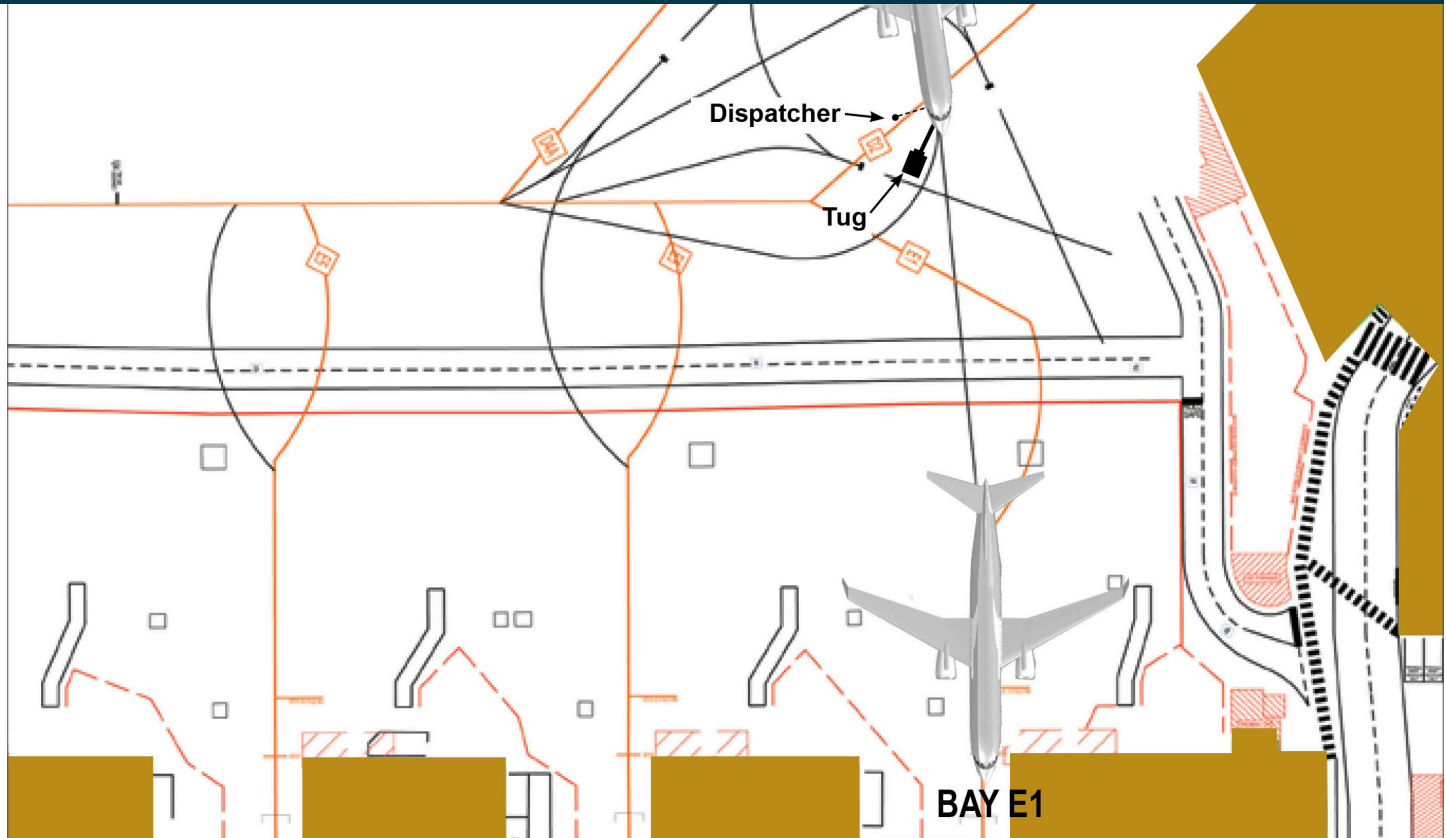




Australian Government
Australian Transport Safety Bureau

Collision during pushback between Boeing B737-8FE, VH-YID and Airbus A320-232, VH-VGR

Melbourne Airport, Victoria | 10 August 2013



Investigation

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Addendum

Page	Change	Date

Safety summary

What happened

On 10 August 2013, an Airbus A320-232, registered VH-VGR (VGR) and operated by Jetstar Airways Pty Ltd was holding short of gate D2 at Melbourne Airport, Victoria. At the same time, a Boeing B737-800, registered VH-YID (YID) and operated by Virgin Australia Airlines Pty Ltd. (Virgin) was approved by air traffic control for a pushback from bay E1 once VGR was on the gate at bay D2. The dispatcher for YID assessed VGR was on the gate and commenced the pushback. During the pushback, the left wingtip of YID collided with the tail cone of VGR, damaging both aircraft. There were no injuries.

What the ATSB found

The ATSB found that the dispatcher for YID could not visually confirm the position of VGR relative to gate D2 and assessed that because the aircraft hadn't moved, it was on the gate. The pushback ground staff followed the normal practice for a pushback from bay E1. However, this practice did not allow for visual monitoring of the left side of the aircraft, such as by using a wing walker. This meant it was not possible for the dispatcher to identify the collision risk in time to prevent the collision.

What's been done as a result

Virgin advised that following this occurrence, they issued a local instruction to ground staff, mandating the use of wing walkers from certain bays at Melbourne Airport, including bay E1.

Safety message

This occurrence highlights the importance of ensuring that adequate clearance exists prior to commencing pushback. This includes using sufficient personnel to ensure visibility of each side of the aircraft at all times.

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The occurrence

On 10 August 2013, Airbus A320, registered VH-VGR (VGR) and operated by Jetstar Airways Pty Ltd (Jetstar), was flown from Sydney, New South Wales to Melbourne, Victoria. Upon arrival, the crew of VGR were cleared by the air traffic control surface movement controller (ground controller) to taxi to gate D2.

At 0930 Eastern Standard Time¹, VGR entered the apron en route to gate D2, when a Boeing B737-800, registered VH-YID (YID), requested pushback approval from gate E1 (Figure 1). YID was being operated by Virgin Australia Airlines Pty Ltd. on a flight to Maroochydore, Queensland. The controller advised the crew of YID that a Jetstar A320 was entering the apron behind them for bay D2 and that when that traffic was 'on the gate'², pushback from bay E1 was approved.

The flight crew of YID reported that they saw VGR (the Jetstar A320) pass behind them from the reflection in the terminal window in front of their parked aircraft. The captain of YID relayed the pushback approval to the dispatcher, including that it could only commence once the A320 was on the gate. The dispatcher was standing to the right of the aircraft's nose.

At 0931:34, as VGR approached the gate on bay D2, the automatic nose-in guidance system (NIGS) displayed a message 'STOP-WAIT'. In response the flight crew stopped the aircraft short of the gate. The dispatcher on YID reported looking under the aircraft and observing that VGR was stopped. The dispatcher reported then waiting for about 15–20 seconds to confirm the aircraft remained stationary. As it did, the dispatcher was satisfied that VGR was on the gate and the pushback of YID could commence. Pushback began at 0931:46.

At 0931:58, the crew of VGR transmitted to the controller that they were holding short of the bay because of the NIGS. However, that message was over-transmitted by another aircraft. Forty seconds later, the crew re-transmitted the same message. The message was acknowledged by the controller, who requested to be advised when the aircraft was at the gate.

Neither the crew of VGR nor the controller mentioned the gate number during the transmissions. The crew of YID later reported they did not hear these transmissions.

At 0933:03, the left wingtip of YID contacted the tail cone of VGR immediately aft of the operating auxiliary power unit. The tail cone of VGR immediately aft of the auxiliary power unit separated from the aircraft and fell to the ground. The left wingtip of YID was damaged during the collision.

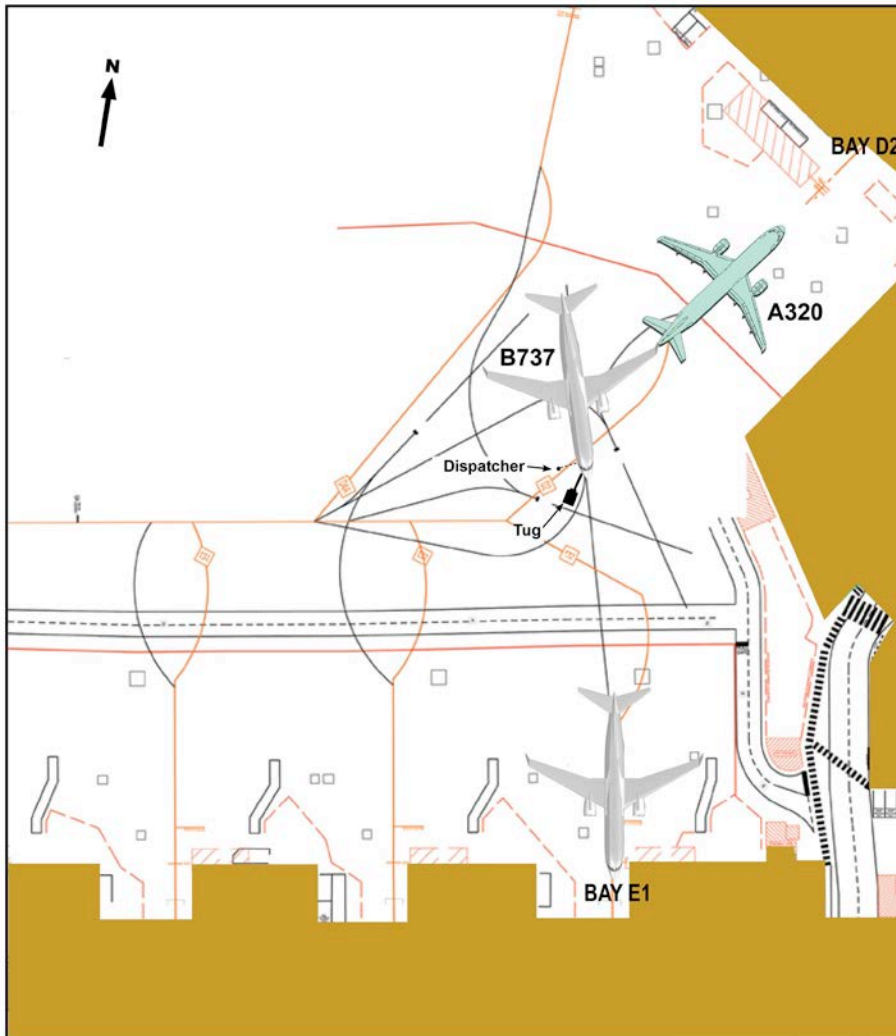
Following the collision, YID was towed back to gate E1 and VGR was marshalled to gate D2.

There were no injuries as a result of the collision.

¹ Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

² 'On the gate' means that the aircraft had stopped in a position where the aerobridge, or 'gate', for Bay D2 could be aligned with the front-left passenger door.

Figure 1: Position of A320 VGR (in green), holding short of gate D2, and B737 YID (in grey) during pushback from Bay E1 at the time of the collision. The position of the dispatcher and tug for YID are also shown



Source: ATSB

Context

Communications

During the pushback from Bay E1, the dispatcher of YID communicated with the aircraft captain via a headset that was plugged into the nose of the aircraft on the first officer's (FO) (right) side. The dispatcher communicated with the tug driver by hand signal.

When the ground controller issued the conditional approval for a pushback to the crew of YID, it was acknowledged by the FO. The captain heard the transmission and relayed it to the dispatcher. In turn, once the dispatcher was satisfied of VGR's location at Bay D2, they communicated the commencement of the pushback to the tug driver using hand signals.

The surface movement control radio frequency was used for communication between the ground controller and aircraft. This frequency was not normally used for direct communication between aircraft. During this period, the crew of YID were also monitoring other communication channels, including the cabin interphone, the company radio frequency and the dispatcher.

When VGR had to hold short of the gate at bay D2, the flight crew notified the ground controller. While not required to do so, this displayed good judgement and communication in an effort to ensure a common understanding of their situation.

Aerodrome information

Control of aircraft during airport ground operations

While flight crew need a clearance from the ground controller to be allowed to move their aircraft on the apron, responsibility for separation between a moving aircraft and any obstacles rests with the flight crew and supporting company staff (see Appendix A).

There are taxi lines marked for aircraft to follow when entering or departing from any bay/gate. Guidance lines also show pushback limits and where to disconnect from a tug after a pushback.

Clearance lines indicate the limit of an area on the apron where an aircraft may park and, once located 'on the gate', be assured of adequate clearance. An aircraft holding short of a designated gate may not be wholly beyond the clearance line and may therefore present a collision risk.

Nose-in guidance system

A nose-in guidance system (NIGS) is an automatic system for accurately guiding aircraft to the gate. The NIGS at bay D2 had a function that identified the shape of an approaching aircraft. Using this feature, the NIGS only provided guidance to the specific aircraft type that was programmed into the NIGS at that time.

If the NIGS did not identify an approaching aircraft as the correct type, it would not provide guidance. Instead, it would display a message 'STOP-WAIT' when the aircraft was about 20 m short of the gate.

Recorded information

Recorded flight data was obtained from both aircraft. The cockpit voice recording was available from VGR; however, the recorded audio from YID had been overwritten.

Audio recordings of the surface movement control radio frequency and data from the surface movement radar were also obtained.

Wreckage and impact information

The left wingtip of YID was damaged during the collision (Figure 2).

Figure 2: Damage to the left wingtip of YID



Source: ATSB

The tail cone of VGR aft of the auxiliary power unit (APU) and the APU exhaust duct separated from the aircraft (Figure 3). The bulkhead aft of the APU was buckled and there was also minor localised damage to the external skin.

Figure 3: Damage to the tail cone of VGR aft of the APU, looking from left to right of the aircraft



Source: ATSB

No other damage was identified on either aircraft.

Pushback procedures

Dispatcher

Under Virgin Australia Airlines Pty Ltd. (Virgin) operating procedures, the dispatcher was responsible for the guidance of the aircraft and for the avoidance of obstructions when the aircraft was under tow. They were responsible from the time that voice communications were first established with the cockpit, until the flight crew indicated the aircraft was clear to start taxiing under its own power.

The standard operating procedures stated:

The aircraft dispatcher is to stand in a position that gives clear visibility of aircraft wingtips or wing walkers and potential obstructions at all times.

From the dispatcher's position to the front-right of YID on the day of the occurrence, it was not possible to see the left side of the aircraft during the pushback (Figure 4). During the ATSB's observation of operations at Bay E1 the following day, it was similarly noted that the dispatcher's position meant that the dispatcher could not see the left side of the aircraft (Figure 5).

Figure 4: Screenshot of YID during pushback, 5 seconds before the collision with VGR and showing the position of the tug and the dispatcher



Source: Melbourne Airport, modified by the ATSB

Figure 5: Pushback of the same Virgin flight from bay E1 on the next day



Source: ATSB

Once YID was pushed back from bay E1 on the day of the occurrence, it was turned slightly 'tail left' from the pushback driver's point of view. The geometry of the aircraft and the tug meant the

pushback driver was positioned well to the right of the aircraft's nose. The dispatcher reported they could not safely change from one side of the aircraft to the other while the aircraft was moving. However, the dispatcher could walk on the side that gave a bigger field of view during any expected turn. In this occurrence, the dispatcher could have walked on the left side of the aircraft during the pushback.

The dispatcher reported that it was normal practice to walk on the side of the aircraft where the headset sockets were located, which for the 737 was the right side. The dispatcher reported they had never walked on the other side of the aircraft during a pushback before. It was also reported as being normal for the 737 to be pushed back from bay E1 without using a wing walker. This meant that normally only one wingtip could be monitored visually during pushback.

Before starting a pushback, dispatchers normally visually assessed the area for potential obstacles behind the aircraft. In this occurrence, the dispatcher did this by looking under and around the engines.

Pushback driver

The pushback driver reported that their attention was focussed on controlling the aircraft and the tug. As such, they were not concentrating on any collision potential during the pushback.

Wing walkers

The dispatcher was required to use a wing walker if they did not have clear visibility of the aircraft wingtips.

If a wing walker was used, the wing walker was responsible for monitoring the wingtip and tail clearances on that side of the aircraft.

Safety analysis

Introduction

The collision between the two aircraft occurred when the B737, VH-YID (YID) was being pushed back from gate E1. At that time the A320, VH-VGR (VGR) was holding short of gate D2 due to a STOP-WAIT indication from the guidance system. The following analysis will examine the factors leading to the collision.

Pushback approval and commencement

The ground controller issued a pushback approval to YID that required VGR to be on gate D2 before commencement. While this was accurately conveyed to the dispatcher by the captain of YID, from the dispatcher's position at the front-right of YID, there were insufficient visual cues for the dispatcher to accurately determine that VGR had stopped at gate D2. While VGR was actually holding short of the gate, the dispatcher formed the opinion that the aircraft was on the gate based on the observation that it had been stationary for a period of time. This was consistent with their experience and as a result, they did not move to a position from where they could accurately assess VGR's location.

After observing that VGR was stationary for a period of time, the dispatcher signalled the pushback driver to commence YID's pushback. From the dispatcher's walking position, it was not possible to see the clearance lines for bay D2 marked on the apron. It was also not possible for the dispatcher to see VGR's fuselage or its position in relation to the gate. From the dispatcher's perspective, YID obscured most of VGR. The operator's standard operating procedures required the dispatcher to have 'clear visibility of the aircraft wingtips or wing walkers and potential obstructions at all times'.

As was reported to be normal practice, a wing walker was not used in this case for a pushback from bay E1. In the absence of a wing walker, the dispatcher was not able to ensure the aircraft would not collide with potential obstructions during the pushback as there was no visibility of the left side of YID. Following this occurrence, Virgin Australia Airlines Pty Ltd. provided a local instruction to Melbourne Airport ground staff that stipulated the gates that required the presence of a wing walker prior to push back. Gate E1 was included in that list of gates.

Communication

The flight crew of YID did not recall hearing the transmissions between VGR and the ground controller. There were a number of factors that may have affected the crew being alerted by the communication:

- the surface movement control radio frequency was very congested in the time leading up to the occurrence, being in use for about 96 per cent of the time
- during the 2 minutes and 20 seconds between issuing pushback approval and the collision, the ground controller participated in sequences of transmissions between seven different aircraft and one ground tug
- VGR's transmissions were abbreviated and fast, likely as a result of the frequency congestion discussed above
- VGR's crew did not mention the gate number in their holding short transmission, nor were they required to as it was included in the ground controller's initial contact with the crew
- the pilots' expectation that in the radio environment, messages would be directly addressed between the controller and a specific aircraft, and not broadcast generally. Pilots will therefore pay more attention to transmissions directed to their aircraft.

Given these factors, it is not reasonable to expect that the transmission from VGR could have alerted the crew of YID to the collision risk. In addition, in the lead up to the collision, the crew of VGR were communicating with their company to resolve the issue with the nose-in guidance system at the gate. This limited their ability to identify and therefore react to the collision risk.

Findings

From the evidence available, the following findings are made with respect to the collision during pushback between Boeing B737-8FE, registered VH-YID, and Airbus A320-232, registered VH-VGR, at Melbourne Airport, Victoria on 10 August 2013. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing factors

- The dispatcher of the B737 could not visually confirm the position of the A320 relative to its assigned gate and incorrectly assessed that, as the aircraft was stationary, it was at the gate.
- The pushback of the B737 was commenced with insufficient clearance from the A320, which was not identified prior to the collision as the dispatcher's position to the right-front of the B737 prevented observation of its left wing.

General details

Occurrence details

Date and time:	10 August 2013 –0933 EST	
Occurrence category:	Accident	
Primary occurrence type:	Taxiing collision	
Location:	Melbourne airport	
	Latitude: 37° 40.40' S	Longitude: 144° 50.60' E

Aircraft details

Manufacturer and model:	Boeing B737-8FE	
Registration:	VH-YID	
Operator:	Virgin Australia Airlines Pty Ltd.	
Serial number:	38709	
Type of operation:	High Capacity Regular Public Transport	
Persons on board:	Crew – 6	Passengers –168
Injuries:	Crew – 0	Passengers –0
Damage:	Substantial	

Aircraft details

Manufacturer and model:	Airbus A320-232	
Registration:	VH-VGR	
Operator:	Jetstar Airways Pty Ltd	
Serial number:	4257	
Type of operation:	High Capacity Regular Public Transport	
Persons on board:	Crew – 2	Passengers –0
Injuries:	Crew –0	Passengers –0
Damage:	Substantial	

Sources and submissions

Sources of information

The sources of information during the investigation included:

- the flight crew of YID and VGR
- the dispatch ground staff for YID
- recorded data from both aircraft
- recorded data from Melbourne Airport
- Virgin Australia Airlines Pty Ltd. (Virgin)
- Airservices Australia.

Submissions

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

A draft of this report was provided to Airservices Australia, flight crew and ground staff from Virgin, flight crew from Jetstar Airways Pty Ltd and the Civil Aviation Safety Authority.

Submissions were received from the captain of VGR, the dispatcher of YID and Virgin. The submissions were reviewed and where considered appropriate, the text of the report was amended accordingly.

Appendices

Appendix A – Airservices safety bulletin



Safety Improvement Branch

✉ safety.promotions@airservicesaustralia.com

www.airservicesaustralia.com

Safety Bulletin

SAFETY OF GROUND MOVEMENT ON A CONTROLLED AERODROME

15 MARCH 2016

BACKGROUND

Airservices has identified some misinterpretation among pilots, airside drivers and ground crew regarding the responsibilities for collision avoidance on aerodrome movement areas and the services Air Traffic Control (ATC) provide to aircraft and/or vehicles operating on these areas. To clarify the responsibilities and services available, Airservices has released [AIC 32/15](#). This Safety Bulletin aims to highlight the issue and provide guidance regarding aircraft ground movements.

DEFINITIONS

The aerodrome surface is separated into different areas, with varying requirements and ATC services. The following definitions are from AIP GEN 2.2 - DEFINITIONS:

Movement Area: That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s). The Movement Area is divided into two parts:

- **Apron:** A defined area on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail, cargo, fuelling, parking or maintenance.
- **Manoeuvring Area:** That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons

Helicopter Movement Area: The movement area for helicopters is the part of an aerodrome that can safely be used for the hovering, taxiing, take-off and landing of helicopters and consists of the manoeuvring area and aprons, but excludes those areas reserved for unrestricted use by the general public.

Taxiway: A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another.

INTRODUCTION

ATC clearances and instructions exist to facilitate safe and efficient operations at aerodromes by regulating aircraft/vehicle movement on the manoeuvring area. Although ATC and ground personnel reduce the likelihood of a collision on the ground, the ultimate responsibility lays with the pilot in command. The following is a summary of responsibilities.

OPERATIONS ON THE APRON AND PUSH-BACK APPROVALS

The pilot in command (with any assisting ground personnel) is responsible for avoiding collision on the apron. ATC push-back approvals and taxi clearances are only to regulate entrance to, and movement on, the taxiways and do not relate to movement on the apron areas.

When ATC issue approval for push-back or taxi clearance, they will only provide information about relevant known aircraft moving on the same apron. This information may be incomplete as ATC has limited knowledge (or visibility) of movements on the apron.

Pilots must also obtain traffic information from assisting ground personnel and, where available, the apron service which may be established as a discrete service at some locations.

OPERATIONS ON TAXIWAYS AND TAXI CLEARANCES

The pilot in command is responsible for avoiding collision on taxiways. ATC will issue clearances and instructions to aircraft under their control to assist flight crews to follow cleared taxi routes, to avoid collision with other aircraft or objects and to minimise the potential for the aircraft inadvertently entering a runway.

Pilots and vehicle drivers must obtain a clearance to taxi or proceed, prior to entering or moving on taxiways.

After landing, ATC will provide a taxi clearance to regulate entry onto the apron. This clearance does not relate to movement on the apron. ATC or the apron service (if established) may provide information about relevant known aircraft entering or leaving the same apron.

NON-STANDARD TAXI CONFIGURATION

In addition to the responsibility of collision avoidance, it is essential that pilots advise ATC of any non-standard taxi configuration that may affect an aircraft's taxi performance. For example, many airlines use single engine taxi procedures to conserve fuel. This practice (and the subsequent reduction of taxi performance) may have both efficiency considerations for the aerodrome ground traffic flow and, more importantly, safety considerations if the aircraft performance reduces the ability of the pilot to comply with instructions. An aircraft conducting single engine taxi may be slower than expected to cross a runway and may not be able to accept a clearance to 'expedite'.

SUMMARY

Regardless of whether an aircraft is in receipt of an ATC push-back approval or taxi clearance, the pilot in command is ultimately responsible for avoiding collision on the apron and manoeuvring areas of an aerodrome.

REFERENCES AND FURTHER INFORMATION

- [AIP - GEN 2.2 Definitions and Abbreviations](#)
- [AIP – ENR 1.1 General Rules and Procedures](#)
- [AIC 32/15 – Safety of Ground Movement on a Controlled Aerodrome](#)
- CASA have produced Manoeuvring Area Maps for Archerfield, Bankstown, Cairns, Cambridge, Camden, Jandakot, Launceston, Moorabbin, and Parafield. These are available at http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_101463
- Local aerodrome information can be found in [ERSA](#).

Further information

For further information please contact safety.promotions@airservicesaustralia.com.

Australian Transport Safety Bureau

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

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

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

Purpose of safety investigations

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

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

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

Australian Transport Safety Bureau

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Investigation

ATSB Transport Safety Report Aviation Occurrence Investigation

Collision during pushback between Boeing B737-8FE, VH YID and Airbus A320-232, VH-VGR, Melbourne Airport, Victoria, 10 August 2013

AO-2013-125

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