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Contents

Turboprop aircraft

Piston aircraft

Helicopters

Turboprop aircraft

Propeller strike involving Fairchild SA227-DC, VH-WBQ

AO-2012-106

What happened

On 22 August 2012, at about 0604 Western Standard Time[1], a Skippers Aviation Fairchild SA227-DC aircraft, registered VH-WBQ, departed Perth on a charter passenger service to Granny Smith aerodrome, Western Australia. The first officer (FO) was designated as the pilot flying.

Propeller damage

Source: *Aircraft operator*

The aircraft arrived at the aerodrome and joined the circuit. When on downwind, the landing gear was extended, with the crew confirming that the three green down-locked lights ('three greens') were illuminated. When on approach, at about 500 ft, the crew again confirmed the landing gear was extended, with 'three greens' observed. Shortly after, the FO once more confirmed they had 'three greens'.

During the landing flare, when about 1-2 ft above the runway, the left wing suddenly dropped. The FO immediately applied right aileron in an attempt to counteract the wing drop and the aircraft touched down. After landing, the crew observed the landing gear door warning light illuminate.

The captain assumed control of the aircraft and taxied to the parking area.

After shutdown, the crew inspected the aircraft and determined that the left propeller had contacted the ground. The aircraft sustained damage to the left propeller blades and spinner, and the left landing gear doors (Figure 1).

The operator examined the aircraft and believed that there was an uncommanded retraction of the left landing gear on, or just after touchdown, which resulted in the left wing dropping. Right aileron was applied, which raised the left wing, and with the forward momentum of the aircraft, the left landing gear extended. The crew could not recall hearing the landing gear warning horn activate during the landing.

Landing gear examination

The left landing gear was examined and found to be operating correctly. A wiring inspection was also conducted, with an open circuit found on one diode[2]; however, the operator was unable to determine if this had any effect on the operation of the landing gear.

While the examination was unable to identify any faults with the left landing gear, as a precaution, the operator sent some of the landing gear components to maintenance organisations for additional examination; with no faults found. Extensive ground testing of the landing gear has also been conducted, in accordance with the aircraft's maintenance manual, with no issues identified. To date, the aircraft has not been returned to service.

Recorded information

The flight data recorder (FDR) and cockpit voice recorder (CVR) were retrieved from the aircraft and downloaded. An analysis of the data by the Australian Transport Safety Bureau (ATSB) identified that the landing gear was selected down, 3 minutes and 40 seconds prior to touchdown,

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1 Western Standard Time (WST) was Coordinated Universal Time (UTC) + 8 hours.

2 A valve or solid-state device that allows electric current to flow in only one direction through it.

and that 2.5 seconds after touchdown, a warning horn momentarily sounded. The data also indicated that, on a number of occasions, the crew confirmed that the landing gear" three green" down-locked lights were illuminated.

Figure 1: Propeller and landing gear door damage

Source: *Aircraft operator*

ATSB comment

The reason for the uncommanded left landing gear retraction could not be determined.

Aircraft details

Manufacturer and model:	Fairchild Industries Inc. SA227-DC	
Operator:	Skippers Aviation	
Registration:	VH-WBQ	
Type of operation:	Charter - passenger	
Location:	Granny Smith aerodrome, Western Australia	
Occurrence type:	Propeller strike	
Persons on board:	Crew – 2	Passengers – 15
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Minor	

Depressurisation event involving a Metro 3, VH-SEF

AO-2012-127

What happened

Metro 3

Source: Brendan Scott

On 23 September 2012 at 1855 Eastern Standard Time[1], a Metro 3 aircraft, registered VH-SEF (SEF), and operated by Brindabella Airlines, departed Narrabri on a scheduled passenger flight to Sydney, New South Wales. On board were seven passengers and two flight crew.

Passing through transition[2], the Captain was the pilot flying and asked the First Officer (FO) for the transition checks, which included a check of the cabin altitude[3]. The transition checks were completed with no abnormalities found. Passing through FL140[4], the Captain noted that he was not feeling well and that he was not as accurate as usual. The Captain asked the FO how he was feeling and he responded that he felt fine.

Passing through FL160, the Captain noted that his symptoms were increasing in severity and he was feeling quite ill. The Captain again asked the FO how he was feeling and he replied that he still felt fine. The Captain requested that he take over flying the aircraft and to check the cabin altitude again[5]. At the same time, the Captain reached for his oxygen mask and took a few breaths, noting that his symptoms started to improve.

The Captain noted that the FO was taking longer to reply than usual to his request for a check of the cabin altitude, when the cabin altitude warning light illuminated[6]. There was no audible alert fitted to SEF nor was there required to be. At this stage, the Captain had not switched the intercom to his oxygen mask, so he prodded the FO to draw his attention to the warning light. The FO then stated that the cabin altitude was at 17,000 ft. The Captain took over flying the aircraft and instructed the FO to perform the stage 1 memory items for emergency descent and to request an immediate descent to 10,000 ft. By the time the crew reached the checklist item that required the passenger oxygen to be turned on, SEF had descended to 10,000 ft, consequently the crew elected not to perform this item of the checklist. The Captain turned the cabin lights on and activated the PA and noted that all the passengers were responsive.

The crew proceeded through the standard checklist and noted that the pressurisation system would not pressurise the cabin in automatic mode. The crew than attempted to pressurise the cabin in manual mode, however they found the cabin altitude erratic and difficult to maintain. They elected to continue to Sydney, not above 10,000 ft, with the cabin unpressurised.

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

[2] Below 10,000 ft, Australian aircraft measure their altitude by reference to the ground. Above 10,000 ft, they measure altitude in terms of flight levels. 10,000 ft also represents the height past which unpressurised aircraft should not climb.

[3] The purpose of an aircraft pressurisation system is to maintain sufficient cabin pressure for passengers to remain comfortable while the aircraft cruises at high altitudes. Cabin pressure is measured by reference to external air pressure at a given height. From the time a flight is commenced, the cabin altitude progressively climbs to a maximum of 9,000 ft.

[4] At altitudes above 10,000 ft in Australia, an aircraft's height above mean sea level is referred to as a flight level (FL). FL 370 equates to 37,000 ft.

[5] The cabin altitude indicating gauge was located on the FO's side of the cabin and not readily visible to the Captain.

[6] During a depressurisation event, a warning light will illuminate in the cockpit if the cabin altitude reaches 10,000 ft. Flight crew are required to descend the aircraft to the lowest safe altitude or 10,000 ft

Aircraft information

Following the incident, the pressurisation system and pressurisation warning system were inspected:

- The pressurisation system was tested, with no fault found.
- The cabin altitude warning switch was found to be out of tolerance and replaced. At the time of the incident, there was no routine maintenance regime for the cabin altitude warning system.

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.

Brindabella Airlines

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

- **Transition checks**

The cabin altitude transition check has been amended, so that rather than just responding with "checked", the pilot with the cabin altitude indicating system on their side, will respond with "Cabin altitude is (indicated cabin altitude)". The other pilot will respond with "checked".

- **System of maintenance**

The system of maintenance for the Metro has been amended, to include test of the Cabin Pressure Warning System at an interval of 900 hours.

- **Training**

Simulator training to be considered that replicates this incident that is, a gradual loss of cabin pressure coupled with a failure of the warning system, this would be included in re-currency simulator training sessions.

ATSB comment

When suffering from the effects of hypoxia, a pilot's ability to react to an aural warning is impaired less rapidly than the ability to react to a visual warning. In an uncommanded cabin depressurisation the occupants' physical and mental functions will suffer progressive impairment and early recognition and rectification of the situation is vital.

On 17 December 2000, the ATSB issued safety recommendation R20000288 to the Civil Aviation Safety Authority (CASA) which recommended that CASA mandate the fitment of aural warnings to operate in conjunction with the cabin altitude warning system on all Beechcraft Super King Air and other applicable aircraft.

The current status of this safety recommendation is available from the ATSB web site:

- www.atsb.gov.au/publications/recommendations/2000/r20000288.aspx

Safety message

People on board an aircraft that experiences a loss of pressure when flying above 10,000 ft will suffer the effects of hypoxia. This is a condition where the body is starved of enough oxygen to function normally and can ultimately lead to death[7].

The signs and symptoms of hypoxia become more likely to occur if there are a few other risk factors added to the equation, such as cold temperatures and physical activity. Time of useful consciousness (TUC) refers to the time between the development of an oxygen problem and the point at which a pilot can no longer take effective corrective action (Figure 1). Symptoms of hypoxia vary from individual to individual and include loss of short term memory, an increase in reaction time, mental 'tunnel vision', loss of muscle coordination, deterioration of hearing and impairment of vision.

In July 2006, the ATSB published a report titled: 'Depressurisation Accidents and Incidents Involving Australian Civil Aircraft 1 January 1975 to 31 March 2006.'

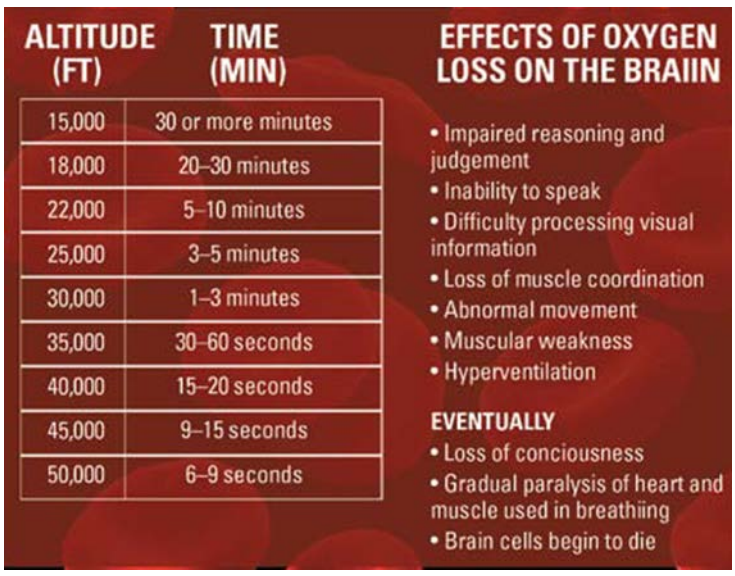
In general, the results of the study showed that there is a high chance of surviving a pressurisation system failure, provided that the failure is recognised and the corresponding emergency procedures are carried out expeditiously. Flight crew should maintain a high level of vigilance with respect to the potential hazards of cabin pressurisation system failure.

Dr Newman in an article for Flight Safety Australia writes "If you do not feel well, oxygen will do you no harm – and it may well save your life"[8]

The following publications provide further information on Hypoxia:

- *Black Out*, Flight Safety Australia, www.casa.gov.au/fsa/2005/aug/21-23.pdf
- *Depressurisation Accidents and Incidents Involving Australian Civil Aircraft*, 1 January 1975 to 31 March 2006 –ATSB, www.atsb.gov.au
- CASA has a produced an educational video for pilots called 'Oxygen first' which explains the symptoms of hypoxia and how to take the appropriate action. As the title suggests, the first action for a pilot must be putting on their oxygen mask, www.casa.gov.au

Figure 1: Time of useful consciousness



Source: Flight Safety Australia, *CASA*

[7] New Warning about hypoxia, CASA media release, 18 August 2005

[8] Black Out, Flight Safety Australia July-August 2005.

Aircraft details

Manufacturer and model:	Fairchild SA227-AC	
Operator:	Brindabella Airlines	
Registration:	VH-SEF	
Type of operation:	RPT	
Location:	93 km SSE of Narrabri, NSW	
Occurrence type:	De-pressurisation	
Persons on board:	Crew – 2	Passengers – 7
Injuries:	Crew – 0	Passengers – 0
Damage:	None	

Piston aircraft

Two aircraft proximity events at Ballarat airport

AO-2012-102

What happened

The ATSB was advised of two aircraft proximity events at Ballarat Airport, Victoria on 4 August 2012, which occurred within a short period of time. The first incident involved VH-VSD and VH-VTA, while the second involved VH-VTJ and VH-PKH. Both incidents were witnessed by one observer on the ground. Some differences between the pilots' and observer's recollections of events could not be reconciled. Any radio broadcasts made by the pilots could not be verified as transmissions at Ballarat are not recorded.

Ballarat Airport

Source: *Airservices Australia*

VH-VSD and VH-VTA

Pilot recollection

The pilot of a Cessna 172S aircraft, registered VH-VSD (VSD), broadcast on the Ballarat common traffic advisory frequency (CTAF) advising that he was at 13 NM inbound. Shortly after, the pilot of a Cessna 172S aircraft, registered VH-VTA (VTA), also made a broadcast on the CTAF advising he was at 10 NM inbound. The pilot of VSD reported hearing the inbound call made by VTA and maintained a lookout for the aircraft.

VTA arrived overhead the airport, maintaining 3,000 ft AMSL. The pilot broadcast that he was on the non-active side[1] of runway 23, intending to join the circuit mid-field, on crosswind. He then commenced a descent to 2,500 ft above mean sea level (AMSL) (circuit height).

Shortly after, VSD arrived at the airport, maintaining 3,000 ft AMSL. The pilot broadcast advising that he was overhead and tracking to descend on the non-active side. He observed VTA on the non-active side, at a lower altitude.

The pilot of VTA then broadcast advising that he was joining the circuit, mid-field crosswind. At that time, the pilot believed there would be sufficient vertical separation from VSD.

The pilot of VSD reported that he observed VTA flying towards him, about 400-500 ft below and to his left. He stated that he made a slight right turn to maintain separation (Figure 1).

Observer

An observer[2], positioned at the refuelling point, initially reported sighting VSD and VTA on converging headings, with about 200 m horizontal separation. Both aircraft appeared to be maintaining about 1,000 ft above ground level (AGL). He then observed VSD pass 100-200 ft below VTA. The observer later spoke to the pilot of VTA, who indicated that he was not aware that an incident had occurred.

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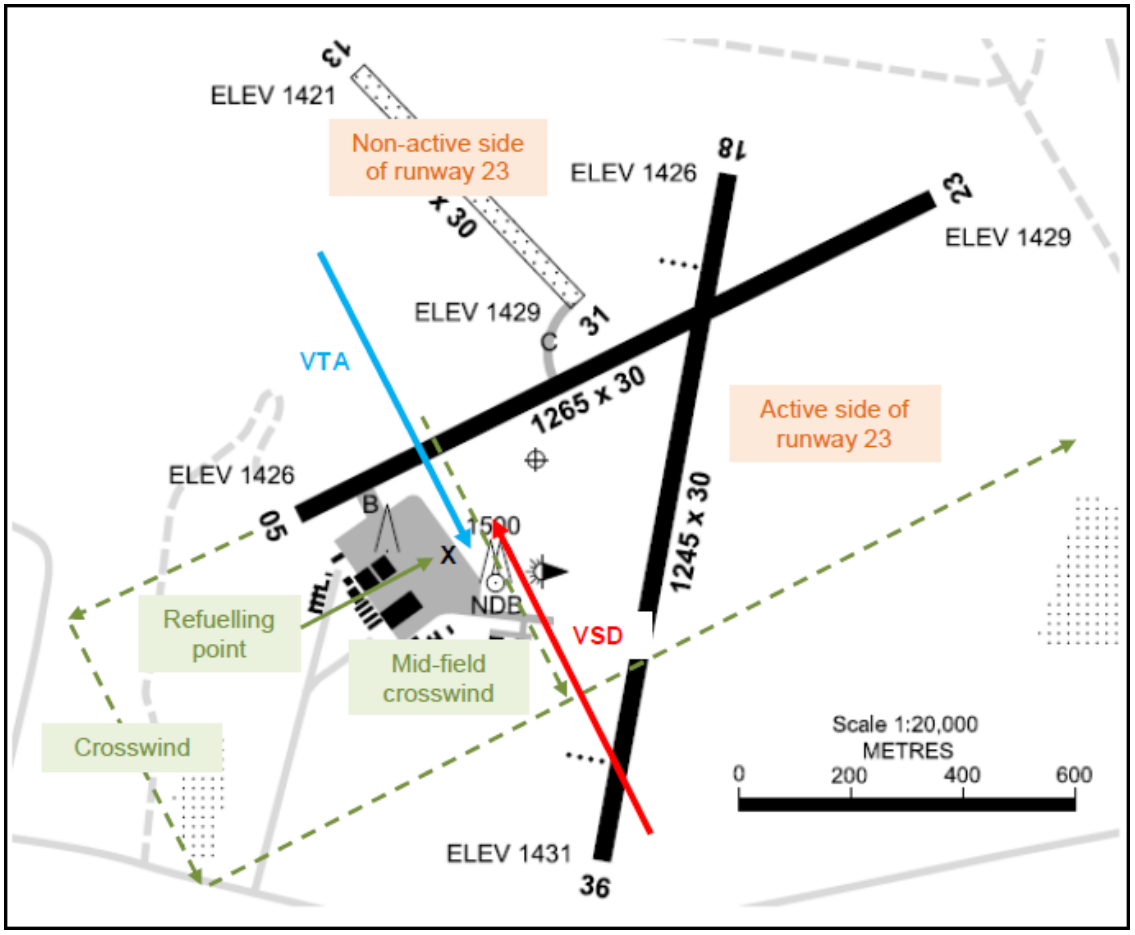
1 The side of the airport or active runway away from that of the circuit in use, or from which arriving aircraft join the circuit.

2 A pilot who regularly operated at Ballarat.

Surveillance data[3]

A review of Airservices Australia radar surveillance data did not identify VSD or VTA. However, at 1212 Eastern Standard Time[4], the data showed two aircraft overhead the airport on converging headings. The aircraft passed in close proximity, with about 0.2 NM lateral separation and 300 ft vertical separation.

Figure 1: Aircraft positions overhead the airport



Source: ***Airservices Australia***

VH-VTJ and VH-PKH

Pilot recollection

The pilot of a Cessna 172S aircraft, registered VH-VTJ (VTJ), broadcast on the CTAF advising that he was 10 NM to the west, inbound. Shortly after, he heard a broadcast from the pilot of a Cessna 172RG aircraft, registered VH-PKH (PKH), advising he was also inbound (Figure 2[5]).

VTJ was flown to the non-active side of runway 23 and a descent to 2,500 ft AMSL commenced. Soon after, the pilot observed PKH in his 9 o'clock[6] position and reported broadcasting a call

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[3] Radar surveillance data for Ballarat was provided by Airservices Australia. As the aircraft involved were operating outside controlled airspace under visual flight rules (VFR), they were not monitored by Airservices Australia or assigned a unique transponder code.

[4] Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

[5] Based on the pilots' recollection of events, the aircraft were identified using Airservices Australia surveillance data.

[6] The clock code is used to denote the direction of an aircraft or surface feature relative to the current heading of the observer's aircraft, expressed in terms of position on an analogue clock face. Twelve o'clock is ahead while an aircraft observed abeam to the left would be said to be at 9 o'clock.

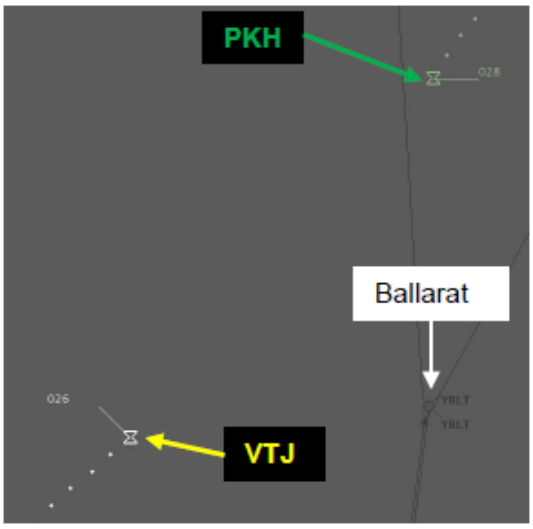
advising he was on the non-active side. The pilot believed that PKH would conduct an orbit and follow behind VTJ.

At about 1242, the pilot of VTJ stated that he broadcast another call advising he was joining the circuit, mid-field crosswind. He then observed PKH to his left, about 200-300 ft below and overtaking (Figure 3). The pilot of VTJ did not take any avoiding action, however, continued to monitor PKH. He further stated that he could not recall hearing a joining mid-field crosswind call from PKH.

The pilot of PKH reported that he did not hear any calls made by the pilot of VTJ, and was not aware that an incident had occurred. He further stated that he had made a broadcast advising he was joining the circuit, mid-field crosswind for runway 23.

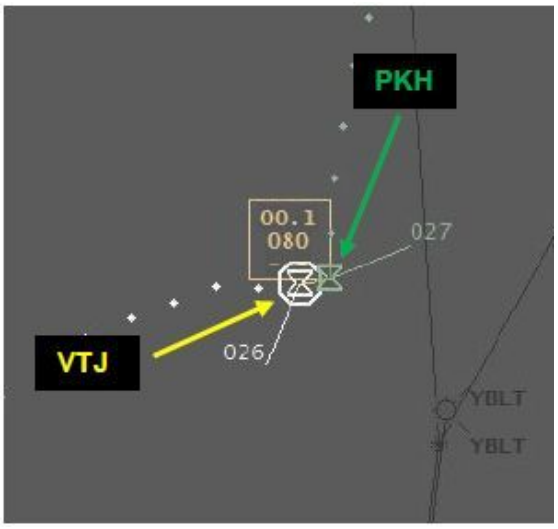
A review of Airservices Australia surveillance data indicated that the distance between VTJ (at 2,600 ft AMSL) and PKH (at 2,700 ft AMSL) reduced to 0.1 NM laterally and 100 ft vertically.

Figure 2: Aircraft positions at 1241



Source: *Airservices Australia*

Figure 3: Aircraft positions at 1242



Source: *Airservices Australia*

Observer

The observer on the ground reported that he was inside a building overlooking the apron when he heard (on a ground-based radio) the pilot of PKH broadcast a joining mid-field crosswind call. Shortly after, when looking out towards the apron, he observed several persons looking overhead the airport, pointing and shouting. The observer immediately went outside and saw VTJ and PKH on converging headings. PKH was observed to overtake VTJ, with the left wing of PKH passing underneath the right wing of VTJ. He then observed VTJ conduct a right turn and join the circuit behind PKH. The observer could not recall hearing a joining mid-field crosswind call from VTJ.

ATSB comment

The observer reported that, generally, there was a reasonable amount of aircraft activity at Ballarat, which was evident on the incident day. Aircraft movement data for Ballarat, supplied by the Civil Aviation Safety Authority, was compared with Airservices Australia movement data for towered airports[7] for the period 1 November 2009 to 31 October 2010. A review of that data showed that the level of activity at Ballarat was similar to that experienced at Townsville and Mackay (Queensland), and Essendon (Victoria).

[7] Airservices Australia movement data is only recorded during hours of tower operation, therefore, actual movements at non-24 hour locations may be higher than published.

An ATSB research report, '*A pilot's guide to staying safe in the vicinity of non-towered aerodromes*'[8] highlighted that the most hazardous phases of flight were within 5 NM of an aerodrome, below 3,000 ft, where traffic density is higher.

Safety message

It is crucial that pilots effectively broadcast and actively listen to the CTAF, and maintain a vigilant lookout at all times, to enhance traffic and situation awareness. This is particularly important when operating in a high traffic density environment. Furthermore, while pilots are expected to make a number of specific positional broadcasts, where a potential traffic conflict may exist, Civil Aviation Advisory Publication (CAAP) 166-1(1)[9] states that:

> '...radio broadcasts should be made as necessary to avoid the risk of a collision or an airprox event. A pilot should not be hesitant to call and clarify the other aircraft's position and intentions if there is any uncertainty.'

The following are a number of other aircraft proximity occurrences reported to the ATSB that have occurred at Ballarat:

- While on approach, the pilot of aircraft 1, heard a broadcast from the pilot of another aircraft (aircraft 2) advising he was also on final. Immediately after, the pilot of aircraft 1 observed aircraft 2 pass below, by about 100 ft (ATSB occurrence 201006276).
- The pilot of aircraft 1, joined the circuit, mid-field crosswind and made the appropriate broadcast. He then heard the pilot of another aircraft (aircraft 2) broadcast a 'go-around' call and immediately after, observed aircraft 2 pass below, by about 100 ft. While the pilot of aircraft 1 was aware of aircraft 2, he had expected aircraft 2 to be at a different position and altitude (ATSB occurrence 201104966).
- Aircraft 1 departed runway 36 and turned onto crosswind. Shortly after, another aircraft (aircraft 2) passed above, by about 30 ft. The pilot of aircraft 1 could not recall hearing any broadcasts by the pilot of aircraft 2 (ATSB occurrence 201206748).

Aircraft details

Occurrence 1

Manufacturer and model:	VH-VSD:	Cessna Aircraft Company 172S	
	VH-VTA:	Cessna Aircraft Company 172S	
Type of operation:	VH-VSD:	Flying training	
	VH-VTA:	Flying training	
Location:	Ballarat Airport, Victoria		
Occurrence type:	Aircraft separation		
Persons on board:	VH-VSD:	Crew – 1	Passengers – Nil
	VH-VTA:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil	
Damage:	Nil		

[8] www.atsb.gov.au/media/2097901/ar2008044(1).pdf

[9] Operations in the vicinity of non-towered (non-controlled) aerodromes (CAAP 166-1(1)) http://www.casa.gov.au/wcmswr/_assets/main/download/caaps/ops/166-1.pdf.

Occurrence 2

Manufacturer and model:	VH-PKH:	Cessna Aircraft Company 172RG	
	VH-VTJ:	Cessna Aircraft Company 172S	
Type of operation:	VH-PKH:	Private	
	VH-VTJ:	Flying training	
Location:	Ballarat Airport, Victoria		
Occurrence type:	Aircraft separation		
Persons on board:	VH-PKH:	Crew – 1	Passengers – 3
	VH-VTJ:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil	
Damage:	Nil		

Inadvertent landing gear retraction involving Aero Commander, VH-YJS

AO-2012-110

What happened

Aero Commander

Source: Copyright Steve Bottom

On 21 August 2012, at about 1530 Eastern Standard Time[1] an Aero Commander 500S, registered VH-YJS (YJS), departed Charleville, Queensland for Brisbane Airport via, Roma, Dalby and Toowoomba on a freight charter flight under the IFR[2]. The pilot was the only person on board.

At about 1835, the pilot performed a straight-in approach to Toowoomba and noted as part of the final checks that the landing gear was down with three green lights illuminated. The pilot reported flying a slightly higher approach than he would during daylight hours and the touchdown being slightly heavier than normal. Otherwise, the pilot reported that there was nothing out of the ordinary with the approach and touchdown phase.

About 300 m into the landing roll, the pilot recalled intending to retract the flaps, when the main gear collapsed. The aircraft slid along the runway for a short distance on the lower fuselage. The nose gear remained in the locked down position and the aircraft came to rest on the runway.

The pilot shut down the aircraft normally leaving the navigation lights on. The pilot then contacted air traffic control to report the incident and alert them to the aircraft on the runway. The pilot exited the aircraft without injury, however, the aircraft's lower fuselage was damaged due to contact with the runway surface.

Landing gear operation and inspection

To lower the landing gear, the aircraft checklist required the pilot to move the gear handle to the down position and confirm that the landing gear was down and locked. Confirmation that the landing gear was down was through the illumination of three green lights which corresponded to, the two main gear and nose gear. The pilot was then required to position a manual safe pin to the locked position (Figure 1). The manual safe pin was a design feature to prevent inadvertent movement of the gear selector to the UP position.

Movement of the gear selector to the UP position opened a solenoid which released 1000 psi pressure from down actuators. To move the gear selector to the UP position required the following actions:

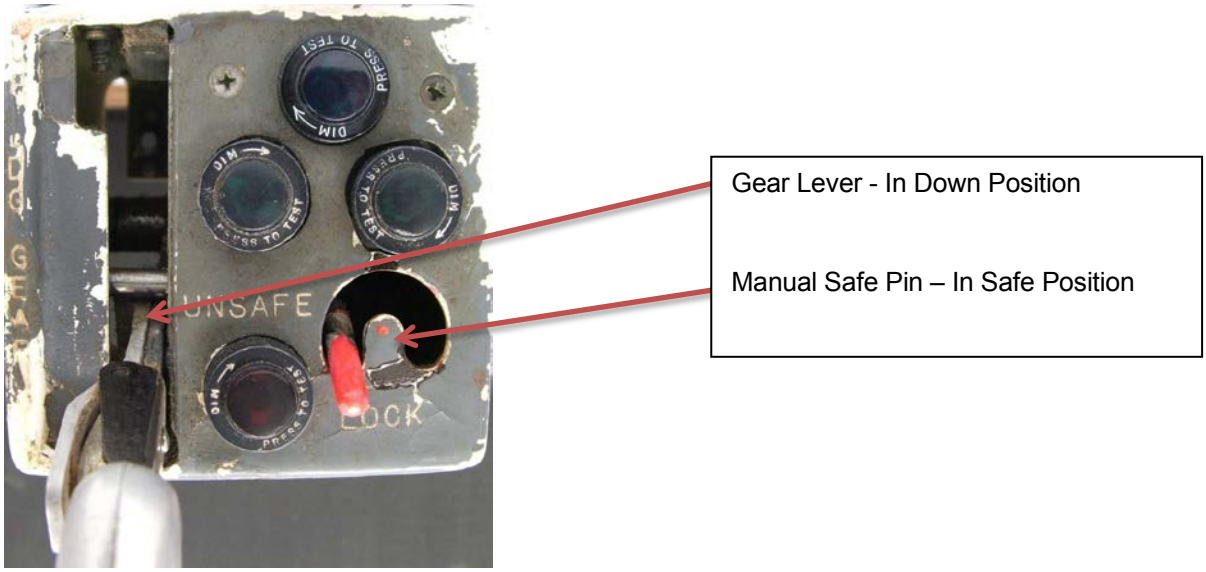
- if the manual safe pin was in the safe position; movement of the safe pin from the locked position to the unlocked position (Figure 1)
- squeeze the safety lock
- movement of the gear handle to the left to release indent pin
- movement of the gear handle to the UP position

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

[2] Instrument flight rules permit an aircraft to operate in instrument meteorological conditions (IMC), which have much lower weather minimums than visual flight rules. Procedures and training are significantly more complex as a pilot must demonstrate competency in IMC conditions, while controlling the aircraft solely by reference to instruments. IFR-capable aircraft have greater equipment and maintenance requirements

The day after the incident, the aircraft was inspected by engineers and a number of landing gear extensions and retractions were performed without fault.

Figure 1: Gear Selector



Source: *GAM Air*

Pilot information and comments

The pilot held an Airline Transport Pilots Licence, with a current medical. The pilot had a total of 2,450 flight time with 760 hours on type.

During the landing roll, the pilot reported looking towards the parking area to locate a suitable parking area for YJS. At the same time, the pilot reported retracting the flaps during the landing roll, which the pilot stated was his usual practice to increase braking efficiency and was in accordance with the aircraft flight manual.

The pilot thought that while intending to retract the flaps he may have inadvertently retracted the landing gear and there were two possibilities as to how this happened;

- Either he did not place the safety pin in the safe position when the landing gear was extended in accordance with the checklist or alternatively;
- He unconciously repositioned the safety pin as part of a well rehearsed muscle program used to operate the landing gear selector.

The pilot also reported some issues with the checklist which included:

- They were difficult to see and awkward to use
- There was ambuiguity between the aircraft checklist and the standard operating procedures (SOPS). The SOPs required items on the checklist to be performed out of order, particularly the point at which the flaps were to be retracted after landing.

The pilot reported being 20 minutes behind schedule as the freight had been delayed in Roma. This placed the pilot under significant pressure as the landing time in Brisbane had been allocated prior to departure, and could not easily be changed. The pilot considered after the event that he would have been fatigued due to the combination of the following:

- He had commenced duty at 0400 and estimated that he had an hour and 45 minutes of broken sleep in the middle of the day before signing back on for duty at 1430.
- The pilot had only recently been cleared by his DAME[3] to flying duties following an extended period of illness.
- The pilot reported being under a degree of financial and personal stress.
- The pilot also reported instability and unpredicatablity with the flying roster.

Safety action

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

Aircraft operator

As a result of this accident, the aircraft operator has taken the following safety action:

- The method of notifying pilots of important operational information is being reviewed with the aim of making the system effective and robust. In addition to the current digital receipt via AirMaestro[4], a signature from each pilot will be required confirming that the notice/instruction has been read and understood.
- Aircraft checklists are being reproduced with a matt finish to provide a non-reflective surface to aid in the reading under artificial light and or bright day light.
- Modification of the landing gear control to an automatic gear control lock once gear is selected down and or an alarm to sound if the gear control is not manually locked after gear selected down. The alarm will be a voice alarm - “Check Gear- Check Gear”
- Implementing of random flight checks by check and training captains to ensure pilots are operating in accordance with standard operating procedures.
- Negotiating with the client for a “doors closed” time, ensuring departure times are kept within a time frame, allowing pilots to meet their allotted landing slot time in Brisbane.

ATSB comment

The manual safe pin was a design feature intended to prevent inadvertent retraction of the landing gear. However as a design feature, its effectiveness could be reduced over time, as it could be operated without conscious awareness. That is, once a pilot put their hand on the undercarriage lever, the safe pin could be repositioned to the unsafe position without further thought. The aircraft design did not incorporate a squat switch[5], a design feature that prevents retraction of the landing gear whenever there is weight on the aircraft wheels.

On 24 October 2012, the same operator had a further inadvertent landing gear retraction at Mount Gambier Airport, South Australia. The aircraft type was an Aero Commander 500S registered VH-KAK. The circumstances were similar to the incident on 21 August 2012. As a result of the

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[3] Designated Aviation Medical Examiner

[4] Air Maestro® is a web-based aviation software application allowing your personnel to update and manage operational information via a connection over the internet.

[5] Switch triggered by sustained compression of main or nose landing-gear struts on touchdown; prevents inadvertent retraction of landing-gear.

latest incident, the ATSB has been advised by the operator that retrofitting a squat switch to prevent retraction of the landing gear while there is weight on the aircraft wheels is a priority.

Safety message

Research on human skill development has provided insight on why pilots make errors related to habit. As pilots progress in flying skills, the physical activities of flying become automatic, causing some pilots to make control inputs "by habit" in certain situations[6]. Automatic information processing occurs without conscious awareness and represents the unfolding of pre-programmed sensory-motor response sequence similar to a stored computer program. Skill based errors are related to response selection, timing and coordination. A slip occurs when a pilot performs an unintended action during the execution of a well-practiced and familiar task, in this case inadvertently retracting the landing gear while intending to retract the flaps following a normal runway landing.

Pilots are reminded to positively identify any control lever before actioning.

For further reading on skill based errors and muscle memory please see the following:

- Human Factors Checklist Provides Tools for Accident/ Incident Investigation - Flight Safety Digest Vol 20 No 2 Febuary 2001 www.flightsafety.org/fsd/fsd_feb01.pdf
- Inattentional blindness: let's not blame the victim just yet - Canadian Aviation Maintenance Council www.camc.ca/fr/SMS_40/Articles_270/8.html

Aircraft details

Manufacturer and model:	Rockwell Aero Commander 500S	
Registration:	VH-YJS	
Type of operation:	Charter (freight)	
Location:	Toowoomba Airport, Queensland	
Occurrence type:	Incorrect aircraft configuration	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Damage:	Substantial	

[6] Fitts, P.M.; Posner, M.I. Human Performance. New York, United States: Academic Press 1967

Airspace related event between Cessna 172, VH-EPB and Piper Warrior, VH-BZE

AO-2012-111

What happened

On 27 August 2012, at about 1330 Eastern Standard Time[1] a Piper PA-28 (Warrior) aircraft, registered VH-BZE (BZE), departed Moorabbin Airport on a private flight to Colac, Victoria. The pilot was the only person on board.

At the same time, a Cessna 172 aircraft, registered VH-EPB (EPB), was conducting circuits on runway 35R at Moorabbin. On board were a student pilot and flying instructor.

Visual Pilot Guide: Melbourne

Source: CASA

While en-route to Colac and overhead Point Cook, the pilot of BZE decided to return to Moorabbin due to the severity of turbulence. When overhead Brighton, the pilot of BZE contacted the Tower 2 controller at Moorabbin and received a clearance to join left base for runway 35L.

At about 1350 EST, while turning onto finals, BZE started to drift off the centreline of runway 35L towards the centreline of runway 35R. The pilot of BZE contacted the tower 2 controller and requested a late change of runway to 35R, as she was experiencing difficulty controlling the aircraft. The tower 2 controller then re-cleared BZE for landing on runway 35R. Due to the late request for a change in runway from a pilot who was experiencing difficulty, there was not time to provide an alert to EPB or for coordination between the tower controllers.

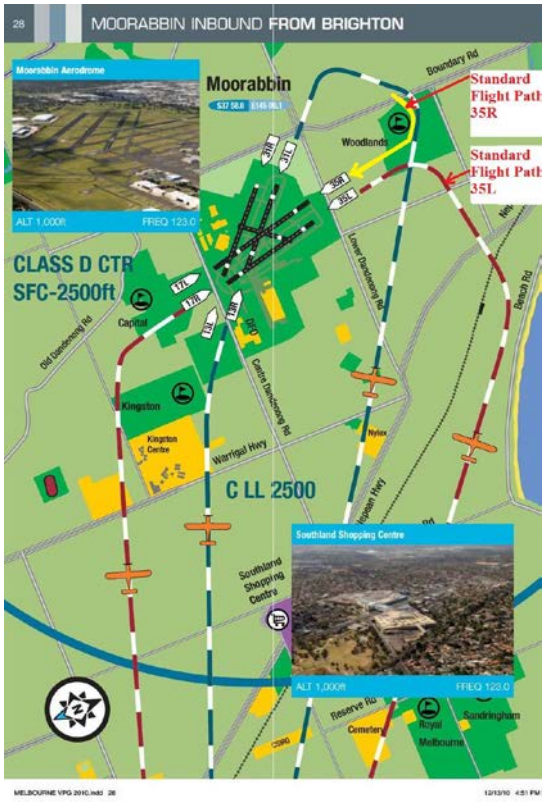
BZE then passed in front of and in close proximity to EPB who was on short finals for runway 35R. EPB contacted the tower 1 controller and informed them that an aircraft had just passed in front of, EPB and they were performing go-around[2] as they were unable to follow BZE.

Moorabbin airport

Moorabbin has two sets of parallel runways and by day, simultaneous contra-circuits may be conducted using separate tower frequencies. Operations are regulated independently in each circuit, and ATC approval is required to enter the opposite circuit airspace (Figure 1).

[1] Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.
[2] Make another circuit

Figure 1: Melbourne basin visual flight guide



Source: *Airservices Australia*

Pilot experience and comments

The pilot of BZE held a Private Pilot Licence and had 150 hours total time and 120 hours on type. The pilot reported being familiar with Moorabbin, having conducted all of her flying training there. The pilot commented that she noted that the weather forecast predicted light to moderate turbulence. She stated that it was the first time that she had flown with forecast turbulence, however she was building hours towards a Commercial licence and thought that it would be valuable experience. The pilot added that it was not until she was airborne that she gained an appreciation as to the severity of the turbulence and decided to return to Moorabbin.

The flying instructor on board EPB held a Commercial Pilot Licence with Grade 2 Instructor rating and had 1,300 hours total time and 900 hours instructing. The instructor commented that he did not become aware of BZE until the aircraft had passed in front of EPB and that he did not have time to take any avoiding action. The instructor estimated that BZE came within 100 ft of EPB.

Weather

The TAF[3] for Moorabbin at the time forecast the wind as 350 at 12 knots. The ATIS[4] current at the time recorded the wind as gusting to 27 knots.

[3] Aerodrome Forecasts are a statement of meteorological conditions expected for a specific period of time, in the airspace within a radius of 5 NM (9 km) of the aerodrome.

[4] An automated pre-recorded transmission indicating the prevailing weather conditions at the aerodrome and other relevant operational information for arriving and departing aircraft.

Safety message

Pilots should always know and stay within their personal minimums. When set, personal minimums provide a safety buffer between the skills required for a flight, and the skills available to an individual pilot through training, experience, currency, and proficiency.

The *CASA Flight Planning Kit* contains a 'Standing personal minimums checklist' that can aid a pilot to address issues related to themselves, the aircraft, the environment and external pressures. A document in the kit describes how the checklist should be used to make smart go /no-go decisions.

For further reading on setting personal minimums see:

- *Getting the maximum from Personal Minimums* by Susan Parson, available from the May/June 2006 FAA Aviation News: www.faa.gov/news/safety_briefing/
- The *CASA Flight Planning Kit* is available from the CASA online store: www.thomaslogistics.com.au/casa/index.html

Aircraft information:

VH-BZE, Piper PA-28

Manufacturer and model:	Piper Aircraft Company PA-28	
Registration:	VH-BZE	
Type of operation:	Private	
Location:	Moorabbin Airport	
Occurrence type:	Airspace related event	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Damage:	Nil	

VH-EPB, Cessna 172

Manufacturer and model:	Cessna Aircraft Company 172	
Registration:	VH- EPB	
Type of operation:	Flying training	
Location:	Moorabbin Airport	
Occurrence type:	Airspace related event	
Persons on board:	Crew – 2	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Damage:	Nil	

Fuel starvation involving Piper Seneca, VH-BTW

AO-2012-112

What happened

On 31 August 2012, at about 1230 Eastern Standard Time[1], a Piper PA-34-200 (Seneca) aircraft, registered VH-BTW (BTW), departed Hobart Airport, Tasmania for Bankstown Airport New South Wales on a private flight under the IFR[2]. The pilot was the only person on board.

VH-BTW

Source: Copyright Owner

While cruising at 9,000 ft above mean sea level (AMSL) and 19 km south of Nowra, New South Wales, the pilot heard a bang and the left engine stopped and then the right engine stopped shortly after. The pilot immediately feathered the propellers, declared a PAN[3] and started looking for a suitable landing area. The pilot then proceeded through the memory items on the emergency checklist. While performing the emergency checklist, the pilot discovered that the right fuel selector was in the cross-feed position and the left fuel tank had run out of fuel. The pilot repositioned the fuel selectors and restarted both engines.

At the time of the engine restart, BTW had descended to 4000 ft AMSL. The pilot advised air traffic control that both engines were now running and that he would continue to Bankstown as planned.

During the landing roll on runway 29C at Bankstown, the aircraft departed the runway, travelling approximately 80 metres along the grass runway edge before the pilot was able to regain control. The pilot was able to continue taxiing to the parking area without further incident. The aircraft was not damaged and the pilot was uninjured.

Weather Bankstown

A SPECI[4] was issued during the time of BTW's arrival at Bankstown indicating that the wind was 190 degrees at 19 kts gusting 34 kts. The cloud was scattered[5] at 900 ft above ground level.

Fuel system

The fuel system for this aircraft consisted of two tanks, one in each wing, that were interconnected. The fuel system had two fuel selectors (Figure 3), one for each engine, which were identified as LEFT ENGINE and RIGHT ENGINE. Each selector had three positions. The forward position (ON) allowed each tank to feed its respective engine. The central position (OFF) cut off the fuel supply. The rear position (XFEED) was for cross-feeding fuel to an engine from the

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

[2] Instrument flight rules permit an aircraft to operate in instrument meteorological conditions (IMC), which have much lower weather minimums than visual flight rules. Procedures and training are significantly more complex as a pilot must demonstrate competency in IMC conditions, while controlling the aircraft solely by reference to instruments. IFR-capable aircraft have greater equipment and maintenance requirements.

[3] An internationally recognised radio call announcing an urgency condition which concerns the safety of an aircraft or its occupants but where the flight crew does not require immediate assistance.

[4] SPECI is used to identify special observations; ie, observations when conditions are below specified criteria, or when there have been significant changes since the previous report. SPECI is also used to identify observations reported 10 minutes following an improvement to above SPECI conditions.

[5] Scattered indicates that cloud was covering between a quarter and a half of the sky.

opposite side tank. For example, if the right fuel selector was on XFEED, the right engine would receive fuel from the left fuel tank.

According to the pilot's checklist, the fuel selector operation was to be checked while the aircraft was taxiing. The pilot was to set one of the selectors to OFF. When the corresponding engine started to sputter, the selector was to be set to XFEED. When the engine resumed operation the selector was to be set to ON. The selector for the other engine was then to be checked in the same manner. The checklist provided four additional opportunities to ensure that both fuel selectors were set to ON: during the engine run up, during the pre-takeoff check, when the aircraft was lined up on the runway, and when the aircraft was established at cruising altitude.

Figure 1: Fuel Selector

Source: *Copyright TSB*

Pilot information and comments

At the time of the incident, the pilot held a Private Licence (Aeroplane) and a Private Instrument rating with about 2,000 hours total time and 1,000 hours on type.

The pilot stated his wife normally assisted on the flight, by holding the checklist and reading out the items; on this flight however, his wife was not with him. In addition, shortly after take-off he relocated his flight bag from the middle row of passenger seats to the front passenger seat. The pilot considered that it was possible that while moving the flight bag he may have dragged it across the fuel selector which is located between the front seats. The pilot also considered it possible that the fuel selector for the right engine was not returned to the ON position, after the performance of the pre-taxi checks at Hobart.

The pilot stated that he did not pay close attention to the fuel gauges in flight and did not realise that the left tank was being depleted rapidly while the right tank remained full. As the autopilot was on, the pilot could not feel the lateral imbalance caused by the difference in the quantities of fuel in each tank.

The pilot stated that following the engine failure, he disengaged the autopilot and hand flew BTW to Bankstown. However he did not comprehend the magnitude of the imbalance due to the prevailing turbulence. Consequently, he did not have an appreciation of the effect the cross wind and lateral imbalance would have on the controllability of the aircraft during the landing roll.

Safety message

Forty-four per cent of all accidents and over half of fatal accidents between 1999 and 2008 were attributed to private operations. These figures far surpassed the proportions for any other flying category, even though private operations contributed to less than 15 per cent of the hours flown in that decade[6].

Checklists are the most readily available means of risk management against errors and omissions. Pilots are reminded to be diligent in the performance of checklist items during all stages of flight as they are there to capture errors made before and during flight.

For further reading of a similar accident involving a PA-32 aircraft that occurred in Canada please see:

- Transportation Safety Board - Aviation Investigation Report A09Q0181 www.tsb.gc.ca/eng/rapports-reports/aviation/2009/a09q0181/a09q0181.asp

Aircraft details

Manufacturer and model:	Piper Seneca - PA 34-200	
Operator:	Private	
Registration:	VH - BTW	
Type of operation:	Private	
Location:	19 km south of Nowra, New South Wales	
Occurrence type:	Fuel starvation	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Damage:	Nil	

[6] ATSB, AR-2008-045 - Improving the odds: Trends in fatal and non-fatal accidents in private flying operations. Available at www.atsb.gov.au/publications/2008/ar2008045.aspx

Runway excursion involving Piper PA-28, VH-SFK

AO-2012-113

What happened

On 4 September 2012, the pilot of a Piper PA-28 aircraft, registered VH-SFK (SFK), was conducting solo touch-and-go[1] circuits at Bankstown Airport, New South Wales. The pilot had completed several circuits with a flight instructor before commencing solo circuits.

When on the final leg of the fourth solo circuit, the pilot conducted his pre-landing checks and prepared the aircraft for landing. He reported that the approach and landing were normal.

After landing, when the pilot applied full power for take-off, SFK veered suddenly to the left onto the grass. The pilot reduced the throttle setting to the idle position and applied the brakes, however the aircraft collided with the airport perimeter fence. The pilot shut down the aircraft and exited. The aircraft sustained substantial damage (Figure 1) and the pilot sustained minor injuries.

The pilot reported that, prior to take-off, the park brake was difficult to release and required several attempts before the brakes released.

Aircraft inspection

The aircraft operator visually inspected the aircraft and noted there was no evidence of an aircraft unserviceability. The operator also inspected the runway, which appeared to show that the left brake had been applied during the landing.

Figure 1: Aircraft damage

Source: ***Aircraft operator***

[1] A touch-and-go is a practice landing whereby the aircraft is permitted to touch the runway briefly, without braking before taking off again.

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-28-161	
Registration:	VH-SFK	
Type of operation:	Flying training	
Location:	Bankstown Airport, New South Wales	
Occurrence type:	Runway excursion	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Minor	Passengers – Nil
Damage:	Substantial	

Engine failure involving Piper PA-32, VH-FAJ

AO-2012-125

What happened

VH-FAJ

Source: Airclaims

On 22 September 2012, a Piper PA-32 aircraft, registered VH-FAJ, was being operated on a private scenic flight near Yea, Victoria. On board the aircraft were the pilot and a passenger.

About 5 minutes after departing, at about 1,000 ft above ground level (AGL), the pilot changed the fuel selection from the left main tank to the right tip tank[1]. About 3 minutes later, when at about 800 ft, the engine failed. The pilot changed the fuel selection back to the left main tank and placed the fuel mixture and throttle control full forward, but the engine did not respond[2]. As a result, the pilot elected to conduct a forced landing.

The pilot moved the throttle to the idle position and prepared for the landing. During the landing, the pilot noted that engine power had been restored. The aircraft subsequently impacted two fences and sustained substantial damage. Both occupants were uninjured.

Aircraft usage

The aircraft had been refuelled from a bowser before its last flight, about 9 months prior to the accident. Since that time, the aircraft had been stored in a hangar. Consequently, the pilot reported that he had conducted a thorough pre-flight inspection before the accident flight. The pilot also noted that the fuel tanks were near full and he tested the fuel for water, with none observed.

The pilot also conducted a number of circuits, without the passenger on board, and stated that the aircraft operated as normal.

Figure 1: Aircraft damage

Source: Airclaims

1 The aircraft was fitted with four fuel tanks: left tip tank, left main tank, right main tank, and right tip tank.

2 The pilot could not recall selecting the electric fuel pump on when he changed the fuel selection back to the left main tank.

Aircraft examination

An insurance representative attended the site and noted that there was a significant quantity of fuel in all the tanks, apart from the left tip tank, which had been damaged in the accident. There was evidence that fuel had leaked from that tank onto the ground. The insurance representative also found evidence of insects, likely wasps, lodged inside the left and right tip tank vent pipes.

A subsequent examination of the aircraft by a licenced aircraft maintenance engineer (LAME) found evidence of water in the right tip tank and in the fuel filter bowl. The LAME also determined that there was no obstruction in the tip tank from the insects observed in the vent pipe.

Pilot comments

The pilot reported that, several months prior to the accident, he had washed the aircraft. He stated that water may have entered the right tip tank through the fuel filler cap. The pilot further suggested that, while he had visually inspected a sample of the fuel from the right tip tank prior to the flight, he had not smelt it and it was possible that the sample contained water rather than fuel.

Safety message

The deterioration of fuel cap seals can allow for the ingress of water into fuel tanks. CASA Airworthiness Bulletin (AWB 28-008) *Water contamination of fuel because of failure of fuel filler cap* contains information on inspecting fuel filler and caps and conducting pre-flight inspections of fuel filler/caps and fuel samples (www.casa.gov.au/airworth/awb/28/008.pdf).

It is important that the testing of fuel drainage samples for water contamination are positive in nature and do not rely exclusively on the sensory perceptions of colour and smell, both of which can be unreliable (Civil Aviation Order (CAO) 20.2). The CAO details a number of acceptable methods for testing fuel, including:

- Placing a small amount of fuel into a container, before taking samples from tank or filter drain points. The presence of water will be identified by a visible surface of demarcation between the two fluids.
- Using chemical means such as water detecting paper or paste; where a change in colour of the detecting medium will provide a clear indication of the presence of water.

This accident highlights the importance of conducting a thorough pre-flight fuel inspection, particularly when the aircraft has been stored for an extended period. The following publications provide additional information on fuel inspections:

- Fuel system inspection: www.comlaw.gov.au/Details/F2006C00266
- Fuel and oil safety: www.casa.gov.au/newrules/parts/091/download/ac091-365.pdf
- Fuel management: www.caa.govt.nz/safety_info/GAPs/Fuel_Management.pdf

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-32-260	
Registration:	VH-FAJ	
Type of operation:	Private	
Location:	4 km E of Yea, Victoria	
Occurrence type:	Engine failure	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – 0	Passengers – 0
Damage:	Substantial	

Hard landing involving Cessna P206B, VH-EGG

AO-2012-135

What happened

On 29 September 2012, a Cessna P206B aircraft, registered VH-EGG, departed Gympie on a private flight to Monduran, Queensland. On board the aircraft were the pilot and four passengers.

On arrival at the Monduran aeroplane landing area (ALA), the pilot noted the windsock was indicating gusty wind conditions, from about 310-320°, and elected to land on runway 02.

VH-EGG

Source: *Pilot*

When on the base and final legs of the circuit, the pilot reported that wind gusts in excess of 20 kts were experienced, along with moderate to severe turbulence.

During the landing, at about 10 ft above the runway, the flare[1] was commenced. Immediately after, a significant wind gust was experienced, resulting in a hard landing on the main landing gear. The aircraft bounced and the pilot applied a small amount of power in an attempt to regain control. A second wind gust of greater intensity then occurred. The aircraft stalled[2] and touched down hard, collapsing the nose landing gear. The pilot maintained directional control and the aircraft came to a stop.

The aircraft sustained damage to the propeller, nose landing gear and lower engine cowls (Figure 1).

Pilot comments

The pilot reported that, at the time, he was confident that he could conduct the approach and landing under the given wind conditions. However, in hindsight, he stated that he should have conducted a go-around.

Figure 1: VH-EGG and windsock indication

Source: *Pilot*

[1] The flare, also known as the roundout, is the final nose-up of a landing aircraft to reduce the rate of descent to about zero at touchdown.

[2] Stall (aerodynamic) is the term used when a wing is no longer producing enough lift to support an aircraft's weight.

Safety message

A go-around, the procedure for discontinuing an approach to land, is a standard manoeuvre performed when a pilot is not completely satisfied that the requirements are in place for a safe landing.

The need to conduct a go-around may occur at any stage during the approach and landing. However, the most critical go-around is one initiated very close to the ground[3]. Consequently, the sooner a condition that warrants a go-around is recognised, the safer the manoeuvre will be.

This incident highlights the importance of conducting a go-around as soon as landing conditions appear unfavourable.

Aircraft details

Manufacturer and model:	Cessna Aircraft Company P206B	
Registration:	VH-EGG	
Type of operation:	Private	
Location:	Monduran (ALA), Queensland	
Occurrence type:	Aircraft control	
Persons on board:	Crew – 1	Passengers – 4
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Minor	

[3] FAA Airplane Flying Handbook, Chapter 9, Approaches and Landings: http://www.faa.gov/library/manuals/aircraft/airplane_handbook/media/faa-h-8083-3a-4of7.pdf

Helicopters

In-flight fire involving Eurocopter AS-350BA, VH-HEB

AO-2012-084

What happened

Accident site

Source: South Australia Police

On 19 June 2012, at about 1645 Central Standard Time[1], a Eurocopter AS-350BA helicopter, registered VH-HEB (HEB), was en-route from Ceduna to Border Village, South Australia when abnormal fumes were detected in the cockpit.

Prior to the flight, the helicopter was refuelled at Ceduna Airport. The helicopter was equipped with a standard AS-350BA fuel tank and an additional fuel drum was secured in the cabin. During the refuelling process, an amount of fuel was spilt on the outside of the helicopter and in the cabin. The fuel was subsequently cleaned up and the pilot conducted several checks in the cabin and on the belly panel[2], to ensure the fuel spill had been satisfactorily cleaned up. The helicopter then departed.

About 15 minutes into the flight, the pilot and passenger recalled smelling abnormal fumes in the cockpit. Following a brief discussion with the passenger, the pilot elected to conduct an emergency landing about 51 km west of Ceduna. Once the helicopter was on the ground, the passenger exited and noticed smoke and fire emanating from the aft cargo compartment. The fire spread to the cabin area where the fuel drum was secured. The pilot and passenger left the vicinity of the helicopter and the helicopter was destroyed as a result of the fire (Figure 1). The cause of the fire could not be determined.

Survivability

The aircraft had an Emergency Locator Transmitter (ELT)[3] device fitted to the airframe, capable of transmitting the helicopter's position to search and rescue (SAR) agencies during an emergency. The ELT did not activate and was destroyed in the fire. The aircraft was also equipped with a fire extinguisher and a basic first kit. Neither the pilot nor passenger was carrying a satellite phone or personal emergency position-indicating radio beacon (EPIRB). The occupants of the aircraft did not have time to collect equipment, water or rations from the aircraft before the fire spread to the cabin area.

Related Accidents

The Japan Transport Safety Board investigated an accident involving an AS350 B3 helicopter that experienced an in-flight fire originating from the aft cargo compartment. The European Aviation Safety Agency issued Airworthiness Directive (AD) 2011-0244-E[4] in relation to the accident. The AD applied only to helicopters fitted with a Grimes-Honeywell power supply unit and was not applicable to HEB.

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1 Central Standard Time (CST) was Coordinated Universal Time (UTC) + 9.5 hours.

2 A fiberglass panel on the underside of the helicopter; located underneath the cabin area.

3 Crash-activated radio beacon that transmits an emergency signal that may include the position of a crashed aircraft. Also able to be manually activated.

4 www.casa.gov.au/ADFiles/rotor/as355/2011-0244-E.pdf

Figure 1: Accident site

Source: South Australia Police

ATSB comment

The ignition source of the fire was not established; however the spillage during the refuelling process may have provided an initial fuel source for the fire.

Safety action

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

Aircraft Operator

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

- For all future remote area operations additional equipment will be carried; including satellite phones and personal EPIRBs.
- The operations manual has been amended to include specific procedures for the carriage of large containers of fuel.

Safety message

This incident highlights the importance of:

- carrying appropriate equipment while conducting remote area operations
- carrying personal EPIRBs on person
- taking appropriate care when refuelling aircraft
- making decisions to reduce the level of risk to the safety of the aircraft and its occupants in emergency or abnormal situations. In this case, the pilot elected early to conduct a precautionary landing and investigate the source of the fumes.

Additionally, the Civil Aviation Safety Authority (CASA) provides information in relation to the carriage of dangerous goods onboard aircraft on their website:
www.casa.gov.au/dg/

Aircraft details

Manufacturer and model:	Eurocopter AS-350BA	
Registration:	VH-HEB	
Type of operation:	Private	
Location:	51 km W Ceduna, South Australia	
Occurrence type:	In-flight fire	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Destroyed	

Collision with terrain involving Kawasaki 369HS, VH-JWJ

AO-2012-104

What happened

Accident site

Source: Airclaims Australia

On 19 August 2012, at about 1520 Eastern Standard Time[1], a Kawasaki 369HS helicopter, registered VH-JWJ (JWJ), was transiting from Tyabb, Victoria (VIC), to Konwack, VIC on a private flight. As the the helicopter approached the intended landing site, at about 500 ft above ground level (AGL) and at about 110 to 125 kts, the 'engine out' caution light illuminated, accompanied by the low rotor revolutions per minute (RPM) horn and a loss of power.

The pilot immediately lowered the collective to enter autorotation[2], but then increased the position of the collective lever to clear a line of trees about 100 to 150 m ahead, directly in the path of the helicopter. Clearing the trees at about 100 to 150 ft AGL, the pilot was able to maintain speed by keeping the nose of the helicopter down while descending at about a 45° angle.

The pilot aimed for a dry area in a muddy paddock, allowing the helicopter to turn gently left towards his aiming spot. The pilot reported that he flared too late, causing the tail boom and then the left skid to drag along the wet ground. As the left skid broke contact with the ground, the weight of the helicopter was transferred to the right side. The right skid contacted the ground and was torn off, taking the tail boom with it. The helicopter skidded for about 80 m before coming to rest (Figure 1).

Both the pilot and passenger were wearing a four-point harness and the pilot was wearing a helmet. The pilot was uninjured while the passenger sustained a minor head wound.

The helicopter was serviceable prior to the flight and no evidence of a mechanical fault was found following the accident. Prior to recovery, JWJ was de-fuelled showing that there was sufficient fuel for the expected approach and landing. The cause of the reported power loss could not be determined.

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

2 Descent with power off, air flowing in reverse direction upwards through lifting rotor(s) causing it to continue to rotate at approximately cruise RPM. The pilot preserves usual control functions through pedals, cyclic and collective, but cannot alter steep 'glide path'. The rate of descent is reduced just before ground impact by an increase in collective pitch; this increases lift trading stored rotor kinetic energy for increased aerodynamic reaction of the blades, and should result in a gentle touchdown.

Figure 1: Cabin of VH-JWJ

Source: ***Airclaims Australia***

Safety message

The accident highlights the value of occupant restraints and safety helmets for both pilots and passengers.

The following publications provide further information on helicopter safety helmets:

- ATSB aviation occurrence report AO-2012-016 – VH-FUJ, Partial power loss available at: www.atsb.gov.au/publications/investigation_reports/2012/aair/ao-2012-016.aspx
- *A hard-headed look at helmets*, Flight Safety Australia, issue 87 July – August 2012 available at: www.flightsafetyaustralia.aero/?xml=CASA_Callout_V2&iid=64732#folio=3

Aircraft details

Manufacturer and model:	Kawasaki Heavy Industries 369	
Registration:	VH-JWJ	
Type of operation:	Private	
Location:	near Inverloch Victoria	
Occurrence type:	Collision with terrain	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Nil	Passengers – 1 (minor)
Damage:	Destroyed	

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.

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