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AO-2012-060

What happened

At 0749 Eastern Standard Time[1] on 17 April 2012, a Boeing Company 737-7Q8 aircraft, registered VH-VBL (VBL), departed Melbourne, Victoria, on a scheduled passenger service to Sydney, New South Wales. On board were two flight crew, five cabin crew and 129 passengers.

Two cabin crew were stationed at the front of the passenger cabin (cabin), one being the cabin supervisor (supervisor).The other three cabin crew were stationed at the rear of the cabin.

The pilot in command (PIC) reported a burning smell in the cockpit on takeoff that dissipated at the top of climb. Shortly after the landing gear had retracted, at about 1,000 ft, the supervisor advised the PIC of a very unusual smell in the front and rear of the cabin.

The PIC instructed the supervisor to open the vents to improve ventilation and to advise him if the smell did not dissipate within 3 to 5 minutes. The PIC advised the supervisor that the cause of the smell was probably the result of the aircraft being newly out of maintenance and that he had experienced a similar occurrence before.

One of the rear crew members was ill a number of times and was not able to continue with his duties. The inability of a cabin crew member to continue with their duties could have reduced the level of safety if there had not been an extra crew member on the flight, although the operator had procedures in place to mitigate this risk for a cabin crew complement of four, the standard cabin crew complement for this aircraft type.

About halfway through the flight, the supervisor went to the cockpit to discuss the situation with the PIC. The PIC again advised that he had experienced a similar occurrence before. The supervisor also noted that the smell was not present in the cockpit.

On descent into Sydney, while passing through 10,000 ft, the PIC noticed a slight smell for about a minute.

At 0901 the aircraft landed at Sydney. After the passengers left the aircraft, the PIC discussed the matter with a company engineer. Following a review of the maintenance log, the engineer advised that the aircraft had just undergone an engine wash and that may have caused the smell.

After vacating the aircraft, the PIC discussed the situation with the cabin crew and advised them of the engineer’s comments.

No passengers reported feeling unwell during or following the flight, though the cabin crew observed some passengers in the front of the cabin coughing during the flight. The PIC at no time felt unwell. The first officer (FO) advised the PIC that he had not smelt anything unusual throughout the flight.

Two of the cabin crew members affected by the fumes were later deemed by a doctor to be unfit to return to work. The doctor deemed one crew member fit to fly back to her home port, the other was deemed unfit to fly and did not return to his home port until the following day.

PIC recollection of events

About 30 minutes into the flight, the supervisor informed the PIC that one of the rear cabin crew members had been ill. The PIC was also aware that the supervisor and the other crew member in the front cabin were experiencing minor symptoms due to the fumes.

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

Cabin crew recollection of events

Immediately after the aircraft became airborne, before the landing gear was retracted, the supervisor and the other crew member in the front of the cabin noticed a strong smell, though there were no visible signs of fumes. As this was a No Contact Period[2], the supervisor was unable to advise the flight crew.

Although she had worked as a supervisor with the company for about six years, the supervisor could not recognise the smell and described it as similar to dirty socks. As soon as the landing gear was retracted, the supervisor informed the PIC of the smell and that the rear cabin crew could also smell the fumes.

A short time later, the supervisor noted that the smell was slightly worse when she stood up. The supervisor developed blurry vision, dizziness and a dry throat. The other crew member at the front of the cabin felt nauseous and had a dry cough throughout the flight.

The supervisor advised the PIC of the condition of the crew member in the rear cabin, but did not use the term "incapacitated" as she believed she had explained the crew member's condition clearly.

After the flight, the supervisor conducted a debrief with the cabin crew and the PIC joined them a short time later and advised that he was considering submitting a hazard report on the occurrence.

Checklists and procedures

The PIC did not refer to the company's 'smoke, fire and fumes checklist' during the event as he considered the situation to be under control and that the smell had dissipated. Additionally, there were no complaints from the passengers.

Part of the checklist states that, in case of fumes, cabin crew were not to open the flight deck door and were only to communicate by interphone. Further, if any cabin crew were affected, the PIC was to inform the company.

The company procedures required the flight crew and the cabin crew to conduct a debrief following occurrences such as this. Additionally, company procedures require the PIC to report the occurrence of fumes in the aircraft immediately after landing.

Safety message

The incident highlights the potential for crew incapacitation from exposure to fumes.

Clear and unambiguous communication between the flight and cabin crew should be maintained during any unusual event. The following ATSB investigation reports provides further reading on occurrences related to fume events in aircraft passenger cabins:

- AO-2009-025 – Fumes event, 5 June 2009
  www.atsb.gov.au/publications/investigation_reports/2009/aair/ao-2009-025.aspx
- AO-2007-063 – Fumes event, 23 November 2007
  www.atsb.gov.au/publications/investigation_reports/2007/aair/ao-2007-063.aspx
- AO-2007-031 – Fumes event, 5 August 2007
  www.atsb.gov.au/publications/investigation_reports/2007/aair/ao-2007-031.aspx
- AO-2007-025 – Smoke in cabin, 23 July 2007
  www.atsb.gov.au/publications/investigation_reports/2007/aair/ao-2007-025.aspx

2 The 'no contact period' for take-off was from when power was applied for take-off until the landing gear was retracted. During this period, cabin crew are not permitted to initiate communication with flight crew regardless of circumstance.

- 200500141 – Fumes event, 15 January 2005
  www.atsb.gov.au/publications/investigation_reports/2005/aair/aair200500141.aspx

Aircraft details

Manufacturer and model:	Boeing Company 737-7Q8	
Operator:	Virgin Australia	
Registration:	VH-VBL	
Type of operation:	Air transport – high capacity	
Location:	near Melbourne Airport, Victoria	
Occurrence type:	Fumes event	
Persons on board:	Crew – 7	Passengers – 129
Injuries:	Crew – 2 (minor)	Passengers – nil
Damage:	None	

Turboprop aircraft

Take-offs without runway lighting

VH-FVL (ATR-72), VH-FVU (ATR-72), VH-QOK (DHC-8)

AO-2012-069

What happened

Gladstone runway 10

Source: *QantasLink*

At 1751 Eastern Standard Time[1] on 16 May 2012, a GIE Avions de Transport Regional ATR-72 aircraft, registered VH-FVL, was being operated by Skywest Airlines on a scheduled passenger flight from Gladstone to Brisbane, Queensland. On departure from Gladstone the runway lighting extinguished during the takeoff roll.

At 1754 EST on 17 May 2012, a GIE Avions de Transport Regional ATR-72 aircraft, registered VH-FVU, operated by Skywest and a Bombardier DHC-8-402 aircraft, registered VH-QOK, operated by QantasLink, were conducting scheduled passenger flights from Gladstone to Brisbane. VH-FVU departed Gladstone without activating the runway lights for the takeoff. VH-QOK departed Gladstone without the runway lights being activated for the taxi and takeoff roll.

Airport information and lighting

Gladstone Airport is a non-towered, uncontrolled airport operating on a common traffic advisory frequency (CTAF). A CTAF is a radio frequency designated for communications between aircraft in the vicinity of aerodromes without a control tower.

The runway lighting was controlled by a pilot activated lighting (PAL) system that was combined with an aerodrome frequency response unit[2] (AFRU). To activate the lights, pilots were required to make a sequence of three transmissions on the CTAF. Each transmission was to have a maximum duration of 1 second, with the break between transmissions being a maximum of 1 second. On receipt of the appropriate transmission, the AFRU would broadcast an automatic message ‘Gladstone lights ON’ on the CTAF.

Once the PAL system was activated, the airport lighting would remain on for 30 minutes. If it was reactivated during this period, the lighting would remain on for 30 minutes from the time of reactivation. At 10 minutes prior to the end of the 30-minute activation period, the wind indicator (windsock) lights would commence flashing to warn users that the airport lighting was about to extinguish. In addition, an automated message would be transmitted on the CTAF to state there was 10 minutes of runway lighting remaining. There was no indication that the system was malfunctioning on the nights of the occurrences.

Aircraft lighting information

The exterior lighting of both aircraft types included several lights, which illuminated the ground in front of the aircraft. These included the landing lights, nose lights, taxi lights and flare lights. The combination of these lights provided a substantial amount of illumination in front of the aircraft.

Local conditions

Gladstone Airport is in a shallow valley surrounded by commercial and industrial buildings which were well lit, as well as private housing, major roads and a brightly lit railway. The overall effect was to provide a high level of ambient lighting surrounding the airport.

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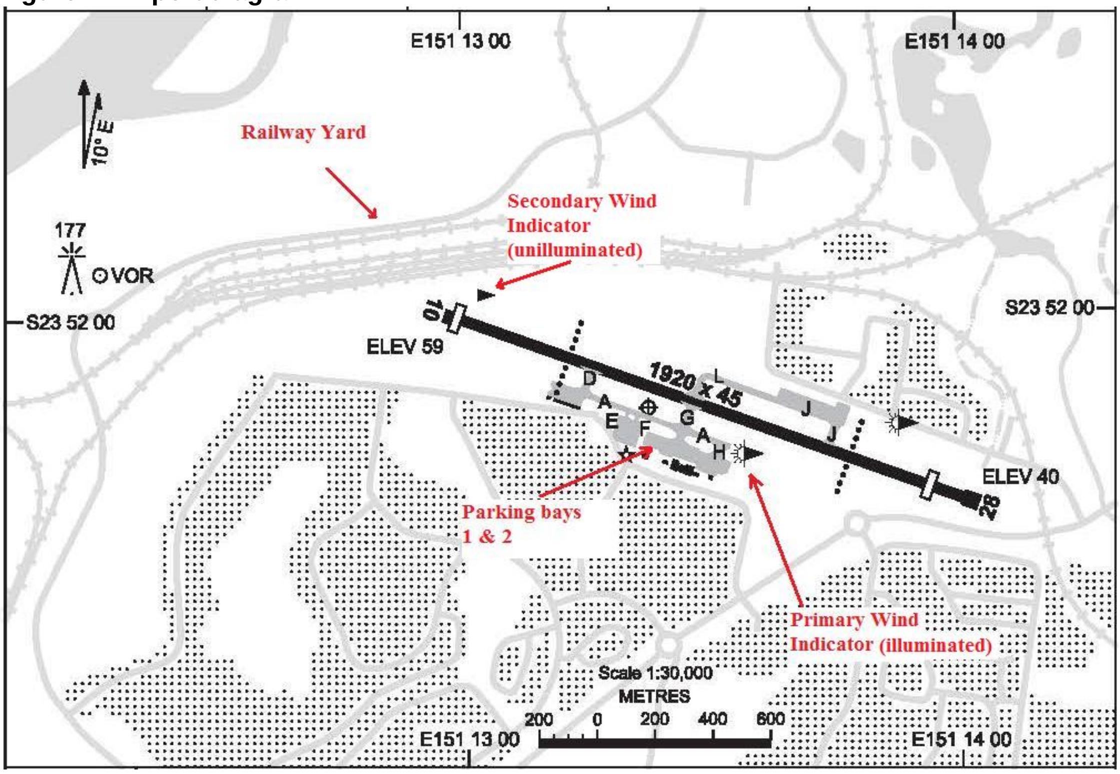
[1] Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

[2] Aerodrome frequency response unit (AFRU) is a VHF transceiver which provides an automatic response when the pilot transmits on the traffic frequency (normally a CTAF) for a particular aerodrome.

The primary wind indicator (windsock) was located adjacent to the eastern most corner of the apron (Figure 1). It was behind all aircraft parked on bays 1 to 4. The windsock was situated in low ground relative to the apron. From parking bays 1 and 2, the windsock was partially obscured by a lighting control cabinet (Figure 2). The windsock lights were grouped at the top of the pole.

All aircraft were utilising parking bays 1 and 2 and were parked facing the terminal on the nights of the occurrences. The terminal was brightly lit inside and the glare from the lighting extended out to the apron. The parking bays were also floodlit. The flood lighting provided an area of bright lighting which reached to the rear of the apron behind the aircraft.

Figure 1: Airport diagram



Source: *Airservices Australia*

Weather

The weather conditions on both nights were reported as calm with a clear sky and no moon. Last light on the 16 and 17 May 2012 was at 1743 Eastern Standard Time.

Recorded information

Recordings of radio transmissions made on the CTAF along with footage from closed circuit television (CCTV) mounted on the passenger terminal were reviewed by the ATSB. The CCTV showed movements of the aircraft consistent with the audio recording of the CTAF for both nights. In addition, the recordings confirmed the following:

16 May 2012

- *Runway lights are on – from CCTV footage 1727*
- an automatic airport lighting 10 minutes remaining warning was made at about 1737
- VH-FVL made a taxi call at 1745
- VH-FVL made an entering and backtracking call at 1746
- *Runway lights turn off at 1747 - from CCTV footage*
- VH-FVL made a departure call at 1753 noting time of departure of 1751
- a DHC-8 made a taxi call at 1751
- a DHC-8 made an entering and bactracking call at 1752
- 'Gladestone lights ON' at 1752
- A DHC-8 made a rolling call at 1754

17 May 2012

- *Runway lights are on – from CCTV footage 1735*
- an automatic airport lighting 10 minutes remaining was made at about 1745
- VH-FVU made a taxi call at 1748
- VH-FVU made an entering and backtracking call at 1750
- VH-FVU made a rolling call at 1754
- *Runway lights turn off- from CCTV footage at 1754*
- VH-QOK made a taxi call at 1804
- VH-QOK made an entering call at 1804
- VH-QOK made a rolling call at 1806
- 'Gladstone lights ON' at 1811

Comments from flight crew

All flight crew interviewed advised that, during the taxi and take-off roll, they did not notice anything unusual or problematic with the airport lighting or environmental conditions at the airport. In addition, they reported that they had no difficulties maintaining directional control during the take-off. All pilots commented that the aircraft's lights provided a substantial amount of illumination during the taxi and take-off roll. The flights crew also reported that they were not aware that the runway lights had deactivated between boarding the aircraft and the aircraft departing,until contacted by the ATSB.

All crew stated that they did not recall hearing the 10 minute warning broadcast on the CTAF. They stated that they may have been distracted with other tasks related to preparing the aircraft for departure at the time of the transmission.

The crews commented that they could not recall seeing or specifically looking for the windsock flashing warning, indicating the runway lights were about to turn off. However, all crew noted that the windsock was difficult to see from the parking bays and on taxi out to the runway. In addition, all crew stated that the presence of an aerodrome weather information service (AWIS), which provided actual weather conditions via a radio broadcast on a frequency separate to the CTAF and PAL frequency, made it unnecessary for them to turn their attention to the windsock to obtain information on wind speed and direction.

All crew also noted that on line up for runway 10, the illuminated primary windsock is over half way down the runway and behind the terminal flood lighting. There was higher ground containing bright lighting behind the windsock. The combination of these things obscured any flashing warning (Figure 3). All crew stated that they would be more likely to look to the closer unlit windsock located on the threshold of runway 10 as a final confirmation of the wind direction on line up at runway 10.

Figure 2: Windsock view from parking bay 2

Source: *QantasLink*

Figure 3: Gladstone runway 10 threshold – lights on

Source: *QantasLink*

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.

Skywest Airlines

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

- Issue of an internal company memo reminding flight crew of the standard operating procedure requirement to cycle the runway lighting prior to engine start and to confirm that the PAL status light is correctly illuminated.

QantasLink

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

- Policy to be formulated regarding the activation and verification of the runway lights prior to taxi,
- A review of runway verification process and line up drill to align with “best practice”,
- QantasLink, with the assistance of the Civil Aviation Safety Authority (CASA), will approach operators of airports where air transport operations are conducted to encourage airport lighting to be left on continously during periods of peak aircraft activity.

Gladstone Airport

As a result of this occurrence, Gladstone Airport has advised the ATSB that they will be investigating the viability of installing a reflective sign, stating ‘Are the runway lights on?’, to prompt pilots before entering the airport manoeuvring areas.

Safety message

Runway and taxiway lighting serves many important functions for a departing aircraft. For example, it provides:

- navigational guidance around the airport
- directional guidance during the take-off roll
- an indication of the location of the end of the runway
- necessary guidance for approach and landing if required due to an emergency shortly after takeoff

The incident highlights the potential hazards associated with change blindness, inattention blindness and expectation bias.

Change blindness occurs when a person does not notice that something is different about the visual environment relative to before the change. Research has shown that in some cases, quite dramatic changes are not detected, particularly if changes occur when the observer is not looking at the relevant part of the visual environment at the time. In this instance, the crews did not notice the difference between the airport lighting when they were boarding the aircraft versus when they taxied out for departure. At the time the airport lighting was turned off, the aircraft was parked on the apron and the crew were onboard the aircraft facing away from the runway lighting and looking into a brightly lit terminal.

Inattention blindness occurs when a person does not notice an object which is visible, but unexpected, because their attention is engaged on another task. In this instance, the absence of airport lighting was noticeable, if looked for, and the crews probably had an assumption or expectation that the lighting was on.

In simple terms, expectation bias is ‘seeing’ what you expect to see even when it is not there. In this case, runway lighting being on.

Defining a specific place for PAL tasks in the crew's sequence of procedures, such as when the pre-taxi CTAF call is made and incorporating this into a pre-taxi checklist, could potentially ensure more reliability in performing these tasks.

For a similar procedural event refer to:

- Procedures-related event, Launceston Airport, Tas., 12 March 2008, VH-VQY, Airbus A320-200 ATSB Investigation AO-2008-020 www.atsb.gov.au/publications/investigation_reports/2008/aair/ao-2008-020.aspx

For further information on change and inattention blindness and expectation bias refer to:

- *Deadly Omissions*- Transport Canada
  www.tc.gc.ca/eng/civilaviation/publications/tp185-2-10-feature-3718.htm
- Sights unseen – American Psychological Association
  www.apa.org/monitor/apr01/blindness.aspx

VH-FVL

Manufacturer and model:	GIE Avions de Transport Regional ATR 72
Operator:	Skywest
Registration:	VH-FVL
Type of operation:	Air transport – high capacity
Location:	Gladstone Airport , Queensland
Occurrence type:	Navigation event
Damage:	Nil

VH-FVU

Manufacturer and model:	GIE Avions de Transport Regional ATR 72
Operator:	Skywest
Registration:	VH-FVU
Type of operation:	Air transport – high capacity
Location:	Gladstone Airport, Queensland
Occurrence type:	Navigation event
Damage:	Nil

VH-QOK

Manufacturer and model:	Bombardier DHC-8-402
Operator:	QantasLink
Registration:	VH-QOK
Type of operation:	Air transport – high capacity
Location:	Gladstone Airport, Queensland
Occurrence type:	Navigation event
Damage:	Nil

Piston aircraft

Partial power loss – Gippsland Aeronautics GA8, VH-WOV

AO-2012-062

What happened

A similar GA8 aircraft

Source: ***GippsAERO Pty Ltd***

On 28 April 2012, at about 0815 Western Standard Time[1], a Gippsland Aeronautics GA8-TC 320 aircraft, registered VH-WOV (WOV), took off from runway 12 at Kununurra airport, Western Australia, for a sightseeing flight over the Bungle Bungle ranges. On board were the pilot and six passengers.

The flight was scheduled to depart at 0630, but was delayed after the aircraft initially assigned to the task was found to be unserviceable during engine run-up. Further delays ensued because the replacement aircraft, WOV, required additional fuel and there were complications associated with organising the refuel. The pilot sensed a growing level of passenger frustration at the delay and was also concerned that his subsequent flight would be substantially affected by the delay. These circumstances made the pilot anxious to commence the flight.

The engine operated normally during the pre-flight engine run-up, but failed to deliver full power during the takeoff roll. Gradual application of the throttle during the takeoff meant that the pilot was unaware of the of the engine problem until some time into the takeoff roll. After becoming airborne, the engine power decreased further, despite the continuing application of full throttle by the pilot. At about 30 ft above ground level (AGL), the engine power had decreased to the point that level flight could not be maintained. In response to the low and reducing power, the pilot turned toward a field in preparation for a forced landing.

At about 10 ft AGL during the forced landing, the pilot discovered that sufficient power was available to remain airborne. The pilot commented that continued flight at this point may have been aided to some extent by ground effect[2]. After assessing that the surface of the forced landing field was unsuitable, the pilot elected to remain airborne and continue the turn back toward the departure airport. The aircraft reached the airport, but continued across the runway and parallel taxiway at an angle of about 45˚, only several feet above the ground. The pilot did not land on the runway or taxiway, concerned that any attempt to significantly bank the aircraft to align with the runway or taxiway may have resulted in wing tip contact with the ground. The pilot landed the aircraft on a grassed area of the airport adjacent to the parallel taxiway (Figure 1). The aircraft was undamaged and there were no injuries.

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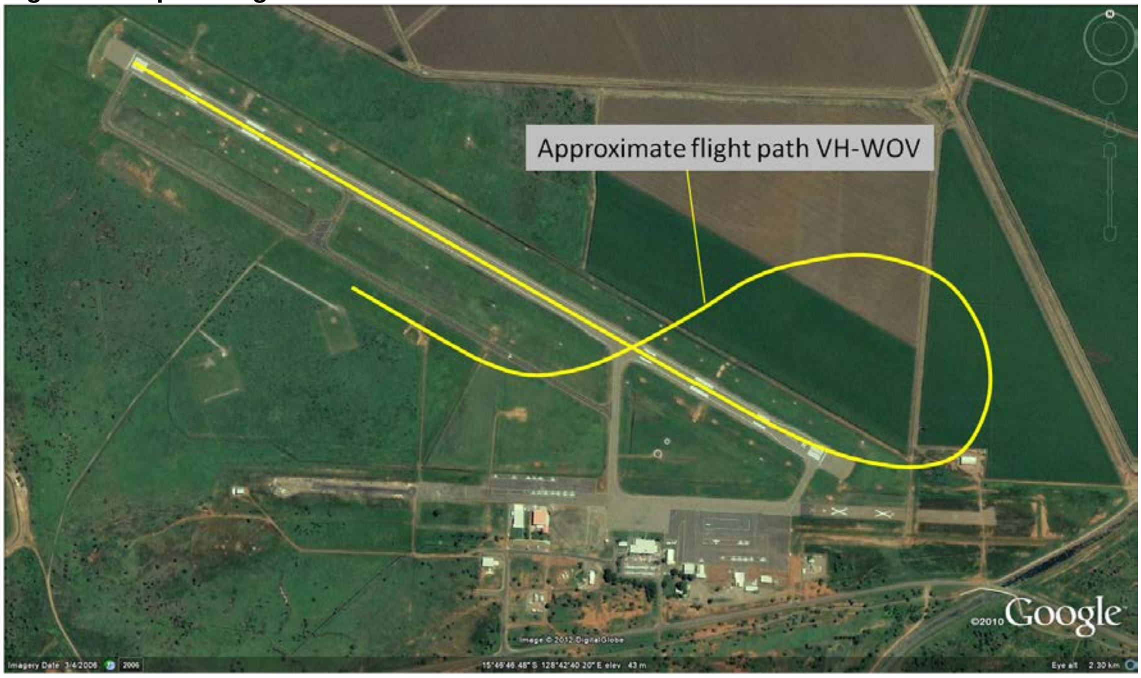
1 Western Standard Time (WST) was Coordinated Universal Time (UTC) + 8 hours.

2 Ground effect is a term used to describe improvements in aerodynamic lift and drag generated when an aircraft flies close to the ground.

Figure 1: Airport diagram



Source: ***Google Earth***

Engine malfunction

WOV was fitted with a six cylinder, horizontally opposed, air cooled, turbocharged, fuel injected Lycoming TIO-540-AH1A engine. This engine had a maximum continuous power rating of 300 brake horsepower at 38 inches Hg[3] manifold pressure and 2,500 RPM. Published aircraft takeoff performance data was based upon a power setting of 40 inches Hg manifold pressure and 2,500 RPM. During the incident flight, the takeoff manifold pressure reached only 29 inches Hg, and decreased further after the aircraft became airborne, despite the continued application of full throttle.

Engine run-up procedures did not require the pilot to check that the engine was capable of delivering full power, or to check operation of the engine turbocharger system. The GA8-TC 320 Pilot's Operating Handbook (POH) did however state the importance of checking full throttle engine performance early in the takeoff run. The POH also stated that "... sluggish acceleration is good cause for discontinuing the takeoff ...".

The engine turbocharger system fitted to WOV had undergone maintenance during the day prior to the incident flight. This maintenance included adjustment to correct play in the waste gate[4] linkage and adjustment to correct the maximum manifold pressure. Following the incident flight, further maintenance was carried out on the turbocharger system in an attempt to rectify the low manifold pressure problem. During the subsequent flight, flown by another pilot to check engine performance, manifold pressure problems were still apparent. The turbocharger system waste gate was then replaced.

Pilot's decision to continue the takeoff with low engine power

When the pilot noticed the low manifold pressure during takeoff, he suspected a turbocharger system malfunction. At that point however, the aircraft was close to takeoff speed and the pilot

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[3] Inches Hg (Mercury) is the unit measure of manifold pressure used in piston engine aircraft and is indicative of the engine power being produced.

[4] The waste gate mechanism is an integral part of the turbocharger system. It varies the amount of exhaust air delivered to the turbocharger turbine, which in turn varies the turbine speed, turbocharger system output and available manifold pressure.

had very little time to analyse the circumstances and effectively assess the situation. The pilot's decision to continue with the takeoff was influenced by an expectation that the engine would still deliver adequate power for the planned flight, despite the apparent turbocharger system malfunction. The pilot did not anticipate the subsequent uncommanded decrease in manifold pressure once airborne. At worst, he expected that the engine would behave like a normally aspirated engine. The pilot's expectations were based upon his understanding of earlier discussions with engineering staff.

Safety message

Abnormal manifold pressure - turbocharged engines

Abnormal manifold pressure indications involving turbocharged engines can be symptomatic of a number of engine malfunctions, some of which may not be immediately apparent to the pilot. It may be associated with a malfunction within the turbocharger system itself, as in this incident, but it can also be symptomatic of other serious engine problems, such as an induction or exhaust system leak or an engine oil system problem.

Pilots are reminded that abnormal manifold pressure indications involving turbocharged engines can be symptomatic of a very serious engine malfunction. Even if abnormal manifold pressure is the result of a turbocharger system problem, engine operation and aircraft performance are unpredictable.

Pilots are encouraged to carefully review POH emergency procedures with respect to abnormal manifold pressure indications and turbocharger malfunctions. The US Federal Aviation Administration (FAA) Special Airworthiness Information Bulletin CE-09-11 provides some further operational information to pilots regarding engine turbocharger system management.

www.rgl.faa.gov/Regulatory_and_Guidance_Library/rgSAIB.nsf/(LookupSAIBs)/CE-09-11?OpenDocument

Takeoff decision making

Aircraft performance data published in the POH always specifies the conditions under which that performance can be expected. Where the manifold pressure is less than that specified, then aircraft takeoff and climb performance are unpredictable.

Pilots are encouraged to carefully consider their response to any aircraft abnormality that might become apparent during takeoff, as part of their pre-flight preparation. Self-briefing may help pilots respond to abnormal takeoff indications more effectively, and help manage the influence of perceived pressure when confronted with a time-critical decision.

The ATSB report AR-2010-055 *Managing partial power loss after takeoff in single-engine aircraft* provides some key messages regarding pilot response to partial power loss. A copy of the report is available on the ATSB website here:

www.atsb.gov.au/publications/2010/ar2010055.aspx

Aircraft details

Manufacturer and model:	Gippsland Aeronautics GA8-TC 320	
Registration:	VH-WOV	
Type of operation:	Charter	
Occurrence type:	Partial power loss	
Persons on board:	Crew – 1	Passengers – 6
Injuries:	Crew – Nil	Passengers – Nil
Damage:	None	

Airspace related event – Amateur Built Van's RV-8, VH-YGY

AO-2012-067

Redcliffe CTAF

Source: Airservices Australia

What happened

On 13 May 2012, a Cessna Aircraft Company 208, registered VH-DZQ (DZQ), was conducting parachute operations at Bells Beach[1], near Redcliffe aerodrome, Queensland (Figure 1). At about 1229 Eastern Standard Time[2], DZQ departed Redcliffe aerodrome with nine parachutists for a parachute drop (drop) from Flight Level (FL)[3] 140 under the Visual Flight Rules (VFR).

DZQ was equipped with two very high frequency (VHF) radios, COMM 1 and COMM 2. While in controlled airspace, COMM 1 was selected to the Brisbane Approach frequency 124.7 and COMM 2 was used for communication on three frequencies alternately (Brisbane Centre 125.7, the Redcliffe common traffic advisory frequency (CTAF)[4] 127.15 and the ground control frequency[5]).

At about the same time, an amateur built Van's RV-8 aircraft, registered VH-YGY (YGY), was operating near Archerfield aerodrome as part of a private VFR scenic flight around the Brisbane area. On board were a pilot and one passenger. YGY was equipped with one VHF radio. The radio was serviceable although the aircraft's transponder was reported as intermittent by air traffic control.

Four minutes before dropping the parachutists, at about 1244, the pilot of DZQ made a broadcast on the Redcliffe CTAF advising that nine canopies (i.e. nine parachutists) would drop from FL 140 at Bells Beach. There was no response on the CTAF. The pilot then switched COMM 2 to Brisbane Centre to make a three minutes before parachuting drop call, before switching back to monitor the CTAF.

At 1244, YGY was operating in the Archerfield area with the pilot monitoring the Archerfield Tower frequency.

At 1246, after completing all broadcasts regarding the parachute operation, the pilot of DZQ was cleared for the drop by Brisbane Approach. At around the same time, the pilot of YGY switched his radio to monitor Brisbane Centre and headed towards the Redcliffe area at about 1,000 ft.

At 1249, the parachute drop was completed and the pilot of DZQ switched COMM 2 to the CTAF and broadcast that nine parachutes were in the air from FL 140 at Bells Beach. DZQ then returned to Redcliffe aerodrome. At that time, the pilot of YGY was monitoring the Brisbane Centre frequency as the aircraft had not yet entered the Redcliffe CTAF.

Near the Bald Hills Mast (Figure 1) at about 1250, the pilot of YGY switched the radio to the Redcliffe CTAF and broadcast his intent to track along the coastline. DZQ did not hear YGY's CTAF broadcast.

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[1] Bells Beach is 6 km south south-east of the Redcliffe aerodrome, at 27°15' 26''S; 153°05' 25''E.

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

[3] 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.

[4] Common traffic advisory frequency (CTAF) is the name given to the radio frequency used for aircraft-to-aircraft communication in the vicinity of aerodromes without a control tower.

[5] Ground control was a company frequency for the drop zone safety officer who monitored conditions on the drop zone.

At about 1252, as YGY flew along Bells Beach, the passenger saw a parachute above the aircraft and advised the pilot. On looking up, the pilot saw four parachutes, the closest being on the left of the aircraft. The pilot made a slight right turn away from the parachutist, being mindful of the Brisbane control zone boundary on his right. After passing the parachutes, YGY continued the flight and landed without further incident.

PIC of VH-YGY recollection of events

The pilot of YGY did not hear any broadcasts about the parachute operation on either Brisbane Centre or the Redcliffe CTAF.

The pilot further stated that there was no NOTAM[6] issued about parachute operation on Bells Beach and that the drop zone location was not marked with a parachute symbol on the Brisbane Visual Terminal Chart (VTC)[7] (Figure 1).

Parachutist recollection of events

At about 1,200 ft on descent under canopy, the parachutist heard an engine noise and then saw an aircraft flying directly toward him. The parachutist was at about 1,000 ft when the aircraft passed about 150 to 200 ft below and about 50 ft to his left.

The parachutist noted that it could take between six and eight minutes from the time the last parachutist exited the aircraft until that parachutist landed.

Radio broadcasts

Before the drop, the pilot of DZQ made a broadcast on the Redcliffe CTAF and the Brisbane Centre frequency as required by the Civil Aviation Safety Authority (CASA)[8] and in accordance with company policy. Neither of those calls were heard by the pilot of YGY as he was operating away from the drop zone area at that time and was consequently monitoring a different radio frequency when each broadcast was made.

Location of parachute operations

Airservices Australia (Airservices)[9] had a Letter of Agreement (LOA)[10] with the parachute operator in relation to the drop zones in the Redcliffe area. There were four approved drop zones – Castlereagh Point, Queens Beach, Suttons Beach and Bells Beach (Figure 1).

Of the four drop zones, only Castlereagh Point was marked on the VTC. Further, the four drop zones were not marked with parachute symbols on the VTC. The only parachute area marked with a symbol in the Redcliffe area, to the west of the Redcliffe aerodrome, had not been used for at least eight years (Figure 1).

DZQ operated in accordance with the LOA.

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6 A notice to airmen (NOTAM) is a notice containing information that is of direct operational significance and which may immediately affect aircraft operations.

7 The VTC is a chart which provides both aeronautical and topographical information at a scale of 1:250,000 for VFR operations in the vicinity of major aerodromes. In some cases, these charts show detail of tracks to be flown and significant landmarks which are used by pilots of VFR aircraft to avoid inadvertent penetration of controlled airspace.

8 Section 10 of Instrument number CASA 405/09.

9 Airservices Australia provides air traffic services and is responsible for the Aeronautical Information Publication (AIP) which includes VTCs.

10 Letter of Agreement number LOA_3209, effective from 4 November 2010.

Figure 1: Diagram of the Redcliffe CTAF area

Source: ***Airservices Australia***

Legend:

1. Castlereagh Point (27°11' 30''S; 153°06' 38''E)
2. Queens Beach (27°12' 25''S; 153°06' 59''E)
3. Suttons Beach (27°14' 07''S; 153°06' 55''E)
4. Bells Beach (27°15' 26''S; 153°05' 25''E)
5. Bald Hills Mast
6. Parachute symbol near Redcliffe aerodrome

ATSB comment

Pilots are responsible for obtaining information necessary to make operational decisions. Before beginning a flight, a pilot in command must study all available information appropriate to the intended operation. The pilot of YGY had reviewed available operational information prior to the flight. However the location of parachute operations in the Redcliffe area was not marked on the VTC, nor was a NOTAM issued so the pilot could not assess and mitigate the potential risk of his planned route.

Broadcasts prior to and following the drop were made by the pilot of DZQ in accordance with CASA requirements. However, these were not heard by the pilot of YGY as he was monitoring a different radio frequency at the time.

In this instance, the vigilance of the passenger ensured that the pilot of YGY had sufficient time to manoeuvre away from the parachutes, ensuring that the aircraft and the parachutist remained separated.

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 actions in response to this occurrence.

Australian Parachute Federation

As a result of this occurrence, the Australian Parachute Federation (APF)[11] has advised the ATSB that they are taking the following safety actions:

Amendments to the AIP

The APF will liaise with the South Queensland Regional Airspace and Procedures Advisory Committee (RAPAC)[12] and the Office of Airspace Regulation (OAR)[13] within CASA to amend the Aeronautical Information Publication (AIP) to:

- On the VTC, remove the parachute symbol to the west of Redcliffe aerodrome and add symbols to denote the drop zones detailed in the Airservices LOA; and
- In the En Route Supplement Australia (ERSA)[14], amend the location of skydiving operations in the vicinity of Redcliffe aerodrome in the entry for that aerodrome.

Education program for local operators

The APF will facilitate an education program on skydiving activities in the Redcliffe CTAF for aircraft operators based at aerodromes in the Brisbane area.

NOTAM release

The APF are liaising with the CASA OAR on the correct procedure for the release of a NOTAM to cover the period until the publication of the amended VTC and ERSA in June 2013.

Safety message

The incident highlights the importance of accurate information being available to pilots to facilitate an adequate pre-flight brief. The correct placement of parachute symbols on the Brisbane Visual Terminal Chart (VTC) or a NOTAM on current parachute operations would have alerted the pilot of YGY to the potential for parachutists in the Bells Beach area.

CASA have published a number of Civil Aviation Advisory Publications (CAAPs) on the importance to pilots of a continuous visual scan and not relying solely on radio broadcasts for traffic advice in the vicinity of non-towered aerodromes.

The following publications provide useful information on the limitations of see-and-avoid and the importance of an effective visual scan technique:

- CASA Publications 166-1(0) – *Operations in the vicinity of non-towered (non-controlled) aerodromes* and 166-2(0) – *Pilots' responsibility for collision avoidance in the vicinity of non-towered (non-controlled) aerodromes using 'see-and-avoid'* are available at: www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_91054

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[11] The APF controls skydiving and parachuting at most civilian operations in Australia. With the approval of CASA, the APF sets standards of operation, conducts competitions, issues licences and instructor ratings, conducts exams and distributes various publications to keep its members informed of current events and safety standards.

[12] RAPACs are primarily state-based forums for discussion of all matters relating to airspace and related procedures in Australia, and specifically in their areas of responsibility. Membership is open to all significant airspace users through their major industry associations/organisations or independently.

[13] Within CASA, the Office of Airspace Regulation (OAR), a distinct operational unit, is responsible for regulating Australian airspace. There are members of the Australian Defence Force embedded within the OAR.

[14] The ERSA is an airport directory for Australian aerodromes. It has pictorial presentations of all licensed aerodromes and includes aerodrome physical characteristics, hours of operation, visual ground aids, air traffic services, navigation aids and lighting.

- *Limitations of the see-and-avoid principle* (1991) is available at: www.atsb.gov.au/publications/2009/see-and-avoid.aspx

Special Operational Information provided by Airservices titled *Sport Parachuting Operations* is available at:
www.airservicesaustralia.com/publications/special-operational-information/

Details of the radio broadcasts required by CASA in relation to parachute operations can be found at:
www.comlaw.gov.au/Details/F2009L03395

Aircraft details

Manufacturer and model:	Amateur Built Aircraft Van's RV-8	
Registration:	VH-YGY	
Type of operation:	Private	
Location:	155° M 6 km from Redcliffe aerodrome, Queensland	
Occurrence type:	Airspace related event	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – nil	Passengers – nil
Damage:	None	

Fuel contamination – Cessna 182P, VH-WTS

AO-2012-083

What happened

On 19 June 2012, at about 0815 Eastern Standard Time[1], the pilot of a Cessna Aircraft Company 182P aircraft, registered VH-WTS (WTS), departed Mayvale Station, about 53 km east-north-east of Cunnamulla, Queensland, for an aerial inspection of the property. Shortly after becoming airborne, at about 80 to 100 ft, the pilot recalled the aircraft losing airspeed and then clipping a tree during the subsequent forced landing. The pilot's next recollection was being on the ground, out of the aircraft and unable to stand. The aircraft had collided with the ground and came to rest inverted (Figure 1).

Mayvale Station airstrip

Source: *Google Earth*

The pilot, who was the only occupant, was seriously injured and the aircraft was destroyed. The pilot reported securing his seat belt before takeoff, but had not used the shoulder harness. About 3 hours later, when WTS had not returned to the Station, and the pilot could not be contacted by radio, a search was commenced and the aircraft and injured pilot were found. Although the aircraft was fitted with an Emergency Locator Transmitter (ELT)[2], it had not activated, and a personal ELT carried by the pilot in the aircraft was inaccessible. The reason why the fitted ELT had not activated was not determined but may have been due to shielding of the ELT's antenna when the aircraft came to rest inverted.

The day before the accident flight, the pilot refuelled the aircraft with about 20 L of aviation gasoline (AVGAS) from a 200 L (44 gallon) drum kept as an emergency fuel supply. The drum stock was stored upright in the hangar and had not been used for about 3 months. The pilot reported that he had not tested the fuel in the drum for water or contamination. The hand-pump used to pump the fuel from the drum was not fitted with a filter, but when the pilot pumped a small quantity of fuel onto the ground before refuelling the aircraft, he did not notice any contamination.

The pilot reported taking samples from the wing tank fuel drains during the pre-flight inspection and had opened the fuel strainer drain to release a small quantity of fuel onto the ground. The pilot stated that taking a fuel sample from the fuel strainer drain point was difficult due to the distance between the drain point and the strainer knob[3]. The pilot had not detected any water or contamination of the aircraft's fuel.

Following the accident, a considerable amount of water was found in fuel samples taken from a number of locations in the aircraft's fuel system. Water was also found in a sample taken from the drum.

Refuelling from drum stock

Civil Aviation Order (CAO) 20.9 requires all ground fuel stock to be carefully checked for the presence of undissolved water before fuelling. The CAO notes that such checks are particularly important when handling fuel from drum stocks. It also notes that it is necessary to use a positive testing method, such as suitable water-detecting paste or paper, as sensory perceptions of colour

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

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

3 The fuel strainer drain knob was located under an access panel on the right side of the engine cowling. The drain point was located under the nose of the aircraft.

and smell, if used alone, can be misleading. Additionally, approved aviation fuel filters should always be used when refuelling from drums.

Safety message

Pre-flight checks

Checking fuel for water, and other contaminants, is something pilots can never be too careful about. The ATSB research report into managing partial power loss after takeoff, published in 2011, found that pre-flight checks, including checking samples from all fuel drain points, are a vital barrier in reducing the likelihood of power loss after takeoff. The Cessna *Pilot Safety and Warning Supplements* document (1998) provides general advice on fuel sampling as part of pre-flight checks.

Occupant restraints

Although WTS was fitted with a single shoulder strap harness, the pilot had only fastened the seat belt. In order to afford the best possible protection against injury in the event of an accident, aircraft occupants should fasten both the seat belt and shoulder harness, where provided, particularly for takeoff and landing.

Survival equipment

The seriously injured pilot of WTS was rescued about 3 hours after the accident. Pilots are encouraged to leave a flight note with a responsible person as discussed in the Aeronautical Information Publication (AIP) and a personal ELT should be carried on the person so that they are readily available when most needed.

The following publications provide further information relating to refuelling and fuel checks:

- ATSB Avoidable Accidents No. 3 – *Managing partial power loss after takeoff in single-engine aircraft* is available at www.atsb.gov.au/publications/2010/ar2010055.aspx
- Civil Aviation Order 20.9 titled *Air service operations – precautions in refuelling, engine and ground radar operations* is available at www.comlaw.gov.au/Details/F2011C00881
- *Safety on the ground*, provides advice on refuelling from a drum, and on the correct way to store a fuel drum; available from the Civil Aviation Safety Authority's website at: www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_91386
- The Cessna *Pilot Safety and Warning Supplements* (1998) is available at: www.docs.google.com/gview?url=http://www.gaceflyingclub.com/Member+Download/Pilot+Safety+and+Warning+Supplements+Searchable.pdf&chrome=true

Figure 2: VH-WTS

Source: ***Approved Aircraft Maintenance***

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 182P	
Registration:	VH-WTS	
Type of operation:	Aerial work	
Location:	53 km from Cunnamulla aerodrome, Queensland	
Occurrence type:	Fuel contamination	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 (Serious)	Passengers – Nil
Damage:	Substantial	

Total power loss – Gippsland Aeronautics GA-8, VH-FCK

AO-2012-092

What happened

VH-FCK engine damage

Source: *Maintenance organisation*

On 6 July 2012, a Gippsland Aeronautics GA-8 Airvan aircraft, registered VH-FCK (FCK), departed Tennant Creek on a night training flight to Alice Springs, Northern Territory.

At about 1920 Central Standard Time (CST)[1], when maintaining 7,500 ft above mean sea level (AMSL), the crew noticed that the engine oil pressure indication was slightly lower than normal.

The crew continued to monitor the oil pressure and, at about 1955, having noted the pressure dropping further, they began planning for a diversion to the Ti Tree aeroplane landing area (ALA). The instructor had flown into the ALA the previous week and reported using the pilot activated lighting (PAL)[2] system without any issues[3]. The crew relayed their intentions to air traffic control (ATC) via VH-XGN, a Cessna 310 cruising in the vicinity at a higher altitude.

At about 2000, the engine oil pressure light illuminated, necessitating an immediate landing. The crew then diverted to the Ti Tree ALA and attempted to activate the runway PAL system via the designated frequency, without success. The pilot reported that the unsuccessful attempt to activate the PAL system had cost them valuable time in searching for another suitable landing area.

Shortly after, when abeam the township of Ti Tree, the engine began to run rough and subsequently stopped. The instructor then noticed a vehicle travelling on a road to the north of the town. They elected to abandon the landing at the unlit ALA and, following the vehicle's lights, carried out a successful landing onto the Stuart Highway, 4 km north of the township.

ATC had alerted the emergency services, who arrived a short time later.

Engine examination

The engine was removed from the aircraft and disassembled by a contracted maintenance organisation. The assessment by the maintenance organisation at the time of writing this report was that the failure was a result of a No. 6 connecting rod, big end cap bolt failure (Figure 1).

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

2 Pilot activated runway and taxiway lighting is activated by a series of timed transmissions using the aircraft's very high frequency radio, on either a discrete or the local airport communication frequency.

3 The instructor also reported that he had flown into the ALA on at least one other occasion at night in the previous month and had successfully used the PAL system.

Figure 3: VH-FCK engine damage

Source: ***Maintenance organisation***

PAL system

The serviceability of the PAL system at Ti Tree was queried with the operator of the ALA. The operator advised that, as far as they were aware, the PAL system was reported as unreliable about four years prior and had not been tested since. They did not know if it had been rectified as this was prior to them taking over control of the ALA, but they did not actively maintain or monitor the system; it was considered to be not in use.

When lighting was required by an inbound aircraft, such as the Royal Flying Doctor Service (RFDS), a responsible person on the ground would manually activate the system. The RFDS confirmed that their pilots did not use the PAL facility, but rather, pre-arranged for ground personnel to activate the lighting for them.

The Aircraft Owners and Pilots Association of Australia National Airfield Directory (2010/11) stated that the runway lighting at the Ti Tree ALA was on an electric 2.5 hr time switch (to be activated by ground personnel) and PAL. That Directory was the only source of information on the status of the PAL system for pilots but did not detail any issues with the serviceability of the system. The pilot had also successfully used the system recently and therefore assumed that it was serviceable.

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.

Northern Territory Government

The Northern Territory Department of Construction has advised the ATSB that the runway lighting system at the Ti Tree ALA was undergoing an upgrade. That upgrade was mid-September 2012 at which time the lighting became solar powered and capable of automatically turning on each night from sun down.

Safety message

One of the greatest concerns for pilots operating single-engine aircraft is the prospect of a total power loss at night. Should such an event occur, it is crucial that pilots are mentally prepared to act immediately. The crew of FCK were faced with an engine failure at night in a remote location, which was further exacerbated by the unsuccessful activation of the PAL runway lighting system at the Ti Tree ALA. In this instance, the crew of FCK quickly changed their plan and made a successful landing on a road, with no injuries or aircraft damage sustained. This incident demonstrates how responding to an adverse situation promptly can result in a positive outcome.

Aircraft details

Manufacturer and model:	Gippsland Aeronautics GA-8 Airvan	
Registration:	VH-FCK	
Type of operation:	Flying training	
Location:	Ti Tree, Northern Territory	
Occurrence type:	Total power loss	
Persons on board:	Crew – 2	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Helicopters

Collision with terrain – Guimbal Cabri G2, VH-ZZT

AO-2012-055

VH-ZZT

Source: *Helicopter operator*

What happened

On 13 April 2012, at about 1440 Eastern Standard Time[1], a Guimbal Helicopters Cabri G2 (Cabri G2) helicopter, registered VH-ZZT (ZZT), collided with terrain at Camden Airport, New South Wales. On board the helicopter was an instructor and a student.

The Guimbal Cabri G2 is a two-seat helicopter manufactured in France. It features a 7-bladed fenestron[2] in place of a conventional tail rotor and a 3-bladed main rotor which rotates clockwise when viewed from above. The torque produced by the main rotor causes the fuselage of the helicopter to rotate in the opposite direction (nose left). The anti-torque system comprises a shrouded tail rotor or fenestron. The fenestron provides thrust, which counteracts this torque and provides directional control while hovering. It received the European Aviation Safety Agency's (EASA) Type Certificate in December 2007. ZZT was the first of type to be registered in Australia.

The student was undergoing type endorsement training on the helicopter. The student had conducted a flight of about an hour's duration earlier that morning with the Chief Flying Instructor of the school. After the flight, another instructor was assigned to complete the student's training.

A short briefing was performed by the second instructor, which included the characteristics of the fenestron anti-torque system.

The student and instructor departed Bankstown Airport for Camden Airport due to the amount of traffic at Bankstown. At Camden, circuits were not available due to traffic and ZZT was confined to operations not above 200 ft within the confines of grassed runway 10/28.

The instructor simulated a jammed right yaw control pedal[3] forward emergency from the hover and demonstrated the recovery procedure. The student then attempted the exercise.

The instructor simulated a jammed right pedal by placing his foot against the right anti-torque pedal and holding it in a forward position. The helicopter began rotating to the right, the student increased collective[4] and the rotation stopped. The height above the ground increased as a consequence of the increased collective input. The student then wound off throttle to decrease the rotor revolutions per minutes (RPM) slightly to initiate a descent. The student then assessed the rate of descent to be too high and instinctively increased the collective lever again to arrest the descent. The helicopter rotated left between 45 and 60 degrees and momentarily stabilised before continuing to rotate to the left for a number of rotations.

The instructor took control and recovered the helicopter.

The instructor landed the helicopter and discussed with the student the recovery procedure. The instructor then re-demonstrated the recovery procedure to the student.

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

2 Helicopter tail rotor with numerous blades rotating in a short duct inset into the fin.

3 Yaw control or anti-torque pedals controls yaw about the yaw axis by simultaneously varying pitch on the fenestron blades.

4 A primary helicopter flight control that simultaneously affects the pitch of all blades of a lifting rotor. Collective input is the main control for vertical velocity.

With the helicopter aligned with runway 10 and the instructor the only person on the controls, a simulated jammed right pedal forward emergency was initiated. The instructor increased collective to increase torque and the rotation stopped. The helicopter's height above the ground increased slightly higher than the previous occasion. The instructor wound off the throttle slightly to initiate a descent. The instructor assessed the rate of descent to be too fast and attempted to abort the manoeuvre by; increasing collective, applying full throttle to increase the rotor RPM and full right pedal to counteract the increasing left yaw rate.

The helicopter rotated to the left through several full rotations. The instructor was unable to recover the rotor RPM, nor arrest the left yaw or left roll that subsequently developed.

The helicopter collided with terrain in a left skid-low, nose-high attitude, and came to rest on its side. Both occupants exited the helicopter. The instructor was not injured, however, the student sustained some minor soft tissue injuries. The helicopter was seriously damaged (Figure 1).

Figure 1: VH-ZZT

Source: ***Helicopter operator***

Weather

The METAR[5] issued for Camden Airport around the time of the accident, reported the weather to be fine and the wind as light and variable, with the following conditions observed:

- 030° at 5 to 8 kts, at 1400
- 360° at 5 to 8 kts, at 1430
- 080° at 4 to 9 kts, at 1500

Pilot information

At the time of the accident, the instructor held a Commercial Pilot (Helicopter) Licence and a Grade 2 Instructor Rating. The instructor had about 750 hours total time and 200 hours on type.

The student held an Air Transport (Helicopter and Aeroplane) Pilot Licence with 4,018 hours total time, of which 1,300 hours were on helicopters. Of this, 30 hours were in piston-engined helicopters similar to the Cabri G2.

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5 Routine aerodrome weather report issued at fixed times, hourly or half hourly.

Type endorsement requirements and yaw control emergencies

The requirements for the issue of a type endorsement were found in Civil Aviation Order (CAO) 40.3.0 at Appendix II. Training shall include:

> All other emergency procedures specified in the Flight Manual[6]

The helicopter's flight manual listed yaw control as an emergency and prescribed the following for loss of yaw control while hovering:

> Land immediately,
>
> Lower the collective slowly enough to land smoothly, while rolling-off throttle to reduce yawing nose to the right.

Instructor comments

The instructor commented that there are a number of different ways of dealing with a right yaw control pedal jam in the hover. The following was the technique being demonstrated prior to the accident;

- The collective lever was increased until torque and anti-torque provided by the fenestron equalised and the rotation ceased.
- Due to the increased position of the collective lever, the helicopter's height above the ground increased. In order to descend the helicopter without lowering the collective lever, the throttle was wound off slightly. The rotor RPM decreased, and consequently, total rotor thrust and the helicopter's height above ground level decreased until the helicopter could be landed safely.

The instructor acknowledged that the trans-cockpit authority gradient[7] between himself and the student was quite flat with the student having significantly more experience than he did. However, the instructor added that it was not unusual for him to fly with more experienced pilots and it was his usual practice to reaffirm during the pre-flight briefing that he was the pilot in command.

Student comments

The student commented to the instructor at the time, that he had previously been taught to deal with this scenario by opposing the direction of rotation with pedal, closing the throttle, and performing a hovering autorotation[8].

The student also acknowledged that the trans-cockpit gradient may be an issue In an attempt to address the authority gradient between the instructor and himself the student emphasised to the instructor during the pre-flight briefing, that he only had a limited amount of piston engine helicopter time.

During the flight, the student again emphasised to the instructor not to be reluctant to take control if at any stage he was uncomfortable.

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6 CAO 40.3.0, Appendix II, 2(b) (xvii).

7 Studies of accidents involving crew members with comparable experience levels (especially high levels) indicate that crew interaction and supervision tend to diminish once individual members assume that other crew are fully capable of conducting safe operations and as a result the type of detailed assistance and/or supervision that they might normally provide to less experienced crew members is not required.

8 This manoeuvre is used to land a helicopter from the hover without engine power.

Manufacturer comments

The manufacturer noted that the recovery procedure used was not in accordance with the helicopter's flight manual. The manufacturer also added, that the recovery procedure used was not suitable for the Cabri G2 as:

- the helicopter featured a high inertia rotor system, and rotor RPM would take longer to decay and conversely longer to recover;
- as rotor RPM decreased, the main rotor efficiency would initially increase before decreasing; and
- decreasing rotor RPM would decrease fenestron efficiency leading to a reduced anti-torque capability.

All of the above elements were likely to result in a high vertical descent rate, an increase in workload associated with the emergency procedure, and generally, an increase in the risk associated with its performance.

Manufacturer's service letter

On 22 June 2012, Guimbal Helicopters published Service Letter (SL) '12-001 - Yaw control in approach' . This SL was issued in response to two previous accidents that occurred on approach. The SL highlights handling chracteristics that are specific to Fenestron equipped helicopters.

Safety action

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

Operator

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

Supervision of low time instructors

The helicopter training school has advised that they are in the process of amending their operations manual to:

- improve the supervision of low time instructors by the Chief Flying Instructor
- amending the endorsement training syllabus

Safety message

This accident highlights, that different helicopter types have their own specific handling characteristics; and that pilots should also be familiar with the emergency procedures prescribed by the flight manual and the immediate actions to be performed to ensure a successful outcome.

The following publications provide useful information:

- Eurocopter Service Letter, 1673-67-04, is a reminder concerning yaw axis control for all helicopters in some flight conditions
  www.eurocopter.com/site/docs wsw/RU B 36/1673-67-04en.pdf
- AAIB investigation: Guimbal Cabri G2, G-UIMB
  www.aaib.gov.uk/publications/bulletins/march_2012/guimbal_cabri_g2__g_uimb.cfm

- AAIB investigation: SA341G Gazelle 1, G-HAVA
  www.aaib.gov.uk/publications/bulletins/february_1998/sa341g_500862.cfm

Aircraft details

Manufacturer and model:	Guimbal Cabri G2	
Registration:	VH-ZZT	
Type of operation:	Flying training	
Location:	Camden Airport, New South Wales	
Occurrence type:	Collision with terrain	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – 1 (minor)	Passengers – Nil
Damage:	Serious	

Collision with terrain, Robinson R44, VH-HOU

AO-2012-078

What happened

VH-HOU

Source: *Passenger*

On 10 June 2012 at about 1245 Central Standard Time[1], a Robinson Helicopter Company R44 Raven 1, registered VH-HOU, was seriously damaged, following a reported loss of power and collision with terrain near Maryvale, Northern Territory. The helicopter was providing support and aerial filming of a competitor participating in the annual Finke Desert race.

The helicopter departed the Finke Desert race start line at 1130. On board the helicopter were the pilot and three passengers. At about 1240 and about 115 km into the race, the pilot described lowering the collective lever[2] and reducing the power to about 17 inches of manifold pressure[3] in order to perform a gentle flare, to slow the helicopter from 80 kts to 60 kts. At about 200 ft above ground level (AGL) and at 60 kts, the pilot described levelling the helicopter and applying power to increase the helicopter's airspeed in order to maintain the helicopter's position relative to the race competitor on a motorbike.

As the pilot increased the position of the collective lever, there was not a corresponding increase in manifold pressure. The helicopter began to sink and the pilot increased the collective position further. The low rotor revolutions per minute (RPM) light and horn activated[4] and the pilot lowered collective and applied full throttle. The pilot was unable to recover the rotor RPM and increased the collective lever to its upper limit, in an attempt to use the remaining rotor RPM to decrease the rate of descent immediately prior to impacting terrain.

The helicopter impacted the terrain in a level attitude collapsing the skids on impact. The helicopter came to rest on its belly in an upright position (Figure 1). The pilot and front seat passenger exited the helicopter without assistance. The front seat passenger and the pilot were able to assist the two rear seat passengers to exit the aircraft. The passenger seated behind the pilot sustained serious injuries. The other passengers and the pilot sustained minor injuries.

Weather

Weather observations were obtained for Alice Springs Airport from the Bureau of Meteorology. Alice Springs Airport is approximately 97 km north of the accident site.

At Alice Springs Airport the following conditions were observed:

- At 1230 – the wind was 120° at 5 kts, tempertaure 13° C with a dew point -4° C, barometric presure was 1022 hpa.
- At 1300– the wind was 050° at 6 kts, temperature 14° C with a dew point of - 3° C, barometric pressure was 1022 hpa.

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1 Central Standard Time (CST) was coordinated universal time (UTC) + 9.5 hours.

2 A primary helicopter flight control that simultaneously affects the pitch of all blades of a lifting rotor. Collective input is the main control for vertical velocity.

3 Manifold Air Pressure (MAP) is the absolute pressure, in inches of mercury, of the air flowing through the engine intakemanifold. It indicates the amount of power being generated by an engine.

4 A horn and indicated caution light indicate that rotor RPM may be below safe limits.

Fuel on board

A review of the operator's fuel records revealed that at the time of departure from Alice Springs Airport the helicopter was fuelled with 150 litres of 100LL aviation fuel. At the time of the accident the fuel on board was calculated to be approximately 90 litres.

Weight and balance

A review of the helicopter's weight and balance data revealed that the helicopter would have been at maximum takeoff weight on departure from the start line with the passengers on board.

Pilot comments

The pilot stated that while on the ground and prior to departure he noticed that the carburettor heat temperature gauge was within the yellow caution range[5] for carburettor icing[6]. Prior to lift off to the hover the pilot applied enough carburettor heat to keep the gauge out of the yellow caution range. HOU was fitted with a carburettor heat assist system[7], no further adjustment was made to the carburettor heat by the pilot during the flight and the heat assist system was left in the unlocked position.

Figure 1: VH-HOU

Source: *Passenger*

ATSB comment

A definitive reason for the reported loss of engine power could not be determined. However, a review of the carburettor icing probability chart reveals that the temperature/dew point spread, put the accident flight in the 'serious icing – descent power' operating realm (Figure 2).

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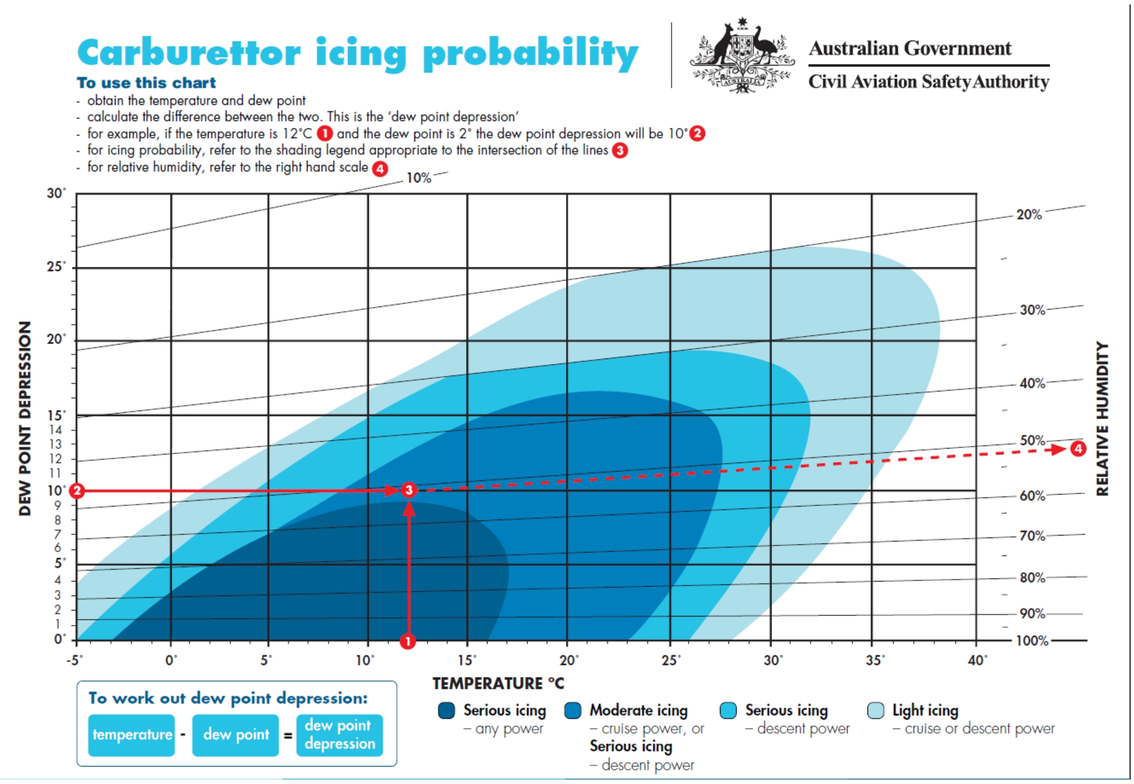
5 Caution range on a carburettor gauge is typically a yellow band between about -19 °C to +3 °C.

6 Carburettor ice is formed when the normal process of vaporising fuel in a carburettor cools the carburettor throat so much that ice forms from the moisture in the airflow and interferes with the operation of the engine.

7 The carburettor heat assist system fitted to the Robinson R44 Raven 1 is designed to apply a level of heat corresponding to the amount of power being applied via a mechanical correlation. The carburettor heat assist system does not sense carburettor temperature. This carburettor heat lever is able to be locked in the off position if carburettor heat is not required.

Figure 2: Carburettor icing probability chart



Source: *Civil Aviation Safety Authority*

Safety message

The Australian Transport Safety Bureau (ATSB) has investigated several occurrences of reported partial power loss situations where carburettor icing was suspected. The majority of those occurrences involved low power descents and a requirement for increased power at the bottom of the descent. Robinson Helicopter Company Safety Notices (SN) SN-25 and SN 31 warned pilots of the dangers and methods of preventing carburettor icing.

When an aircraft is fitted with a carburettor air temperature gauge, carburettor heat is applied to a level to maintain the temperature outside the caution range. The carburettor heat assist system fitted to the Robinson R44 Raven 1 is designed to automatically apply a level of heat corresponding to the amount of power being applied. It does not directly sense carburettor air temperature and further adjustments may be required to be made by the pilot to maintain the temperature outside the caution range.

Robinson Safety Notice SN-31 contains a reminder to pilots that if carburettor heat assist is used in conjunction with the throttle governor, it will reduce carburettor heat where the aircraft is lifting off to a hover and that the control may require adjustment in flight. This safety notice also contains a reminder to apply full carburettor heat when the manifold pressure is below 18 inches.

The following publications provide useful information on carburettor icing and avoidance:

- *Robinson Safety Notice SN-25*- Carburettor Ice
  www.robinsonheli.com/srvclib/rchsn25.pdf
- *Robinson Safety Notice SN-31*- Governor Can Mask Carb Ice
  www.robinsonheli.com/srvclib/rchsn31.pdf
- Melting Moments: Understanding Carburettor Icing
  www.atsb.gov.au/publications/2009/carburettor-icing.aspx
- Ice Blocked. Flight Safety Australia, November-December 2004, 31-33

www.casa.gov.au/fsa/2004/dec/32-33.pdf

- ATSB Report AO-2010-107
  www.atsb.gov.au/publications/investigation_reports/2010/aair/ao-2010-107.aspx
- ATSB Report AO-2009-031
  www.atsb.gov.au/publications/investigation_reports/2009/aair/ao-2009-031.aspx

Aircraft details

Manufacturer and model:	Robinson R44	
Registration:	VH-HOU	
Type of operation:	Aerial work	
Location:	93 km south of Alice Spring Airport, Northern Territory	
Occurrence type:	Collision with terrain	
Persons on board:	Crew – 1	Passengers – 3
Injuries:	Crew – 1 (minor)	Passengers – 2 (minor) and 1 (serious)
Damage:	Serious	

Wirestrike - Robinson R44, VH-HIE

AO-2012-079

Accident site

Source: *Aircraft owner*

What happened

On 12 June 2012, at about 1000 Eastern Standard Time[1] a Robinson Helicopter Company R44 Raven 1 (R44) helicopter, registered VH-HIE (HIE), departed Moorabbin Airport, Victoria with one person on board to conduct a private flight to the pilot's property at Moolort[2], Victoria.

During the flight, the pilot decided to check on the progress of a bore under construction (bore site)[3], about 2 km west of his intended destination. The pilot had not previously landed at the bore site, though he was very familiar with the area from ground level and had landed at a nearby property.

As there was no wind, the pilot flew HIE past the bore site in a westerly direction, parallel with the road and the main powerline, before conducting a left turn and landing south of the road in an easterly direction (Figure 1). This approach path enabled him to scan the area for obstacles.

After shutting down, the pilot checked the progress of the bore construction and noted that there had been no activity. He then returned to the helicopter to prepare for departure. The pilot scanned the area to determine the best direction for departure, checking for wires as well as other obstacles. The pilot's decision to depart in an easterly direction was primarily influenced by the main powerline and the terrain. The pilot stated that during this time he felt frustrated by the lack of progress on the bore.

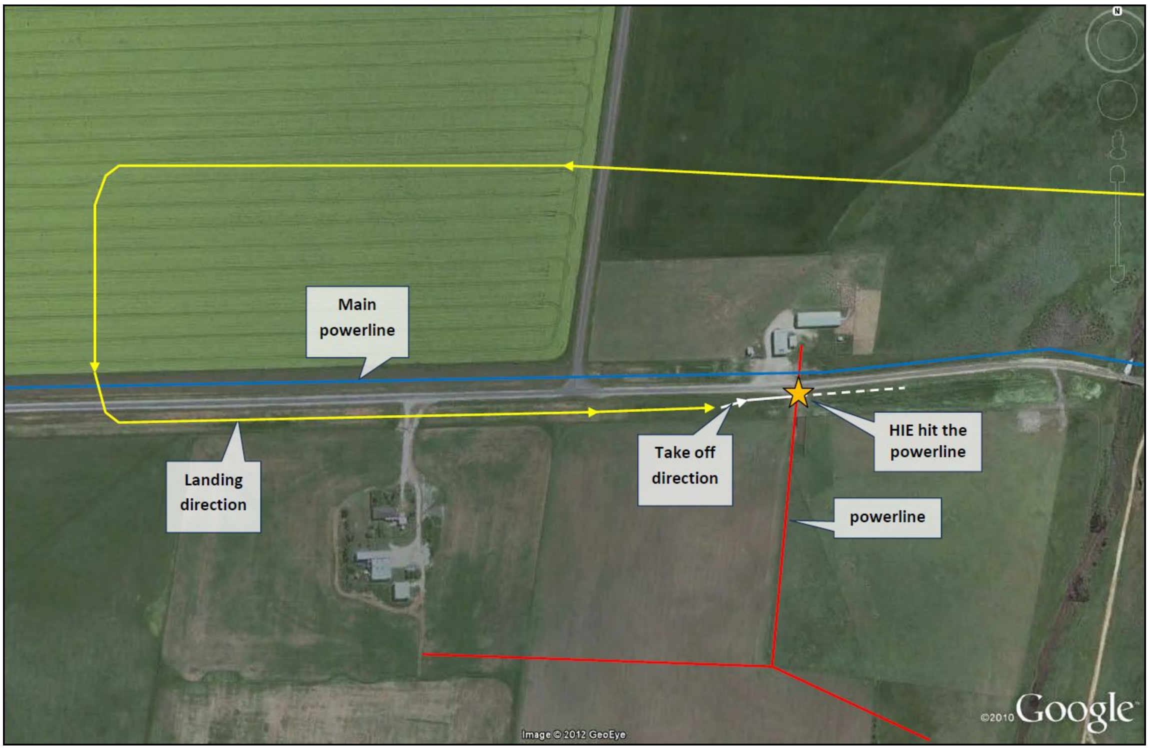
At about 1130, the helicopter became airborne and as it transitioned from the hover to forward flight, the pilot saw a single strand powerline directly ahead. There was no time to avoid the wire the helicopter struck the wire on the middle of the main rotor mast. The pilot reported that he had been focused on avoiding the main powerline and had not seen the second powerline during his scans of the area on arrival or prior to departure.

Following the wirestrike, the helicopter swung upwards on the wire and the pilot remembered seeing the sky before the wire broke, releasing the helicopter. The pilot had limited control and was able to change the attitude to remain relatively straight and level until the helicopter landed heavily on the right skid.

The pilot was not injured, however the helicopter sustained serious damage.

1 Eastern Standard Time was Coordinated Universal Time (UTC) + 10 hours.
2 The property at Moolort was about 23 km east of Maryborough aerodrome, Victoria.
3 The bore site location was S 37° 06.16 E 143° 55.44.

Figure 4: Map of accident site



Source: ***Google Earth***

Powerline information

The main powerline ran in an east-west direction north of the road (marked in blue in Figure 1) and formed a major part in the pilot's choice of approach and departure paths.

The pilot had known of the second powerline prior to the incident flight, but only remembered it as it came into sight, as he transitioned from hover to forward flight, about 40 m from where he had landed. The second powerline was a single multi-strand wire of about 6 to 8 mm diameter. One pole for the wire was about 8 m to the south of the accident site; the other was beside a house on the northern side of the road. The pole near the house appeared to the pilot to be a part of the main powerline system that ran parallel to the road.

The main powerline running along the road in the vicinity of the landing site and the location of the poles supporting both the main and second powerlines, in the pilot’s opinion, most likely provided a considerable distraction and contributed to his inability to identify the second powerline during the evaluation of his departure path.

There were no powerline markers on the second powerline, nor was there any requirement for them under the Australian Standard[4].

The pilot had not undertaken any wire environment training, though he was aware of the existence of such training.

Safety message

The accident highlights the importance of a proper reconnaissance when flying in a wire environment and remaining focused only on operational tasks. The pilot's reaction to the wirestrike, which was to continue to fly the aircraft to the ground, assisted in him being able to land without injury.

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4 Australian Standard, AS 3891.1-2008 Air Navigation – Cables and their supporting structures – Marking and safety requirements.

ATSB research found that at least 40 per cent of wirestrike occurrences in Australia between July 2003 and June 2011 had not been reported. Of those reported, wirestrikes were the third most prevalent cause of fatal accidents in private flying operations and that 'when all incidents and accidents are taken into account, the likelihood of being killed was … about 50 per cent for a wirestrike.' Assessing and planning issues were linked to these accidents and a failure to conduct a proper reconnaissance was a common contributing factor in wirestrike accidents.

Research into aerial agriculture accidents found that wirestrikes occurred even when pilots knew the location of wires. Though this accident was not related to agricultural operations, the research found that focussing only on operational tasks while flying was an important habit to develop.

Internationally, in 2010 the United States Federal Aviation Administration (FAA) released a safety alert for operators (SAFO) that noted that the best methods of reducing risks in a wire environment were education and vigilance in the cockpit.

Fatal Traps for Helicopter Pilots contained a section titled 'After you hit a wire', reminding pilots to continue to fly the aircraft to the ground.

Further safety information relating to wirestrikes is available in the following publications:

- AR-2011-004 *Under reporting of aviation wirestrikes*, is available at: www.atsb.gov.au/publications/2011/ar2011004.aspx
- AR-2011-028 *Wirestrikes involving known wires: A manageable aerial agricultural hazard*, is available at: www.atsb.gov.au/publications/2011/ar2011028.aspx
- AR-2008-045 *Improving the odds: Trends in fatal and non-fatal accidents in private flying operations*, is available at: www.atsb.gov.au/publications/2008/ar2008045.aspx
- The FAA Safety Alert for Operators (SAFO) 10015, 8 June 2010, is available at: www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/
- The Helicopter Association International video highlighting the importance of wirestrike prevention training is available at: www.rotor.com/Publications/HAIVideosLibrary/SurvivingtheWiresEnvironment.aspx
- *Fatal Traps for Helicopter Pilots* by Greg Whyte was published by McGraw Hill in 2007.
- The International Helicopter Safety Team (IHST) website provides safety information at: www.ihst.org/Default.aspx?tabid=3057&language=en-US

The following ATSB investigation reports provide further reading on occurrences related to wirestrike:

- AO-2010-033 – Wirestrike, 20 May 2010 www.atsb.gov.au/publications/investigation_reports/2010/aair/ao-2010-033.aspx
- AO-2011-080 – Wirestrike, 12 July 2011 www.atsb.gov.au/publications/investigation_reports/2011/aair/ao-2011-080.aspx

Aircraft details

Manufacturer and model:	Robinson Helicopter Company R44 Raven 1	
Registration:	VH-HIE	
Type of operation:	Private	
Location:	21 km east of Maryborough aerodrome, Victoria	
Occurrence type:	Wirestrike	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Collision with terrain – Schweizer 269C-1, VH-LTO

AO-2012-082

VH-LTO

Source: *Operator*

What happened

On 18 June 2012, an instructor and student were conducting emergency procedures training in the circuit at Redcliffe aerodrome, Queensland in a Schweizer 269C-1 helicopter, registered VH-LTO. The purpose of the flight was a bi-annual flight review for a company line pilot. The flight was to include low-level autorotations[1] to simulate an engine failure on approach.

At about 1120 Eastern Standard Time[2], when the helicopter was at about 250 ft above ground level (AGL) and 55 kts airspeed, the instructor called for a practice engine failure. The exercise was to be conducted to a power termination[3] at the threshold of runway 25. The student initiated the practice engine failure by closing the throttle and lowering the collective[4] to enter autorotation. Power was restored shortly after, by opening the throttle in anticipation of a power termination. The student flared[5] the helicopter, however the helicopter did not decelerate as expected. The instructor increased the flare in an attempt to arrest the rate of descent and decrease the groundspeed.

The tail rotor struck the ground and the helicopter pitched forward. The skids then contacted the ground before the helicopter became airborne again and immediately entered a rapid rotation to the right. The crew closed the throttle in an attempt to recover from the uncommanded right yaw, however the helicopter impacted the ground before the rotation could be arrested and the helicopter rolled over. The helicopter was seriously damaged. Both instructor and student reported soft tissue injuries and some minor cuts and bruises.

Weather

The instructor reported that the meteorological condition at the time of the occurrence included:

- A light and variable wind predominately from the south to south-west at less than 10 kts
- Nil cloud
- Visibility greater than 10 kilometers

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[1] 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 kinetic energy for increased aerodynamic reaction of the blades, and should result in a gentle touchdown.

[2] Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 Hours

[3] Used during training to terminate an autorotation at a height above ground level, by restoring full engine power, and resulting in the helicopter coming to a hover above the ground.

[4] A primary helicopter flight control that simultaneously affects the pitch of all blades of a lifting rotor. Collective input is the main control for vertical velocity.

[5] Final nose up pitch, to reduce rate of descent and airspeed prior to touchdown.

Pilot experience

Instructor

The instructor held an Airline Transport Pilot Licence (ATPL) - Helicopter and Grade 1 Instructor rating. The instructor had 3,370 hours total time, including 2,155 hours instructing and 503 hours on type.

Student

The student held a Commercial Pilot Licence (CPL) – Helicopter and Grade 2 Instructor rating. The student had about 5,000 hours total time with about 810 hours on type.

Figure 5: Redcliffe aerodrome

Source: ***Google Earth***

Pilot comments

Instructor

The instructor commented that the flare did not have the same effect as previous autorotations. In addition, the instructor noted that if the student had not been an experienced company pilot he may not have conducted a practice low level autorotation in those wind conditions.

Student

The student commented that he initiated a flare which did not have the same effect as previous autorotations conducted earlier that morning. The student stated that he had decided not to flare to the hover due to the unexpected high rate of descent. Instead he intended to perform a power termination with a high groundspeed. The student noted that he did not communicate his intention to the instructor.

ATSB comment

The reason for the accident could not be conclusively established. While there may be a number of factors that can influence the successful outcome of an autorotation, the following three conditions are known to adversely affect an autorotation: low rotor RPM, wind shear and low forward airspeed.

- **Rotor RPM**. It was considered that rotor RPM would have been high at the time of the flare as power had been reintroduced in anticipation of a power termination.
- **Forward airspeed**. The airspeed at the time of the flare could not be conclusively determined.
- **Wind shear**. Both instructor and student reported the wind as being light and variable both instructor and student commented that the wind may have shifted at the time of the flare.The student also added that it is common to get mechanical turbulence off the hangars at the threshold of runway 25 where the practice autorotation was to be conducted.

It is likely that the helicopter encountered low level wind shear during the flare resulting in a tail rotor strike and subsequent loss of control.

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 investigating a change to the company operations manual to require a minimum 10 kts of wind in the runway direction for the performance of practice low-level autorotations.

Safety message

ATSB research indicates that for helicopters the greatest risk of an accident occurs during practice autorotations. Page 27 of the Australian Transport Safety Bureau research report, *Australian Helicopter Accidents 1969-1988*, published in 1989, includes information that out of a total of 42 helicopter accidents analysed, 18 involved hard landings after a practice autorotation. A copy of the report can be accessed at:

www.atsb.gov.au/publications/1989/aust-helicopter-accidents.aspx

When performing autorotations, there are a number of factors that must be considered in planning and execution to achieve a successful outcome. The following publications provide useful information on practice autorotations:

- *Planning Autorotations*- Federal Aviation Administration- www.faasafety.gov
- Robinson Safety Notice SN-38 www.robinsonheli.com/srvclib/rhcsn-38.pdf

Although specific to Robinson Helicopters the concepts are applicable to all autorotations.

Aircraft details

Manufacturer and model:	Schweizer 269C-1	
Registration:	VH-LTO	
Type of operation:	Flying training	
Location:	Redcliffe Aerodrome, Queensland	
Occurrence type:	Collision with terrain	
Persons on board:	Crew – 2	Passengers – 0
Injuries:	Crew – 2 (minor)	Passengers – 0
Damage:	Serious	

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[1]), 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.

ATSB Transport Safety Report

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