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Piston aircraft

Loss of control during landing involving Cessna 182 VH-LMA

What happened

On 7 December 2013, at 0550 Eastern Daylight-saving Time, the pilot of a Cessna 182 aircraft, registered VH-LMA, departed Albury, New South Wales, on a private flight to the Tyabb aeroplane landing area (ALA), Victoria. The flight was being conducted under the instrument flight rules (IFR), and on board were the pilot and one passenger.

The pilot reported that the weather was fine and it was a relatively smooth flight. During the cruise, the pilot checked the wind displayed on the GPS, and noted it was about 230° T at 20 knots, which was similar to the forecast he obtained the night before.

VH-LMA damage

Source: Victoria Police

At about 0702, the aircraft left controlled airspace on descent into Tyabb. When about 13 NM from the airfield, the pilot broadcast the aircraft's current position and intentions on the Tyabb common traffic advisory frequency (CTAF). The pilot heard no other transmissions on the CTAF frequency. With about 6 NM to run, the pilot levelled the aircraft at 1,100 ft to prepare to join the circuit. He reported initially having some difficulty locating the airport, however by 4 NM had identified the runway and joined an extended left base for runway 17.

During the base leg, he again broadcast on the CTAF, then completed the pre-landing checks, except for selecting the final stage of flap. When on final approach, he checked the secondary windsock (Figure 1) and noted the wind was predominantly crosswind from the right, gusting around 5-10 knots. With the final stage of flap selected, the aircraft touched down on the main wheels about 20-30 metres past the runway threshold, close to the centreline. The pilot estimated that the aircraft touchdown speed was about 65 knots. During the landing roll, he applied a small amount of right aileron to counter the crosswind.

When the aircraft had slowed to about 50 knots, he began to apply the brakes. At about the same time, a gust of wind pushed the aircraft to the left. The pilot applied right rudder in an attempt to steer the aircraft back to the centreline, but stated the aircraft pulled to the left and felt like the left brake had locked. The grass verge next the runway was wet due to recent heavy rain. The aircraft rapidly decelerated, and continued along a path through the wet grass a few metres to the left of the sealed runway. As it stopped, the aircraft nosed forward, and then tipped over onto its back (Figure 2).

The pilot and his passenger were hanging upside down, and due to their weight on the straps, were unable to release the seatbelts. Fortunately, a person had been waiting for the aircraft to arrive, and quickly rendered assistance. The young passenger was able to slip through the harness and was carried a safe distance from the aircraft by the assistant. The pilot then instructed the assistant to find the pocketknife which he kept in a bin between the two front seats, while he reached to shut off the fuel and master switch. The pocketknife was located on the now upside down aircraft ceiling and was used to cut the seatbelt and free the pilot. Both the pilot and his passenger received minor injuries and the aircraft was substantially damaged.

Pilot comments

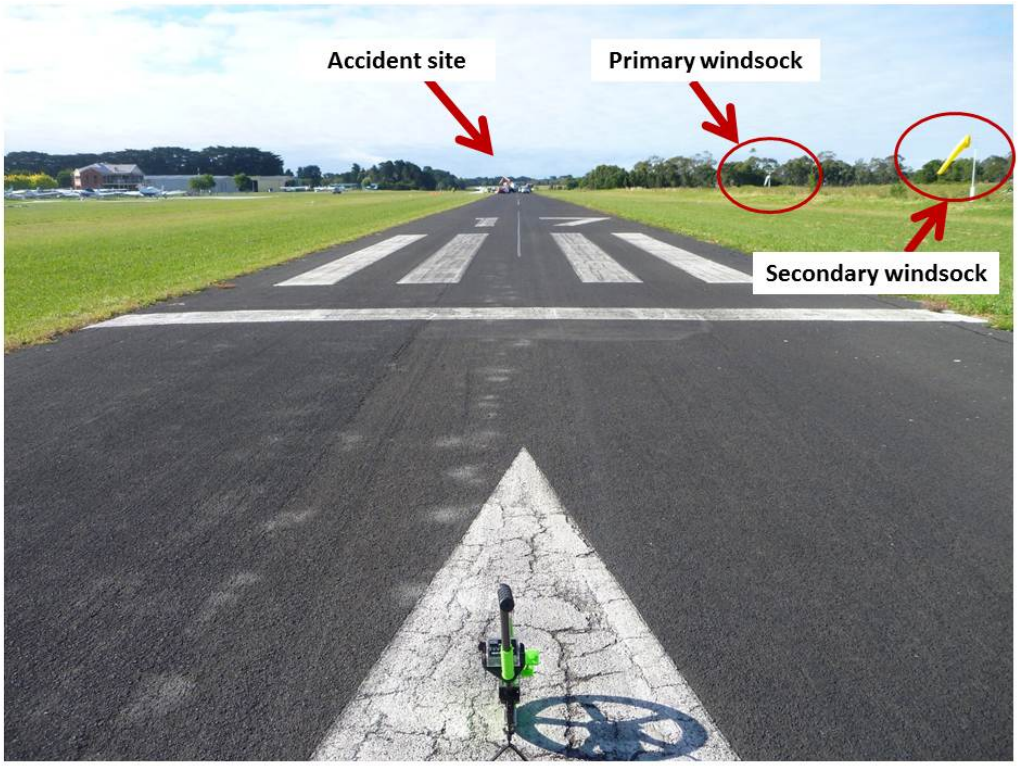
As there is no terminal area forecast (TAF) service available at Tyabb, the pilot planned the flight using the nearby Moorabbin Airport weather information. Moorabbin has a Category B[1] TAF service and also an Automatic Weather Information Service (AWIS) available if the airport is uncontrolled. On this occasion, the pilot did not call the Tyabb airport operator for prior permission as required in the en route supplement Australia (ERSA).

The pilot's normal procedure was to overfly non-controlled aerodromes at the recommended 1500 ft above ground level (AGL). This allowed time to assess the wind, check the runway status, check for traffic and prepare to join the circuit. On this occasion, wanting to comply with the ERSA noise abatement procedure notes for Tyabb, which include an instruction to avoid overflying the aerodrome and the Tyabb township unless operationally required, coupled with the lack of other traffic he elected to join base leg at circuit altitude.

Also, in hindsight, the pilot felt that if he had applied right rudder a little earlier during the landing roll, this may have prevented the aircraft leaving the sealed runway, and onto the sodden grass verge.

He also commented on his foresight to carry a pocket knife for emergencies. In future he planned to strap the pocket knife to the aircraft fire extinguisher.

Figure 1: Approach to runway 17 at Tyabb ALA



Source: Victoria Police

[1] A Category B weather services applies to major domestic airports with a control tower, with passenger numbers above 40,000 pa. The TAF service is issued 6 hourly and valid for 12, 18 or 24 hours. There is also a continuous MET watch and amendment service (Airservices AIP GEN 3.5-4).

En route supplement Australia (ERSA) entry for Tyabb ALA

Tyabb is listed as an uncertified aerodrome. This meant that the movement areas and lighting details are subject to change without prior notice and are not subject to Notices to Airman (NOTAMs)[2] action. Pilots and operators must contact the aerodrome operator directly to ensure currency and the accuracy of aerodrome information. Prior permission is required (PPR) to operate at this ALA.

Figure 2: VH-LMA showing path through the grass verge

Source: Victoria Police

ATSB comment

A search of the ATSB database for fixed wing, private operation accidents, 2004 to 2013 found the landing phase accounted for 33% of all accidents. The take-off and initial climb phases together accounted for 25% of accidents from this group.

Safety message

It is important in the pre-flight planning to obtain all possible information for the flight, and where a full NOTAM or TAF service is not available, to contact the airfield operator and check the airport status. By not flying over the primary windsock where warning signals to the pilot are placed, the pilot also missed the opportunity to notice any unserviceability markers and to assess the wind near ground level.

[2] A Notice to Airmen advices 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.

Actions such as having a responsible person knowing the aircraft's flight plan and estimated arrival time, especially as in this case, where ATC search and rescue service (SARWATCH)[3] is cancelled in the circuit is advisable. These and other considerations in the pre- flight planning process are covered step by step in the Civil Aviation Safety Authority (CASA) publication.

Flight Planning – always thinking ahead. It is available through the CASA online store at www.casa.cart.net.au/epages/casa.sf/en_AU/?ObjectPath=/Shops/casa1/Products/SP88

For airstrips such as Tyabb which do not have a regular NOTAM or TAF service, making a phone call to the local operator may assist in making the decision whether to land there, or whether to consider an alternative. The following publication provides additional information on decision making scenarios:

Decision making for general aviation pilots
www.easa.europa.eu/essi/egast/2011/04/decision-making/

The Civil Aviation Safety Authority has produced the "Out-n-Back" video series covering topics such Aerodromes, Navigation and ALA's and Precautionary search and landing operations.

This series is available at: www.services.casa.gov.au/outnback/

General details

Occurrence details

Date and time:	7 December 2013 – 0720 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Loss of ground control	
Location:	Tyabb ALA, Victoria	
	Latitude: 38° 16.00' S	Longitude: 145° 10.50' E

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 182 S	
Registration:	VH-LMA	
Serial number:	18280816	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Minor	Passengers – Minor
Damage:	Substantial	

[3] The time that Airservices Australia has oversight of the flight.

Fuel starvation and forced landing, involving PA-31, VH-OFF

What happened

VH-OFF damage

Source: SA Police

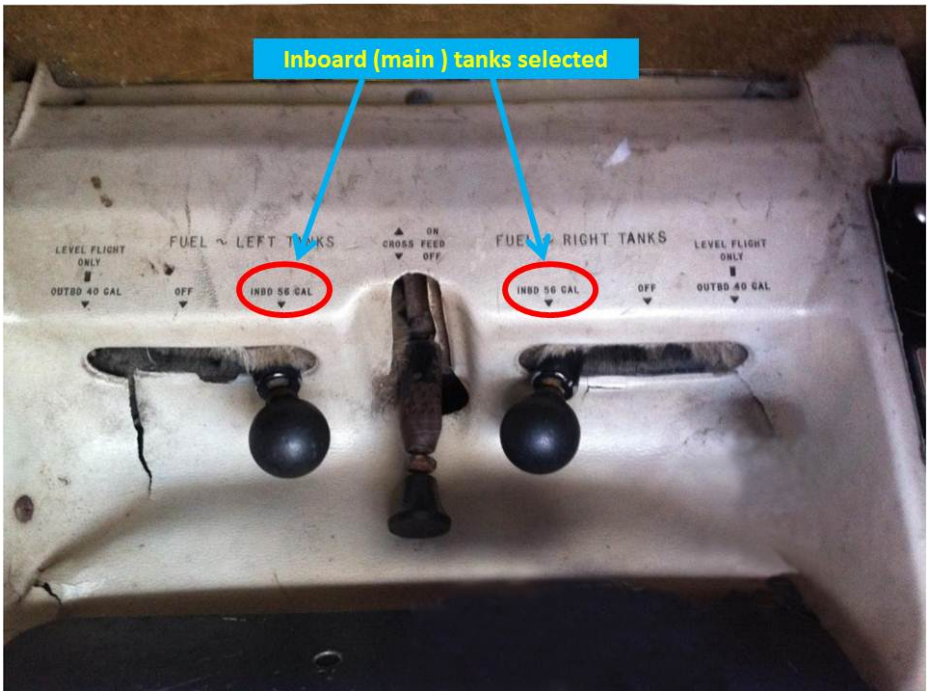
On 29 January 2014, at about 1100 Central Daylight-savings Time, the pilot prepared a Piper PA-31 aircraft, registered VH-OFF, for a private flight from Aldinga aeroplane landing area (ALA) to Kangaroo Island, South Australia.

To check fuel quantities, the pilot entered the cockpit, turned on the master switch and placed the left and right fuel selectors onto the main tank (inboard) position (Figure 1).The gauge for each tank showed just under half full. He then placed each fuel selector onto the auxiliary (outboard) tank position, where the gauge indicated the right and left auxiliary tanks were each about a quarter full. He did not return the selectors to the main tanks. He estimated that refuelling the main tanks would allow sufficient fuel for the flight with over an hour in reserve. He exited the aircraft while it was refuelled and continued preparing for the flight.

Once refuelling was completed, the pilot conducted a pre-flight inspection, and finished loading the aircraft. The pilot and passenger then boarded.

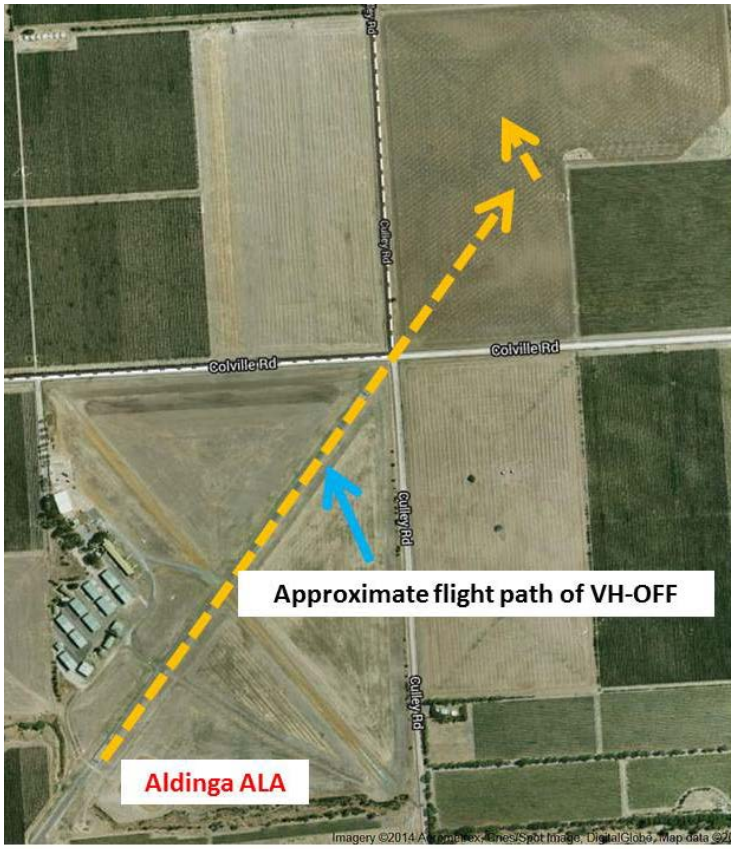
The pilot was familiar with Aldinga ALA (Figure 2), which is a non-controlled airport. At uncontrolled airports, unless a restriction or preference is listed for a certain runway in either the Airservices en route supplement Australia (ERSA), or other relevant publications, selection of the runway is the responsibility of the pilot. Operational considerations such as wind direction, other traffic, runway surface and length, performance requirements for the aircraft on that day, and suitable emergency landing areas in the event of an aircraft malfunction are all taken into consideration.

Figure 1: PA 31 fuel selectors on inboard (main) tanks



Source: Max Velge

Figure 2: Approximate flight path of VH-OFF



Source: Google maps

On this day, the pilot assessed the wind to be favouring runway 14, which already had an aircraft in the circuit intending to land. However, he decided to use runway 03 due to the availability of a landing area in case of an emergency. He then completed a full run-up check of the engines, propellers and magnetos prior to lining up for departure. The pilot reported that all of the pre-take-off checks were normal.

Once the aircraft landing on runway 14 was clear of the runway, the pilot went through his usual memory checklist prior to take-off. He scanned and crosschecked the flight and panel instruments, power quadrant settings and trims, but did not complete his usual final check, which was to reach down with his right hand and confirm that the fuel selector levers were on the main tanks.

After broadcasting on the common traffic advisory frequency (CTAF) he commenced the take-off. At the appropriate speed, he rotated the aircraft as it passed the intersection of the 14 and 03 runways. Almost immediately both engines began surging, there was a loss of power, the power gauges fluctuated and the aircraft yawed from side to side. Due to the surging, fluctuating gauges and aircraft yaw, the pilot found it difficult to identify what he thought was a non-performing engine. He reported there were no warning lights so he retracted the landing gear, with the intent of getting the aircraft to attain a positive rate of climb, so he could trouble shoot further at a safe altitude.

When a little over 50 ft above ground level (AGL), he realised the aircraft was not performing sufficiently, so he selected a suitable landing area. He focussed on maintaining a safe airspeed and landed straight ahead.

The aircraft touched down and slid about another 75-100 metres before coming to rest. The impact marks of the propellers suggest the aircraft touched the ground facing north-easterly and rotated to the north-west prior to stopping.

The pilot turned off the master switch and both he and the passenger exited the aircraft. After a few minutes he re-entered the cockpit and completed the shutdown. Police and fire service attended shortly after the accident.

PA31 Aircraft

The PA31 Navajo fuel system consists of four flexible fuel cells, two in each wing. Two electric fuel quantity gauges are mounted in the overhead switch pane. The right fuel quantity gauge indicates the quantity of fuel in the selected right fuel system tank (right main or right auxiliary), and the left fuel quantity gauge indicates the quantity of fuel in the selected left fuel system tanks. There are also engine-driven fuel pumps, and emergency fuel pumps. Emergency fuel pumps are installed to provide fuel pressure in the event an engine driven pump fails. These pumps are also used under normal conditions for priming the engines, take-off, and landing. The fuel selectors are required to be set on the main tanks for take-off.

Pilot comments

The pilot stated that the large mental workload of running a business may have taken some of his attention from an intended routine flight to a known destination on a clear day. This most likely contributed to his not reselecting the main tanks prior to start up, and also not completing his usual memory checks of physically reaching and checking the selector position during the pre- take-off checks.

The pilot recalled that the time from the initial engines malfunctioned to landing was a matter of seconds, which left him little time to troubleshoot the issue. He had hoped that by retracting the landing gear and lessening the drag, the aircraft would obtain a positive rate of climb and give him longer to assess the situation.

He feels that his clear decision not to persevere with the underperforming aircraft and put it on the ground probably saved both his and his passenger's lives; there was not even time to broadcast a mayday call.

Over time he had developed a mental checklist for pre-take-off and other checks, which had worked well up until this accident. In the future, he intends to revert to a manual checklist for every flight.

Engineering report

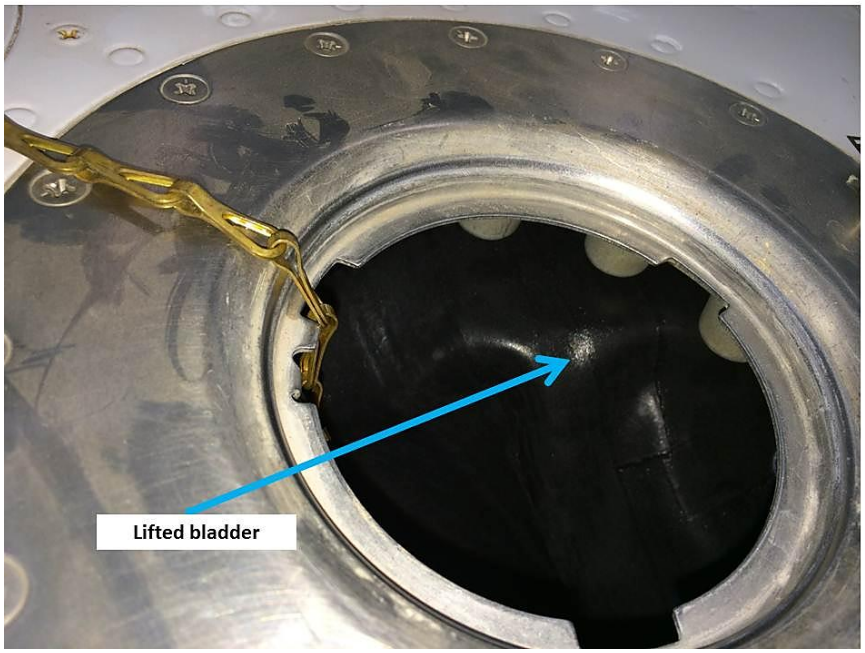
A post-accident engineering report found all four fuel tanks were operational. When selected, the auxiliary tanks were almost empty. The left and right auxiliary tank fuel samples indicated about 0.5 ml of water was present. The left auxiliary fuel tank bladder was found to be lifted inside the tank (Figure 3). The engineer noted that in its extremities, the bladder can lift the fuel sender float, which gives a false indication that there is more fuel in the tank than available. Fuel pressure was tested and was normal.

ATSB comment

Other occurrences of fuel starvation due to tank selection issues have been investigated by the ATSB. One example is noted below.

In 2003 a Piper Chieftain departed Albury, NSW on a charter flight with a pilot and six passengers on board. The flight had been delayed about two hours due to fog, and the pilot had rewarmed the engines prior to departure. To conserve fuel, he conducted this warm up with the auxiliary tanks selected. About five minutes into the flight, while the aircraft was climbing through about 5000 ft, the right fuel flow light illuminated. The pilot moved the right engine mixture control lever to full rich and commenced a return to Albury. Although he was aware of minimal fuel in the auxiliary tanks, the pilot reported selecting them to see if the aircraft performance would improve.

Figure 3: Lifted bladder, VH-OFF left auxiliary tank



Source: Engineer

A short time later the right engine commenced surging. Soon after, the left engine also began to surge. The aircraft was unable to maintain speed or altitude, so the pilot made an emergency landing in an open field near Holbrook, NSW. Although not conclusively proven, the loss of engine power and the subsequent engine surging were consistent with fuel starvation.

The full report is available on the ATSB website at: www.atsb.gov.au/publications/safety-investigation reports.aspx?mode=Aviation&q=200303599

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 has its focus on Genera Aviation operations, including pilot's experiencing a loss of awareness of fuel supply status. Further reading on this topic is available on the ATSB website at: www.atsb.gov.au/safetywatch/ga-pilots.aspx

On average, the ATSB received around 21 reports of fuel exhaustion or starvation occurrences each year. Research conducted by the ATSB indicates that fuel mismanagement was three times more likely to involve fuel starvation than exhaustion, and was more likely to occur in private and charter operations.

Further reading is available from the ATSB Avoidable Accident series: *Starved and exhausted: Fuel management aviation accidents:* www.atsb.gov.au/publications/2012/avoidable-5-ar-2011-112.aspx

General details

Occurrence details

Date and time:	29 January 2014 –1132 CDT	
Occurrence category:	Accident	
Primary occurrence type:	Fuel starvation	
Location:	Near Aldinga ALA, South Australia	
	Latitude: 35° 17.33’ S	Longitude: 138° 29.60’ E

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation	
Registration:	VH-OFF	
Serial number:	31-7812064	
Type of operation:	Private	
Persons on board:	Crew –1	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Runway excursion involving a Beech A36, VH-EUB

What happened

VH-EUB

Source: Operator

On 19 February 2014, at about 1030 Eastern Daylight-savings Time (EDT), a Beech A36 (Bonanza) aircraft, registered VH-EUB, departed Lilydale aeroplane landing area (ALA), Victoria, for a training flight, with an instructor and pilot-under-instruction on board. The purpose of the flight was to complete a constant speed unit (CSU) and a retractable undercarriage (landing gear) endorsement and familiarise the pilot with the aircraft type.

At the time of departure, the weather was fine, with the wind variable to about 10 kt. There were some storm cells and showers and lightning in the area. After completing training exercises in the local area, the aircraft returned to Lilydale. As they returned, a storm cell with heavy rain passed over the airport, so the crew elected to conduct further training to the south-west of the aerodrome to avoid the weather. After the shower had passed, the instructor obtained the weather from the automatic weather information service (AWIS) located at Coldstream, about 3 NM from Lilydale. The pilot then broadcast an inbound call and returned to Lilydale, joining downwind for a landing on runway 18 Left (18 L).

On downwind, the pilot conducted pre-landing checks and confirmed that the brakes had pressure. He observed the windsock which favoured a landing on runway 18. The instructor observed the windsock when on mid-final, and at that stage the wind still favoured runway 18.

There was a row of trees on the approach and the pilot reported maintaining height to pass about 10 ft above the trees. The instructor reported that the approach was a bit unstable, and the aircraft arrived over the runway threshold about 50 ft above ground level (AGL) at about 85 kt indicated airspeed (IAS). This was slightly higher and faster than an optimal approach, which was 30 ft AGL and 80 kt IAS. The pilot then asked whether he should conduct a go-around; however, the instructor advised that there was still sufficient runway remaining for a normal landing.

The aircraft touched down about 250-300 m along the runway and the pilot applied the brakes, but the aircraft did not decelerate. The instructor assumed that the pilot was applying the brakes too heavily, causing the aircraft to skid on the wet runway, so he took over the control of the aircraft and commenced applying the brakes, then releasing and reapplying them. The brake pedals had pressure, however the brakes remained ineffective at gaining traction. At this stage the instructor assessed that it was too late to commence a go-around and that the aircraft was aquaplaning on the wet runway.

With less than 100 m of runway remaining, the pilot and instructor both applied right rudder in an attempt to steer the aircraft away from an embankment located about 20 m beyond the end of the runway. The aircraft rotated 90° to the right and continued to slide in the direction of the runway. The aircraft came to rest on top of the embankment and the left main landing gear collapsed (Figure 1).

After exiting the aircraft, the instructor observed that the wind had veered and was then about 10 kt from 340° and assessed that a tailwind may have contributed to the incident.

Figure 1: VH-EUB

Source: Operator

Pilot comments

The pilot-under-instruction provided the following comments:

- After completing landings at Lilydale in a different Bonanza two days after the incident, he could appreciate why the instructor had advised him to continue with the approach, rather than to conduct a go-around. On that day, the aircraft stopped very quickly, using only about 200 m of runway after touchdown.
- The AWIS at Coldstream usually provided a reliable indication of the weather conditions at Lilydale, however the thunderstorms caused local wind changes that were not necessarily present at Coldstream at that time.
- The ground had been very dry prior to the flight and the downpour created a lot of surface water and a slick film.

Instructor comments

The instructor provided the following comments:

- The shower of rain had left a film of water on the runway. Although the aircraft had skidded for some distance along the runway, both aligned with and at right angles to it, no skid marks were visible on the grass.
- The landing distance required, calculated from the aircraft manual, at 20 °C, sea level, nil wind at 1,350 kg aircraft weight, was 480 m including a 15% safety factor. The runway length was 850 m.
- His decision to continue with the landing (rather than go-around), was based on previous experience in the aircraft type on a wet runway at Lilydale.
- Lilydale had two parallel runways, runway 18 L was shorter and wider than runway 18 Right, which was 1400 m in length. One runway was nominated as the runway in use each day, and the other marked with white crosses to indicate that the runway was closed. This was to allow the grass to recover.

Safety message

A go-around, the procedure for discontinuing an approach to land, is a standard manoeuvre performed when a pilot is not completely satisfied that the requirements for a safe landing have been met. The need to conduct a go-around may occur at any point in the approach and landing phase, but the most critical go-around is one initiated close to the ground.

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

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

General details

Occurrence details

Date and time:	19 February 2014 – 1130 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Runway excursion	
Location:	Lilydale (ALA), Victoria	
	Latitude: 37° 41.52' S	Longitude: 145° 21.98' E

Aircraft details

Manufacturer and model:	Beech Aircraft Corporation A36	
Registration:	VH-EUB	
Serial number:	E-251	
Type of operation:	Flying training – dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Inflight fire involving a Beech 58, VH-SBS

What happened

On 26 February 2014 at about 1645 Central Standard Time (CST), a Beech 58 aircraft, registered VH-SBS, departed Darwin for Gove, Northern Territory, on a private ferry flight with a supervising pilot and pilot-in-command-under-supervision (ICUS) on board. The crew were assessing the suitability of the aircraft to be hired by their company and put on line for charter purposes. A 100-hourly inspection of the aircraft had recently been completed and there were no defects recorded on the maintenance release.

At about 1815, the pilot detected fumes and smoke emanating from within the cockpit. The pilot flying ICUS saw smoke and flames by his left leg adjacent to the circuit breaker panel. He immediately switched off the electrical master switch. The supervising pilot seated in the right seat took control of the aircraft and commenced an immediate descent. The pilot ICUS retrieved the BCF extinguisher from underneath his seat and extinguished the fire (Figure 1).

The crew opened the cockpit vents and the fumes dissipated. To determine what electrics were available and undamaged, the pilot selected the master switch on. The fire then reignited and he immediately selected the master switch off. The crew then established that the most likely cause of the fire was an electrical malfunction, and opted to continue the remaining 40 NM to Gove aerodrome, where emergency services were available on the ground if required.

The crew then observed that the vacuum gauges had ceased to function and both suction indicators showed zero. They then increased their lookout for other aircraft, cognisant that they were no longer able to maintain radio contact.

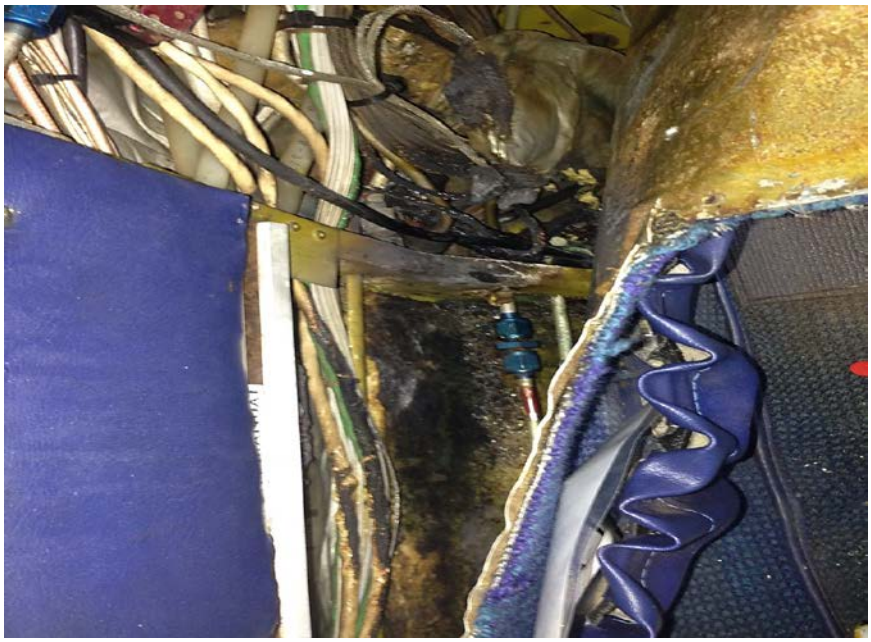
During the approach to Gove, after joining downwind for runway 31, the crew briefly selected the master switch on and used the electric gear lever to lower the landing gear, which took about 3 seconds. At that point they could smell fuel so the pilot conducted a closer circuit than normal and landed the aircraft. After parking the aircraft, the crew observed fuel dripping from beneath the aircraft fuselage, which continued after both fuel selectors had been moved to the off position.

Engineering report

An engineering inspection found that exhaust gas temperature (EGT) wiring had penetrated through the heater supply fuel line causing it to arc out and burn a hole in the fuel line. With an ignition source and fuel, the fire in the cabin was started. Engineers disconnected and capped the heater fuel line and reconnected the vacuum line.

The engineer also reported that the wires had been bundled together and were rubbing on the fuel line. Inspection of the wires prior to the flight would have required the internal panel to be removed, and was not a routine inspection item.

Figure 1: Fire damage behind the left internal panel of VH-SBS



Source: Pilot

Safety message

This incident provides a valuable reminder for all pilots to know the location and operation of the aircraft fire extinguisher. In this incident, having two pilots on board assisted in maintaining control of the aircraft and having a team approach to emergency decision making.

The pilot commented that having turned off the master switch due to suspicion of an electrical fire, it should not be switched back on again due to the risk of providing a subsequent ignition source.

General details

Occurrence details

Date and time:	26 February 2014 – 1815 CST	
Occurrence category:	Serious incident	
Primary occurrence type:	Inflight fire	
Location:	111 km W Gove aerodrome, Northern Territory	
	Latitude: 12° 11.53' S	Longitude: 135° 48.00' E

Aircraft details

Manufacturer and model:	Beech Aircraft Corporation 58	
Registration:	VH-SBS	
Serial number:	TH-366	
Type of operation:	Private	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Minor	

Helicopters

Loss of control involving a Robinson R22, VH-HVW

What happened

On 1 September 2013, the pilot of a Robinson R22 helicopter, registered VH-HVW, refuelled at a stock camp located about 40 NM (70 km) south-west of Lake Nash Station, Northern Territory in preparation for a flight to Argardargada Station.

At about 1600 Central Standard Time, the helicopter departed in a north-easterly direction. At that time, the wind was about 17 kt from the north-east.

Shortly after take-off, the helicopter was observed by witnesses at the stock camp to commence a steep climbing left turn. As the helicopter turned into a downwind position, a number of the witnesses reported that the wind appeared to affect the controllability of the aircraft. It appeared that the pilot attempted to respond to the situation, however, there was insufficient altitude to recover. The helicopter skids contacted the ground and became separated. The helicopter slid along the ground and then flipped over a number of times before coming to rest near the stock camp. During the accident sequence, the pilot was ejected from the helicopter and sustained serious injuries; the helicopter was destroyed (Figure 1).

Figure 1: Damage to VH-HVW

Source: Helicopter owner

The aircraft owner attended the accident site, and based on his observations and that of the witnesses, believed that when the helicopter was in a downwind position, a negative G[1] situation may have occurred. During the subsequent attempted recovery, the pilot appeared to have pushed the nose of the helicopter forward in an attempt to regain airspeed; however, the helicopter contacted the ground.

Safety message

Wind direction and velocity are important considerations for helicopter pilots. It is crucial that pilots maintain an awareness of the wind and be aware of the consequential effects on helicopter performance. This will assist pilots with responding promptly and appropriately to a situation and preventing a loss of control.

General details

Occurrence details

Date and time:	1 September 2013 – 1600 CST	
Occurrence category:	Accident	
Primary occurrence type:	Loss of control	
Location:	70 km south-west of Lake Nash Station, Northern Territory	
	Latitude: 21° 21.98' S	Longitude: 137° 23.67' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R22 Beta	
Registration:	VH-HVW	
Serial number:	3135	
Type of operation:	Aerial work	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 (Serious)	Passengers – Nil
Damage:	Destroyed	

[1] Helicopters are mostly designed to have weight (gravity pulling down to the earth) and lift opposing that force of gravity. Low-G or negative G manoeuvres occur when this balance is disturbed.

Ground fire involving a Robinson R44, VH-TZE

What happened

VH-TZE - Intensity of the fire

Source: Pilot

On 15 October 2013, the pilot of a Robinson R44 helicopter, registered VH-TZE (TZE), was conducting gravity survey[1] work, north of Daly Waters, Northern Territory. On board were the pilot and a geophysical field technician. The survey consisted of landing about every 4 km along a planned grid to collect data. The pilot had completed several landings already that day.

At about 1630 Central Standard Time (CST), the pilot conducted a routine landing at a designated grid point. He then reduced the engine power to idle to prevent vibrations from the helicopter interfering with the survey equipment reading. The technician disembarked with his equipment to carry out a reading, about 5 m away from the helicopter.

An uncommanded change in engine noise prompted the pilot to increase engine power a small amount in order to improve engine performance. While doing this, he checked the gauges and noticed that the engine revolutions per minute (RPM) had dropped significantly and the rotor RPM was decaying toward zero. He then saw the technician waving his arms in an attempt to gain his attention. The pilot looked toward the rear of the helicopter and saw a fire underneath, which was spreading into the engine bay. The pilot exited the helicopter and notified the landholders via phone so they could construct fire breaks to contain the ensuing grass fire. The helicopter was not equipped with a portable fire extinguisher. The occupants were uninjured; however, the helicopter was destroyed by the fire (Figure 1).

Location and survey details

The survey was being conducted in an area about 32 km north of Daly Waters. The temperature was about 40 °C with a relative humidity of around 10% and wind speed of 6 kt.

Several types of grass grow in the area, including tussock, all of which was very dry. The pilot advised he was aware of the danger of landing in long grass. The survey guidelines allow for up to 300 to 400 m deviation from the grid point locations to encourage safe landing site selection.

Proactive standard operating procedures between the survey company and helicopter operator have the field technician look underneath and around the helicopter after landing, to check for any signs of danger and, if required, stamp down any long grass, before moving away to carry out their survey work. The survey field technicians undergo training for field and helicopter operations before they are deployed and again once on site. Daily pre-flight briefings between pilots and technicians discuss each day's tasks and identify risks associated with the operation and location.

[1] Gravity surveying measures small differences in gravity due to the variation in density of rocks across the earth's surface. The data is used for many purposes including minerals exploration, mapping and to underpin the Global Positioning System.

Figure 1: Fire damage to VH-TZE and surrounding bush

Source: Pilot

Grass fire risk

The Australian Transport Safety Bureau (ATSB) has been notified of 13 occurrences since 2000 where a helicopter has been destroyed by grass fire, with many reports highlighting the speed with which the grass ignited and the fire spread beyond control.

In November 2002, Robinson Helicopter Company published *Service Bulletin SB-46,*[2] which recommended that shields could be installed on the exhaust collectors and tailpipe to reduce the chance of grass fire, with all R44 helicopters serial number 1270 and subsequent being fitted with these shields at manufacture.

TZE had a serial number of 1333, indicating that the helicopter had been fitted with aluminium exhaust collector and tailpipe shields during the manufacturing process. A review of the post-accident photographs[3] was unable to identify the presence of these shields in the wreckage; however, it was possible that they had melted in the ensuing fire. The associated stainless steel brackets and clamps were also not observed.

The photographs also indicated that the muffler shroud, a stainless steel shroud that fitted over the muffler to heat the air flow for the cabin heater system[4] and assisted with cooling the muffler and engine compartment, was not visible. The absence of a muffler shroud would reduce engine compartment cooling and expose a larger surface area of heated metal, thereby increasing the risk of a grass fire during off-airport landings. The reason for the muffler shroud not being evident in the photographs could not be determined.

The operator reported that the shields and muffler shroud had been fitted to TZE.

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.

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2 www.robinsonheli.com/service_library/r44_service_bulletins/r44_sb46.pdf

3 The ATSB did not attend the accident site

4 The cabin heater system is required to be installed in the R44 helicopter as per Robinson R44 Maintenance Manual Section 11.100

Survey Company

Prior to this occurrence, the survey company had commenced research into incorporating Bluetooth into the flight helmets to allow for continuous and effective communication between the pilot and technician for a distance of up to 50 m from the helicopter. This has since been successfully implemented.

Safety message

Robinson R22 and R44 helicopters have exhaust systems that are low to the ground. The ground to muffler height on a new R44 is about 49 cm. The *Pilot Operating Handbook* for both types has a note in *Section 10, Safety Tips* stating:

> Do not land in tall dry grass. The exhaust is low to the ground and very hot; a grass fire may be ignited.

Pre-flight briefings highlighting the dangers of landing on grass, especially in areas of high temperatures and low humidity, can reinforce the importance of carefully choosing a landing site.

The Civil Aviation Safety Authority (CASA) airworthiness directive *AD/GENERAL/65 Amdt 5*[5] states that, not all Australian registered aircraft are required to have a hand held portable fire extinguisher fitted. However, in airworthiness bulletin *AWB 26-002 Issue 2*,[6] CASA recommends that each aircraft be fitted with at least one extinguisher that is accessible by the pilot. 'Halon'[7] type extinguishers (those most commonly found in aircraft), while initially rated for class B 'flammable liquids' and class C 'electrical fires', can also be effective against class A 'common combustible fires'.

General details

Occurrence details

Date and time:	15 October 2013 – 1630 CST	
Occurrence category:	Accident	
Primary occurrence type:	Fire (ground)	
Location:	32 km N of Daly Waters, Northern Territory	
	Latitude: 15° 15.97 S	Longitude: 133° 23.30' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R44	
Registration:	VH-TZE	
Serial number:	1333	
Type of operation:	Aerial work	
Persons on board:	Crew – 1	Passengers - 1
Injuries:	Crew – Nil	Passengers - Nil
Damage:	Destroyed	

5 www.casa.gov.au/ADFiles/airgen/gen/GEN-065.pdf

6 www.casa.gov.au/wcmswr/_assets/main/airworth/awb/26/002.pdf

7 Halon is a liquefied, compressed gas that stops the spread of fire by chemically disrupting combustion. It is a preferred extinguisher for aviation as it does not reduce oxygen concentration, impair visibility or leave a residue.

Collision with terrain involving a Bell 206B, VH-BNG

What happened

Damage to VH-BNG

Source: Operator

On 20 February 2014, at about 0605 Eastern Standard Time (EST), a Bell 206B helicopter, registered VH-BNG, took off from a banana plantation to conduct aerial spraying.

The pilot conducted pre-application checks including assessing the wind strength and direction, the position of the sun, identifying the area to be sprayed and any hazards.

The block was to be sprayed as soon as possible after first light and the pilot planned to conduct the spraying in an east-west direction. After about 5 minutes of spraying, some overspray accumulated on the windscreen, resembling a white paint. The pilot then noted that the on-board smoke generator indicated the wind had changed direction, so he flew the helicopter to the southern end of the block and resumed spraying into wind.

After completing spraying, the pilot commenced a return to the staging area. To comply with local noise abatement procedures, the pilot climbed the helicopter to about 250-300 ft above ground level (AGL) and established a flight path to avoid overflying noise-sensitive areas.

At about 0615, on descent to the staging area, when at about 150-200 ft AGL, the helicopter rotor blades collided with a tree, dislodged a branch, and the helicopter subsequently collided with terrain. The helicopter was substantially damaged and the pilot sustained serious injuries (Figure 1).

Pilot comments

The pilot of VH-BNG provided the following comments:

- He did not see the tree at any time.
- The helicopter was in a nose-high attitude on descent to the staging area, which caused a significant blind spot.
- There was some overspray on the windscreen, reducing the visibility through it.
- The helicopter was heading towards the south-east and glare from the rising sun further reduced visibility.
- He had taken off to the west, then turned to the north towards the block to be sprayed, so had not sighted the tree on departure. The return route however put the helicopter directly in line with the tree.

Figure 1: Damage to VH-BNG and large tree strike

Source: Operator

General details

Occurrence details

Date and time:	20 February 2014 – 0623 EST	
Occurrence category:	Accident	
Primary occurrence type:	Controlled flight into terrain	
Location:	Near Mission Beach, Queensland	
	Latitude: 17° 52.25' S	Longitude: 146° 06.42' E

Helicopter details

Manufacturer and model:	Bell Helicopter Company 206B	
Registration:	VH-BNG	
Serial number:	580	
Type of operation:	Aerial agriculture	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 (Serious)	Passengers – Nil
Damage:	Substantial	

Fuel exhaustion event involving a Hughes 269C, VH-HAK

What happened

On 23 February 2014, a Hughes 269C helicopter, registered VH-HAK, was parked on a property about 55 km north-east of Launceston, Tasmania, beside a dam. The pilot had shut the helicopter down in that position about a week earlier, aware that it was low on fuel.

At about 0700 Eastern Daylight-savings Time (EDT), the pilot prepared for a short 200 m flight to reposition the helicopter to the other side of the dam, for refuelling. He conducted fuel drains, with no contaminants found.

VH-HAK

Source: Operator

The helicopter took off and climbed to about 20 ft above ground level. When about three quarters of the way across the dam, the engine stopped due to fuel exhaustion. The pilot conducted a forced landing onto the edge of the dam, with part of the helicopter sinking into the water and mud. The main rotor blades collided with the embankment resulting in substantial damage (Figure 1).

Figure 1: Damage to VH-HAK

Source: Operator

Safety message

While experience and familiarity with operations are invaluable, they can also lead to complacency. It is therefore important that pilots with experience, familiarity and comfort with the aircraft and location, continue to do all checks thoroughly. The ATSB publication, *Avoidable Accidents No. 6 - Experience won't always save you*, is available at www.atsb.gov.au/publications/2012/avoidable-6-ar-2012-035.aspx.

On average, the ASTB receives 21 reports of fuel exhaustion or starvation occurrences each year. Seven per cent of the reported fuel starvation occurrences resulted in a collision with terrain. The ATSB publication *Avoidable Accidents No. 5 – Starved and exhausted: Fuel management aviation accidents* is available at www.atsb.gov.au/publications/2012/avoidable-5-ar-2011-112.aspx.

General details

Occurrence details

Date and time:	23 February 2014 – 0700 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	55 km NE Launceston aerodrome, Tasmania	
	Latitude: 41° 19.65' S	Longitude: 147° 48.32' E

Helicopter details

Manufacturer and model:	Hughes Helicopters 269C	
Registration:	VH-HAK	
Serial number:	311041	
Type of operation:	Aerial agriculture	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Collision with terrain involving a Robinson R44, VH-UGR

What happened

VH-UGR

Source: Operator

On 22 February 2014, the pilot of a Robinson R44 helicopter, registered VH-UGR, was conducting aerial agricultural operations on a property near Yass, New South Wales.

At about 1630 Eastern Daylight-savings Time (EDT), after successfully completing five loads of spraying, the helicopter was refuelled and reloaded with chemical for the next flight. The elevation of the property was about 1,900 ft above mean sea level and the ambient temperature about 23 °C. To ensure the helicopter was well within normal operating limitations, the pilot refuelled it every second load with about 30-35 L of fuel. The helicopter was carrying a chemical load of about 230-240 L.

The wind at the time was light and variable, but favouring a southerly direction, so the pilot manoeuvred the helicopter to take off towards the south. During the take-off for the sixth load, when at about 3 ft above ground level (AGL), the pilot reported that the helicopter was not climbing as expected and he thought that the wind had veered to a more westerly direction.

He commenced a right pedal turn towards the west, and down the slope, in an attempt to gain translational lift.[1] The pilot reported that the wind had actually turned more easterly, and the helicopter therefore had a tailwind.

The low rotor revolutions per minute (RRPM) warning horn sounded and the pilot jettisoned the chemical load. The helicopter was then about 5 ft AGL, and the pilot was attempting to gain lift, and concentrating on keeping the helicopter straight in order to keep the landing skids level. He sighted a dry creek bed ahead and attempted to gain altitude prior to crossing it.

The helicopter was about 40-50 m beyond where the load had been jettisoned, and the pilot was focused on gaining lift, when the left skid contacted the ground, and the helicopter rolled over (Figure 1).

Figure 1: Damage to VH-UGR

Source: Operator

[1] The helicopter gains translational lift from horizontal movement or headwind.

Safety message

The pilot reported that if he had dumped the load earlier, and performed a run-on landing, rather than attempted to gain lift, the accident may have been avoided. This incident highlights the importance of assessing options in case of reduced aircraft performance on take-off. A pre-take-off safety brief can keep alternative options front-of-mind for pilots, particularly during operations with multiple take-offs and landings.

The Airbus Helicopters (formerly Eurocopter) publication, *Decision Making for Single-Pilot Helicopter Operations*, www.airbushelicopters.com/site/docs_wsw/RUB_36/EHEST4_Single-Pilot-Decision-Making-v1.pdf, explains some of the factors that affect pilots' decision making.

General details

Occurrence details

Date and time:	22 February 2014 – 1700 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	near Yass, New South Wales	
	Latitude: 34° 46.25' S	Longitude: 149° 06.50' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R44	
Registration:	VH-UGR	
Serial number:	1351	
Type of operation:	Aerial agriculture	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Hard landing involving a Bell 206B, VH-XJA

What happened

Damage to VH-XJA

Source: Operator

On 21 February 2014, at about 0850 Eastern Standard Time (EST), a Bell 206B helicopter, registered VH-XJA, took off from Sunshine Coast Airport, Queensland, with an instructor and student pilot on board. The training flight involved conducting a series of simulated emergency procedures in the helicopter training area. A practice autorotation[1] and two simulated engine failures in the hover were completed successfully.

At about 1000, the instructor briefed the student on the next sequence to be flown: a practice autorotation using variations in airspeed to move the aiming point for the touchdown closer or further away, with a power recovery. When at about 1,000 ft above ground level (AGL), in the undershoot for runway 12, the instructor reduced the throttle to idle and directed the student to commence the practice autorotation.

The student lowered the collective[2] and entered the autorotation. The instructor observed the airspeed reduce to about 60 kt, and then talked the student through reducing the airspeed to about 40 kt to move the aiming point for the touchdown closer.

The instructor reported that, passing 800 ft AGL on descent, he would normally have conducted the descent checks and advanced the throttle, however he was focused on directing the student through decelerating and then accelerating back to 60 kt IAS and inadvertently omitted the checks.

When at about 20 ft AGL, the instructor directed the student to commence levelling the helicopter. At the same time the low rotor revolutions per minute (RRPM) warning horn sounded. The instructor realised that the throttle was still at idle and took control of the helicopter from the student. He controlled the yaw, levelled the helicopter, allowed the helicopter to sink, and completed the autorotation to the ground, however the helicopter landed heavily, resulting in substantial damage (Figure 1).

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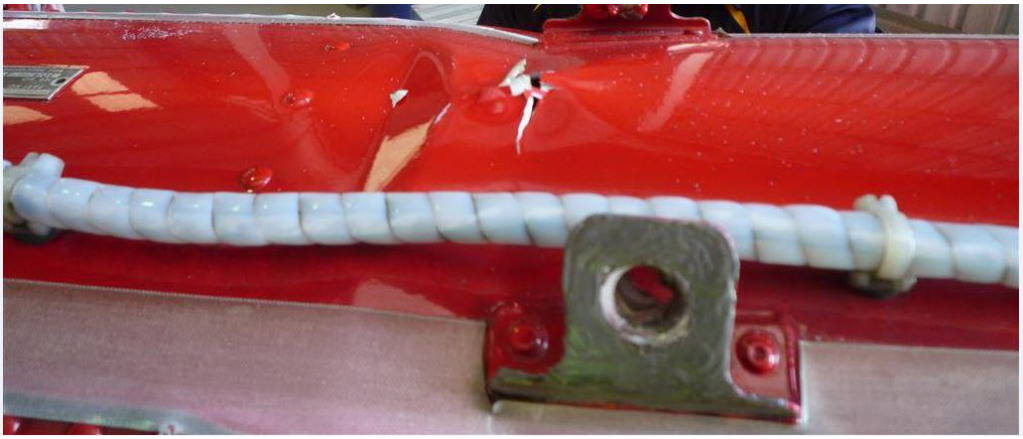
1 Autorotation is a condition of descending flight where, following engine failure or deliberate disengagement, the rotor blades are driven solely by aerodynamic forces resulting from rate of descent airflow through the rotor. The rate of descent is determined mainly by airspeed.

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

Figure 1: Damage to VH-XJA



Source: Operator

Operator comments

For a power terminated autorotation, the standard procedure was to verbally state “decision – power terminate” prior to 400 ft AGL, and to confirm full throttle prior to passing 200 ft AGL, however these were inadvertently omitted due to the high workload of the instructor.

In future, the sequence is to be commenced from at least 1,500 ft AGL, to provide more time and reduce the task workload for both the instructor and the student.

Instructor comments

The instructor reported that the hard landing may have been avoided if he had realised earlier that the throttle was at idle and he had taken control of the helicopter from the student, prior to terminating the flare.

The instructor reported that he would consider in future whether it was necessary to retard the throttle to conduct practice autorotations. It was possible to complete two separate sequences: one of the entry and maintenance of the autorotation, with the throttle at idle; and another with the throttle advanced, to the hover.

Safety action

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

Helicopter operator

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

Review of practice autorotations

The company is reviewing the conduct of practice autorotations in conjunction with other organisations.

Communication to instructors

Company flight instructors have been reminded to be familiar with current company policies and procedures. Team discussions will be held prior to conducting autorotations.

Safety message

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

This incident highlights the complexity and dynamic nature of autorotation training sequences. Autorotation practice provides pilots with skills to be used in emergency situations, but carries inherent risks. This autorotation sequence involved a high workload for both the student and instructor, given the number of tasks to be completed in a short timeframe. High workload sequences often lead to load shedding and one way to reduce this workload, and the risk of missing something important, may be to commence the autorotation sequence from a higher altitude, allowing more time to complete all the tasks.

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

- www.ainonline.com/aviation-news/hai-convention-news/2012-02-13/instructor-pilots-give-guidance-autorotation-training
- www.ainonline.com/aviation-news/aviation-international-news/2013-05-01/astar-accident-shines-light-autorotation-training
- www.aviationtoday.com/rw/training/specialty/Flight-Training-Tips-Dancing-With-the-Devil_13632.html
- http://blog.aopa.org/helicopter/?p=725
- www.robinsonheli.com/srvclib/rhcsn-38.pdf
- www.faa.gov/documentLibrary/media/Advisory_Circular/AC_61-140.pdf
- www.faasafety.gov/files/gslac/library/documents/2011/Aug/56414/FAA%20P-8740-71%20Planning%20Autorotations%20[hi-res]%20branded.pdf

General details

Occurrence details

Date and time:	21 February 2014 – 100- EST	
Occurrence category:	Accident	
Primary occurrence type:	Hard landing	
Location:	Sunshine Coast Airport, Queensland	
	Latitude: 26° 36.20' S	Longitude: 153° 05.47' E

Helicopter details

Manufacturer and model:	Bell Helicopter Company 206B	
Registration:	VH-XJA	
Serial number:	3744	
Type of operation:	Flying training - dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Australian Transport Safety Bureau

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

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

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

Purpose of safety investigations

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

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

About this Bulletin

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

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

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

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

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

Conducting these Short investigations has a number of benefits:

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

Australian Transport Safety Bureau

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Investigation

ATSB Transport Safety Report
Aviation Short Investigations
Aviation Short Investigations Bulletin Issue 29
AB-2014-046
Final – 8 April 2014