented that at the time of the incident, although provision of 'wing-walkers' was included in the ground handling contract between the aircraft operator and ground handling provider at Hobart Airport, the ground personnel were not specifically trained in wing walking. The dispatcher and ramp supervisor had proactively positioned themselves at the wingtip and horizontal stabiliser of VUP to assist the flight crew in maintaining clearance between the two aircraft. Wing walking or marshalling was normal procedure for the ground crew at Hobart Airport and both ground crewmembers had substantial experience in doing so.

Once the wingtip of YFT had passed the wingtip of VUP, the dispatcher's responsibility was over because the next marshaller (ramp supervisor) was in line and the dispatcher was then out of line of sight of the flight deck. There was not usually a marshaller positioned beyond the wingtip.

The dispatcher commented that normally once the aircraft was clear from that position on the wingtip, the dispatcher would give a salute or wave to the captain and they would acknowledge with a wave, but that did not happen on this occasion. The dispatcher commented that the captain appeared to be looking straight ahead towards the exit, or they may have been focused on the marshaller ahead (the ramp supervisor).

Attention and time pressure

The captain initially got the thumbs up from the dispatcher and the ramp supervisor. Immediately before the collision, the captain's attention was on the inbound A320, and they did not see any indication from the ground crew of reducing clearance with VUP (nor was there any evidence of such on the CCTV footage).

The captain commented that during the turn out, their attention was divided between the wing walker, watching where the aircraft was going, listening to ATC, communicating with the first officer, maintaining situational awareness and being aware of other traffic in the area.

The captain also commented that they[8] had to rise at 0345 to commute to Sydney Airport for the flight, and had not slept particularly well as the flight was a line check. There was some pressure to perform well having a check captain in the jump seat. However, the captain felt fit to operate the flight and did not feel tired.

While waiting for the final load sheet to come out on the aircraft communications addressing and reporting system (ACARS), they had a problem with the ACARS printer and had to unjam it as the scheduled departure time was approaching. They requested a hard copy of the load sheet from the dispatcher, but were also able to get the printer fixed and printed the load sheet from the ACARS. This caused them a slight delay and they were ready to go about 2 minutes late (scheduled departure was 1010 and they released brakes at 1013). This created some time pressure.

Clearance and traffic disposition

The presence of two A320s led the captain to doubt their taxi clearance after they started taxiing. The operator commented that the first officer's read back of the taxi clearance, where they stated the A320 'behind' rather than to their left, may also have affected the captain's perception of which of the two A320s they were to follow. Once the aircraft started to turn, the captain could not see the A320 taxiing out (via H) but was concerned about the one inbound. The captain wanted to confirm that the inbound aircraft was going to stop.

Normally the captain would clarify the clearance with the first officer, but the first officer was listening to the ATIS at the time.

Findings

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

- When the captain became aware of the incoming A320, they became uncertain of their clearance and stopped the aircraft to clarify.
- The aircraft taxied outside the marked lead-out line after stopping and without the application of sufficiently increased thrust or tiller input this resulted in insufficient clearance from the parked aircraft. The captain was unable to see the aircraft's position relative to the lead-out line after stopping and the line did not continue to intersect the taxiway ahead of the aircraft.
- The bays were marked according to the standards but the standards probably did not allow sufficient margin for non-normal situations, such as stopping during the turn.
- There was no documented procedure for either flight or ground crew to follow in the case of an aircraft stopping during the turn or crossing the lead-out line.
- The operator did not have a standard training syllabus or assessment criteria for teaching captains to taxi the aircraft.
- There was no direct means of verbal communication between ground marshallers and the flight deck once the aircraft started taxiing, although the crew could contact the movement coordinator if required.
- Wing walkers should remain in sight of the flight crew, but the captain did not see the ramp supervisor signal to indicate reducing clearance between the two aircraft. The captain's attention was to the incoming A320.

[8] Gender-free plural pronouns: may be used throughout the report to refer to an individual (i.e. they, them and their).

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 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 taking the following safety actions:

Flight crew operational notice

The aircraft operator issued a flight crew operational notice (FCON)[9] which stated that:

- When taxiing out of power-out bay, crew shall ensure the aircraft maintains the apron lead-out line until:
  - the end of the lead-out line; or
  - the lead-out line joins a taxiway centreline.
- This may involve an exit turn of more than 180 degrees to assure clearance from adjoining bays.
- Should the aircraft be stopped before completion of the entire turn to exit the apron, caution should be made when re-initiating movement to ensure the above requirements are maintained.
- If at any time aircraft clearance cannot be assured, the aircraft should cease taxiing and request assistance.

Training and checking notice

The aircraft operator also issued a training and checking notice (TCN) that stated ‘All Check Captains and Training Captains are requested to ensure that wingtip geometry, turn markings, turn procedures and hazards are well understood by flight crew during line training and recurrent line checks’.

Flight crew information bulletin

The aircraft operator published a flight crew information bulletin (FCIB) for educational and standardisation purposes titled *Wingtip Clearance Hazard* and applicable to Boeing 737 aircraft. The FCIB included information about taxiing in accordance with lead-out lines, appropriate use of ground crew, images of Hobart and other airports used by the operator, and wing and tail turning geometry for the aircraft.

The FCIB stated

> *In summary, it is recommended that taxi guidance lines be adhered to, whenever practical. Continued vigilance should be employed by crews in the monitoring of obstacles during ground manoeuvring.*
>
> *If there is any doubt whatsoever regarding wingtip clearance, STOP and seek guidance.*

Safety message

This incident highlights the importance of aircraft operators conducting a thorough risk assessment where ground movement is confined, particularly movements involving congested power-out bays. Effective risk assessments ensure that hazards are clearly identified and well understood, and that the associated risks are appropriately managed.

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[9] FCONs are company NOTAMs which are issued to flight crew by the flight operations department to convey new operational and technical information which is of an urgent nature. Flight crew are required to obtain and review a copy of the current FCONs at the commencement of duty each day.

To manage clearance in congested areas, communication tools between ground and flight crew should be used where possible when ground crew are providing marshalling or wing walking assistance. Hand signals rely on constant visual contact, which cannot be guaranteed. Appropriate training of ground crew regarding the use of standard hand signals is required to ensure mutual understanding and communication between flight and ground crew.

Where possible, airport authorities should consider additional margins to accommodate unusual or irregular circumstances during taxiing.

General details

Occurrence details

Date and time:	7 December 2016 –1030 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Taxiing collision	
Location:	Hobart Airport, Tasmania	
	Latitude: 42° 50.17' S	Longitude: 147° 30.62' E

Aircraft details: VH-YFT

Manufacturer and model:	The Boeing Company 737	
Registration:	VH-YFT	
Operator:	Virgin Australia	
Serial number:	41028	
Type of operation:	Air transport high capacity – passenger	
Persons on board:	Crew – Unknown	Passengers – Unknown
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Substantial	

Aircraft details: VH-VUP

Manufacturer and model:	The Boeing Company 737	
Registration:	VH-VUP	
Operator:	Virgin Australia	
Serial number:	36604	
Type of operation:	Air transport high capacity – passenger	
Persons on board:	Crew – Unknown	Passengers – Unknown
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Substantial	

Near collision on ground involving Jetstar Airways Airbus A320, VH-VGJ, and a dispatcher

What happened

On 25 January 2017, a Jetstar Airways Airbus A320-232, registered VH-VGJ (VGJ), taxied for a scheduled passenger transport flight from Newcastle (Williamtown) Airport, New South Wales, to Brisbane Airport, Queensland. There were six crewmembers and 165 passengers on board the aircraft. The captain was the pilot monitoring and the first officer was the pilot flying.[1]

The aircraft parked at bay 4 at the Newcastle Airport terminal for passenger disembarkation and boarding (Figure 1). Bay 4 was a 'pushback' bay, which means that when the aircraft is ready for departure, the aircraft is pushed backwards from the parking bay by a tug under the supervision of a dispatcher. Another operator's aircraft was parked on bay 5, to the left of VGJ. Bay 5 was a 'power-out' bay which means that on departure, aircraft taxi from the bay under their own power by turning sharply away from the terminal.

At about 1836 Eastern Daylight-savings Time (EDT), the crew of VGJ received a clearance from the surface movement controller to pushback, which placed VGJ to the right rear quarter of the aircraft parked on bay 5, and facing towards taxiway H (Figure 1). The dispatcher was walking beside the aircraft and was connected to the nose of VGJ by a headset for communications with the flight crew. The flight crew started the engines during the pushback in accordance with standard procedures. After the pushback was completed, the flight crew set the brakes, the tug disconnected and the dispatcher removed the nose wheel steering pin.[2] The flight crew then started their 'after start flows' (see: *After start flows*). After the tug disconnected from VGJ, the tug driver moved it to a position adjacent to the left wingtip of VGJ, facing towards the aircraft on bay 5.

At about 1838, the crew of the aircraft on bay 5 requested a clearance to taxi for departure. The surface movement controller questioned whether the aircraft could taxi to taxiway J and avoid VGJ.[3] The flight crew responded that they could. At this stage, the flight crew on board VGJ interrupted their 'after start flows' to monitor the other aircraft. The captain, seated in the left seat of VGJ, did not believe there was sufficient clearance for the other aircraft to turn around for taxiway J without a collision. The aircraft started to taxi from bay 5 in a right power-out turn, but stopped within a few metres.

When the tug driver observed the aircraft on bay 5 move towards them,[4] they moved the tug away from VGJ over to the terminal side of the apron, near bay 4, to remain clear of the other aircraft. Meanwhile the dispatcher assisting the aircraft on bay 5, had also moved from bay 5 towards bay 4 in order to monitor and signal wingtip clearance for the left wing of the aircraft conducting the power-out from bay 5.

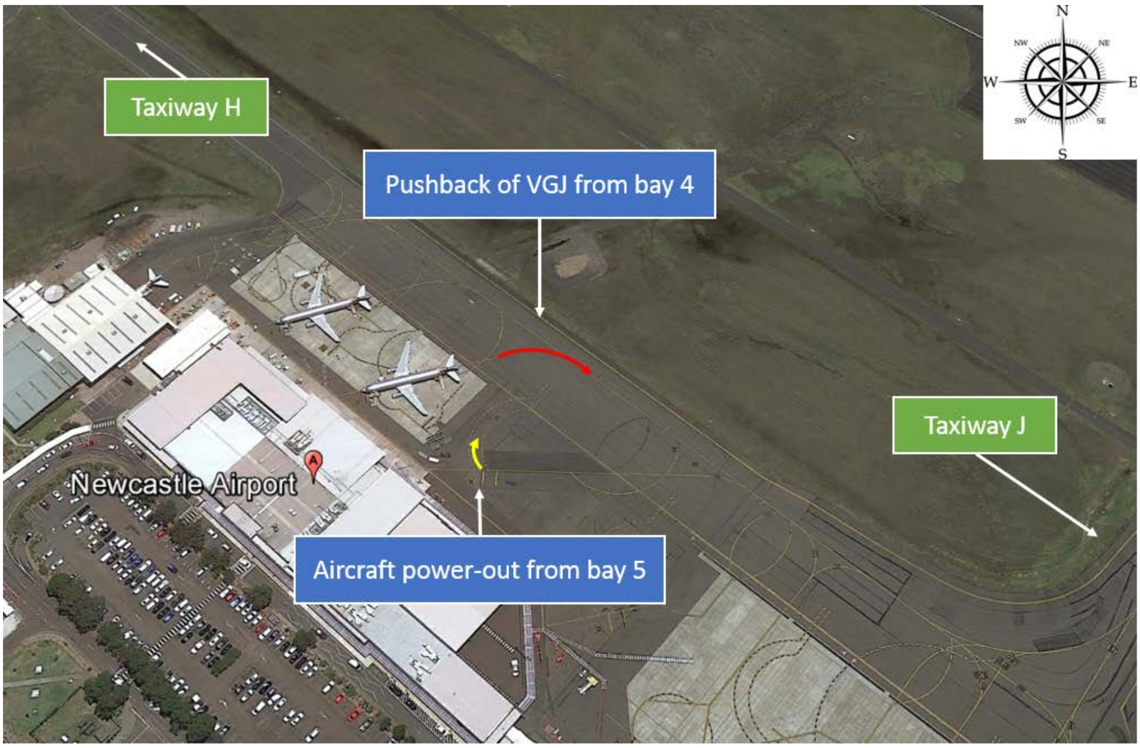
1 Pilot Flying (PF) and Pilot Monitoring (PM): procedurally assigned roles with specifically assigned duties at specific stages of a flight. The PF does most of the flying, except in defined circumstances; such as planning for descent, approach and landing. The PM carries out support duties and monitors the PF's actions and the aircraft's flight path.

2 The nose wheel steering pin is inserted in the nose gear to enable the tug to steer the nose wheel.

3 The air traffic control tower is located on the opposite side of the runway to the civil terminal apron.

4 Gender-free plural pronouns: may be used throughout the report to refer to an individual (i.e. they, them and their).

Figure 1: Newcastle Airport apron



Source: Google earth, annotated by ATSB

Radio communications continued between air traffic control and the aircraft departing from bay 5, until it was confirmed that the aircraft would wait for VGJ before taxiing any further. The captain of VGJ, who was looking out the left window of the flight deck towards the bay 5 aircraft and the terminal, sighted their tug and a dispatcher near bay 4. They assumed that the dispatcher near bay 4 was their dispatcher, who had disconnected from their aircraft while they were monitoring the bay 5 aircraft movements and radio communications. At about 1840, the flight crew on board VGJ requested and received a clearance to taxi for runway 12 via taxiway H. The flight crew selected their taxi lights on, released the brakes and increased power.

The dispatcher for VGJ was still connected to the aircraft nose with their headset and waiting for their clearance from the flight crew to disconnect. They observed the taxi lights for VGJ illuminate, then they heard the engine noise increase, and then the aircraft started to taxi. They immediately disconnected their headset from the aircraft and moved clear to the left of the aircraft towards the terminal with the headset and the nose wheel steering pin. Once the dispatcher was clear of the aircraft, they turned around to display the nose wheel steering pin to the flight crew, but the captain was not looking towards them.

After start flows

On completion of starting both engines, the flight crew conduct their ‘after start flows’, which are memory item checks split between the pilot flying and pilot monitoring (Figure 2). The second-to-last item for the pilot flying is the announcement to the dispatcher that they are clear to disconnect. After the dispatcher disconnects their headset from the aircraft, they walk clear of the aircraft and provide a ‘thumbs-up’ signal to the flight crew while holding up the nose wheel steering pin for the flight crew to sight. During the ‘after start flows’, the attention of the flight crew on board VGJ was diverted to the radio communications between the aircraft parked on bay 5 and the surface movement controller.

Figure 2: After start flows

AFTER START

Ident.: NP-NP-00010945.0001001 / 12 NOV 15
Applicable to: ALL

PF	PM
ENG MODE selector....NORM	
APU BLEED pb-sw....OFF	GND SPOILERS....ARM
ENG ANTI ICE pb-sw....AS RQRD	RUD TRIM....ZERO
WING ANTI ICE pb-sw....AS RQRD	FLAPS....SET
APU MASTER SW....AS RQRD	PITCH TRIM....SET
	"ECAM DOOR PAGE....CHECK"
ECAM STATUS....CHECK	ECAM STATUS....CHECK
N/W STEER DISC MEMO....CHECK NOT DISPLAYED	
CLEAR TO DISCONNECT....ANNOUNCE	
AFTER START C/L....COMPLETE	AFTER START C/L....COMPLETE

Source: Operator

The last item on the ‘after start flows’ is for the flight crew to complete the challenge and response ‘after start checklist’, which is as follows:

- ANTI ICE ...AS RQRD
- ECAM STATUS ...CHECKED
- PITCH TRIM ...SET
- RUDDER TRIM ...ZERO
- DISP CLRNCE ...SIGHTED

The last item on the ‘after start checklist’ is confirmation that the dispatcher was sighted clear of the aircraft. The left seat or right seat pilot reports to the other pilot ‘dispatch clearance sighted’. In this serious incident, the terminal was on the left side of VGJ and therefore it was expected that the captain, in the left seat, would sight the dispatcher. The captain reported remembering sighting a dispatcher, but could not recall what was communicated on the flight deck between the flight crewmembers.

On completion of the ‘after start checklist’, the flight crew request taxi clearance and turn on the taxi light.

Tug movements

After the tug disconnected from the aircraft, the tug driver moved the tug clear of the aircraft and initially waited for the dispatcher near the left wingtip. The tug normally waited beside the aircraft to offer the dispatcher a lift and because the nose wheel steering pin is stowed in the tug when removed from the aircraft. However, when the bay 5 aircraft started to move, the tug moved from the left wingtip to the terminal building near parking bay 4.

Safety analysis

After VGJ was pushed-back from bay 4 and the flight crew had started their ‘after start flows’, their attention was diverted to a potential risk of collision associated with the taxi instructions and movement of an aircraft parked on bay 5. Following confirmation between the conflict aircraft and surface movement control that they would wait for VGJ, the captain of VGJ misidentified the dispatcher for the bay 5 aircraft as their own dispatcher. At this time, the tug, which would normally wait beside the departing aircraft for the dispatcher, had moved away from VGJ towards the terminal to avoid a conflict with the bay 5 aircraft. Therefore, the dispatcher sighted by the captain, was next to the tug used for the pushback of VGJ. This potentially provided an association between the tug and the dispatcher in the mind of the captain, who assumed the dispatcher had removed the nose wheel steering pin and moved away from the aircraft. The diversion of the flight crew’s attention away from their ‘after start flows’ probably resulted in the pilot flying not completing their memory items. This was not detected in the ‘after start checklist’ because the captain had misidentified the dispatcher for the bay 5 aircraft as the dispatcher for VGJ. Consequently, the dispatcher connected to VGJ was not cleared to disconnect prior to VGJ starting to taxi.

Findings

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

- The flight crew on board VGJ were distracted during their ‘after start flows’ by the radio communications between an aircraft parked on bay 5 and surface movement control, and the subsequent movement of that aircraft which had a potential risk of collision with VGJ.
- The captain on board VGJ misidentified the dispatcher for the bay 5 aircraft as their own dispatcher, which resulted in VGJ starting to taxi without clearing the dispatcher to disconnect.

Safety message

Following this serious incident the captain reported that their most important lesson was distraction management. They considered either slowing down the ‘after start flows’ or re-starting the ‘flows’, before the ‘after start checklist’, as the most practical risk mitigation strategies.

General details

Occurrence details

Date and time:	25 January 2017 – 1840 EDT	
Occurrence category:	Serious incident	
Primary occurrence type:	Taxiing collision / Near collision	
Location:	Newcastle (Williamtown) Airport, New South Wales	
	Latitude: 32° 47.70’ S	Longitude: 151° 50.07’ E

Aircraft details

Manufacturer and model:	Airbus A320-232	
Registration:	VH-VGJ	
Operator:	Jetstar Airways PTY LTD	
Serial number:	4460	
Type of operation:	Air transport high capacity – passenger	
Persons on board:	Crew – 6	Passengers – 165
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

Landing on an occupied runway involving Beech Aircraft Corporation B200, VH-ZOK

What happened

On 18 December 2016, at about 1047 Eastern Daylight-saving Time (EDT), a Beech Aircraft Corporation B200 aircraft, registered VH-ZOK (ZOK), was on descent to Horsham Airport, Victoria. The pilot, copilot, and six passengers were on board the charter flight.

Horsham Airport was hosting a gliding competition from the 12-20 December 2016 and a notice to airmen (NOTAM)[1] had been published with information on the event (see *NOTAM* section below).

At about 1000 that morning, the director of the gliding competition conducted a briefing for the glider pilots and other people involved in the event. At the briefing, the selected take-off point for the conditions on the day and the schedule for marshalling the gliders out to the take-off point were discussed.

After the briefing, two ground personnel associated with the event went out to the take-off point for the gliders on runway 17 and began to lay out the 14 ropes that would be attached to the gliders and the launch aircraft. Seven ropes were placed lengthwise on the grass within the runway strip[2] on each side of the bitumen runway,[3] where it was planned the gliders would launch from. Later in the day, the ropes were to be attached to each glider and their respective tow aircraft to launch the gliders.

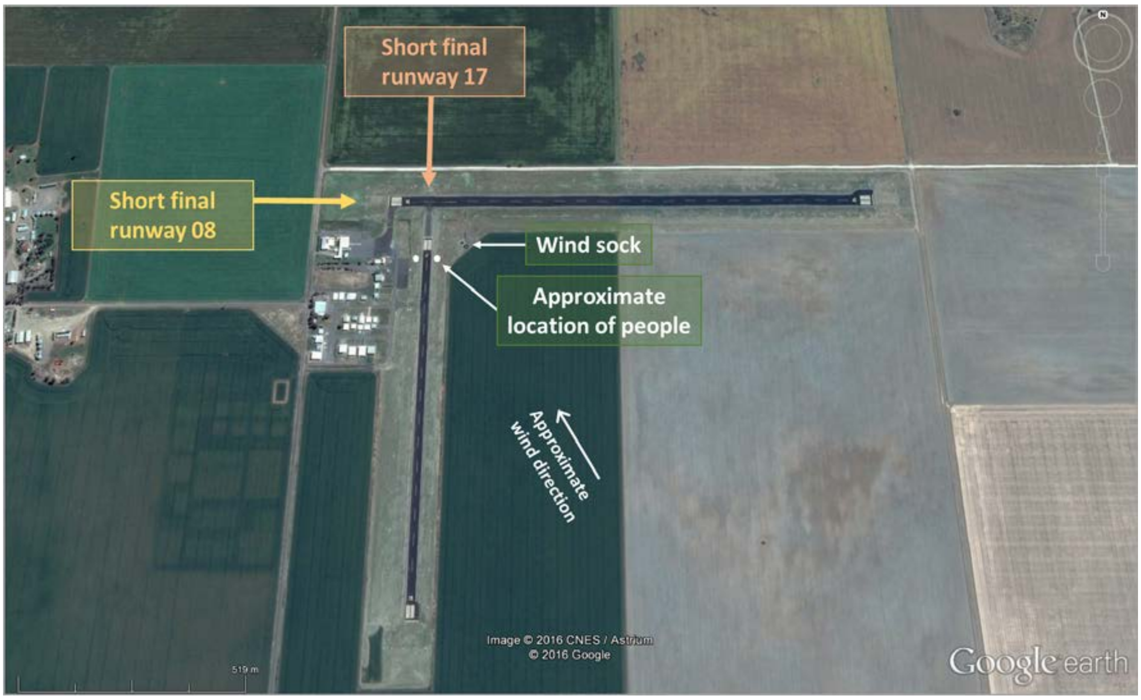
At the time when the event ground personnel were laying out the ropes, a powered aircraft was conducting circuits on runway 08 (Figure 1).

1 A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

2 A runway strip, for a runway without an instrument approach, includes a graded area around the runway (in this case a grass area) and stopway, intended to: (1) to reduce the risk of damage to aircraft running off a runway; and (2) to protect aircraft flying over it during take-off or landing operations.

3 The runway is a defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

Figure 1: Map of airport showing runways 08 and 17 and the approximate location of the ground personnel



Source: Google earth, modified by the ATSB

As ZOK approached the circuit, the pilot was aware of one other aircraft on the common terminal advisory frequency (CTAF) that was on the downwind circuit leg for runway 08. The other aircraft was significantly slower than ZOK and the wind direction was about 140 degrees, and the wind speed was about 7 kt.[4] The pilot of ZOK elected to land on runway 17. The pilot gave an inbound broadcast on the CTAF and another as they joined downwind for runway 17.

As ZOK turned onto the base circuit leg, the aircraft on runway 08 had just landed and was backtracking to vacate the runway. A broadcast on the CTAF was made alerting the pilot of ZOK to the NOTAM. The pilot of ZOK believed the voice was that of the pilot that had just landed. The pilot of ZOK was not able to identify any gliders in the air so continued with the approach. ZOK turned onto the final approach and the pilot was able to see the bitumen part of the runway was clear.

The ground personnel noticed the sound of another powered aircraft and looked up to see the landing lights of an aircraft on final approach for runway 17. The ground personnel were located on the grass on both sides of the runway and each moved back about 10 to 15 m within the runway white gable markers.[5]

As ZOK was on short final, again a radio communication was broadcast on the CTAF indicating that runway 17 was closed that there was ground based activity on the runway and that ZOK should go around. Again, the pilot of ZOK believed the voice was that of the pilot that had just landed. The pilot and copilot double-checked the bitumen runway and did not identify any person on the runway. As the pilot believed that the runway was not closed, given the height of the aircraft above the ground and the risks associated with going around at this height, the pilot continued with the landing.

The aircraft landed just past the threshold and taxied the full length of the runway, turned around and back tracked runway 17 to access the aircraft parking bay near the airport terminal. While backtracking, the pilot noticed two people either side of the runway on the grass about 50 m from

4 Maximum wind gusts recorded was 15 kt.

5 Runway 17 was 24 m wide, total width of the runway strip to the white gable markers was 80 m.

the runway 17 threshold. The pilot, copilot, six passengers, and two ground personnel were not injured and the aircraft was not damaged.

Pilot comment

The pilot had received a copy of the NOTAM during their preparation for the flight. Their understanding of the NOTAM was that there was a gliding competition at the airport and that runway 17/35 was available by prior arrangement. The critical hours for the competition were from 1200 to 1400. The preferred runway for the gliding competition was runway 17/35 but they could change to runway 08/26 if required.

The pilot indicated that although their arrival time was outside 1200 to 1400 they contacted the competition director on the phone number provided in the NOTAM to discuss their arrival and departure. The pilot reported that they rang on the Saturday, the day prior to the flight.

The discussion with the acting competition director concerned the glider flying and their subsequent departure time from Horsham, as that may have posed a conflict with returning gliders and how that separation would be arranged. The pilot indicated that at no stage in the conversation was it mentioned that runway 17/35 was closed to powered aircraft or that there would be people on the runway setting up for the gliders to depart. The pilot indicated that the conversation ended with the pilot believing that there was no problem with the arrival as it was outside the critical time. At the time of their departure from Horsham, the pilot planned to contact the competition director if there was any glider activity.

The pilot indicated that runway 17 was selected for landing as it was the runway that was most appropriate for the wind conditions. Another aircraft was landing on 08, which was significantly slower than ZOK and this could result in a potential conflict as the other aircraft back tracked to clear runway 08, as well as catching up to it in the circuit.

The pilot was aware that there may be glider activity and had briefed the copilot to be extra vigilant. They both ensured that there were no gliders in the area at the time. They were not aware that there might be people working on the runway and at no stage noticed any people or vehicle on the runway.

The pilot commented that it would be hard to see a person against the grass section of the runway when travelling at about 200 km/h and that it was the bitumen part of the runway that they physically landing on.

The pilot also commented that they[6] have not experienced a situation where people were on the runway and had not communicated their intentions on the CTAF to arriving or departing aircraft.

Event ground personnel comment

The event ground personnel believed that runway 17/35 was closed for the gliding competition. They reported that the active runway for powered aircraft was runway 08 and a powered aircraft was operating on that runway. There was no traffic expected and generally, at that time of the morning there is not much wind.

A radio to communicate on the CTAF was located in the vehicle that was used by the ground personnel. As they were setting up on runway 17, near where the equipment was stored, the ground vehicle had not been used to transport the ropes and was not located on or near the runway. They did not feel that the radio was needed at this time.

At the time of the incident, the ground personnel were reported to be wearing bright yellow high visibility vests.

The ground personnel reported that the NOTAM had been written the same way for many years.

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6 Gender-free plural pronouns: may be used throughout the report to refer to an individual (i.e. they, them and their).

Acting competition director (16 December 2016 NOTAM contact)

The acting competition director remembered speaking to the pilot two days prior to the expected arrival of ZOK.[7] The acting director's understanding of the conversation was that:

- the arrival time would not conflict with the launching of the gliders
- the pilot was aware the NOTAM was in force and that the pilot did not want to interfere with the glider traffic
- the pilot mentioned that they would be able to land in a 15 kt crosswind, which further indicated that they were happy to land on runway 08/26.

The acting director believed that the pilot understood that runway 17/35 was 'closed'[8] to powered traffic and that the pilot would use 08/26, which was the active runway for all powered aircraft, however this was not specifically discussed.

The pilot of ZOK rang two days prior to their arrival and in that time the weather conditions can change.

The acting directors understanding of the NOTAM was that:

- 17/35 was 'closed' to all powered traffic
- there was high glider activity in the area
- if anyone wanted to use 17/35 they had to ring the competition director up to 30 minutes before using that runway, but this was not specified in the NOTAM.

The vehicle that the ground personnel had available included a rotating flashing beacon (the vehicle was not used at the time of the incident).

The grass on the runway strip had been specially mowed for the event.

Competition director

The competition director indicated that the airport operator issued the NOTAM and they understood that the NOTAM closed runway 17/35 to non-glider related traffic during daylight hours. The NOTAM had been written this way for about 3 to 4 years. The wording of the NOTAM had evolved over 10 years. About 3 to 4 years ago, the wording changed from 'closing' runway 17/35 to powered aircraft for a short period, to 'closing' it to powered aircraft for the entire day to give powered pilots better notice.

The competition director indicated that they did not believe a general discussion of potential operations at unspecified times constituted either a request for or a granting of permission to use runway 17/35.

The director reported that generally at that time of the year the wind favours runway 17 and it could not be determined which runway would be the most suitable for the glider operations more than 2 hours ahead of time.

The director indicated that similar incidents have happened over the years but on this occasion, there were people and equipment on the runway strip. A search of the ATSB occurrence database did not find any reported events involving landing powered aircraft (see *Previous incidents* below).

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7 The pilot of ZOK reported that this conversation occurred the day prior to the flight, on the Saturday. The ATSB was not able to locate a gliding event official that remembered talking to the pilot on the Saturday. The official that was the main contact for every day except the 16 December does not remember talking to the pilot.

8 Not available without prior approval. – The convention in Australian NOTAM is to use the phrase 'NOT AVBL' rather than 'CLOSED' - Airservices Australia.

The director indicated that permission for an aircraft to land or take off on runway 17/35 would need to be discussed at the time as it depends on the:

- operational situation
- wind
- if gliders are on the strip waiting to be launched.

Notice to airmen (NOTAM)

The NOTAM for the glider flying competition was issued and applicable from 1000 on the 12 December 2016 to 2100 on the 20 December 2016 during sunrise to sunset (Figure 2). The NOTAM indicated that:

- there was intensive glider flying confined to runway 17/35
- the use of runway 17/35 during sunrise to sunset by other aircraft was only by prior arrangement with the competition director
- runway 08/26 may be used for glider flying if runway 17/35 was not suitable
- glider traffic information was available on the CTAF 118.8 and visiting aircraft should plan to arrive or depart outside the hours of 1200 to 1400 local time if possible
- phone numbers were provided to contact the director for further details. On 16 December, a different mobile number was provided to contact the director.

Figure 2: NOTAM

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                                                              C19/16
INTENSIVE GFY CONFINED TO RWY 17/35
USE OF RWY 17/35 DURING HJ BY OTHER ACFT ONLY BY PRIOR ARRANGEMENT
WITH COMPETITION DIRECTOR.
RWY 08/26 MAY BE USED FOR GFY IF RWY 17/35 NOT SUITABLE.
GLIDER TRAFFIC INFORMATION IS AVBL ON CTAF 118.8 VISITING ACFT SHOULD
PLAN ARRIVE OR DEPART OUTSIDE HRS 0100 - 0300 UTC IF POSS.
CTC DIRECTOR XX XXXX XXXX MOBILE XXXX XXX XXX FOR FURTHER DETAILS
EXCEPT ON 16 DEC (AEDT) MOBILE IS XXXX XXX XXX
FROM 12 112300 TO 12 201000
HJ
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Source: Airservices Australia, phone numbers redacted by the ATSB

The Horsham airport operator forwarded a copy of the NOTAM wording to CASA prior to submitting the NOTAM to Airservices Australia to be issued. CASA provided a response to the airport operator that based on the information provided they had no objection to the proposed NOTAM.

Previous incidents

A search of the ATSB database identified one other notification in the last ten years that involved a glider event and a powered aircraft at Horsham Airport. In 2016, during final approach, three gliders were required to manoeuvre to ensure separation from a single-engine aircraft that was taxiing up and down the runway at high speed before taking off. No radio calls were heard from the single-engine aircraft.

Safety analysis

The pilot of ZOK had received a copy of the NOTAM while conducting their preparation for the flight. After reading the NOTAM, they assessed that if they contacted the competition director prior to the flight, they could use runway 17/35.

They believed that by ringing the competition director before the flight, they had made a prior arrangement to use runway 17 and, as the intended arrival time was outside the ‘critical’ hours of 1200 to 1400 specified in the NOTAM, their arrival would not interfere with the competition. As neither party specifically talked about runway 17/35, a connection was not made that there was a different understanding of what the NOTAM meant and that permission was not nor could it have been granted to use runway 17/35 when the weather conditions for the launch day were not known.

The gliding club believed that the NOTAM ‘closed’ the runway to all aircraft during daylight hours, apart from the gliders and tow aircraft taking part in the competition. Due to this interpretation, the ground handlers for the event did not make any radio calls before they entered the runway strip to prepare for the competition. Nor did they carry the radio that was available in their vehicle.

The NOTAM is also not clear when permission is need to use runway 17. The pilot assessed that as they had contacted the director and discussed the flight, they had made an arrangement to use the runway. The competition director believed that there was a requirement for the pilot of an aircraft intending to use runway 17/35 to contact them on the day of the flight.

An opportunity to alert the pilot that there was ground activity on the runway was missed, as the ground vehicle, which had a rotating beacon, was not used (located near or on the runway) due to the close proximity of the equipment to the launch site. In addition, the ground personnel did not have a radio with them to communicate on the CTAF.

Findings

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

- Landing on runway 17, the pilot of ZOK was not aware that two people were located inside the white gable markers denoting the runway strip and that ropes were located beside the runway in preparation for launching gliders.
- The NOTAM for gliding operations was open to misinterpretation.

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:

Improved wording to the NOTAM issued for future gliding events will be developed with gliding event officials and CASA so prior approval would need to be obtained within two hours of the intended use of the runway, to ensure that current weather conditions and gliding operations could be considered at the time.

Safety message

This incident highlights the critical importance of communications and as discussed in the CASA Flight Safety Australia magazine September-October 2012, *Mind your language* the importance of what you say and how you say it for both the written and spoken word, ‘your words matter-make no mistake’. The article identifies three ways that NOTAMs fail in relevance, ambiguity, and readability. NOTAMs should always be clear and concise and leave no room for misinterpretation.

General details

Occurrence details

Date and time:	18 December 2016 – 1055 EDT	
Occurrence category:	Incident	
Primary occurrence type:	Runway event	
Location:	Horsham Airport, Victoria	
	Latitude: 36° 40.18' S	Longitude: 142° 10.37' E

Aircraft details

Manufacturer and model:	Beech Aircraft Corp B200	
Registration:	VH-ZOK	
Serial number:	BB-1275	
Type of operation:	Charter - Passenger	
Persons on board:	Crew – 2	Passengers – 6
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau 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; 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 fare-paying passenger operations.

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.

Purpose of safety investigations

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. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

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 Bulletin

The ATSB receives around 15,000 notifications of Aviation occurrences each year, 8,000 of which are accidents, serious incidents and incidents. It also receives a lesser number of similar occurrences in the Rail and Marine transport sectors. It is from the information provided in these notifications that the ATSB makes a decision on whether or not to investigate. While some further information is sought in some cases to assist in making those decisions, resource constraints dictate that a significant amount of professional judgement is needed to be exercised.

There are times when more detailed information about the circumstances of the occurrence allows the ATSB to make a more informed decision both about whether to investigate at all and, if so, what necessary resources are required (investigation level). In addition, further publically available information on accidents and serious incidents increases safety awareness in the industry and enables improved research activities and analysis of safety trends, leading to more targeted safety education.

The Short Investigation Team gathers additional factual information on aviation accidents and serious incidents (with the exception of 'high risk operations), and similar Rail and Marine occurrences, where the initial decision has been not to commence a 'full' (level 1 to 4) investigation.

The primary objective of the team is to undertake limited-scope, fact gathering investigations, which result in a short summary report. The summary report is a compilation of the information the ATSB has gathered, sourced from individuals or organisations involved in the occurrences, on the circumstances surrounding the occurrence and what safety action may have been taken or identified as a result of the occurrence.

These reports are released publically. In the aviation transport context, the reports are released periodically in a Bulletin format.

Conducting these Short investigations has a number of benefits:

- Publication of the circumstances surrounding a larger number of occurrences enables greater industry awareness of potential safety issues and possible safety action.
- The additional information gathered results in a richer source of information for research and statistical analysis purposes that can be used both by ATSB research staff as well as other stakeholders, including the portfolio agencies and research institutions.
- Reviewing the additional information serves as a screening process to allow decisions to be made about whether a full investigation is warranted. This addresses the issue of 'not knowing what we don't know' and ensures that the ATSB does not miss opportunities to identify safety issues and facilitate safety action.
- In cases where the initial decision was to conduct a full investigation, but which, after the preliminary evidence collection and review phase, later suggested that further resources are not warranted, the investigation may be finalised with a short factual report.
- It assists Australia to more fully comply with its obligations under ICAO Annex 13 to investigate all aviation accidents and serious incidents.
- Publicises ***Safety Messages*** aimed at improving awareness of issues and good safety practices to both the transport industries and the travelling public.

Australian Transport Safety Bureau

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Notifications 1800 011 034
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Investigation

ATSB Transport Safety Report
Aviation Short Investigations
Aviation Short Investigations Bulletin Issue 60
AB-2017-050
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