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Turbulence event involving a Boeing 777, VH-VPE

What happened

On 23 September 2013, the crew of a Boeing 777aircraft, registered VH-VPE (VPE) and operated by Virgin Australia, conducted a scheduled passenger flight from Brisbane, Australia to Los Angeles, United States. At about 0305 Coordinated Universal Time (UTC) in the cruise at flight level (FL)[1] 310 and flying in clear air the aircraft encountered abrupt severe turbulence.[2] The flight crew turned on the seat belt sign, reduced the speed of the aircraft and requested from air traffic control a descent to a block altitude from FL310 to FL 290.

At the same time, the cabin crew had begun the meal service and the seat belt signs were turned off. Cabin crew members reported being thrown around the cabin by the turbulence with two crew hitting their heads on the aircraft cabin ceiling. Other injuries reported by the cabin crew included sore backs, a sore toe, a sore ankle and bumped heads. Food and catering equipment were spread over seats, passengers and the aisles with the rear section of the aircraft affected the most. All passengers were seated at the time with their seat belts on. One passenger reported a sore neck and another passenger reported a burn injury as a result of a spilt hot meal. There were no reported injuries to the four flight crew.

It is reported that the aircraft did not exceed any of the normal flight parameters. Over the next 90 minutes, there was light to moderate turbulence and during this time the cabin crew and passengers remained seated.

Operator investigation

The operator determined that the data from the quick access recorder showed that, during the incident, a positive vertical acceleration value of 1.42g was recorded, and then a negative vertical acceleration of 0.4g was recorded. The negative vertical acceleration experienced by the aircraft resulted in the cabin crew and unsecured objects being thrown into the air.

The operator indicated that the flight crew made a passenger announcement prior to take-off that even when the fasten seat belt sign is turned off there is always a chance of unexpected turbulence and passengers should keep their seat belts fastened whenever they are in their seats.

The flight crew reported that the flight had been smooth up until the aircraft encountered the turbulence.

The operator reviewed the Significant Meteorological Information that was available within the Flight plan package for forecast severe turbulence, however it was determined that the forecast areas of serve turbulence was not in the vicinity of the flight planned track.

1 At altitudes above 10,000 ft, an aircraft's height above mean sea level is referred to as a flight level (FL). FL 310 equates to 31,000 ft.
2 Severe turbulence is characterised by large, abrupt changes in altitude/attitude, with large variations in indicated airspeed.

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.

Virgin Australia

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

- Flight Dispatch has updated their policy regarding severe weather and turbulence avoidance.
- A risk assessment and analysis of the event has been completed and action plans are being developed as a result of this incident.
- A Turbulence Management Working Group has been established.

Safety message

Turbulence by its nature is unpredictable, occurring without warning and ranging from a few minor bumps to severe jolts.

The ATSB aviation safety bulletin AR-2008-034 *Staying Safe against In-flight Turbulence* reported that, for the five-year period 2009 to 2013, there were 677 turbulence occurrences on flights in, to or from Australia that were reported to the ATSB, with 197 minor injuries and 2 serious injuries to passengers and cabin crew.

Staying Safe against In-flight Turbulence

What can you do to stay safe?

- Put your seatbelt on, and keep it fastened when you are seated.
- Pay attention to the safety demonstration and any instructions given by the cabin crew.
- Read the safety information card in your seat pocket.

In a typical turbulence incident, 99 per cent of people on board receive no injuries. However, the turbulence can cause passengers and cabin crew who are not wearing their seat belts to be thrown around without warning.

In this event, all passengers were seated with their seat belts fastened, even though the seat belt sign had been switched off. Cabin crew are at greater risk of injury during turbulence encounters as they are moving around the cabin and not seated with a seat belt fastened. This incident highlights the benefits of keeping your seatbelt fastened during the flight.

The following publications provide additional information:

- *Staying Safe against In-flight Turbulence*, www.atsb.gov.au/publications/2014/in-flight-turbulence.aspx.
- *Cabin Crew Safety 2001, January-February 2001*, www.flightsafety.org/archives-and-resources/publications/cabin-crew-safety/cabin-crew-safety-2001.
- Roller Coaster Ride, how to minimise the risks of injury from in flight turbulence, in *Flight Safety Australia May-June 2006*, www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_91364.

General details

Occurrence details

Date and time:	23 September 2013 – 0305 UTC	
Occurrence category:	Incident	
Primary occurrence type:	Turbulence event	
Location:	472 km NW of Noumea La Tontouta International Airport, New Caledonia	
	Latitude: 18° 47.92' S	Longitude: 163° 14.33' E

Aircraft details

Manufacturer and model:	The Boeing Company 777-3ZGER	
Registration:	VH-VPE	
Operator:	Virgin Australia	
Serial number:	37939	
Type of operation:	Air transport - high capacity	
Persons on board:	Crew – 16	Passengers – 354
Injuries:	Crew – 6	Passengers – 2
Damage:	None	

Turboprop aircraft

Runway excursion involving a Fairchild SA226, VH-OGX

What happened

On 23 January 2014, the pilot of a Fairchild SA226 aircraft, registered VH-OGX, conducted a charter flight from Thangool to Archerfield, Queensland, with 11 passengers on board.

Prior to departure, the pilot received the weather forecast for Archerfield and, based on the forecast conditions, planned to conduct an instrument approach on arrival.

At about 1520 Eastern Standard Time (EST), the aircraft departed Thangool. En-route, the pilot received the current Automatic Terminal Information Service (ATIS) for Archerfield, which indicated there were ‘Few’ (1-2 oktas[1]) of cloud at 800 ft, ‘Broken’ (5-7 oktas) at 1900 ft and that the runway was ‘wet’.

At about 1615, the pilot commenced a non-directional beacon (NDB) approach to Archerfield. Approaching the western boundary of the aerodrome, the pilot sighted the runway and circled the aerodrome at 900 ft above ground level (AGL) before approaching to land on runway 10 Left.

Due to the low cloud in the area, the pilot kept the aircraft close to the runway to ensure the runway remained in sight. When lined up on final, the aircraft was to the right of the extended runway centreline and the pilot elected to conduct a go-around.

The second circle was still tight, due to low cloud to the west of the runway, and the pilot reported that the aircraft was about 30 to 50 m right of the extended runway centreline when on final approach. It was raining heavily as the aircraft touched down close to the runway centreline and about 300 m beyond the runway threshold. The pilot reported that as the wheels touched down, the aircraft commenced sliding towards the right, possibly due to aquaplaning. He reduced the power levers to the ground idle setting. The aircraft veered off the right side of the runway and onto the grass. The pilot then attempted to steer the aircraft back onto the sealed surface and momentarily increased the power on the right engine to assist in regaining control of the aircraft.

The aircraft then slid along the runway and veered off to the left side. As the left main landing gear entered the grass, the aircraft slowed, coming to rest at an angle of about 30 degrees to the runway and with the main landing gear on the grass.

A runway inspection revealed standing water up to 50 mm deep on the right side of the runway near the threshold. After the incident, aquaplaning marks were visible on the runway.

Bureau of meteorology report

In a report provide to the ATSB by the Bureau of Meteorology, 51.6 mm of rain fell at Archerfield Airport between 1500 and 1635.

Airservices Australia comments

The ATIS described the runway condition as ‘wet’. The descriptive terms used to describe water on a runway were:

- DAMP – the surface shows a change of colour due to moisture.

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1 Cloud coverage is reported by the number of 'oktas' (eighths) of the sky that is occupied by cloud.

- WET – the surface is soaked but there is no standing water.
- WATER PATCHES – patches of standing water are visible.
- FLOODED – extensive standing water is visible.

Airservices Australia advised that the runway condition was usually determined using a combination of local knowledge after considering factors such as the amount of rain received (obtained from visual observation and electronic readout), pilot reports, and any comments that may have been received from the aerodrome safety officer after the morning inspection. The oversight of runway condition was difficult from the tower perspective as the runway was up on a rise and appeared as just a thin slither of bitumen. Any pooling or extensive standing water was not easily visible from the tower cab.

No other aircraft arrived at Archerfield during the period of the flight from Thangool to Archerfield.

Archerfield Airport Corporation comments

The Airport Operations & Technical Officer advised the ATSB that the safety officer conducted a runway inspection each morning. Any further inspection may be carried out if requested either by an aircraft operator or the tower controller.

Figure 1: VH-OGX nose landing gear

Source: Operator

Safety action

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

Operator of VH-OGX

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

Amendment to standard operating procedures

The operator of OGX will introduce procedures for flight crew regarding runway contamination events.

The operator has also advised the ATSB that they have written to the airport operator and suggested changes to improve safety.

Safety message

The ATSB found that of the15 runway excursions at Archerfield Airport reported to the ATSB between 2004 and 2014, this was the only incident that occurred during wet weather. This incident demonstrates the importance of communication between the pilot, aircraft operator, air traffic control and the aerodrome safety officer to ensure runway conditions are known. In particular, during an extreme weather event, pilots of inbound aircraft should be notified of potentially unsafe runway conditions.

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 for a safe landing have been met. The need to conduct a go-around may occur at any point in the approach and landing phase, but the most critical go-around is one initiated close to the ground.

The pilot of OGX reported that the weather conditions necessitated low-level manoeuvring from the circling approach. If a straight-in approach to runway 28 had existed at Archerfield, it may have avoided the need for low level manoeuvring.

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

The following link provides some useful information on go-arounds: *Aviation safety explained – Go-arounds* www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD:1001:pc=PC_91481

General details

Occurrence details

Date and time:	23 January 2014 – 1625 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Runway excursion	
Location:	Archerfield Airport, Queensland	
	Latitude: 27° 34.22' S	Longitude: 153° 00.48' E

Aircraft details: VH-OGX

Manufacturer and model:	Fairchild Industries SA226-TC	
Registration:	VH-OGX	
Serial number:	TC-395	
Type of operation:	Charter – passenger	
Persons on board:	Crew – 1	Passengers – 11
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Piston aircraft

Hard landing involving a Grob G 115C2, VH-ZIV

What happened

On 11 October 2013, the student pilot of a G-115C2 Grob aircraft, registered VH-ZIV, departed the Merredin aeroplane landing area (ALA) on his first solo flight to the designated training area located near Lake Brown, Western Australia.

After about 1.4 hours in the training area, the student elected to return to Merredin, tracking via Burracoppin Township. The student navigated to what he believed was the township; however, when overflying the town he discovered that it was not Burracoppin. The student altered the aircraft's heading in the direction that he thought the town was. After about 10 minutes, the student again believed he had located Burracoppin, but after a further 6 minutes, he was unable to sight Merredin (ALA). The student became concerned and broadcast on the universal communications (UNICOM)[1] frequency indicating that he was unsure of his position. The UNICOM operator gave him directions to locate the commercial radio station 6MD transmitter that was located about 6 NM north-west of Merredin, and then track to Merredin.

The student located Merredin and joined the circuit for runway 28. When turning onto the base leg of the circuit, the student reported that the aircraft's airspeed was low so he adjusted the engine power and aircraft attitude. When on short final he determined that he was too high and initiated a go-around. The student commenced a second circuit to runway 28. When on short final, the student reported there was a crosswind with slight windshear, and the glare from the sun was making it increasingly difficult to see the runway. The student indicated that, at the height of the windsock, he reduced the engine power to idle and the aircraft sank quickly. At about 1700 Western Standard Time (WST), [2] the aircraft touched down heavily and bounced. The student reported that the sun glare made it very difficult to judge the height of the aircraft and he believed that the aircraft had not bounced very high. The aircraft touched down again on the nose landing gear, which subsequently collapsed. The aircraft slid along the runway and came to a stop. The student pilot was uninjured and the aircraft sustained substantial damage (Figure 1).

Figure 1: Accident site

Source: Aircraft operator

1 UNICOM operators provide air-ground radio services at some non-controlled aerodromes to provide further operational information to pilots, and to support broadcasts on the common traffic advisory frequency (CTAF).

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

Aircraft operator investigation

The aircraft operator conducted an internal investigation and determined the following:

- The student pilot had a total of 35.8 hours dual and 2 hours solo flying experience.
- The student's last meal was at 0600, which consisted of a sandwich.
- On the day of the accident, the student began his duty at 0600. The student had completed a long duty period with very little sustenance, which was insufficient for the training tasks completed.
- The wind was from 260° at 15 kt gusting to 20 kt, visibility was greater than 10 km, and light turbulence was present. Light turbulence had been experienced by a flight just prior to the accident. The student was also landing into the western sun.
- The operator's flight risk assessment tool (FRAT) (Figure 2) for the accident flight was incomplete. If all values for the flight had been entered, the total risk value for the flight would have been in the red area stating 'No dispatch'.

Figure 2: Flight risk assessment tool (FRAT)

Flight Risk Assessment Tool

Date: ____________ Current Time: _______ ETD: _______ Tail No: __________

Departure Airport: ______ Arrival Airport: _______ IP: ____________________

Student #1: ________________________ Student #2: ______________

		Risk Value*	Flight Value
Qualifications and Experience			
1-1	Pilot in command with less than 100 hours in make and model	4	
1-2	Single Pilot (Solo) Flight	5	
1-3	Pilot in command with less than 100 hours in last 90 days	3	
1-4	Duty day projected greater than 11 hours	4	
1-5	Flight time of Pilot-in-Command greater than 7 hours in the duty day	4	
1-6	Rest less than 10 hours prior to the duty day	4	
1-7	Impairing prescription drug or alcohol use within 24 hours	3	
1-8	Domestic/family illness/distraction issues	5	
1-9	Last meal more than 4 hours ago	3	
Operating Environment			
2-1	Mountainous considerations in IMC or at night	5	
2-2	Control tower not operational at ETA or ETD, or uncontrolled airport	4	
2-3	Circling approach required	3	
2-4	Density altitude greater than 4,000 feet	5	
2-5	Wet runway	3	
2-6	Twilight operation	2	
2-7	Night operation	3	
2-8	Contaminated runway	4	
2-9	Reported or forecasted weather within 200 feet or one half mile of minimums	5	
2-10	Less than 2 hours notice to beginning of duty period	3	
2-11	Unimproved or unpaved runway	4	
2-12	No destination weather report	3	
2-13	Thunderstorms at departure or destination	4	
2-14	Moderate turbulence reports	4	
2-15	Winds greater than 25 knots	4	
2-16	Winds within 5 knots of max documented crosswind proficiency of the PIC or AFM	5	
2-17	A manager waived any operating limitations or company policies	4	
Equipment			
3-1	Some on board equipment is inoperative and AFM limitations impact plan	5	
3-2	Maintenance ferry flight	3	
		Total:	
Insert a Check Mark ✓ next to the assessment			
If total <= 16	Go		
If total >= 17	Consult with flight supervisor about mitigations; consider not dispatching		
If total >= 23	No dispatch		

Source: Aircraft operator

Student pilot comments

The student provided the following comments regarding the accident:

- He had last eaten and drank at about 0615, which was a piece of bread and water. Due to his schedule on that day, lunch was no longer available when he had a break.
- He had felt rushed in his pre-flight preparation and had forgotten his sunglasses.
- He reported feeling nervous when he was unable to locate Merredin (ALA), but was very relieved when he had found it.
- He felt uncomfortable about the wind and windshear experienced on the day, but he just wanted to land safely to finish a very long day.
- He had about 6 hours sleep the night before the accident as he was finishing his ground school homework and preparing for the next day.
- He has had several instructors during his training and had been given different instructions on when to initiate a go-around when a bounce occurred during landing.

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:

Instructor brief

A brief will be given to all company flying instructors at Merredin on the reasoning for, and the accurate completion of the flight risk assessment tool (FRAT). Plans are also in place for the training of instructors at the Jandakot base.

Training

- The accident will be used as a training scenario to help guide student pilots through the FRAT form, instilling an understanding of the information that the form provides.
- The accident will underpin the required understanding.
- Student pilot training using the FRAT will be undertaken and recorded.
- The student pilot training guidelines are being reviewed to ensure understanding of the FRAT is included with training for future courses.

Operations manual

- The operations manual will be amended to include that, when student pilots are scheduled for an extended tour of duty and the last training event is a flight, that flight must be conducted with an instructor. The definition of extended tour is a tour of more than 8 hours.
- Comprehensive instructions on the preparation and use of the FRAT form will be included in the operations manual.

Safety message

While pilots conduct a pre-flight inspection of their aircraft to determine airworthiness, this accident highlights the importance of pilots also assessing their own wellbeing. Tools such as the FRAT form (Figure 2), the Federal Aviation Administration's (FAA) (United States) 'I'm safe checklist' (Figure 3), and the Civil Aviation Safety Authority's (CASA) personal minimums checklists allows pilots to determine if they are physically and mentally prepared, and if the operating conditions are suitable for the conduct of the flight.

Figure 3: I'm Safe Checklist

I'M SAFE
Checklist

Illness - Symptoms
Medication - Prescription or OTC
Stress - Job, Financial, Health, Family
Alcohol - 8 Hrs? 24 Hrs?
Fatigue - Adequately rested
Eating - Adequately Nourished

Source: Federal Aviation Administration

The following provide additional information on these tools:

- Flight risk assessment tool: www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2007/inFO07015.pdf
- I'm Safe Checklist: www.faa.gov/regulations_policies/handbooks_manuals/aviation/pilot_handbook/media/phak%20-%20chapter%2017.pdf
- CASA personal minimums checklists: casa.cart.net.au/epages/casa.sf/en_AU/?ObjectPath=/Shops/casa1/Categories/Safety_Publications

The effect of sun-glare when relying on visual cues is an important consideration for all pilots. The FAA has conducted research into sunlight and its association with aviation accidents. This research found that:

- 85 per cent of accidents where glare from natural sunlight was considered among the reasons for the accident occurred in clear weather and optimal visual conditions.
- 55 per cent were during the approach/landing and take-off/departure phase of the flight.

The report suggests a number of preventative techniques to reduce the effects of sun glare including wearing sunglasses, using the aircraft's sun visor or a brimmed hat to shield the pilot's eyes from exposure to glare. The research report is available at:

www.faa.gov/data_research/research/med_humanfacs/oamtechreports/2000s/media/0306.pdf

General details

Occurrence details

Date and time:	11 October 2013 – 1700 WST	
Occurrence category:	Accident	
Primary occurrence type:	Hard landing	
Location:	Merredin (ALA), Western Australia	
	Latitude: 31° 31.37' S	Longitude: 118° 19.82' E

Aircraft details

Manufacturer and model:	Grob G-115C2	
Registration:	VH-ZIV	
Serial number:	82081/C2	
Type of operation:	Flying training - solo	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Take off event involving a De Havilland DH-82 Tiger Moth, VH-RAY

What happened

On 23 September 2013, the pilot of a De Havilland DH-82 Tiger Moth aircraft, registered VH-RAY, taxied at Sandy Beach aeroplane landing area (ALA), New South Wales to conduct circuits in visual meteorological conditions. The pilot was the only person on board.

The pilot taxied to the end of the runway and applied the brakes to conduct engine run up checks, then released the brakes and lined up on the runway heading and applied full power for take-off. The aircraft accelerated down the runway. As the airspeed increased the tail rose to the take-off position, at about 200 meters down the runway and at about 30 knots indicated air speed the nose of the aircraft dropped very rapidly and the aircraft flipped onto its back.

Pilot comment

The pilot reported that the aircraft was stored in an open hangar that is located about 4 km from the ocean and that everything was normal up until the accident.

The pilot inspected the grass runway after the accident and reported that there were no witness marks on the runway to show a skidding main wheel and that the runway was in good condition with nothing on the runway that could have resulted in the accident.

Maintenance report

The aircraft was modified in 1997, installing main wheel brakes in accordance with an engineering order. Following the accident, the aircraft was inspected by the maintenance organisation and it was determined that the left main landing gear brake drum had evidence of corrosion and the brake operating rod was found stiff to operate. When the brakes were applied and released the left brake did not release fully. After the brake was cleaned and lubricated the brake operated normally. The maintenance organisation suspects that the left brake was partially engaged on take-off. They also determined that the aircraft was last flown on 12 February 2013 and the aircraft was normally stored in a high corrosion environment.

Figure 1: VH-RAY

Source: Frank Redward

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 not been advised of any proactive safety action in response to this occurrence.

Safety message

This accident is a timely reminder of the work that the Civil Aviation Safety Authority (CASA) is conducting in response to the Australian Government's *Aviation White Paper - Flight Path to the Future* (December 2009) which encourages CASA to continue its focus on the safety of ageing aircraft in Australia. CASA is implementing an ageing aircraft management plan where they have found that there is no one simple solution to effectively manage the ageing-related problems of the Australian fleet. Aircraft age from the day of manufacture and the rate at which an individual aircraft ages is dependent on how it has been operated, maintained and stored. They have determined that the aircraft's maintenance program needs to be able to adapt to take into account the ageing process. For many general aviation aircraft, the original design assumptions are no longer valid (operation beyond notional life, incorporation of modifications and repairs, incorporation of new materials and technologies and the aircraft used in different roles from what they were designed).

The following links provide additional information on ageing aircraft:

- Details of CASA's Ageing Aircraft Management Plan (AAMP) is available at www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_100381.
- ATSB Aviation Research and Analysis Report – B20050205 *How Old is Too Old? The impact of ageing aircraft on aviation safety www.atsb.gov.au/publications/2007/b20050205.aspx.*
- CASA Flight Safety Australia January-February 2011 magazine article *Aging – it's not just chronology www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_93249.*
- CASA presentation Ageing Aircraft Management Plan Airworthiness & Sustainment Conference Brisbane July 2013 www.ageingaircraft.com.au/proceedings13.html.

General details

Occurrence details

Date and time:	23 September 2013 – 1600 EST	
Occurrence category:	Accident	
Primary occurrence type:	Cillision with terrain	
Location:	19 km NNE Coffs Harbour, New South Wales	
	Latitude: 30° 09.33' S	Longitude: 153° 09.87' E

Aircraft details

Manufacturer and model:	De Havilland DH-82A Tiger Moth	
Registration:	VH-RAY	
Serial number:	3787	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Loss of control involving a Piper PA-28R 201, VH-HVX

What happened

On 15 January 2014, the pilot of a Piper PA-28 aircraft, registered VH-HVX, was undergoing a Commercial Pilot Licence test flight with a testing officer on board. At about 1330 Eastern Daylight-savings Time (EDT),[1] the aircraft departed from Bankstown and subsequently landed at Orange Airport, New South Wales, at about 1500, where the pilot and testing officer exited the aircraft for a short break. The aircraft had encountered moderate turbulence enroute and the pilot reported a slight overshoot on landing at Orange due to fluctuating wind conditions.

During the time on the ground at Orange Airport, the pilot observed the windsock indicating the wind varying from an easterly to a westerly direction and the speed fluctuating from 0 to about 15 kt. The temperature at Orange was about 33 ºC, and the aerodrome elevation was 3,115 ft. The pilot had calculated the density altitude[2] at Orange to be about 5,725 ft. He therefore planned to increase the indicated airspeed by about 5-10 kt during the take-off, to ensure adequate aircraft performance.

At about 1530, the pilot observed the wind to be from 110º at about 10-15 kt and configured the aircraft for a short field take-off from runway 11, selecting two stages of flaps. During the take-off run, the pilot and testing officer observed the aircraft performing normally and the pilot rotated the aircraft at about 55-60 kt indicated airspeed (IAS). The pilot then established the aircraft in an attitude to achieve a best angle-of-climb speed of about 72 kt IAS. The pilot reported that the stall warning horn sounded momentarily during the take-off due to turbulence.

When at about 50 ft above ground level (AGL) and about 65-70 kt IAS, the testing officer reduced the engine power to idle and stated "simulated engine failure". The pilot immediately lowered the nose of the aircraft in an attempt to increase the airspeed and selected the third stage of flaps. At about 10 ft AGL, the pilot reported the aircraft was sinking and flared[3] the aircraft for landing. However, the aircraft continued to sink and landed heavily. The left main undercarriage collapsed and the aircraft slid along the runway and then veered off to the left, coming to rest outside the airstrip gable markers. The aircraft was substantially damaged and both pilots were uninjured.

The pilots reported that the stall warning did not sound during the descent and that a shift in the wind direction was the most likely cause of the accident.

Bureau of Meteorology data

The ATSB obtained the data from the Automatic Weather Station (AWS) at Orange Airport at one minute intervals, which showed significant variations in wind direction and speed at the time of the incident.

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1 Eastern Daylight-savings Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

2 Density altitude is the effective height the aircraft and engine is performing at. It is determined by atmospheric conditions. Density altitude is calculated from the local air pressure, temperature and elevation, relative to the International Standard Atmosphere (ISA) of 1013 hPa and 15 ºC at sea level.

3 The flare is the final nose-up pitch of landing the aeroplane to reduce rate of descent to about zero at touchdown.

Figure 1: Damage to VH-HVX

Source: Pilot

Safety message

This incident highlights the critical importance of considering local conditions such as wind, elevation and temperature, as well as the inherent risks of conducting simulated engine failure at low altitude.

General details

Occurrence details

Date and time:	15 January 2014 – 1530 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Loss of control	
Location:	Orange Airport, New South Wales	
	Latitude: 33° 22.90' S	Longitude: 149° 07.98' E

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-28R-201	
Registration:	VH-HVX	
Serial number:	28R7837164	
Type of operation:	Flying training	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Pilot incapacitation involving a Piper PA 28-180, VH-PXB

What happened

On 25 January 2014, at about 1300 Eastern Daylight-savings Time (EDT),[1] a Piper PA-28-180 (Cherokee) aircraft, registered VH-PXB (PXB), taxied at Forbes aerodrome, New South Wales, for a private local flight with the pilot and one passenger on board.

The pilot of a Piper PA-25 (Pawnee) glider tug observed PXB take off from runway 27 and heard a broadcast on the common traffic advisory frequency (CTAF), advising that PXB was departing on a left downwind leg at low level to remain clear of gliders and hang gliders operating in the area.

The passenger of PXB reported that, about 10 minutes after take-off, the pilot appeared to suffer a seizure and lost consciousness, and only regained consciousness a few times briefly during the flight. The passenger took control of the aircraft and ensured the unconscious pilot remained clear of the controls. He turned the aircraft back towards Forbes aerodrome, following the Eugowra – Forbes Road, and used the aircraft radio to call for help.

At about 1312, after the pilot of the Pawnee had launched one glider and was back-tracking on the grass runway 27 Right at Forbes, he heard the passenger of PXB call for help on the CTAF.

He asked the passenger to identify the aircraft he was in, and the assistance required. He ascertained that the passenger was able to control the aircraft at that time, but had not landed an aircraft previously. PXB was at about 2,000 ft above mean sea level (AMSL) and the passenger advised that he was going to try to land back at Forbes.

The pilot of the Pawnee asked gliding club members on the ground to call emergency services. The Pawnee then took off and the pilot communicated with the passenger of PXB, determined that PXB had about 3 hours of fuel on board, and reassured the passenger that he would assist him.

The pilot of the Pawnee broadcast a 'MAYDAY'[2] call on the CTAF on behalf of PXB. He established that PXB was then at about 1,400 ft AMSL, or about 500 ft above ground level (AGL) and on descent. The pilot of the Pawnee talked the passenger through climbing PXB up to 2,000 ft AMSL using the throttle to increase power. He continued talking to the passenger, attempting to keep him calm, refrain from attempting a landing immediately, and to set the aircraft up to conduct orbits to the north of the aerodrome and maintain about 2,000 ft AMSL and an engine power setting of about 2,300 revolutions per minute.

The pilot of the Pawnee asked the glider and hang gliders airborne at the time to land, to clear the airspace for PXB. He then communicated with the pilot of an aircraft operating nearby under instrument flight rules (IFR), who relayed the distress call to Melbourne Centre air traffic control (ATC). He continued to maintain separation with PXB while keeping the aircraft in sight and continued communicating with the passenger.

He then contacted Melbourne Centre (ATC) and requested assistance to talk the passenger through landing PXB. A rescue helicopter and the IFR aircraft with an instructor on board both diverted to Forbes to provide assistance.

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1 Eastern Daylight-savings Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.
2 Mayday is an internationally recognised radio call for urgent assistance.

At about 1341, after orbiting the aerodrome for about 22 minutes, the passenger advised that the pilot was conscious and had taken control of the aircraft to return to land at the aerodrome. The pilot of the Pawnee became concerned as he observed PXB descending and heading south-west, away from the aerodrome. He communicated with the pilot, querying the altitude and heading of PXB, and with the assistance of the passenger, PXB turned towards the aerodrome.

The pilot of the Pawnee alerted the pilot to a left crosswind and broadcast a downwind call for PXB. A few minutes later, at about 1345, PXB landed just short of the threshold of runway 27, bounced once and veered off the runway during the landing roll.

The pilot of PXB was assessed by paramedics and transported to Orange hospital in the rescue helicopter. He did not recall any of the flight after the initial climb, until when the aircraft was lined up for a landing on runway 27.

Pilot comments (VH-PXB)

The pilot of PXB provided the following comments:

- he was feeling unwell during the morning prior to the flight
- he had had a late night and consumed a moderate amount of alcohol, prior to sleeping for about 5 to 6 hours on the night before the flight
- it was a hot day, with temperatures around 36 to 38 °C
- he had no pre-existing medical conditions
- in the morning he had a cup of coffee but no other liquids or food prior to the flight
- his doctor advised the most probable cause of loss of consciousness was dehydration.

Safety message

The ATSB report *Pilot Incapacitation: Analysis of Medical Conditions Affecting Pilots Involved in Accidents and Incidents,* www.atsb.gov.au/publications/2007/b20060170.aspx, found that the majority of pilot incapacitation events between 1 January 1975 and 31 March 2006 did not involve a chronic or pre-existing medical condition.

The Federal Aviation Administration (FAA) publication *Alcohol and flying: A deadly combination*, www.faa.gov/pilots/safety/pilotsafetybrochures/media/alcohol.pdf, advises that even after complete elimination of all of the alcohol in the body, there are undesirable effects, or hangover-effects, that can last 48 to 72 hours following the last drink. The minimum guidelines from the FAA are to wait for at least 8 hours after drinking alcohol before commencing a flight however, a more conservative approach is to wait 24 hours from the last use of alcohol before flying. The symptoms of hangovers include headache, dizziness and impaired judgment.

The Civil Aviation Safety Authority (CASA) conducts random drug and alcohol testing, with the prescribed limit for a blood alcohol concentration of 0.02%. The Civil Aviation Safety Regulations 1998 (CASR 1998) Part 99 can be accessed from: www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_91041.

One of the CASA's 'Out-N-Back' six part video series focuses on pilot decision making in regard to fitness to fly. It directs pilots to Civil Aviation Order (CAO) 48. This publication sets out clear guidelines in regard to fatigue assessment and management. The Civil Aviation Advisory Publications (CAAP) 48-1 offers further guidance. This Out-N-Back video and article can be found at: www.services.casa.gov.au/outnback/inc/pages/episode3/episode-3_Fatigue_management.shtml.

In addition, this 'I'm safe checklist' provide a means of self-checking one's current readiness to conduct a flight, www.ampl.ma/attachements/publication/509.pdf

General details

Occurrence details

Date and time:	25 January 2014 – 1325 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Crew incapacitation	
Location:	Forbes aerodrome, New South Wales	
	Latitude: 33° 21.82' S	Longitude: 147° 56.10' E

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-28-180	
Registration:	VH-PXB	
Serial number:	28-7405236	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Aircraft proximity event between a Cessna 172S, VH-FPV, and a Piper PA 28-161, VH-OWO

What happened

On 29 January 2014, at about 1100 Eastern Daylight-savings Time (EDT), the student pilot of a Piper PA-28-161 aircraft, registered VH-OWO (OWO), taxied to runway 17 Left (17 L) at Moorabbin Airport, Victoria to conduct five solo circuits.

At about the same time, a Cessna 172S aircraft, registered VH-FPV (FPV), was conducting circuits from runway 17 L with a student pilot and instructor on board. The air traffic controller (controller) had asked the instructor of FPV on the previous circuit to keep the circuits closer to the runway.

After completing his first touch-and-go circuit, the pilot of OWO was following an aircraft on upwind. When approaching 500 ft above ground level (AGL), prior to commencing the turn onto crosswind, the pilot observed the aircraft ahead continuing to climb straight ahead, and assumed it was departing for the training area. He then commenced the turn onto crosswind.

At about 1105, the pilot of an aircraft broadcast that they were turning downwind just as the pilot of OWO commenced his turn onto downwind. He immediately sighted the aircraft he had been following to his right and realised he had turned inside it. He was then given a new sequencing instruction by the controller.

The pilot of OWO reported that, having ‘cut off’ an aircraft in the circuit, he was conscious of conducting a tight circuit and maintaining the aircraft’s speed, to ensure OWO remained well in front of the following aircraft. At about 1108, as OWO turned onto final, the pilot was instructed by the controller to go around as he was then too close to an aircraft conducting a full stop landing on runway 17 L at the time.

The pilot of OWO conducted two more uneventful touch-and-go circuits and reported that he was concentrating on flying ‘perfect’ circuits with regard to spacing, altitude and turning landmarks such as the green roof used for turning onto final (Figure 1). At about 1121, when on his fifth and planned final circuit, the pilot of OWO reported downwind for a full stop landing. He was instructed to follow a Cessna (FPV) and sighted the aircraft.

When on about mid-downwind, the pilot moved his attention inside the cockpit to switch the fuel selector to the other fuel tank. When he had completed the fuel tank selection and the downwind checks, he looked up and sighted an aircraft on final, assumed it was FPV and continued to follow that aircraft.

At about 1123, the pilot of FPV reported that FPV was established on early final, at about 400 ft AGL, when he sighted OWO in a turn about 100 ft above and just in front of FPV. He immediately took control of the aircraft from the student and descended to increase the vertical separation between the two aircraft.

As the pilot of OWO commenced the turn onto final, at about 500 ft AGL, he sighted FPV to his right about 200 ft below OWO. He reported that at the time he was unsure whether that aircraft was landing on the parallel runway, 17 Right (17 R), however he levelled OWO off to maintain separation between the two aircraft.

The controller broadcast “OWO go around thanks, go around” with which the pilot complied immediately. The controller then asked the pilot of OWO, “Are you watching those aircraft when turning?” The pilot of OWO reported feeling somewhat rattled by the comment and apologised.

The pilot of FPV continued with the approach and reported to the controller that he had OWO in sight, to which the controller replied “that’s not the point”.

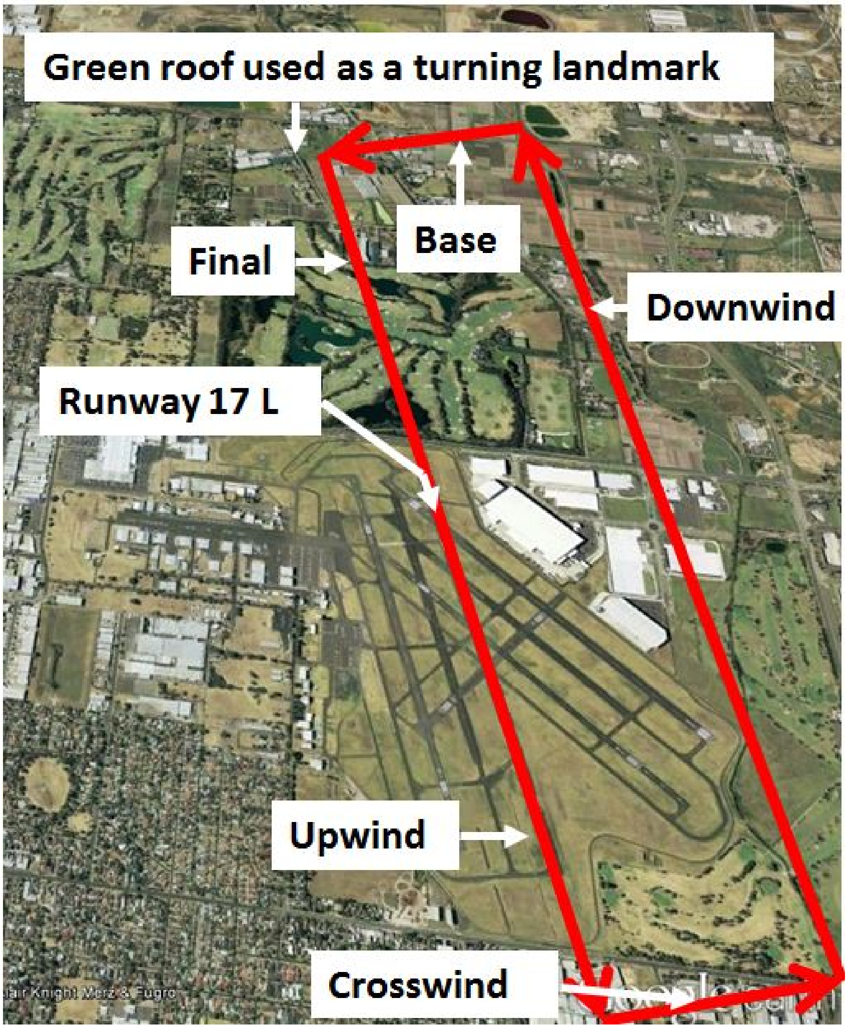
OWO conducted a final circuit before being cleared to land on runway 17 R and reported that he paid particular attention to keeping the aircraft in front of him in sight. Airservices Australia advised that the controller acted professionally and in accordance with procedures throughout the incident.

Controller comments

The air traffic controller provided the following comments:

- The controller frequently assisted student pilots to maintain adequate separation
- This sort of occurrence happens frequently at Moorabbin.
- The controller did not consider it to be a proximity event and estimated the aircraft came within about 200 to 300 ft of each other. The controller did not observe either aircraft taking any avoiding action.
- The comment to the student pilot of OWO was intended to elicit a response indicating that he would pay more attention to observing the other aircraft in the circuit.
- Many student pilots seem to be focused on flying a ‘perfect’ circuit, using ground features, and not following sequencing instructions or paying sufficient attention to other aircraft in the circuit. When an aircraft ahead flies a wider or slower circuit, the pilot is unable to maintain adequate separation with it.
- Education is needed to ensure pilots are aware of their responsibilities to maintain separation in Class D airspace. In visual meteorological conditions (VMC), there is a joint responsibility in Class D airspace between pilot and air traffic controllers to maintain separation.

Figure 1: Circuit flown by VH-OWO including circuit 'legs'



Source: Google earth and pilot recollection

Safety action

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

Operator of VH-OWO

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

Pilot briefing

The operator conducted a briefing of staff and student pilots, addressing the need for situational awareness, visual scanning and prioritising tasks. An emphasis was placed on developing an effective scan and maintaining a listening watch to assist in building an awareness of the other aircraft operating in the airspace. Pilots were advised to maintain traffic separation and not fly circuits solely by reference to ground features.

Safety message

The Civil Aviation Safety Authority booklet, *Class D airspace*, www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_93379, advises pilots that when operating in Class D airspace, they must sight and maintain separation from other aircraft. The ATC instruction to 'follow' an aircraft requires pilots to see the preceding aircraft and regulate your speed and approach path to achieve separation. Pilots and ATC have a dual responsibility to maintain situational awareness of other traffic.

This incident highlights the importance of adjusting the circuit flown, varying the shape of the circuit, and the aircraft speed to ensure the pilot is able to comply with a sequencing instruction. It is also a reminder to keep a good lookout at all times, including in Class D airspace.

General details

Occurrence details

Date and time:	25 January 2014 – 1200 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Near collision	
Location:	Moorabbin Airport, Victoria	
	Latitude: 37° 58.55' S	Longitude: 145° 06.13' E

Aircraft details: VH-OWO

Manufacturer and model:	Piper Aircraft Corporation PA-28-161	
Registration:	VH-OWO	
Serial number:	28-7916066	
Type of operation:	Flying training – solo	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Aircraft details: VH-FPV

Manufacturer and model:	Cessna Aircraft Company 172S	
Registration:	VH-FPV	
Serial number:	172S8311	
Type of operation:	Flying training – dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Near collision between a Piper PA-25, VH-MLS, and an AMS-flight DG-303, VH-DGA

What happened

On 8 February 2014, at about 1500 Eastern Daylight-savings Time, the pilot of an AMS-flight DG-303 glider, registered VH-DGA (DGA), broadcast on the local gliding club radio frequency that he would return to land at Bunyan[1] aeroplane landing area (ALA), New South Wales, following a local flight of about 90 minutes duration (Figure 2). The glider was about 5 NM east of the aerodrome and on descent from 10,000 ft above mean sea level (AMSL).

About 10 minutes later, the pilot of a Piper PA-25, registered VH-MLS (MLS), broadcast a lining up and rolling call and took off from runway 33 at Bunyan to launch a glider from overhead the aerodrome (Figure 1).

At about 1515, when at about 4,000 ft AMSL, in anticipation of the glider pilot releasing the tow cable, the pilot of MLS turned to look behind the aircraft. He confirmed that the glider had released successfully and, in accordance with standard operating procedures, he then commenced a descending turn to the left.

The pilot of DGA sighted MLS release the glider and commence the turn. The two aircraft were at about the same altitude and he then observed MLS with the wings level, he assumed the aircraft would then track straight ahead. He commenced a right turn to increase separation between them, and to track towards the joining point for a right downwind for runway 27. He reported that he assumed the pilot of MLS had sighted DGA at that time, and that he did not see MLS again until it was on downwind.

As the pilot of MLS rolled the aircraft's wings level from the turn, he saw DGA as a white flash passing about 30 ft below him, and reported that he could see the rivets on the glider's airbrakes.

About 25 seconds later, the pilot of DGA broadcast joining downwind for runway 27 and the pilot of MLS responded that he had the glider visual. After landing, the pilot of MLS alerted the pilot of DGA to the incident that had occurred.

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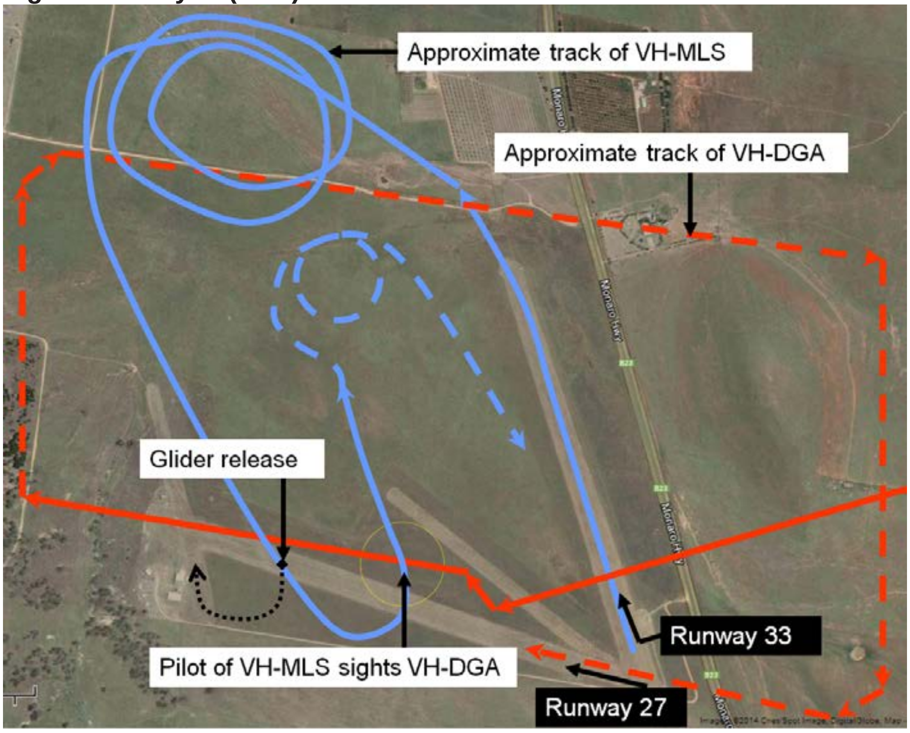
1 The aerodrome was at an elevation of about 2,540 ft above mean sea level.

Figure 1: Bunyan (ALA) and aircraft tracks



Source: Google earth and pilot recollection

Pilot comments: VH-MLS

The pilot of MLS provided the following comments:

- It was important for glider pilots to understand that the glider tow pilot has limited visibility and a high concentration on the task.

Pilot comments: VH-DGA

The pilot of DGA provided the following comments:

- He did not broadcast an inbound call because he was conducting a local flight and was only about 5 NM from the aerodrome with the aerodrome in sight.
- If he had broadcast an inbound call, or communicated directly with the pilot of MLS when he sighted the aircraft, it may have alerted the pilot of MLS to the position of the glider and assisted in maintaining separation between the two aircraft.
- At the same time as he initiated the right turn, the pilot of MLS would probably have been looking to his left prior to commencing a left turn. If he had perceived that MLS was continuing to turn left, he would have maintained heading rather than turning right.

Gliding Australia, NSW Regional Manager Operations comments

The NSW Regional Manager Operations provided the following comments:

- Due to proximity to terrain and associated turbulence, Bunyan (ALA) did not have fixed, prescribed circuit directions.
- Circuits may be flown in either direction, however the gliding club recommended that pilots of the glider tow aircraft descend away from the circuit direction currently in use.

Figure 2: VH-DGA

Source: Operator

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.

Gliding club

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

Fitment of FLARMs

The gliding club is proposing the fitment of FLARMs to all club aircraft. This is an electronic device which selectively alerts pilots of potential collisions between aircraft. It is tailored for the specific needs of small aircraft such as gliders.

Pilot communications briefing

All gliding club pilots will be reminded of the standard procedures with regard to radio communications at a pilots' briefing night.

Safety message

This incident highlights the importance of communication and the limitations of unalerted see-and-avoid principles. Issues associated with unalerted see-and-avoid have been detailed in the ATSB's research report *Limitations of the See-and-Avoid Principle*. The report highlights that unalerted see-and-avoid relies entirely on the pilot's ability to sight other aircraft. Broadcasting on the CTAF is known as radio-alerted see-and-avoid, and assists by supporting a pilot's visual lookout for traffic. An alerted traffic search is more likely to be successful as knowing where to look greatly increases the chances of sighting traffic. The report is available at www.atsb.gov.au/publications/2009/see-and-avoid.aspx.

The ATSB SafetyWatch highlights the broad safety concerns that come out of our investigation findings and from the occurrence data reported to us by industry. One of the safety concerns is safety around non-controlled aerodromes.

SafetyWatch

The ATSB publication *A pilot's guide to staying safe in the vicinity of non-towered aerodromes*, outlines many of the common problems that occur at non-controlled aerodromes, and offers useful strategies to keep you and other pilots safe. The report found that insufficient communication between pilots and breakdowns in situational awareness were the most common contributors to safety incidents in the vicinity of non-controlled aerodromes.

A copy of the report is available at: www.atsb.gov.au/safetywatch/safety-around-aeros.aspx.

General details

Occurrence details

Date and time:	8 February 2014 – 1515 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Near collision	
Location:	Bunyan (ALA), New South Wales	
	Latitude: 36° 08.18' S	Longitude: 149° 08.55' E

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-25	
Registration:	VH-MLS	
Serial number:	25-3809	
Type of operation:	Gliding – towing	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Glider details

Manufacturer and model:	AMS-Flight D.O.O DG-303	
Registration:	VH-DGA	
Serial number:	3E503 A37	
Type of operation:	Gliding – pleasure / travel	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Helicopters

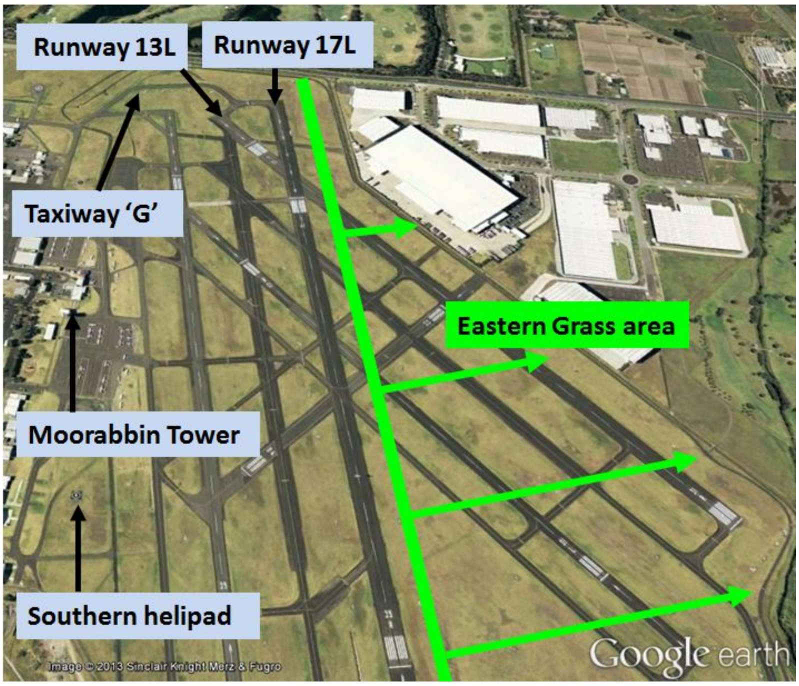
Loss of separation between a Schweizer 269C, VH-HYD and a Piper PA-31, VH-IBI

What happened

On 22 October 2013, at about 0850 Eastern Daylight-savings Time (EDT), a flight instructor and student pilot of a Schweizer 269C helicopter, registered VH-HYD (HYD), taxied to the southern helipad to conduct circuits at Moorabbin Airport, Victoria, under the visual flight rules (VFR).

Runway 17 Left (17L) was the designated runway in use[1] at the time. The helicopter circuit area was the 'Eastern Grass', defined as the area extending from 20 m east of, and parallel to, runway 17L to the perimeter fence. When operating in this area, helicopter pilots were required to broadcast prior to becoming airborne for each circuit, but were otherwise not controlled by air traffic control (ATC) (Figure 1).[2]

Figure 1: Moorabbin Airport



Source: Google earth

There were two ATC positions active at the time; an aerodrome controller – east (ADCE), and a combined surface movement controller / coordinator position (SMC). The rostered aerodrome controller – west (ADCW) was in the tower but was not yet required as there was only one runway

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1 A runway in use is a runway under the control of the aerodrome controller. All runways are considered 'active' and a clearance is required to cross or enter any runway.

2 As detailed in the En Route Supplement Australia, www.airservicesaustralia.com/aip/current/ersa/

in use. He was seated between ADCE and SMC, from where he was able to sight the aerodrome. ADCE had the runway strip for runway 17L on the runway bay on the console (Figures 2 and 3).

Figure 2: Aerodrome controller – east console

Source: Airservices Australia

Figure 3: Runway strip

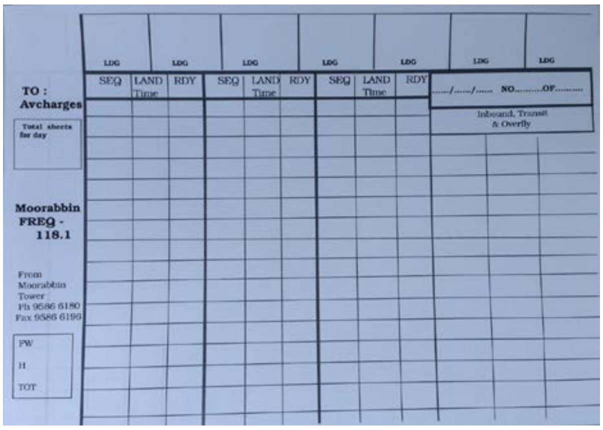
Source: Airservices Australia

The flight instructor of HYD requested and obtained a take-off clearance from ADCE. ADCE then placed the 'Helicopters' strip on the runway bay of the console and recorded HYD on the traffic sheet. At about 0905, the flight instructor of HYD broadcast 'airborne'. The ADCE controller read back this call and recorded the activity on the traffic sheet (Figures 4 and 5).

Figure 4: Helicopters strip (valid at the time of the occurrence)

Source: Airservices Australia

Figure 5: Traffic sheet (example)



Source: Airservices Australia

At about 0913, the pilot of another aircraft conducting circuits from runway 17L under the VFR at 1,000 ft above ground level (AGL), reported that the base of cloud moving into the area was at about 1,200 ft AGL. The reduced cloud base meant that fixed-wing aircraft conducting circuits must request a Special VFR (SVFR)[3] clearance. ATC are then required to provide a separation service between SVFR and other SVFR aircraft as well as between SVFR and instrument flight rules (IFR)[4] aircraft.[5]

At about 0914, an aircraft taxied to the runway 17L holding point in order to conduct solo circuits under the SVFR. Another aircraft was turning onto the base leg for a landing on runway 17L.

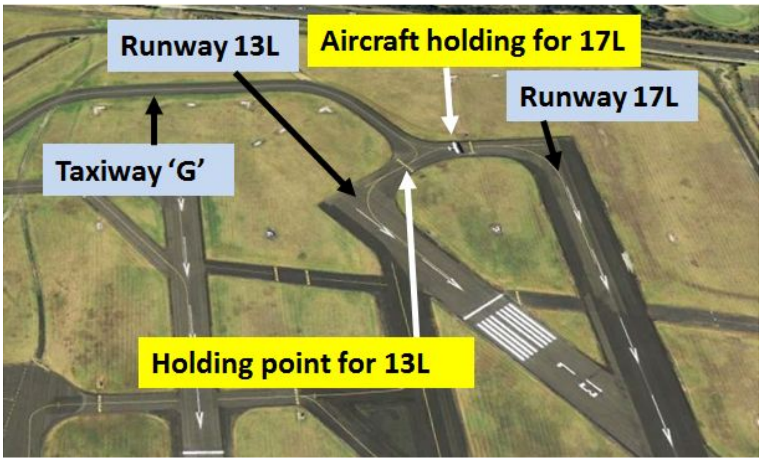
About 30 seconds later, the pilot of a Piper PA-31 aircraft, registered VH-IBI (IBI), requested a clearance from SMC for an IFR flight to Barnbougle Dunes, Tasmania, with 8 passengers on board. At about 0915, IBI commenced taxiing for runway 17L.

At about 0917, the pilot of the aircraft taxiing for circuits reported ready at the holding point for runway 17L.

ADCE was concerned about the deteriorating weather conditions, the solo student pilot of the SVFR aircraft and was attempting to expedite the departure of IBI. ADCE expected that the aircraft conducting circuits would request SVFR clearances, and IBI, operating IFR, would enter cloud after take-off. In order to ensure separation and to expedite the departure of IBI, ADCE elected to re-sequence the aircraft, so that IBI could depart before clearing the aircraft holding for circuits on 17L for take-off.

To facilitate re-sequencing of the aircraft, ADCE opted to change the departure runway for IBI from runway 17L to runway 13L. As IBI was already on taxiway 'G' and the aircraft ready for circuits was at the holding point for runway 17L, there was limited time to obtain coordination with SMC for the use of runway 13L and then alert the pilot of IBI to turn right towards the holding point for 13L, instead of left towards 17L prior to IBI reaching the intersection. ADCE also had to ensure adequate runway separation for the aircraft on base for runway 17L (Figure 6).

Figure 6: Holding points for runways 13L and 17L



Source: Google earth

ADCE then requested, and was given, jurisdiction of runway 13L from SMC. SMC handed ADCE the plastic runway 13L strip, and attempted to contact the pilot of IBI. As SMC did not get a

3 Special VFR applies in Class D airspace when meteorological conditions are less than that required for VFR. The definition is available at www.comlaw.gov.au/Details/F2010L01271

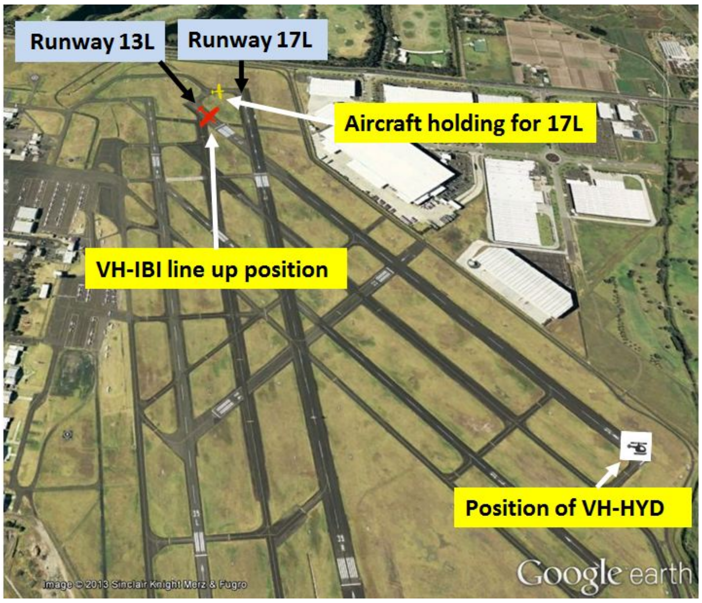
4 Instrument flight rules permit an aircraft to operate in instrument meteorological conditions (IMC), which have much lower weather minimums than visual flight rules. Procedures and training are significantly more complex as a pilot must demonstrate competency in IMC conditions, while controlling the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

5 www.casa.gov.au/wcmswr/_assets/main/pilots/download/classd_booklet.pdf

response on the ground frequency, ADCE then called the pilot on the tower frequency and offered the pilot the option to depart from runway 13L, which the pilot accepted.

At this time, the helicopter, HYD, was on the runway 31 Right threshold at the far end of runway 13L, however ADCE did not see the helicopter when conducting a scan of the runway prior to clearing IBI for take-off. ADCE reported that the 'Helicopters' strip on the console was not effective in alerting the controller to the presence of the helicopter (Figure 7).

Figure 7: Aircraft positions



Source: Google earth

At about 0918, ADCE cleared IBI for take-off from runway 13L. The pilot of IBI sighted the helicopter ahead, on the runway centreline, when about two-thirds of the way along the runway. As the aircraft had already exceeded the minimum rotate speed, the pilot continued the take-off, increased the aircraft's angle of climb, and IBI passed about 100-200 ft above HYD.

About 1 minute after IBI was cleared for take-off, the off-duty controller (ADCW) scanned runway 13L and sighted the helicopter on the runway, and immediately advised ADCE, however it was too late to advise the pilot of IBI as the aircraft was already taking off.

When at about 500 ft above ground level, the pilot of IBI asked ADCE whether ATC was aware there was a helicopter on the runway. ADCE replied that they had just realised it was there.

The instructor and student of HYD saw IBI pass overhead. At about 0920, the instructor of HYD reported 'airborne' and returned to the southern helipad.

Moorabbin tower procedures

Moorabbin tower used a combination of flight strips and traffic sheets. There was a permanent (green) strip for each runway (Figure 3). When a runway was in use, the strip for that runway was placed on the runway bay of the console by the aerodrome controller with the jurisdiction for that runway. All other runway strips were held on the runway bay of the console of the SMC position. A permanent strip for helicopters (Figure 4) was placed on the console in front of the aerodrome controller when helicopters were operating in the helicopter circuit area. There were also other permanent strips including 'runway occupied', 'overfly' and 'transit'.

A temporary flight strip was created for each IFR arrival and departure by SMC and used for coordination with Melbourne Centre air traffic control.

Unlike a number of other ATC towers in Australia, traffic sheets were used at Moorabbin to record aircraft movements, instead of Flight Progress Strips (FPS).

A review conducted by Airservices Australia in 2011 identified that the current practices at Moorabbin tower increased risk and that the practices could be changed to transition to an FPS-only environment. A trial of FPS found that due to the physical limitations of Moorabbin tower, the system could not be safely implemented.

ATC comments

The Moorabbin air traffic controllers provided the following comments:

- the helicopter strip was on the console but there was no trigger to check it as the traffic sheet was being used to monitor aircraft movements
- the small helicopters can be difficult to see when they are operating at the far end of the aerodrome
- the use of traffic sheets placed greater reliance on the controller's ability to keep a mental picture of the situation as conflicts were not displayed visually on the sheet
- the outside of the tower windows were normally washed each week, but had not been washed for over a month due to strong winds reducing the visibility from the tower.
- When runway works were being conducted, a 'works' strip was placed over the relevant runway by SMC. SMC suggested that putting 'helicopters' on the works strip as a secondary check, may provide a reminder to check for helicopters when handing a runway strip to ADC. To achieve this, ADC would be required to advise SMC of helicopter operations, as VFR helicopter flights obtained clearances from ADC and did not contact SMC.

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.

Moorabbin Tower (Airservices Australia)

As a result of this occurrence, the Moorabbin Tower Manager advised the ATSB that they have changed the colour of the 'Helicopters' strip from yellow to bright orange to make it more visible.

In a comprehensive review of the incident and a report provided to the ATSB, Airservices Australia has committed to the following actions:

- Amend local procedures at Moorabbin associated with helicopter operations including the Eastern Grass training area as follows: ADC to request release of helicopter training areas from the SMC; SMC to display a helicopter training area reminder strip underneath the runway jurisdiction strip/s when helicopter training areas are active; and SMC to indicate active helicopter areas on the reminder strip. Coordination will be required between ADC and SMC for activation of the training areas and the SMC and ADC will display a helicopter reminder strip.
- Conduct a review of the local ATC procedures at Moorabbin for: the use of FPS for IFR departing and arriving aircraft; and the use and format of traffic running sheets and memory prompts for optimum controller situation awareness.
- Review the clearance requirements for helicopter training areas to clarify the discrepancy between AIP requirements and ERSA descriptions.

Safety message

The ATSB report *Loss of separation between aircraft in Australian airspace January 2008 to June 2012*, found that Moorabbin Airport had the highest overall collision risk of any towered airport. This was related to the large number of occurrences (due in part to the large number of aircraft movements, and a complex arrangement of taxiways to deal with three runways), and the relatively high number of occurrences with an elevated or some collision risk. www.atsb.gov.au/publications/2012/ar-2012-034.aspx

The report states that

> *Both the air traffic controller and the pilots of aircraft under the controller's jurisdiction have responsibilities for maintaining separation, and errors by either or both can lead to a loss of the separation standard. However, through the ATS system, it is the controller that is provided with the bigger picture of the positions and proximity between all aircraft in their airspace, and who therefore has accountability for keeping those aircraft apart.*

The report found that high workload was by far the most common factor contributing to controller errors across loss of separation occurrences.

Further information about operating in Class D airspace, including Special VFR procedures, can be found at www.casa.gov.au/wcmswr/_assets/main/pilots/download/classd_booklet.pdf

General details

Occurrence details

Date and time:	22 October 2013 – 0919 EDT	
Occurrence category:	Serious incident	
Primary occurrence type:	Airprox	
Location:	Moorabbin Airport, Victoria	
	Latitude: 37° 58.55' S	Longitude: 145° 06.13' E

Aircraft details: VH-HYD

Manufacturer and model:	Schweizer Aircraft Corporation	
Registration:	VH-HYD	
Serial number:	0179	
Type of operation:	Flying training – dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	None	

Aircraft details: VH-IBI

Manufacturer and model:	Piper Aircraft Corporation	
Registration:	VH-IBI	
Serial number:	31-7552035	
Type of operation:	Charter - Passenger	
Persons on board:	Crew – 1	Passengers – 8
Injuries:	Crew – Nil	Passengers – Nil
Damage:	None	

Engine failure involving a Eurocopter EC120B, VH-JYV

What happened

On 21 January 2014, a pilot and check pilot were conducting a check flight in a Eurocopter EC120B, registered VH-JYV, at Port Hedland aerodrome, Western Australia.

The crew completed two simulated engine failures in the hover from about 3 to 4 ft above ground level (AGL), and a practice autorotation[1] into wind. The check pilot then briefed the pilot in command about the next manoeuvre, a 360° autorotation.

At about 1600 Western Standard Time (WST), when at about 1,500 ft above ground level, and overhead the runway 32 threshold, the check pilot stated that, on the count of three, he would reduce the throttle to idle. He counted to three and then reduced the throttle to idle and stated that they had a simulated engine failure. The pilot lowered the collective[2] and reduced airspeed, and entered the autorotation, simultaneously commencing a 360° turn. After about 3 seconds, passing through about 90° of rotation, the check pilot observed the (orange) 'GEN' warning light illuminate. He advised 'generator warning' and pushed the generator switch and attempted to restart the generator, without success, and the light remained on. The check pilot confirmed that the throttle was in the idle position. The (orange) fuel pressure light then illuminated and the check pilot advised 'fuel pressure warning' and selected the electric fuel pump on. The engine turbine continued to wind down and, when at about 800 ft AGL, the check pilot called 'engine failure' and simultaneously the (red) oil pressure light illuminated. The pilot continued the autorotation to the ground, with the check pilot assisting in the final stages. The helicopter landed smoothly, completing 360° of rotation, in the undershoot of runway 32, and no damage or injuries were sustained.

The check pilot then exited the helicopter and conducted a walk-around inspection, and found no damage or evidence of oil leakage or other mechanical fault. He then re-boarded the helicopter. As the helicopter was in the runway undershoot and two passenger aircraft were inbound to Port Hedland and about 5 NM away, the pilot attempted to restart the engine. The engine started normally, no warnings illuminated and all engine instruments indicated normal operation. The helicopter was fitted with a vehicle and engine multifunction display (VEMD), and all indications were normal.

The pilot then commenced a take-off and repositioned the helicopter to a dirt area away from the active runway and taxiways. The pilot kept the engine running and advised the airport fire services, aerodrome safety officer and Port Hedland aerodrome flight information service (AFIS) operator that no assistance was required and all operations were normal.

After idling the engine for about 15 minutes, with all systems operating normally, the check pilot again conducted an external inspection of the helicopter, with no abnormalities found. The pilot then relocated the helicopter to the company base helipad, recorded the engine flameout on the maintenance release and advised the senior base engineer of the incident.

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1 Autorotation is a condition of descending flight where, following engine failure or deliberate disengagement, the rotor blades are driven solely by aerodynamic forces resulting from rate of descent airflow through the rotor. The rate of descent is determined mainly by airspeed.

2 The collective pitch control, or collective, is a primary flight control used to make changes to the pitch angle of the main rotor blades. Collective input is the main control for vertical velocity.

Figure 1: VH-JYV

Source: Operator

Engine flameout restart procedures

The flight reference card (FRC) stated that there was a standard procedure for restarting the engine following a flameout in flight, providing sufficient altitude remained. As the helicopter was at about 800 ft AGL when the flameout occurred, the crew elected not to attempt a restart.

There was no directive preventing a restart following a flameout either on the ground or in flight. Prior to restarting (and repositioning) the helicopter, the crew carried out a thorough external inspection with no defects found and all VEMD engine system indications were normal.

Engineering inspection

The throttle twist grips were thoroughly investigated with the following findings: the idle stop markings were correct; the rigging confirmed as correct on both collectives; the fuel shut-off lock solenoid was functioning normally and could not be selected at the flight idle position and the twist grip inspection and modification had been carried out in accordance with Eurocopter Service Bulletin 76-007.

No defects were found in the chip monitor, fuel control unit or fuel injector and no fuel contamination was found. No faults were recorded on the VEMD.

A boroscopic inspection of the engine revealed burnt dilution tubes however these were deemed to be within normal limits by the engine manufacturer.

The engine manufacturer subsequently tested the engine and found no discrepancies that would explain the flameout.

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.

Helicopter operator

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

Flight Safety Instruction

The operator issued a flight safety instruction with the following requirements:

An incident must be assessed for its potential to have caused an accident. If an accident nearly occurred due to an aircraft anomaly, the aircraft is to be deemed unserviceable until advised by the chief pilot or engineering manager.

Any warning generated by the helicopter warning system or abnormal flight characteristics is to be discussed with the senior base engineer or engineering manager prior to continuing or commencing flight.

Safety message

The United States Federal Aviation Authority (FAA) reported that a high number of accidents were associated with practice autorotations with a power recovery. However, engine failure and subsequent autorotation often lead to accidents or serious incidents. The benefits of practice autorotations must be weighed against the risk of incidents during practice autorotations.

The company pilots in this incident had conducted two check flights per year on each aircraft type, with practice autorotations in each check. The successful completion of the autorotation highlights the benefits of the practice. Due to the risk inherent in conducting practice autorotations, some organisations are moving to conducting check flights in simulators where practical.

The American Aircraft Owners and Pilots Association (AOPA) found that more accidents happen each year from practice autorotations than from actual engine failures. The following links provide information regarding practice autorotations:

• www.ainonline.com/aviation-news/hai-convention-news/2012-02-13/instructor-pilots-give-guidance-autorotation-training

• www.ainonline.com/aviation-news/aviation-international-news/2013-05-01/astar-accident-shines-light-autorotation-training

• www.aviationtoday.com/rw/training/specialty/Flight-Training-Tips-Dancing-With-the-Devil_13632.html

• blog.aopa.org/helicopter/?p=725

• www.faa.gov/documentLibrary/media/Advisory_Circular/AC_61-140.pdf

• www.faasafety.gov/files/gslac/library/documents/2011/Aug/56414/FAA%20P-8740-71%20Planning%20Autorotations%20[hi-res]%20branded.pdf

General details

Occurrence details

Date and time:	21 January 2014 – 1630 WST	
Occurrence category:	Serious incident	
Primary occurrence type:	Engine failure or malfunction	
Location:	Port Hedland aerodrome, Western Australia	
	Latitude: 20° 22.67' S	Longitude: 118° 37.58' E

Helicopter details

Manufacturer and model:	Eurocopter France EC120B	
Registration:	VH-JYV	
Serial number:	1112	
Type of operation:	Flying training	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Controlled flight into terrain involving a Robinson R22, VH-LZR

What happened

On 10 February 2014, at about 1500 Central Standard Time, the pilot of a Robinson R22 helicopter, registered VH-LZR, commenced take-off for a private local flight from a property about 100 km east of Mataranka, Northern Territory.

As the helicopter became airborne heading to the south-east, the pilot sighted an object moving to his right. At about 10 ft above ground level, the pilot was distracted looking outside the door at the object and the helicopter collided with a tree. The object was not identified. The helicopter sustained substantial damage and the pilot was uninjured (Figure 1).

Figure 1: Damage to VH-LZR

Source: Owner

Safety message

This incident shows that distractions can have a significant impact on flight safety.

Distraction is defined as a process, condition or activity that takes a pilot's attention away from the task of flying. Even a momentary deflection of attention away from the primary task can have adverse consequences. Studies found that all pilots are vulnerable to distraction, the sources of distraction are diverse and distractions can occur during all stages of flight.

Research conducted by the ATSB identified 325 occurrences between 1997 and 2004 which involved distractions. In 35 of the incidents the distraction occurred during take-off. A total of 11 distractions were attributed to an object or person on the ground, two of which resulted in a collision with foliage or a tree.

The report *Dangerous Distraction* is available at www.astb.gov.au/publications/2005/distraction_report.aspx

General details

Occurrence details

Date and time:	10 February 2014 – 1500 CST	
Occurrence category:	Accident	
Primary occurrence type:	Controlled flight into terrain	
Location:	100 km E Mataranka (ALA), Northern Territory	
	Latitude: 14° 59.05' S	Longitude: 133° 59.53' E

Helicopter details

Manufacturer and model:	Robinson R22 BETA	
Registration:	VH-LZR	
Serial number:	2629	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Australian Transport Safety Bureau

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

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

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

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

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

About this Bulletin

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

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

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

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

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

Conducting these Short investigations has a number of benefits:

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

Australian Transport Safety Bureau

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Investigation

ATSB Transport Safety Report
Aviation Short Investigations
Aviation Short Investigation Bulletin Issue 28
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