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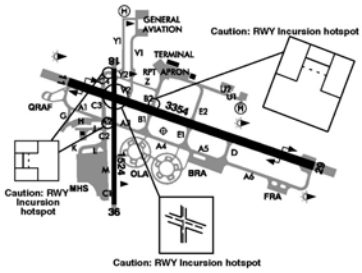
What happened

On 1 October 2013, at about 0530 Central Standard Time,[1] the crew of a Vincent Aviation Beech 1900C aircraft, registered VH-VNV, were preparing to conduct two return flights from Darwin to Jabiru, Northern Territory.

The crew conducted a pre-flight briefing, which involved reviewing the applicable Notice to Airmen (NOTAMs).[2] This included a NOTAM that advised that the runway 29 threshold would be displaced from 0800 due to works in progress. The crew noted that this would be applicable for the second flight later in the morning but not the first.

Darwin Airport



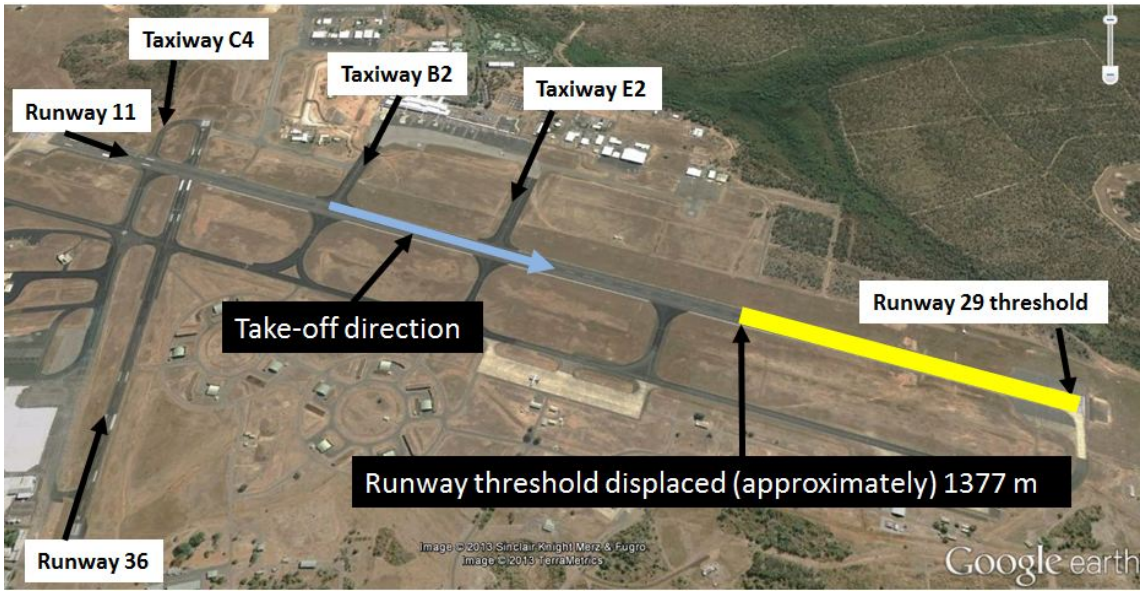
Source: Airservices Australia

The first flight departed Darwin at about 0615 and returned at about 0800, at which time the displaced threshold was in place on runway 29.

For the second flight to Jabiru, the captain was designated as the pilot flying. The crew had received the automatic terminal information service (ATIS) prior to taxiing, which advised of the displaced threshold.

At about 0900, the first officer (FO) requested a clearance from Darwin air traffic control (ATC) to taxi to taxiway 'Echo 2' (E2) for runway 11 (Figure 1). Air traffic control advised the crew that a reduced runway operating length was in effect. The FO then requested and obtained a clearance to taxi to taxiway 'Bravo 2' (B2).

Figure 1: Darwin Airport



Source: Google earth

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

2 A Notice to Airmen advises personnel concerned with flight operations of information concerning the establishment, condition or change in any aeronautical facility, service, procedure, or hazard, the timely knowledge of which is essential to safe flight.

While taxiing to B2, the captain asked the FO to check the take-off performance data in the aircraft performance manual regarding the displaced threshold; however, he was unable to locate the relevant section prior to approaching the holding point.

When at the B2 holding point, the captain observed an aircraft on final approach to runway 11. Air traffic control then cleared the crew of VNV to line up on runway 11, ahead of the approaching aircraft, and asked them to confirm that they were aware of the displaced threshold to the east of taxiway 'Echo' (E). The FO replied that he understood.

The crew reported that when they were lined up on runway 11, they could see the tops of vehicles conducting the runway works, but due to a rise in the runway, were unable to see the start of the displaced threshold.

The aircraft was then cleared for take-off by ATC. As the take-off run was commenced, both crew members observed that the displaced threshold was closer than expected and the captain immediately rejected the take-off at low speed. The aircraft on final approach conducted a go-around.

After vacating the runway, the crew checked the NOTAM, which advised that the threshold was displaced by 1,377 m. The crew were of the understanding that the runway 29 threshold had been displaced by about 700 m. They subsequently elected to depart from the 'Charlie 4' intersection.

Notice to Airmen (NOTAM)

A NOTAM had been issued stating that the runway 29 threshold would be displaced by 1,377 m due to works in progress for the period 27 September 2013 to 1 October 2013. The works would commence at 0800 and finish at 1200 each day.

Pilot comments

The captain provided the following comments:

- They had briefed for a B2 departure however the FO inadvertently requested a taxi clearance to E2.
- They misread the NOTAM details and did not discuss the displaced threshold in detail as it had been in place for the previous days.
- Maintenance on the arrestor cables fitted to both ends of the runway occurred on a regular basis. For this, a displaced threshold of about 700 m was generally put in place. They had assumed that this was the location of the displaced threshold on the day.
- The crew had calculated the take-off performance data based on a departure from B2, with a 700 m displaced threshold in place. This data had previously been included in the aircraft's performance manual, but was removed to ensure company pilots checked all NOTAMs and obtained the appropriate performance data for each flight.
- He asked the FO to check the data in the performance manual for the reduced runway length, but it had been removed. They then arrived at the holding point before he was able to check the current NOTAM.
- As there was another aircraft on final approach, he felt some pressure to continue to line-up, as instructed by ATC.
- The progression of the runway works had been detailed in a Method of Works document, which had not been distributed to company pilots.

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-VNV

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

- A notice was released to company pilots reinforcing the policy regarding planning of the flight by both members of the crew.
- The chief pilot is to be included in the Northern Territory Airports distribution list for notifications regarding runways and airports.

Intersection departures

- The Manual of Air Traffic Services (MATS),[3] stated that, when a pilot is offered an intersection departure, the take-off distance remaining is to be included if that information is not readily available to the pilot. While the crew requested an intersection departure, the operator believed that this information should have been provided to the crew.
- Additionally, when a pilot reports ready from a position other than the runway threshold, without requesting an intersection departure or backtrack, ATC should ascertain the pilot's intentions prior to authorising entry to the runway.[4] The operator has reminded company pilots to state their intentions when broadcasting at the holding point.

Safety message

A report prepared for the ATSB, *The Clarity and Accessibility of NOTAM Information for the Aviation Industry*, www.atsb.gov.au/media/761312/clarity_accessibility_notam.pdf, found that there was a significant potential for oversight of critical information in the NOTAM system. This incident highlights the importance of thorough pre-flight planning and the use of all available information in preparing for flight.

General details

Occurrence details

Date and time:	1 October 2013 – 0900 CST	
Occurrence category:	Incident	
Primary occurrence type:	Runway event	
Location:	Darwin Airport, Northern Territory	
	Latitude: 12° 24.88' S	Longitude: 130° 52.60' E

Aircraft details

Manufacturer and model:	Beech Aircraft Corporation 1900C	
Registration:	VH-VNV	
Operator:	Vincent Aviation	
Serial number:	UC-56	
Type of operation:	Air transport – low capacity	
Persons on board:	Crew – 2	Passengers – 11
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

[3] MATS for ATS Version 23, Paragraph 12-20-565.
[4] MATS for ATS Version 23, Paragraph 12-20-560.

Runway incursion between a Fairchild SA227, VH-UZP and a Bell 47G, VH-UTF

What happened

On 9 October 2013, at about 1720 Eastern Daylight-savings Time,[1] the pilot of a Fairchild SA227 aircraft, registered VH-UZP (UZP), was preparing for a freight charter flight from Ballina/Byron Gateway Airport (Ballina) to Coffs Harbour, New South Wales.

At the same time, the flight instructor and pilot of a Bell 47G helicopter, registered VH-UTF (UTF), had completed about 15-20 minutes of circuit training at Ballina. After landing, the pilot broadcast on the common traffic advisory frequency (CTAF) that UTF was entering runway 06 to conduct left hand circuits.[2] Shortly after, UTF departed and recommenced circuit training.

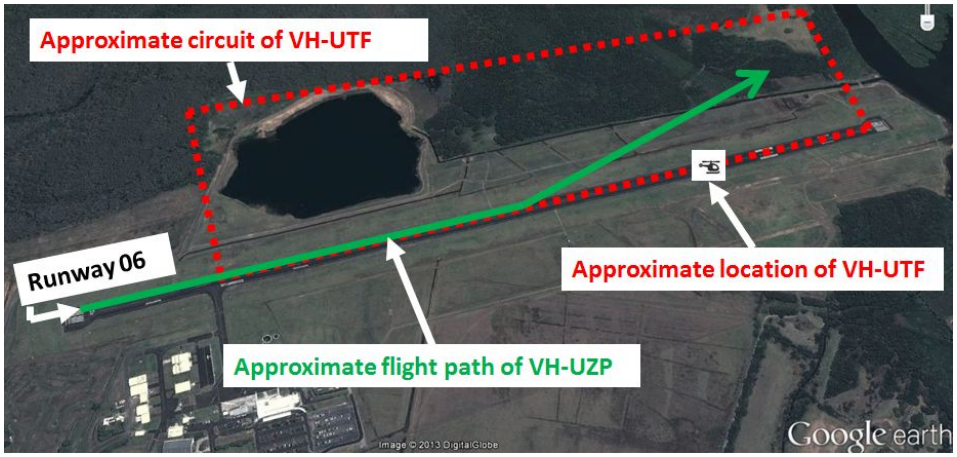
At about 1723, the pilot of UTF broadcast turning onto a left base for runway 06. Soon after, UTF landed about two-thirds of the way along the runway and came to a stop, facing east (Figure 1). The instructor briefed the pilot prior to commencing a further circuit.

The pilot of UZP observed UTF during the landing. At about 1724, he broadcast a taxi call and commenced taxiing to runway 06. After hearing no further broadcasts from the pilot of UTF, the pilot of UZP broadcast on the CTAF that he was entering and backtracking runway 06. The pilot again received no response, and after waiting about 5 seconds, he taxied UZP onto the runway and lined up on runway 06. At about 1727, the pilot broadcast a lining up and rolling call, which was acknowledged by the pilot of another aircraft inbound to Ballina.

At about 1728, the pilot of UZP looked along the runway and commenced the take-off run. Just prior to rotation, he sighted UTF stopped on the runway, towards the departure end. He elected to continue the take-off and increased the climb angle to provide separation with UTF.

The instructor of UTF then attempted to contact UZP, with nil response received. He then realised that the radio volume had been turned down. UTF then vacated the runway.

Figure 1: Ballina Airport and approximate flight paths



Source: Google earth and pilot recollections

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

2 Recordings of the transmissions made on the CTAF indicated that the broadcast was partially over-transmitted.

Pilot comments (VH-UZP)

The pilot of UZP provided the following comments:

- He expected UTF to be conducting right hand circuits, which was the normal circuit direction at Ballina. When at the runway 06 holding point, the right hand circuit was positioned behind the pilot.
- He expected UTF to be on early downwind when he entered the runway. He did not expect UTF to have stopped on the runway.
- His attention was directed inside the cockpit after lining up, and he then looked along the runway prior to commencing the take-off run.

Pilot comments (VH-UTF)

The flight instructor of UTF provided the following comments:

- It was the end of a long hot day.
- They had been making the appropriate calls on the CTAF, but did not hear any broadcasts from other aircraft. While this could have indicated a potential radio issue, it was not unusual to have low traffic volume at Ballina at that time.
- As the 'student' pilot was a commercial pilot, the instructor was not monitoring the pilot's actions as closely as he would have for a low hour student.
- Ballina Airport has an aerodrome frequency response unit (AFRU),[3] which provides an automatic response to pilots when transmitting on the CTAF. The 'beep backs' from the AFRU would not have been heard as the radio volume had been turned down.

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-UZP

As a result of this occurrence, the operator of VH-UZP has advised the ATSB that they will be highlighting the importance of communications and situational awareness with all company pilots.

Operator of VH-UTF

As a result of this occurrence, the operator of VH-UTF has advised the ATSB that they have made an addition to the start-up checklist, with the pilot having to check the automatic weather information service (AWIS). As well as providing weather information, this enables the pilot to confirm that the radio is on and audible.

Safety message

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-towered aerodromes www.atsb.gov.au/safetywatch/safety-around-aeros.aspx.

SafetyWatch

[3] AFRU: A facility installed at certain non-towered aerodromes that provides an automatic response to pilots when transmitting on the CTAF. The AFRU indicates to the pilot that the correct radio frequency has been selected and confirms the operation of the aircraft's transmitter, receiver and volume setting. The pilot will receive either a voice identification, for example 'Leinster aerodrome CTAF', or a 300 millisecond tone or 'beep'.

An ATSB research report identified over 200 occurrences between 2003 and 2008 where pilots flying within 10 NM of a non-towered aerodrome may not have been broadcasting or maintaining a continuous listening watch on the CTAF. This included instances of where the incorrect radio frequency had been selected, the radio volume had been turned down, faulty radio equipment, not making broadcasts, or other distractions.

Broadcasting and monitoring the CTAF and maintaining a good lookout are useful strategies to improve safety at non-towered aerodromes. The publication, *Staying safe in the vicinity of non-towered aerodromes,* is available from the ATSB website at www.atsb.gov.au/publications/2008/ar-2008-044(1).aspx.

In addition, where available, the AFRU is also a useful tool for pilot to confirm that the correct radio frequency and volume has been selected.

General details

Occurrence details

Date and time:	9 October 2013 – 1730 EDT	
Occurrence category:	Serious incident	
Primary occurrence type:	Runway incursion	
Location:	Ballina/Byron Gateway Airport, New South Wales	
	Latitude: 28° 50.03' S	Longitude: 153° 33.75' E

Aircraft details: VH-UTF

Manufacturer and model:	Bell Helicopter Company	
Registration:	VH-UTF	
Serial number:	25026	
Type of operation:	Flying training - dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Aircraft details: VH-UZP

Manufacturer and model:	Fairchild Industries Inc.	
Registration:	VH-UZP	
Serial number:	AC-498	
Type of operation:	Charter – freight	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Piston aircraft

Pilot incapacitation event involving a Cessna 210, VH-JMG

What happened

A Cessna 210 aircraft

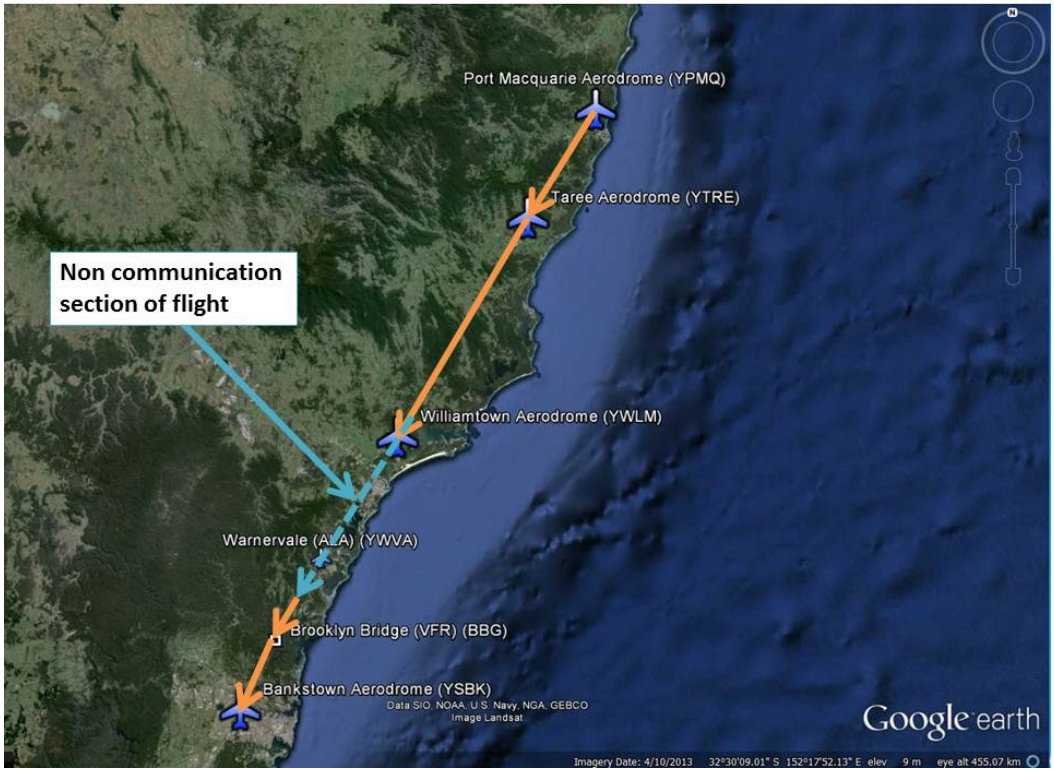
Source: William Whaley

On the afternoon of 1 September 2013, the pilot of a Cessna 210 aircraft, registered VH-JMG, planned a private flight from Port Macquarie to Bankstown, New South Wales, under the visual flight rules (VFR).

The pilot had flown the same route on a regular basis to oversee business interests in Sydney and was very familiar with the airspace. The pilot had planned to stay in Sydney overnight and return to Port Macquarie early the next morning.

The pilot reported feeling a little tired and unwell. He elected to depart Port Macquarie earlier than usual at about 1510 Eastern Standard Time.[1] The planned route was from Port Macquarie to overhead Taree, Williamtown, then on descent from controlled airspace to Brooklyn Bridge, and via the lane of entry (LOE) to Bankstown Airport (Figure 1).

Figure 1: Flight planned track



Source: Google earth

After departing Port Macquarie and reaching the planned cruising level of 8,500 ft above mean sea level (AMSL), the pilot selected the autopilot, which was coupled to one of the aircraft's two global positioning system (GPS) units. The autopilot maintained the aircraft's track and altitude, while the pilot listened to music through the radio and continued to monitor the flight. The pilot reported the flight was progressing normally, with ideal weather conditions experienced.

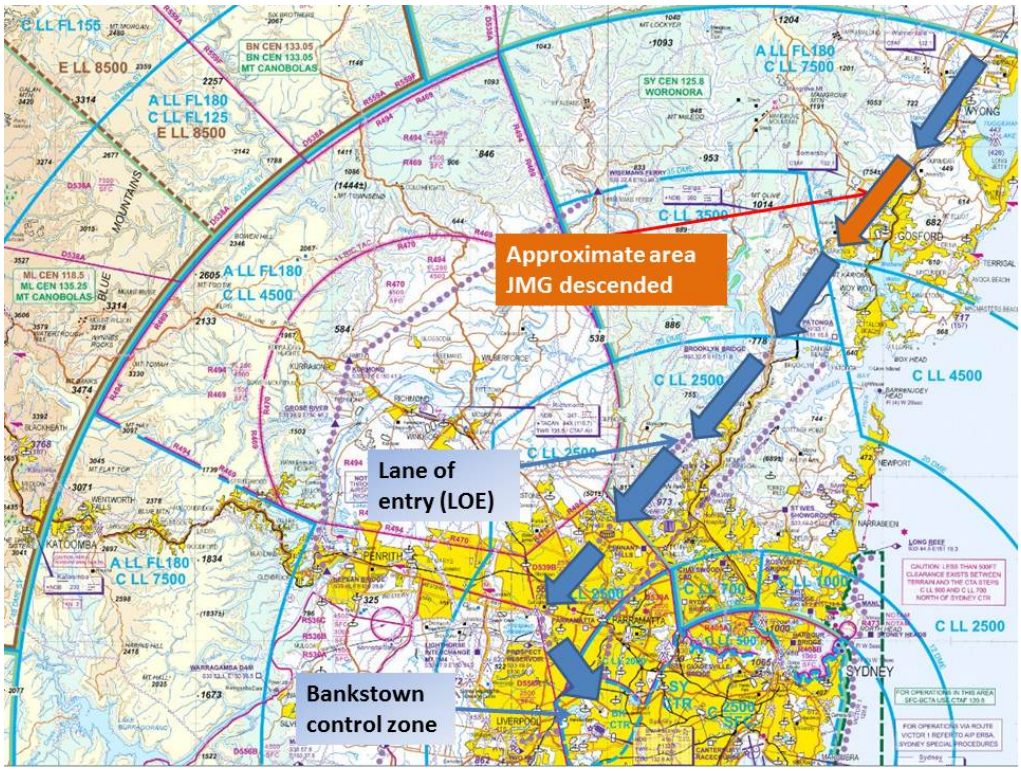
[1] Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

A few minutes before passing overhead Taree, the pilot contacted Brisbane Centre air traffic control (ATC) to obtain an airways clearance through Williamtown Class C[2] airspace. He recalled receiving the clearance and entering Williamtown airspace while maintaining 8,500 ft.

At about 1601, as JMG passed overhead Williamtown, ATC called the pilot of JMG to advise that control services were terminated, but no response was received. The aircraft subsequently entered Class E airspace[3]. At about 1620, the aircraft was observed to re-enter Class C airspace, without an ATC clearance, maintaining 8,500 ft.

About 20 minutes after entering Williamtown airspace, the pilot recalled waking up. Realising he must have fallen asleep, he gathered his thoughts, checked the aircraft's instruments and then realised that he was now in Class C airspace, about 12-15 NM north of Brooklyn Bridge (Figure 2).

Figure 2: Flight path of VH-JMG



Source: Airservices Australia

In a state of shock, the pilot placed the aircraft into a spiral descent down to 2,500 ft to regain the original flight planned track and altitude for the LOE. During the descent, he selected the Brisbane Centre, Sydney Radar and Williamtown Approach ATC frequencies to listen for any calls regarding his aircraft. The pilot then broadcast his position on the Warnervale common traffic advisory frequency (CTAF), in case the aircraft posed a risk to other traffic in the area.

Having not heard the aircraft mentioned on any of the selected radio frequencies and reasoning that no issues had occurred when in Class C, the flight to Bankstown was continued without further incident. The pilot spoke to ATC at length after landing.

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2 Class C: All aircraft must get an airways clearance and communicate with air traffic control. Instrument flight rules (IFR) aircraft are positively separated from both IFR and VFR aircraft. VFR aircraft are provided traffic information on other VFR aircraft.

3 IFR (instrument flight rules) aircraft requires an airways clearance and must communicate with air traffic control. IFR aircraft are positively separated from other IFR aircraft and given traffic information on known VFR aircraft. VFR aircraft do not require an airways clearance and are not required to communicate with air traffic control.

Airservices Australia audio recordings

The Australian Transport Safety Bureau obtained surveillance and audio data from Airservices Australia, which provided the following:

- at about 1601, while still in Williamtown controlled airspace, the pilot stopped responding to ATC radio calls
- an INCERFA[4] phase was declared by ATC
- Sydney Centre, Sydney Radar and Sydney Approach controllers all made numerous attempts to contact the pilot
- Two inbound flights to Sydney were kept at a higher than normal altitude to keep sufficiently clear of the aircraft
- Sydney Approach ATC also requested that the crew of an ambulance flight and a scheduled regular public transport flight maintain a visual lookout and monitor their respective traffic collision avoidance systems (TCAS)[5] for the aircraft
- ATC had concerns as to the intentions of the pilot.

Pilot comments

The pilot reported that this was the first time he had experienced such an event and it took some time to recover. He realised that the pressure of the family business in tough economic times influenced his decision to fly, when in hindsight he realised how tired and unwell he had been.

He also reported that his sleep pattern had deteriorated over the last few years and he felt that this had contributed to the occurrence. He routinely had minimal sleep due to work commitments, but until now, it had never posed a problem.

He also commented that, conducting the same flight once or twice a week, over many years may have allowed him to become too familiar with the airspace, and too reliant on the aircraft's autopilot and GPS.

Safety message

One of the Civil Aviation Safety Authority'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:

http://services.casa.gov.au/outnback/inc/pages/episode3/episode-3_Fatigue_management.shtml

Research published by the ATSB determined 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 following publications provide additional information on pilot incapacitation and the 'I'm safe checklist':

- Pilot incapacitation: Analysis of Medical Conditions Affecting Pilots Involved in Accidents and Incidents – 1 January 1975 to 31 March 2006
  www.atsb.gov.au/publications/2007/b20060170.aspx
- Federal Aviation Administration Risk Management Handbook
  www.faa.gov/library/manuals/aviation/media/FAA-H-8083-2.pdf

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[4] INCERFA is a phase where uncertainty exists as to the safety of an aircraft and its occupants.

[5] Traffic collision avoidance system (TCAS) is an aircraft collision avoidance system. It monitors the airspace around an aircraft for other aircraft equipped with a corresponding active transponder and gives warning of possible collision risks.

- The ‘I’m safe checklist’ provide a means of self-checking one’s current readiness to conduct a flight. I.M.S.A.F.E. Checklist: www.ampl.ma/attachments/publication/509.pdf

General details

Occurrence details

Date and time:	1 September 2013 - 1601 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Pilot incapacitation	
Location:	56 km N of Sydney, New South Wales	
	Latitude: 33° 27.43’ S	Longitude: 151° 18.45’ E

Aircraft details

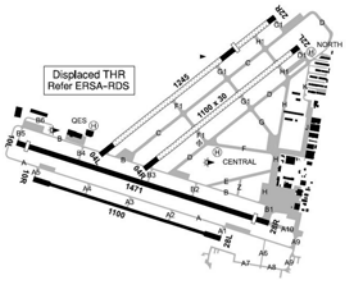
Manufacturer and model:	Cessna Aircraft Company 210L	
Registration:	VH-JMG	
Serial number:	21061147	
Type of operation:	Private/business	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Aircraft proximity event between a Cessna 172, VH-NUU and a Beech F33A, VH-ZBZ

What happened

On 7 October 2013, at about 1830 Eastern Standard Time (EST),[1] the pilot of a Cessna 172 aircraft, registered VH-NUU (NUU), commenced night circuits at Archerfield Airport, Queensland, where common traffic advisory frequency (CTAF) procedures were in place.[2] He reported that there were also four other aircraft and a helicopter conducting night circuits at the time. The active runway was runway 10.

Archerfield Airport



Source: Airservices Australia

The pilot of NUU reported that the aircraft in the circuit were flying a 'modified' circuit with a longer downwind leg due to a strong tailwind and were flying a slower, larger circuit to make allowance for a helicopter that had been conducting stop-and-go circuits.

At about 1850, the pilot of a Beech F33A aircraft, registered VH-ZBZ (ZBZ), was conducting a private flight from Hervey Bay to Archerfield. While on descent to Archerfield, prior to leaving controlled airspace, the pilot of ZBZ was advised by Brisbane air traffic control that there were four or five aircraft in the circuit area.

At about 1856, ZBZ joined the circuit between an aircraft on downwind and another on upwind (Figure 1). The pilot reported that, after turning onto downwind, he had the aircraft in front of him (NUU) sighted also on downwind and so he extended the downwind leg to maintain separation with NUU.

At about 1857 (Figure 2), the pilot of NUU broadcast that he was turning onto base and about 20 seconds later the pilot of ZBZ also broadcast that he was turning onto base for runway 10.

At about 1858 (Figure 3), the pilot of ZBZ commenced turning onto final and then broadcast that he was established on final. He reported that, at that time, he had sighted an aircraft well ahead on late final and believed it was NUU. The pilot of NUU immediately broadcast that he was also on final.

At about 1859 (Figure 4), the pilot of ZBZ saw NUU below his aircraft. The pilot of ZBZ conducted a go-around and NUU continued the approach.

Airservices Australia surveillance data indicated that the vertical separation reduced to 300 ft.

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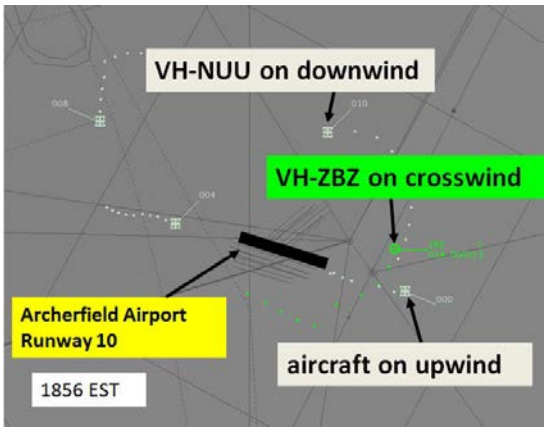
1 Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

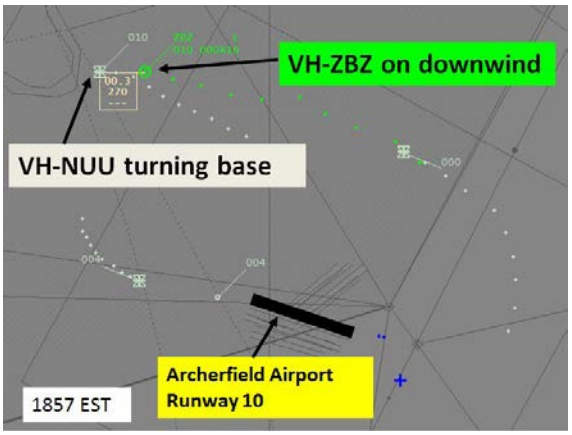
2 Archerfield Tower provides air traffic services within Class D airspace during tower hours. Outside tower hours the airspace becomes Class G and common traffic advisory frequency (CTAF) procedures apply.

Figure 1: Aircraft positions at 1856



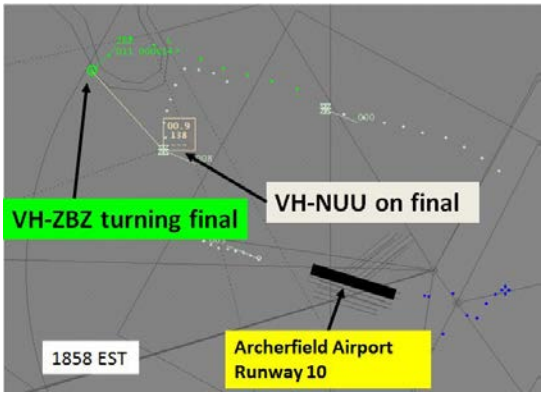
Source: Airservices Australia

Figure 2: Aircraft positions at 1857



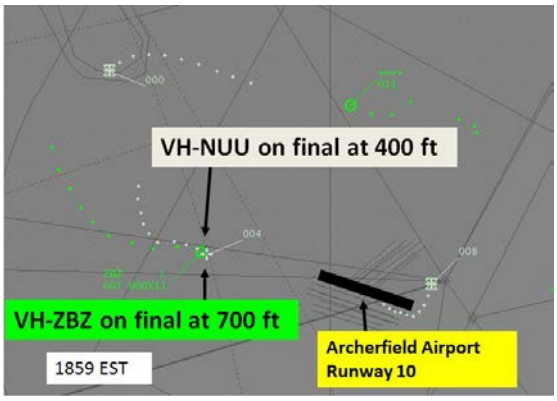
Source: Airservices Australia

Figure 3: Aircraft positions at 1858



Source: Airservices Australia

Figure 4: Aircraft positions at 1859



Source: Airservices Australia

Pilot comments (VH-ZBZ)

The pilot of ZBZ provided the following comments:

- After turning base, he sighted an aircraft in front of NUU on late final and mistook it for NUU.
- NUU had descended lower than ZBZ on base and he was looking along his projected glidepath. NUU was not where he had expected it to be.
- As NUU was below ZBZ's approach path, the aircraft was difficult to see due to the lights from the residential area below.
- NUU appeared to diverge to the left on final and he thought it was a helicopter approaching to land on the taxiway to the left of runway 10, as had occurred on previous occasions.

Pilot comments (VH-NUU)

The pilot of NUU provided the following comments:

- There were five company aircraft in the circuit conducting solo circuits. There was a duty instructor on the ground, who had conducted a safety briefing prior to the flight.
- Having the Archerfield air traffic control tower active when multiple aircraft were conducting night circuits would assist in providing separation between aircraft in the circuit and arriving aircraft.
- A helicopter conducting circuits had been doing stop-and-go landings. All the other aircraft slowed down and extended the downwind leg of the circuit to maintain their position in the circuit relative to the helicopter.

Airservices Australia comments

Airservices Australia advised the ATSB that hours of operation at non-continuous air traffic control towers are determined following a review of traffic levels outside of tower hours. The review process considers air traffic levels outside tower hours of operation utilising information gained from the airport owner, local flying organisations and statistical analysis.

Airservices has not identified any consistent traffic trends indicating that a change to the air traffic controller hours at Archerfield Airport is required.

Safety message

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-towered aerodromes www.atsb.gov.au/safetywatch/safety-around-aeros.aspx.

Between 2003 and 2008, 709 occurrences in the vicinity of non-towered aerodromes were reported to the ATSB, of which 181 involved reduced separation between aircraft. Thirty-two incidents involved aircraft coming close to each other when both were on final approach. Research conducted by the ATSB also found that there was a higher risk of mid-air collisions when aircraft come too close to each other on final approach or base leg. *A pilot's guide to staying safe in the vicinity of non-towered aerodromes* is available on the ATSB website at www.atsb.gov.au/publications/2008/ar-2008-044(1).aspx.

In addition, the Civil Aviation Safety Authority Civil Aviation Advisory Publication (CAAP) 166-1(1), states that most collisions occur on downwind or final approach and that night circuits require increased vigilance. Good height and speed control to maintain separation is essential. The turn onto final should be completed by not less than 500 ft above aerodrome elevation to allow time to ensure the runway is clear for landing and for the aircraft to be stabilised for the approach and landing. The CAAP is available at www.casa.gov.au/wcmswr/_assets/main/download/caaps/ops/166-1.pdf.

Maintaining a vigilant lookout at all times and standardisation of the circuit pattern is important for safe operations in the vicinity of non-towered aerodromes.

General details

Occurrence details

Date and time:	7 October 2013 – 1855 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Airprox	
Location:	Archerfield Airport, Queensland	
	Latitude: 27° 34.22' S	Longitude: 153° 00.48' E

Aircraft details: VH-NUU

Manufacturer and model:	Cessna Aircraft Company 172R	
Registration:	VH-NUU	
Serial number:	17280366	
Type of operation:	Flying training - solo	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Aircraft details: VH-ZBZ

Manufacturer and model:	Beech Aircraft Corporation F33A	
Registration:	VH-ZBZ	
Serial number:	CE-1200	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Wheels-up landing involving a Beech 95-B55, VH-TLP

What happened

On 20 October 2013, at about 1140 Eastern Daylight-savings Time (EDT),[1] the pilot of a Beech 95-B55 aircraft, registered VH-TLP, was preparing for a local private flight from St Helens aerodrome, Tasmania.

The pilot reported that he closed the aircraft door and noted a distinctive click indicating that it was secure. He then completed the taxi and pre-take-off checks and reported that everything was operating normally.

The pilot commenced the take-off on runway 26 and, as the aircraft became airborne, at about 50-60 ft above ground level (AGL), the pilot reported hearing a bang and the door opened. Documents blew out of the door and around the cockpit.

The pilot continued the climb to 1,000 ft AGL in preparation to return for landing. The pilot could not recall retracting the landing gear after take-off.

When on the downwind leg of the circuit, the pilot attempted to close the door, but was unable to reach it. On turning onto base leg, the pilot selected 10 degrees of flap and continued the approach. On final, he selected full flap and reduced the throttle setting to idle for landing.

As the aircraft touched down, the pilot realised that the landing gear was retracted. The aircraft slid along the runway and came to rest about 600 m from the runway end. The aircraft sustained substantial damage (Figure 1).

The pilot reported hearing a horn activate during the landing, but was unable to distinguish whether it was the stall warning[2] or the landing gear warning horn.[3]

Figure 1: Aircraft damage

Source: Tasmania Police

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

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

3 The operating manual for the aircraft stated that 'if either or both throttles are retarded below an engine setting sufficient to sustain two-engine flight with the landing gear retracted, a warning horn will sound intermittently'.

Pilot comments

The pilot provided the following comments:

- He normally lowered the landing gear on downwind, but omitted to do it on this occasion.
- He had never heard the landing gear warning horn activate before and was not aware of what it sounded like.
- He normally used memorised checks, but in future would use a written checklist.
- An engineering inspection after the accident found that the door appeared to be twisted and not sitting flush in the frame, but was lockable.
- About 9 years prior to the accident, the aircraft door had opened on take-off, but had since been fixed by engineers.

Safety message

An American Bonanza Society magazine article (ABS July 2006) cites other pilots' experiences of doors opening in flight involving the B55 aircraft. The article is available from www.bonanza.org and reinforces the importance of concentrating on flying the aircraft if a door opens unexpectedly.

Generally, distraction is defined as a process, condition or activity that takes a pilot's attention away from the task of flying. Research conducted by the Australian Transport Safety Bureau has identified 325 occurrences between 1997 and 2004, which involved distractions. Of these, 54 occurred during the landing phase of flight. The source of distraction for the majority (33) of the 234 occurrences was related to equipment problems. The report also stated that the most serious source of pilot distraction occurred as a result of an unexpected equipment malfunction.

The Flight Safety Foundation suggests that, after a distraction source has been recognised and identified, the next priority is to re-establish situation awareness by conducting the following:

- *Identify*: What was I doing?
- *Ask*: Where was I distracted?
- *Decide/act*: What decision or action shall I take to get back on track?

The following provide additional information on pilot distraction:

- Dangerous Distraction: An examination of accidents and incidents involving pilot distraction in Australia between 1997 and 2004: www.atsb.gov.au/publications/2005/distraction_report.aspx
- Flight Safety Foundation Approach-and-landing Briefing Note 2.4 – Interruptions/Distractions: http://flightsafety.org/files/alar_bn2-4-distractions.pdf
- The United states Federal Aviation Administration (FAA) On Landings Part III pamphlet:www.faasafety.gov/files/gslac/library/documents/2011/Aug/56411/FAA%20P-8740-50%20OnLandingsPart%20III%20%5Bhi-res%5D%20branded.pdf
- YouTube video of an unintentional wheels up landing: www.flight.org/blog/2012/04/22/gear-up-landings-and-pilot-error/

General details

Occurrence details

Date and time:	20 October 2013 – 1140 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Wheels up landing	
Location:	St. Helens aerodrome, Tasmania	
	Latitude: 41° 20.20' S	Longitude: 148° 16.92' E

Aircraft details

Manufacturer and model:	Beech Aircraft Corporation 95-B55	
Registration:	VH-TLP	
Serial number:	TC-1537	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Runway undershoot involving a Cessna 404, VH-HAZ

What happened

On 29 October 2013, at about 0645 Central Standard Time,[1] the pilot of a Cessna 404 aircraft, registered VH-HAZ, was preparing for a return flight from Darwin to Garden Point and Snake Bay, Northern Territory. The pilot reviewed the applicable Notices to Airmen (NOTAMs)[2] and noted that the runway 11 threshold at Darwin would be displaced due to works in progress. He reported that, on reading the NOTAM, he paid attention to the usable runway length and included the runway distance calculations in his pre-flight planning.

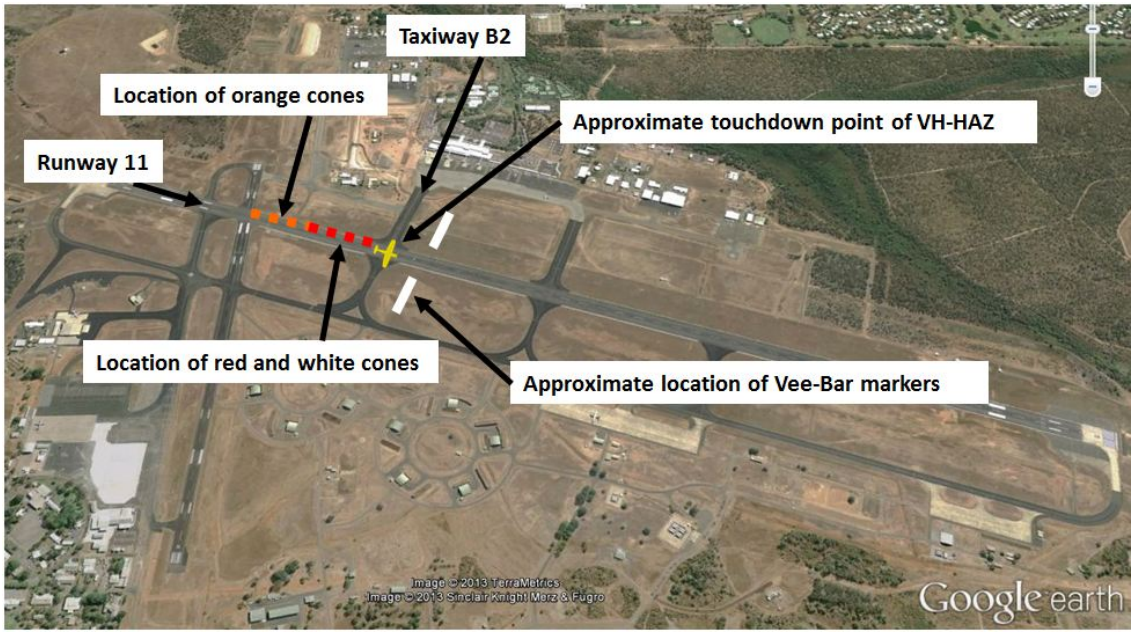
At about 0745, the aircraft departed from the 'Bravo 2' intersection on runway 11 and the pilot reported that he did not observe any markings indicating the location of the displaced threshold.

On return to Darwin, at about 1000, the pilot received the automatic terminal information service (ATIS), which advised of the displaced threshold. He received a clearance from air traffic control (ATC) to land on runway 11.

While on approach, at about 200 ft above ground level (AGL), the pilot observed orange cones (works limit markers) and red and white cones (unserviceability markers) on the runway. He adjusted the aircraft's descent profile, aiming to be over the red and white cones at about 50 ft AGL. He then focused his attention on landing. The aircraft touched down near the 'Bravo 2' intersection (Figure 1).

The pilot reported that, after completing his flying duties at about 1830, he was notified by his company that ATC had advised that the aircraft had landed before the displaced threshold.

Figure 1: Location of runway works markings



Source: Google earth and pilot recollection

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

2 A Notice to Airmen advises personnel concerned with flight operations of information concerning the establishment, condition or change in any aeronautical facility, service, procedure, or hazard, the timely knowledge of which is essential to safe flight.

Displaced threshold markings

The Aeronautical Information Publication (AIP) Part 3 – Aerodromes, 1.1 paragraph 3.5 subparagraph 3.5.4 states that, when a threshold is temporarily displaced, it will be shown by lights or by the following:

a. a series of inverted 'V' markings (white) painted across the runway; or
b. one or two white Vee-Bar markings located on both sides of the runway (Figure 2); or
c. at military controlled aerodromes (such as Darwin), for short periods and dependent on military operational requirements, four white cones situated on both sides of the runway.

Figure 2: Displaced threshold markings

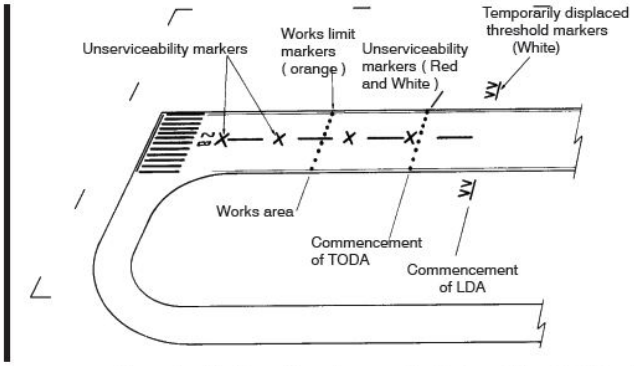

Figure 9 – Markings for a temporarily displaced threshold due to works on the runway for a period of 30 days or less.

Source: Airservices Australia

Pilot comments

The pilot provided the following comments:

- when reviewing the NOTAM, he did not observe the description stating that the displaced threshold would be marked by Vee-Bars
- during the approach, he looked for the runway threshold identification lights, but they were not operational at that time
- the runway works had been underway for the previous three weeks, with the threshold regularly displaced during that period
- there was a hump in the runway, just before 'Bravo 2', and the Vee-Bars were located on the downhill side of the hump; he did not see them at any stage during the landing
- after sighting the cones, he was conducting his finals checks, looking down the runway at his aiming point, and then assessing where he would vacate the runway
- when the displaced threshold lights and precision approach path indicator (PAPI) were previously used to indicate the location of the displaced threshold, they were visible from over 2 NM away and provided valuable guidance to pilots.

Darwin air traffic control comments

Darwin ATC provided the following comments:

- the displaced threshold lights were only activated during periods of darkness or reduced visibility
- a temporary PAPI was activated during routine maintenance on the runway arrestor cables. Local pilots operating at Darwin may have seen these in operation many times. On the day of this occurrence, the displaced threshold was in place for airfield works and at a different location to that used for cable maintenance. As the displaced threshold in use on the day had not been pre-surveyed, the temporary PAPI was not able to be used.

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 the following email was sent to all company pilots advising:

> With current and ongoing works to the airfield in Darwin particularly runway 11/29 and 18/36, the activation of the temporary PAPI guidance system is used when cable maintenance is required or requested by airlines for compliance reasons. This does not include when the threshold is displaced for any other reason i.e. current works in progress. The chevron or vee-bar markings denote the displaced threshold. Pilots may with approval back-track inside the displaced threshold however pilots are required to land outside of this area. Typically red and white cones are positioned a significant distance from the displaced threshold, providing guidance boundaries for men and hand tools to operate in. These cones are not to be mistaken for the displaced threshold markings. Remember to carefully review all NOTAMs and maintain good situational awareness. If in doubt, ask the question. As per the Manual of Standards 139, the PAPI system is not required if there is sufficient displaced markings displayed.

Safety message

A report prepared for the ATSB, The Clarity and Accessibility of NOTAM Information for the Aviation Industry, www.atsb.gov.au/media/761312/clarity_accessibility_notam.pdf, found that there was a significant potential for oversight of critical information in the NOTAM system. This incident highlights the importance of thorough pre-flight planning and the use of all available information in preparing for flight.

General details

Occurrence details

Date and time:	29 October 2013 – 0830 CST	
Occurrence category:	Incident	
Primary occurrence type:	Runway undershoot	
Location:	Darwin Airport, Northern Territory	
	Latitude: 12° 24.88' S	Longitude: 130° 52.60' E

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 404	
Registration:	VH-HAZ	
Serial number:	404-0046	
Type of operation:	Charter – passenger	
Persons on board:	Crew – 1	Passengers – 4
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Loss of control involving a Cessna 172, VH-IGS

What happened

VH-IGS at the accident site

Source: South Australia Police

On 31 October 2013, a Cessna 172 aircraft, registered VH-IGS (IGS), departed Parafield on a private flight to the Gum Creek area near Clare, South Australia. The pilot was the sole occupant on board.

Earlier that day, the pilot had flown IGS to Parafield to pick up a part needed to repair a hay cutting machine. There was a delay of a couple of hours in the part arriving, so the flight departed Parafield around 1200 Central Daylight-savings Time.[1]

The pilot felt pressure to repair the broken machine, to allow the harvest to continue, so planned to land on a gravel road in the Gum Creek area, close to the where the hay cutting machine was parked (Figure 1).

At about 1300, when overhead the selected road at Gum Creek, the pilot conducted a couple of precautionary searches at about 500 ft above ground level (AGL) to identify any potential obstacles during the landing. At this time, he also noted the dust from trucks on a nearby road hanging in the air, indicating very little wind. The flight from Parafield to Gum Creek had also been in minimal wind, so the pilot was not overly concerned about which direction to land. He did, however, identify a single powerline spanning the road, almost at right angles to the selected section of road.

He commenced the approach, taking care to clear the powerline before initiating a descent onto the road. With the aircraft lined up with the centre of the 10 m wide road, and close to the flare,[2] the pilot reported a gust of wind came through a clump of trees on the right of the road, and pushed IGS well to the left. At this point, the aircraft was travelling at about 40 kt, with 30° of flap[3], and the stall warning had just sounded.

Concerned about the proximity of the aircraft to the trees and fence, the pilot decided to conduct a go-around. At this point, the left wheel of IGS was in contact with the road. He applied full power and reported applying pressure to the control column in an attempt to raise the nose and gain some flying speed with the flaps still selected at 30°.

However, IGS continued moving rapidly to the left, and struck a large tree, severing the left wing. The aircraft rotated about 180° and continued for about another 50 m through fences and a gateway before coming to a stop (Figure 2).

The pilot was able to egress the aircraft through the right side. He sustained minor injuries and the aircraft was substantially damaged.

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1 Central Daylight-savings Time was Universal Coordinated Time (UTC) + 10.5 hours.
2 Final nose-up pitch of landing aeroplane to reduce rate of descent to approximately zero at touchdown.
3 IGS had been modified to have a maximum of 30° of flap.

Figure 1: Road used for landing

Source: South Australia Police

Figure 2: VH-IGS damage

Source: South Australia Police

General details

Occurrence details

Date and time:	31 October 2013 – 1300 CDT	
Occurrence category:	Accident	
Primary occurrence type:	Loss of control	
Location:	93 km SE of Port Pirie aerodrome, South Australia	
	Latitude: 33° 146.50' S	Longitude: 138° 45.80' E

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 172N	
Registration:	VH-IGS	
Serial number:	17270677	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 (Minor)	Passengers – Nil
Damage:	Substantial	

Mid-air collision involving a Cessna 152, VH-TNV and a Jabiru J160, 19-4430

What happened

Damage to 19-4430

Source: Owner

On 10 November 2013, at about 1125 Eastern Daylight-savings Time,[1] a flight instructor and student pilot of a Cessna 152 aircraft, registered VH-TNV (TNV), were conducting circuits at Tyabb aerodrome, Victoria.

At about the same time, the pilot of a Jabiru J160 aircraft, registered 19-4430 (Jabiru), taxied for a local flight with one passenger on board. The pilot broadcast a taxi call on the common traffic advisory frequency (CTAF) and commenced taxiing to the runway 17 holding point. The pilot stopped the aircraft short of the marked holding point and turned at an angle to maximise his view of the base and final legs of the circuit (Figure 1).

As the Jabiru neared the holding point, another aircraft landed on the grass runway. The pilot of the Jabiru waited until that aircraft taxied clear of the flight strip.

The pilot of TNV reported that, when on a closer downwind leg than normal, in line with the runway 17 threshold, he reduced the engine power to idle and commenced a glide approach. He broadcast that TNV was turning base for a glide approach and commenced a continuous turn towards runway 17.

The pilot of the Jabiru heard the broadcast and looked for TNV where he would expect an aircraft turning base to be, but was unable to sight the aircraft. He reported that he assumed TNV was difficult to see as it would have been about 1 NM away. From his experience, he expected to have a few minutes to line up and take off. He then broadcast that he was lining up and rolling on runway 17, and commenced the take-off run.

At about the same time, the pilot of TNV reported that he was on a high, close final, had sighted the Jabiru at the holding point, and reported broadcasting on the CTAF that he was turning final. Neither pilot heard the other pilot's broadcast and both reported that they may have transmitted their calls simultaneously.

The student pilot of TNV continued the glide approach, aiming to touchdown about half way along the runway.

The pilot of the Jabiru rotated the aircraft at a speed of about 60 kt, and about 160 m along the runway. As the aircraft became airborne, at about 15 ft above ground level (AGL), the pilot saw the underside of TNV appear from above and fill the windscreen. TNV appeared to be overtaking the Jabiru very slowly and still descending. The pilot of the Jabiru pushed the control stick forward and reduced the power to idle. However this caused the Jabiru to accelerate towards TNV resulting in TNV and the Jabiru colliding with the elevator trim tab of TNV making contact with the fin of the Jabiru. The pilot of the Jabiru reported that the wheels of TNV appeared to be either side of his cockpit, with the front wheel just clear of the Jabiru's propeller blades.

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

The pilot of the Jabiru forced the aircraft onto the ground and it skidded along the runway. The pilot reported that TNV appeared to continue flying about 3 ft above the ground and then gradually climb away.

At the same time, the pilot of TNV reported hearing a loud bang behind him, but did not see the Jabiru. He took control of the aircraft from the student and commenced a go-around. He reported that, as the aircraft required full back pressure on the control column and full back trim to climb, he elected to level out at about 700 ft AGL. He conducted a low level circuit and returned for landing. The pilot also reported hearing a broadcast on the CTAF advising that there was an aircraft to the side of the runway and he assumed that it was the Jabiru that TNV had collided with.

The Jabiru was substantially damaged and TNV sustained damage to the right elevator and trim tab.

Pilot comments (Jabiru)

The pilot provided the following comments:

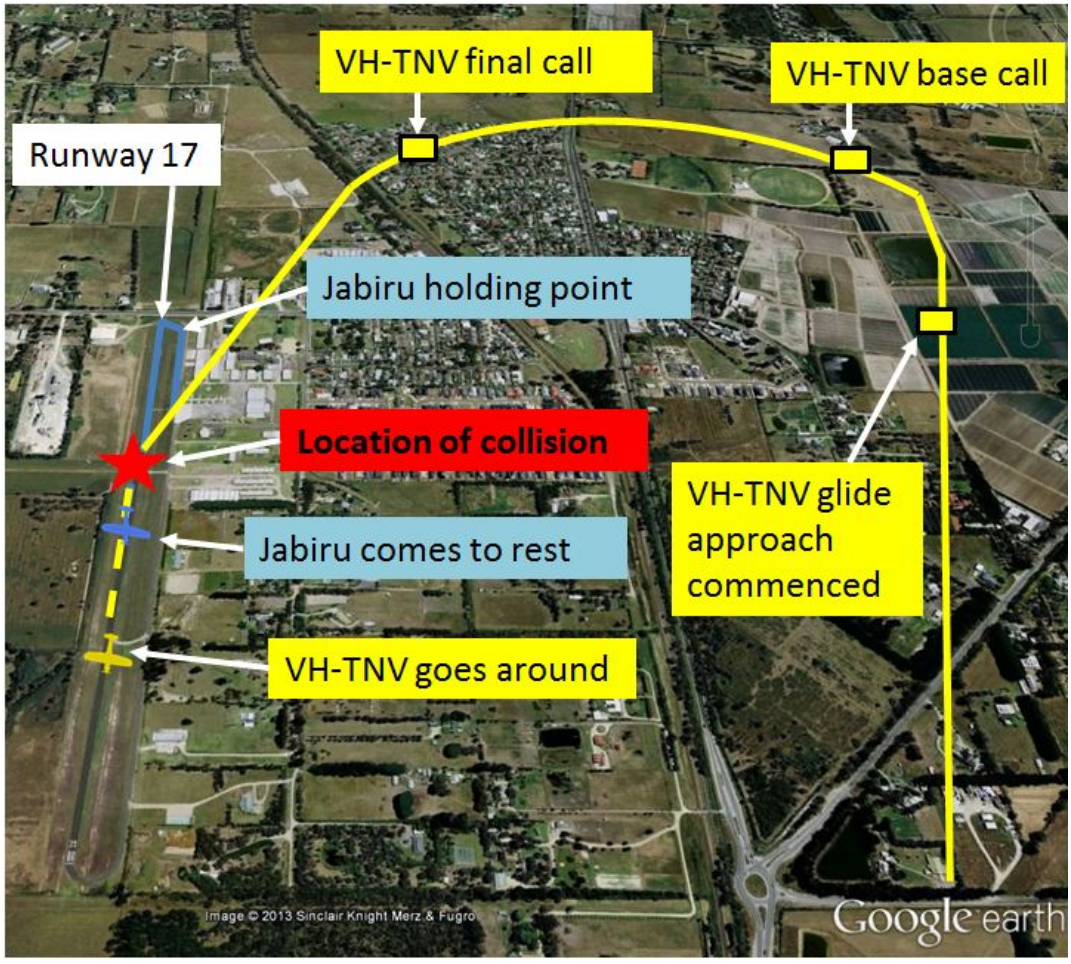
- He looked for TNV when he heard the pilot broadcast a call turning base, but was unable to identify the aircraft. The broadcast created an expectation that TNV was at a particular place in the circuit, but at that time TNV was behind him, at an oblique angle, and closer than expected.
- As he believed that TNV was a couple of minutes away from landing, he commenced his take-off.
- He was aware of two aircraft conducting circuits, another that had just landed, an aircraft inbound to the aerodrome, and a fifth aircraft that was departing the area.
- As it was an event day at the aerodrome, he suggested that if a briefing had been conducted with all pilots prior to commencing flying operations at the aerodrome for the day, it may have assisted in alerting pilots to the increased traffic volume and the importance of flying standard circuit patterns.
- Aircraft are permitted to fly at Tyabb without a radio, increasing the need for pilots to be able to sight other aircraft.

Pilot comments (VH-TNV)

The pilot provided the following comments:

- After broadcasting a turning final call, he focused his attention on the aircraft's airspeed and the landing aim point.
- When on the base leg, and having sighted the Jabiru at the holding point, he assumed that the pilot would hold until TNV had landed.
- TNV was at about 200 ft AGL when lined up on the runway centreline.
- The marked holding point faces west and in a high wing aircraft like the Jabiru, the pilot is unable to see aircraft on final from that position. The operator of TNV reminds their pilots to stop prior to the holding point for better visibility of aircraft on final for runway 17.
- There have been other occurrences at Tyabb where an aircraft has entered the runway with another aircraft on final and that pilot has had to conduct a go-around.
- He was aware of one other aircraft in the circuit and the Jabiru on the ground. He did not hear the taxi or lining up and rolling broadcast from the pilot of the Jabiru, or any other broadcasts until he was in the go-around.

Figure 1: Approximate location of aircraft and radio broadcasts



Source: Google earth and pilot recollections

Safety message

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-towered aerodromes www.atsb.gov.au/safetywatch/safety-around-aeros.aspx.

As detailed in the booklet *A pilot's guide to staying safe in the vicinity of non-towered aerodromes*, available at www.atsb.gov.au/publications/2008/ar-2008-044(1).aspx, ATSB research found that, between 2003 and 2008, there were 709 airspace-related events at, or in the vicinity of non-towered aerodromes. This included 60 serious incidents and six accidents (mid-air and ground collisions). Most of the 60 serious incidents were near mid-air collisions. The report also found that there were 31 occurrences where an aircraft commenced the take-off at the same time as another aircraft was on short final or rolling out after landing.

The risk of runway incursions and other reduced separation events can be minimised through good communication by pilots. Most importantly, a good visual lookout should be maintained when in the circuit for aircraft that could be manoeuvring on the ground. Pilots on the ground should be vigilant when taxiing or entering a runway. Pilots are reminded to keep a good lookout for aircraft on approach, listen to the CTAF for other pilot's intentions, and build a good awareness of the traffic in the circuit.

The need for good communication and maintaining a good lookout are even more important when conducting non-standard or modified circuits.

General details

Occurrence details

Date and time:	10 November 2013 – 1130 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Mid-air collision	
Location:	Tyabb aerodrome, Victoria	
	Latitude: 38° 16.00' S	Longitude: 145° 10.50' E

Aircraft details: VH-TNV

Manufacturer and model:	Cessna Aircraft Company 152	
Registration:	VH-TNV	
Serial number:	15281560	
Type of operation:	Flying training - dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Minor	

Aircraft details: 19-4430

Manufacturer and model:	Jabiru J160	
Registration:	19-4430	
Serial number:	Unknown	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Helicopters

Collision with terrain involving a Robinson R44, VH-UGC

What happened

On 6 November 2013, the pilot of a Robinson R44 helicopter, registered VH-UGC, was conducting a private flight from the Latrobe Valley to Mount Buller, Victoria with three passengers on board.

At about 1425 Eastern Daylight-savings Time (EDT),[1] the helicopter arrived overhead the Mount Buller township. Two orbits at about 500 ft above ground level (AGL) were conducted to assess the landing area (helipad), the wind conditions and confirm the outside air temperature.

The pilot then commenced an approach to the helipad. When in an out-of-ground-effect hover,[2] he conducted a power check at 21 inches hg manifold pressure. He then reduced the engine power to 18 inches hg and reported that, when about 30 m from the helipad, the helicopter became a bit unstable. He then raised the collective,[3] but the engine appeared to lose power. He attempted to increase the power, but the engine appeared not to respond.

As the front of the helicopter's skids were about to touch down, the pilot applied full forward cyclic,[4] and reported experiencing mast bump.[5] In response, he raised the collective. The low rotor revolutions per minute (RRPM) horn then sounded and the pilot reported that the helicopter felt as if it was going to fall backwards. The helicopter rolled onto its side and came to rest about 9 m down an embankment. The helicopter was substantially damaged[6] (Figure 1) and the pilot and passengers were able to exit the helicopter uninjured.

Figure 1: Damage to VH-UGC

Source: Victoria Police

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

2 When hovering within about one rotor diameter of the ground, the performance of the main rotor is affected by ground effect. A helicopter hovering in-ground-effect (IGE) requires less engine power to hover than a helicopter hovering out-of-ground-effect (OGE).

3 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.

4 The cyclic pitch control, or cyclic, is a primary flight control that allows the pilot to fly the helicopter in any direction of travel: forward, rearward, left, and right.

5 Mast bumping occurs when the helicopter's main rotor hub makes contact with and deforms the main rotor mast.

6 The helicopter had been fitted with bladder fuel tanks.

ATSB comment

To maintain a steady hover, an increase in the weight of the helicopter requires more engine power. Increases in altitude and temperature reduce air density, and consequently the engine's ability to produce power.

Mount Buller helipad was at an elevation of 5,400 ft above mean sea level. The pilot reported that the helicopter was at a gross weight of about 1,048 kg when it landed. When the pilot attempted to increase power, the engine was already producing the maximum continuous power available for the altitude and prevailing conditions.

Pilot comments

The pilot provided the following comments:

- in preparation for the flight, the pilot referred to the helicopter's operating handbook and calculated that the flight would be conducted within the IGE and OGE hover limitations
- he had flown to Mount Buller about 20 times previously
- he had done his Helicopter Flight Review the previous day and practiced autorotations and other emergency procedures.

Safety message

The helicopter had been fitted with bladder fuel tanks. Despite the hard landing and resulting substantial damage to the helicopter, there was no post-impact fire and the pilot and all passengers were able to exit the helicopter uninjured.

This incident highlights the effect of gross weight and airfield elevation on aircraft performance. Understanding the controllability issues at the limits of the normal operating envelope can assist pilots in recognising the symptoms of reduced aircraft performance. Further information is available in the following ATSB report:
www.atsb.gov.au/publications/investigation_reports/2006/aair/aair200600979.aspx

General details

Occurrence details

Date and time:	6 November 2013 –1426 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	Mount Buller, Victoria	
	Latitude: 37° 09.20' S	Longitude: 146° 27.50' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R44 II	
Registration:	VH-UGC	
Serial number:	12051	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 3
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Total power loss involving a Robinson R22, VH-STK

What happened

VH-STK

Source: Operator

On 13 November 2013, the pilot of a Robinson R22 helicopter, registered VH-STK, was conducting aerial mustering on a property about 155 km SSW of Normanton, Queensland.

At about 1249 Eastern Standard Time,[1] the helicopter was hovering behind a mob of cattle, when the pilot felt the helicopter jerking. He landed and conducted a magneto check. He selected the left magneto and the engine rapidly lost power. He then selected the right magneto and the engine ran normally. He reselected the magneto switch to 'both' and attempted to contact the property manager.

He was unable to make contact with the manager and elected to take-off. Once airborne, he was able to communicate with the manager via the ultra-high frequency (UHF) radio. He turned the helicopter towards a road and commenced an approach to land on the road.

At about 20 ft above ground level, the engine stopped. The pilot lowered the collective[2] and flared[3] the helicopter for landing. On impact, the helicopter spun around 180° (Figure 1). The helicopter was substantially damaged and the pilot was uninjured.

Figure 1: Damage to VH-STK

Source: Operator

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

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.

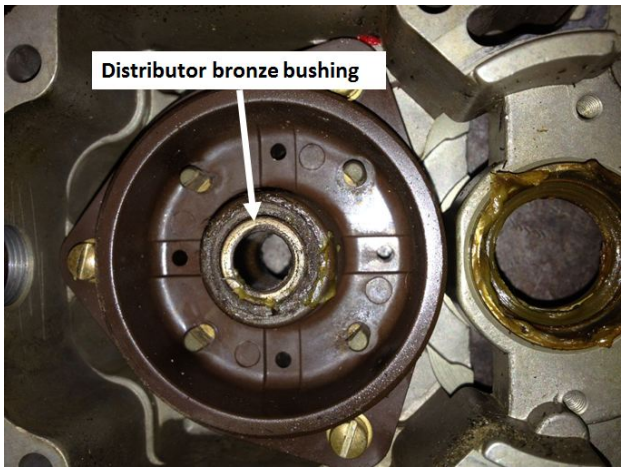
3 Flare is aimed to reduce rate of descent before ground impact by increasing collective pitch; this increases lift, trading stored rotor kinetic energy for increased aerodynamic reaction by blades, and should result in a gentle touchdown.

Engineering inspection

An engineering inspection of the left magneto revealed that the distributor bushing was loose (Figure 2) resulting in 6 mm of movement in the plastic gear wheel (Figure 3). This resulted in the magneto providing the ignition spark to an incorrect engine cylinder at the wrong time.

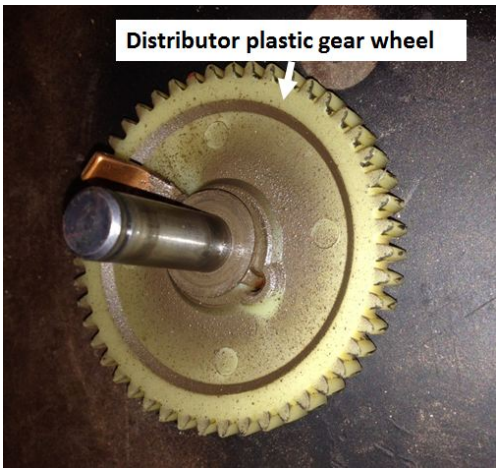
The magneto previously had a 500 hourly inspection carried out on it 80 hours prior to the accident.

Figure 2: Left magneto distributor



Source: Operator

Figure 3: Left magneto gear wheel



Source: Operator

Pilot comments

The pilot provided the following comments:

- he had added 1 L of oil to the engine prior to the day's flight, which was normal for that helicopter
- the magnetos had operated normally during the pre-flight checks
- he had completed a helicopter flight review[4] in April 2013, including practice autorotations and emergency procedures and he believed that low level emergency training was vital for pilots conducting aerial mustering operations
- the helicopter was fitted with an emergency locator transmitter (ELT), but it did not activate. The ELT had recently been serviced as it had activated spuriously on several occasions.

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 operator has advised the ATSB that they have requested all company pilots review the New Zealand Civil Aviation Authority's (CAA) publication *Magneto Checks Basics* and the Robinson R22 Flight manual safety notices (see safety message below for links).

[4] The Civil Aviation Safety Authority requires all Private and Commercial helicopter pilots to undergo a Helicopter Flight Review (HFR) every 2 years to maintain validation of their pilot licence. See Appendix C of Civil Aviation Advisory Publication (CAAP) 5.81-1(1).

Safety message

This accident highlights the importance of understanding the implications of abnormal engine indications. The Robinson R22 Pilot Operating Handbook advises pilots that, when a magneto malfunction is suspected in-flight, select the magnetos to the BOTH position and land as soon as practical (www.robinsonheli.com/manuals/r22_poh/r22_poh_full_book.pdf).

The following New Zealand CAA publication, *Magneto Check Basics* article provides guidance on conducting magneto checks: www.caa.govt.nz/Publications/Vector/Vector_Articles/Magneto_Check_Basics_MarApr08.pdf.

General details

Occurrence details

Date and time:	13 November 2013 – 1253 EST	
Occurrence category:	Accident	
Primary occurrence type:	Total power loss	
Location:	155 km SSW Normanton aerodrome, Queensland	
	Latitude: 18° 58.13' S	Longitude: 140° 28.57' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R22	
Registration:	VH-STK	
Serial number:	4581	
Type of operation:	Aerial work	
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

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