Australian Government
Australian Transport Safety Bureau

Wirestrike involving Cessna 182A VH-SGB

Burrum River, Queensland | 17 December 2012

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2012-170
Final – 5 June 2014

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

Published by: Australian Transport Safety Bureau
Postal address: PO Box 967, Civic Square ACT 2608
Office: 62 Northbourne Avenue Canberra, Australian Capital Territory 2601
Telephone: 1800 020 616, from overseas +61 2 6257 4150 (24 hours)
Accident and incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6247 3117, from overseas +61 2 6247 3117
Email: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

Safety summary

What happened

On 17 December 2012, a Cessna 182A aircraft registered VH-SGB, impacted with electrical powerlines that ran alongside a parachute drop zone at Burrum River, Queensland. The pilot was planning to attend a Christmas function at the drop zone and was flying to an airstrip located about 1.5 km to the north. After contacting the powerlines, the aircraft was seen to climb and continue to fly for approximately 500 m before the right wing separated from the aircraft. The aircraft subsequently impacted the ground and the pilot was fatally injured.

VH-SGB

Source: Jetphotos.net

What the ATSB found

The powerlines that the aircraft impacted were at a height of approximately 9 m (30 ft) above ground level (AGL) and ran perpendicular to the aircraft's flight path. The relevant cable marking standards did not require the powerlines to be marked. Weather conditions were fine, and there was no emergency broadcast from the pilot prior to the impact with the powerlines. No pre-existing defects with the aircraft could be identified.

No operational reason for the pilot to fly at a height below 500 ft AGL could be identified by the investigation.

Safety message

A minimum height of 500 ft AGL for flight over non-populated areas is promulgated for very long standing safety reasons. Pilots who choose to fly below this height without an operational reason to do so are exposing themselves, and any passengers that may be on board, to an increased risk of striking powerlines, many of which are difficult to see from the cockpit of an aircraft in flight. The circumstances of this accident highlight that risk.

Contents

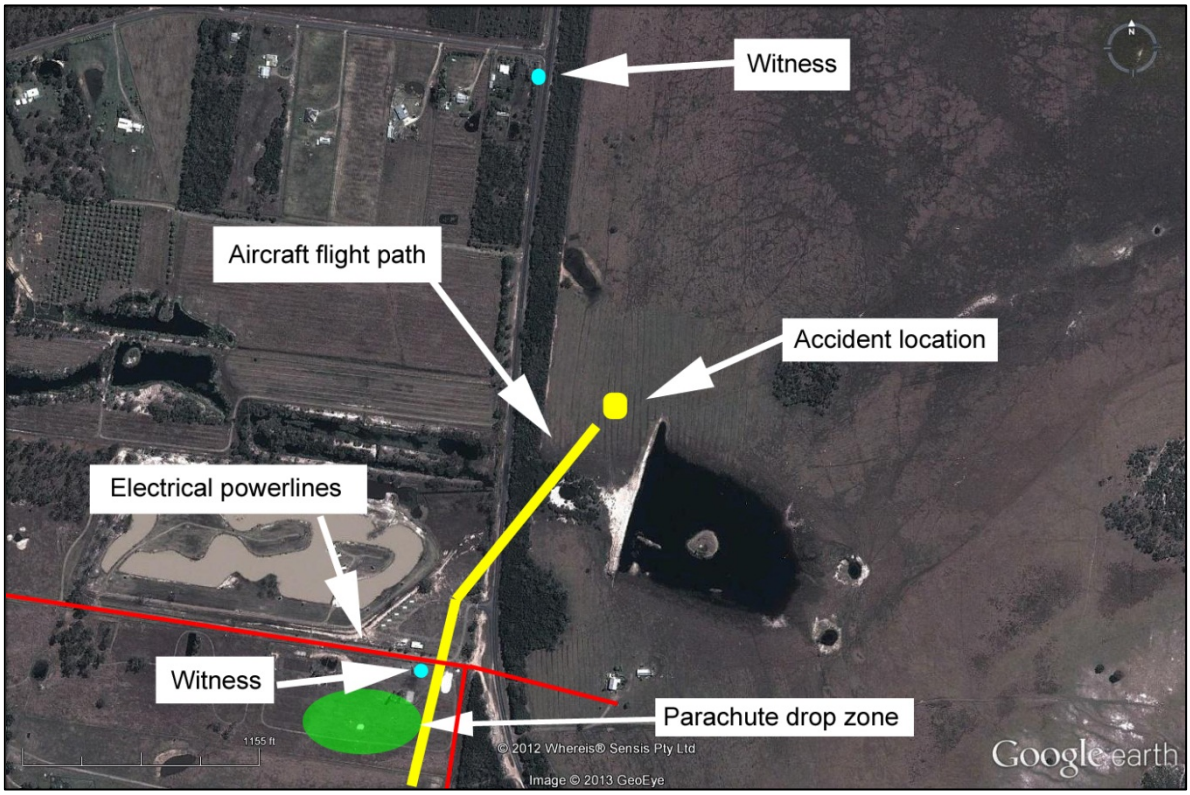
The occurrence

The pilot had departed in a Cessna 182A, registered VH-SGB, from his own airstrip which was located in the Gympie area, Queensland at about 0930[1] on 17 December 2012, with the intention to fly to an airstrip located in the Burrum River area (approximately 100 km to the north). The purpose of the flight was to allow the pilot to attend a Christmas function which was being held at a parachute drop zone located at Burrum River. There was no aircraft landing area at the drop zone. The landing area to be used by the pilot was located approximately 1.5 km to the north of the drop zone.[2]

A number of persons were assembled at the drop zone for the function. At about 1005 the aircraft was observed to descend to a low level to the south of the drop zone. One witness, who had considerable parachuting experience, had their attention brought to the approaching aircraft, and immediately expressed concerns about the safety of the aircraft due to its low level. That witness reported that the aircraft was flying wings level and did not appear to be turning. Another witness who saw the aircraft descend reported that they momentarily lost sight of it as it went below the tops of trees.

The aircraft flew almost overhead the position of the witness at the drop zone and impacted two powerlines, which were at a height of about 9 m (30 ft) above ground level (AGL) and ran in an east-west direction. The aircraft was seen to climb, still trailing the powerlines. It then turned slightly to the right before it disappeared from sight behind trees (Figure 1). The aircraft subsequently impacted the ground and a post-impact fuel-fed fire consumed most of the wreckage. The pilot was fatally injured.

Figure 1: Accident and witness locations



Source: Google Earth modified by ATSB

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

[2] The landing area was a private airstrip which ran in an east-west direction.

Witness description of flight following powerline impact

One witness located approximately 1 km north of the drop zone was able to describe the movements of the aircraft following the powerline impact. They reported the aircraft attempted to climb, turned slightly to the right, the right wing strut failed, immediately followed by both wings folding upwards, before one wing separated from the aircraft. The aircraft then nosedived behind trees.

Context

Pilot information

The pilot had obtained a commercial pilot aeroplane licence in 2002 and held a Class 1 Aviation Medical Certificate, with no restrictions. He had undergone his last medical examination approximately one month prior to the accident. He had logged 2,091.2 flying hours as at 5 December 2012, of which 1,885.7 were in command. He did not hold a low level flying endorsement and there was no record of him undergoing low level flying training. His logbook showed that he had last undergone and successfully completed a flight review in September 2012.

The pilot occasionally flew as a jump pilot for the local parachuting company and the chief parachute instructor reported that he used the accident pilot to train new jump pilots. Other people described the pilot as experienced and safe. The pilot was also a parachutist and had made a number of parachute descents into the drop zone at Burrum River.

Family members reported that the pilot was in a good mood on the morning before the flight. He was reported to be fit and well, with no history of recent illness.

Aircraft information

The aircraft was manufactured in 1958 as a Cessna 182A model aircraft which had conventional tricycle undercarriage. It was subsequently modified and fitted with a tail wheel. It had also been equipped with a glider tow hook and parachute door, in accordance with supplemental type certificates.

The engine fitted to the aircraft had last been overhauled in June 1997 and was installed in the aircraft in October 2009. At the time of the installation, the engine logbook entry indicated that it had accumulated 824.0 hours time-in-service. The Australian Transport Safety Bureau (ATSB) was unable to locate any documentation relating to the history of the engine prior to the installation in the aircraft. The engine's calendar life was older than the recommended 12 year overhaul period specified by the engine manufacturer and it was being operated 'on condition' in accordance with Civil Aviation Safety Authority (CASA) airworthiness directives and airworthiness bulletins. Examination of the engine condition reports in the aircraft log book did not reveal any issues with its operation.

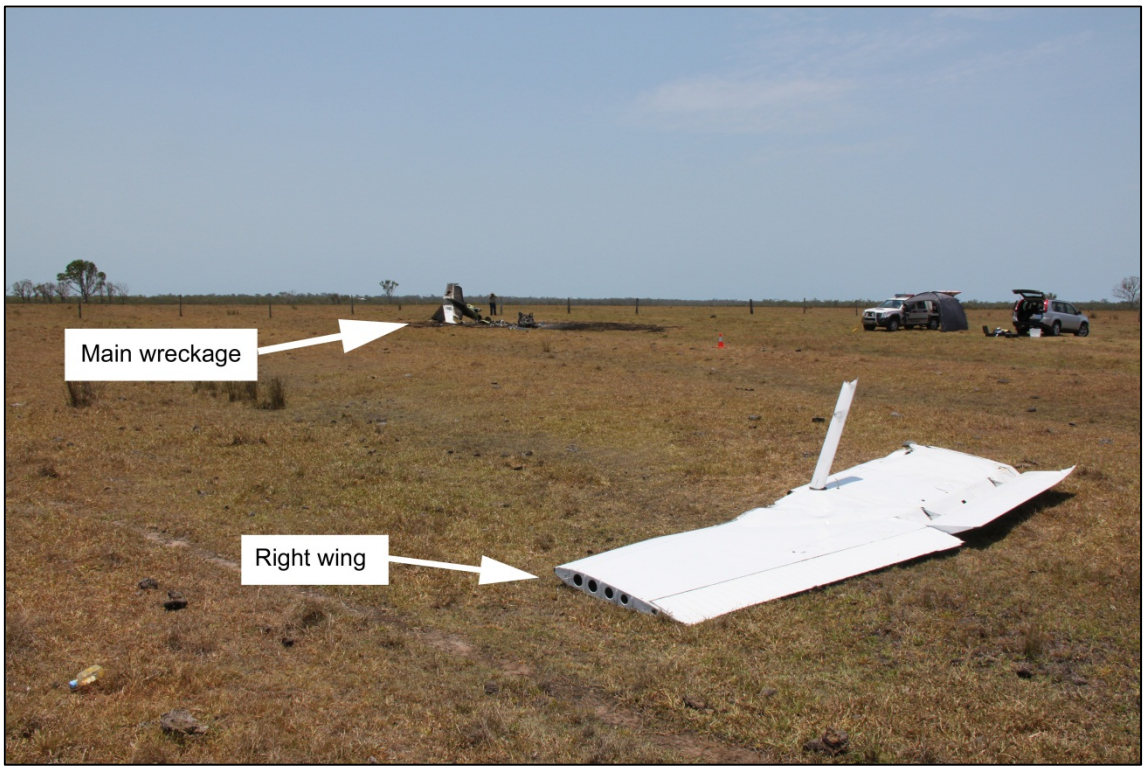
In 2011, the owner modified the engine to operate on unleaded motor vehicle petrol (MOGAS), in accordance with a supplemental type certificate.

The aircraft's maintenance release was destroyed in the accident. Examination of the previous maintenance releases revealed no recorded defects. There were no reported problems with the aircraft from family members and persons who were familiar with the aircraft.

Wreckage

The aircraft had impacted the ground in a nose-down attitude of approximately 90 degrees with very little forward speed. All of the aircraft's primary structures and flight controls were accounted for either at the wreckage location or along the aircraft's flight path. The right wing had separated from the aircraft prior to its impact with the ground and was located approximately 40 m before the main wreckage of the aircraft (Figure 2).

Figure 2 – Right wing in relation to main wreckage location

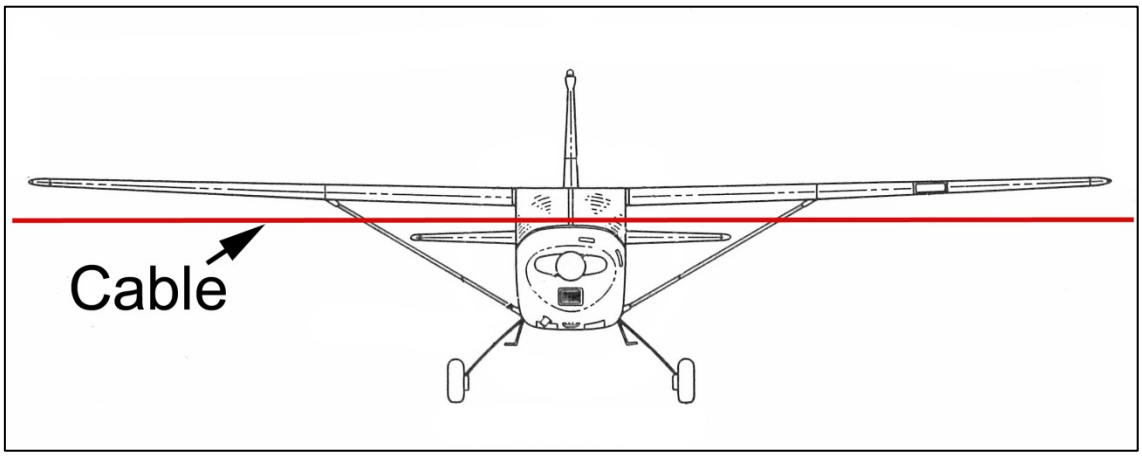


Source: ATSB

Where possible, flight control continuity was established and no pre-impact defects were identified. The engine was examined and it was confirmed that it was producing power at impact. A significant amount of fuel remained in the right wing fuel tank. The fuel colour was consistent with MOGAS. Fire and impact damage to the remainder of the aircraft precluded a detailed examination of aircraft systems.

The right wing strut displayed marks that were consistent with contact with a 3-strand electrical powerline. The start of those marks was located approximately 30 cm from the top of the strut. When that distance and orientation of the marks was transposed to a diagram of the aircraft, the position of the powerline at the point of impact was able to be determined (Figure 3).

Figure 3 – Aircraft orientation to powerline at time of impact



Source: ATSB

Wing failure sequence

As the aircraft climbed, the powerline was drawn down the strut, where there was evidence of electrical arcing (Figure 4).

Figure 4 - Electrical arcing on strut

Source: ATSB

Figure 5 – Severed right wing strut

Source: ATSB

As the aircraft continued in flight, the powerline was further drawn down the strut and probably jammed against the strut step, severing the strut completely as the powerline cut through the structure (Figure 5). The result was the failure of the strut followed by failure of the right wing due to aerodynamic loading in an upwards direction at the wing root attachment points.

The left main landing gear leg had separated from the main wreckage during the impact sequence and remained outside of the area of fire damage. Examination of that landing gear revealed no evidence of powerline contact damage. Fire damage to the remainder of the aircraft precluded any further confirmation of powerline impact damage.

Damage at the wing root was consistent with the powerline continuing to be drawn through the wing structure (Figure 6). Electrical powerline connectors were found in the wreckage trail, between the right wing and the main wreckage.

Figure 6 – Right wing root damage

Source: ATSB

Weather

Weather conditions in the area of Burrum River were forecast to be clear of cloud, with a north-north-westerly wind of up to 15 kt (28 km/h). Reported weather conditions from witnesses, including wind strength, were consistent with the forecast.

The position of the sun at the time of the impact with the powerlines was calculated.[3] It revealed that the sun had an azimuth[4] of 90°, and an elevation[5] of 67° and as such was unlikely to have adversely affected the pilot's ability to see the powerlines.

[3] Geoscience Australia website – www.ga.gov.au

[4] The clockwise horizontal angle from the sun to true north, measured in degrees.

[5] The vertical angle to the sun from an ideal horizon, measured in degrees.

Radio calls

Examination of the recorded radio broadcasts on the applicable area frequency did not reveal any emergency or urgency broadcast from the pilot of the aircraft prior to the impact with the powerlines.

Minimum height requirements

Civil Aviation Regulation (1988) - 157 outlined the requirements for conducting low flying. It stated:

> *(1) The pilot in command of an aircraft must not fly the aircraft over:*
>
> *(a) any city, town or populous area at a height lower than 1,000 feet; or*
>
> *(b) any other area at a height lower than 500 feet.*

The same regulation explained that the above requirements did not apply if weather conditions made it essential for the pilot to fly at a lower altitude. The regulation also did not apply if the aircraft was engaged in approved low flying operations, the aircraft was taking off or landing, or was engaged in the dropping of articles as part of a search and rescue operation.

Examination of documentation revealed that the pilot was not issued with a low flying approval or permission from CASA, nor was the aircraft involved in either a flying training exercise or a search and rescue operation. There was no plan to drop any packages from the aircraft. The position of the aircraft at the time of the impact with the powerlines was not consistent with an approach or circuit pattern to the private airstrip to the north.

The powerlines

The powerlines struck by the aircraft were not required to be marked in accordance with Australian Standard AS 3891.1 - 2008 *Air navigation - Cables and their supporting structures - Marking and safety requirements.*

The electrical power supply organisation reported that the aircraft's impact with the powerlines resulted in approximately 1.2 km of 3-strand steel cable being dislodged from the power poles. Following the accident a large amount of this cable was located to the north of the drop zone and extended across the road into the scrub area to the south of the aircraft impact point.

GPS data

A Garmin GPSMAP 296 navigation unit was recovered during the onsite examination of the wreckage. That unit was transported to the ATSB laboratories where data was successfully downloaded from the unit. The data included the accident flight and also included a number of other flights that the unit had recorded. It was confirmed that the pilot used this unit when flying.

The data for the accident flight revealed that the aircraft departed at about 0930 and tracked direct to the Burrum River area. Approximately 6 km prior to the parachute drop zone, the pilot commenced a descent and maintained approximately 110 kt (204 km/h) groundspeed. The recorded altitude at which the aircraft levelled out was consistent with the reports of the witnesses that the aircraft was about 10 m AGL. The groundspeed of the aircraft during the last minute of flight prior to the powerline impact was 110 kt, which was consistent with normal operation and the speeds recorded during earlier segments of the accident flight and previous flights. The recorded groundspeed was not consistent with operating at speeds recommended in the aircraft owner's manual when dealing with an engine failure or other emergency situations, making it unlikely the pilot was responding to such a condition.[6]

---

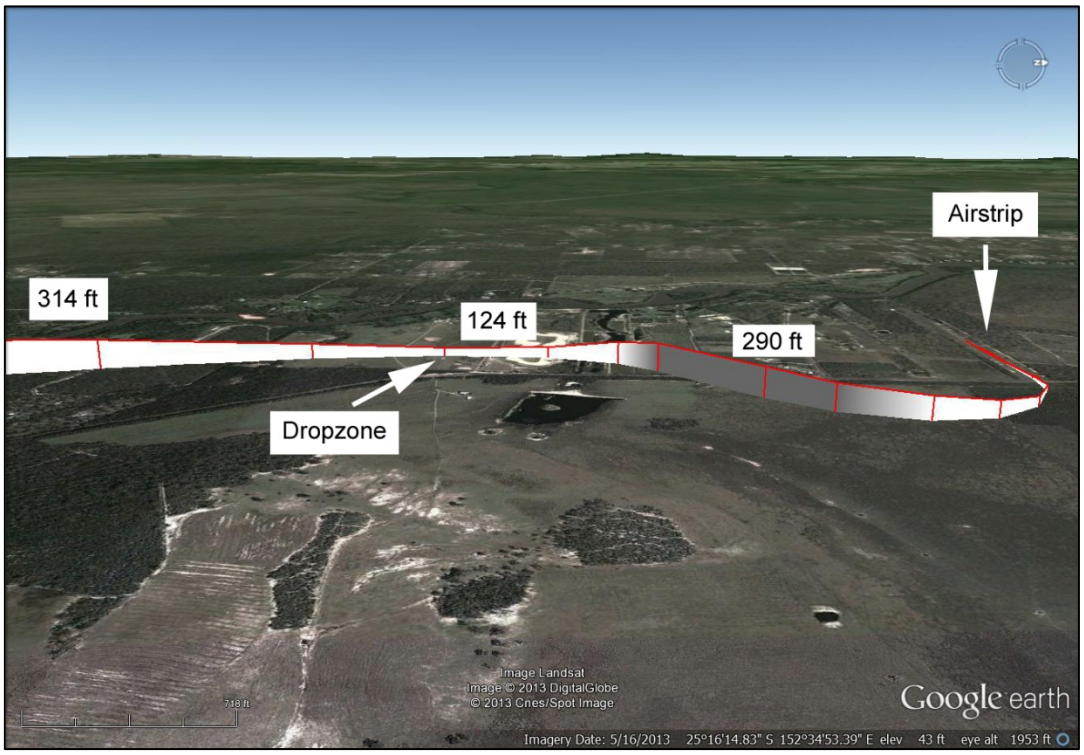
[6] The Cessna 182A owner's manual indicated that the speed to adopt following an engine failure was 80 mph (70 kt).

Previous flights

The operator of the drop zone and the parachute operator both reported that they had never witnessed an aircraft conduct a low level flypast from the south at the drop zone. They indicated that when an aircraft was landing at the airstrip to the north, that it normally overflew the drop zone in an east-to-west direction, at least 500 ft AGL, and that the pilot 'waggled their wings', indicating that they needed someone to come and pick them up from the airstrip.

The GPS data showed that the pilot had previously conducted low level passes at a number of locations, including the parachute drop zone. The flight recorded on the GPS on 11 November 2012[7] involved two low passes, one from the south to the north and another from the west to the east. These flights are reproduced from the GPS data at Figures 7 and 8.

Figure 7 – 11 November 2012 low level pass over drop zone and arrival at airstrip[8]

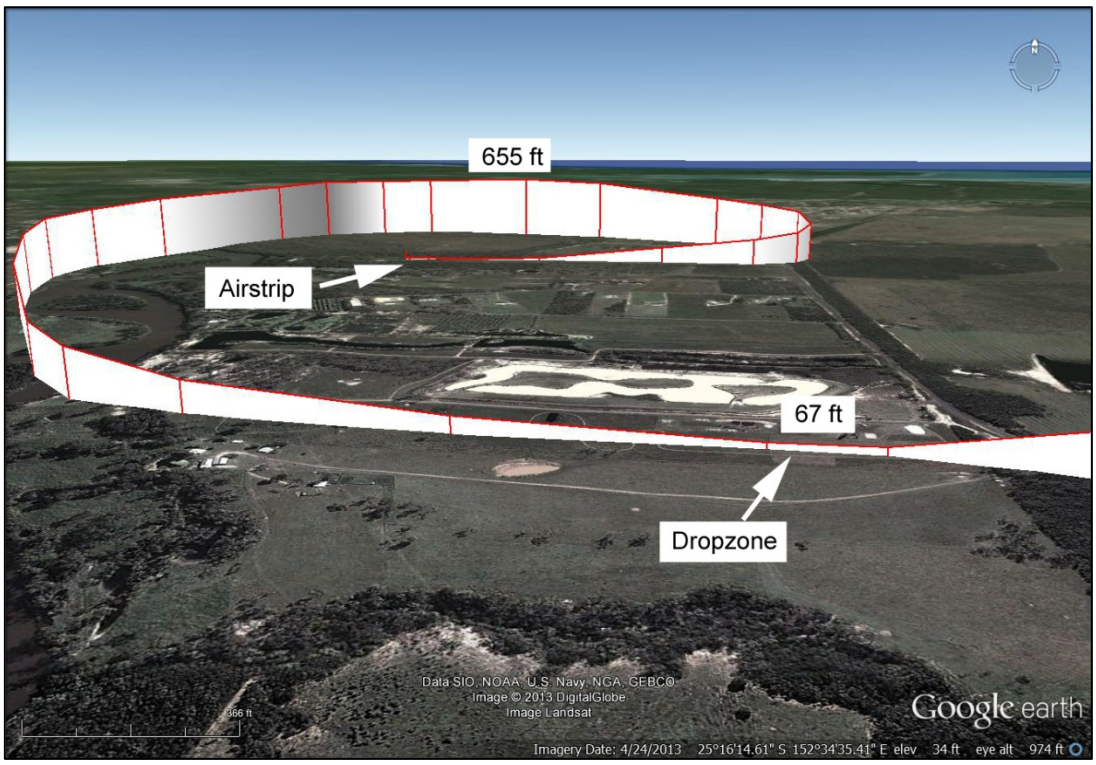


Source: Google Earth modified by ATSB

[7] The accident pilot had recorded this flight in his logbook.

[8] Displayed figures are GPS recorded altitudes.

Figure 8 – 11 November 2012 departure from airstrip and low level pass over drop zone



Source: Google Earth modified by ATSB

Previous occurrences

The ATSB has investigated numerous accidents involving wire strikes from previous years. The common findings from many of these investigations were that the pilot was involved in low flying for no identified operational reason and, in many of the occurrences, was more than likely aware of the presence of wires. Investigation reports into these type of accidents include:

- Aviation Occurrence Investigation 200400437 – Wirestrike, Eildon Weir Vic., 7 February 2004
- Aviation Occurrence Investigation 200607801 – Wirestrike, Nelson Vic., 24 December 2006
- AO-2007-058 – Wirestrike – 20 km N Elliot, NT, 10 November 2007
- AO-2008-082 – Wirestrike – 25 km NW Leongatha Aerodrome, Vic., 25 December 2008
- AO-2009-017 – Wirestrike – Langkoop, Vic., 20 April 2009
- AO-2010-033 – Wirestrike – 37 km SSW Latrobe Valley Airport, Vic., 20 May 2010
- AO-2010-071 – Wirestrike – Geelong (ALA), Vic., 25 September 2010

In 2006 the ATSB re-released research report B2005/0055 *Wire-strike Accidents in General Aviation: Data Analysis 1994-2004*. This report analysed the characteristics of wire-strike occurrences in the general aviation sector using accident and incident data collected by the ATSB. The report findings reinforced the clear danger to pilots when flying at low level in the vicinity of powerlines.

Safety analysis

The Australian Transport Safety Bureau (ATSB) determined that the aircraft was capable of normal operation up until the point where it impacted the powerlines. The ATSB identified that, despite the calendar age of the engine, there was no mechanical defect identified with the engine that would have contributed to the occurrence. No pre-existing airframe defects were discovered in the wreckage of the aircraft.

Given the recent medical examination of the pilot and the level of fitness reported by family members, it was highly unlikely that incapacitation of the pilot was a factor in the occurrence.

Identifying the powerlines near the drop zone

Identifying powerlines and other similar obstructions from an aircraft in low-level flight is not a simple task. If the powerlines are in an area that is known to be a hazard for aircraft operations then they are required to be marked to enhance visibility. In this case, the powerlines were not required to be marked and, therefore, there was no enhancement to indicate their presence or assist in locating them. Factors such as glare and windscreen visibility can compound the problem of detection. The location of the sun was not considered to be a factor given its high elevation at the time of the accident and that the pilot's flight path was approximately 90° to the sun's azimuth. The condition of the windscreen could not be assessed due to the post-impact fire. In the event that the pilot had perceived the presence of the wires, the operating speed of the aircraft immediately prior to the wirestrike would have reduced the opportunity to react and avoid contact with them.

Accident investigations often reveal that the pilot was aware of the presence and location of a powerline and then subsequently flew into it. In this occurrence, the pilot had made parachute descents into the drop zone so it was probable that he was aware of the presence and location of the powerlines and the hazard posed to a parachutist landing at the drop zone.

No operational reason could be identified for the pilot to fly at a height less than 500 ft above ground level.

The circumstances of this accident reinforce the inherently hazardous nature of low-level flying.

Findings

From the evidence available, the following findings are made with respect to the wirestrike involving Cessna 182A, registered VH-SGB, that occurred at Burrum River, Queensland on 17 December 2012. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing factor

- The aircraft struck electrical powerlines while operating below the minimum permitted height of 500 ft above ground level.

Other finding

- The investigation could not identify any operational reason for the pilot to be operating the aircraft below the minimum permitted height.

General details

Occurrence details

Date and time:	17 December 2012, 1005 EST	
Occurrence category:	Accident	
Primary occurrence type:	Wirestrike	
Type of operation:	Private	
Location:	Burrum Heads, Queensland	
	Latitude: S 25º 16.47'	Longitude: E 152º 35.18'

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 182A	
Registration:	VH-SGB	
Serial number:	51034	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 (fatal)	Passengers – Nil
Damage:	Destroyed	

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- Bureau of Meteorology
- Civil Aviation Safety Authority
- interviews with witnesses.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the Australian Transport Safety Bureau (ATSB) may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the Civil Aviation Safety Authority and the next of kin of the pilot. Submissions were received from CASA and the next of kin and, where considered appropriate, the text of the report was amended accordingly.

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.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

Australian Transport Safety Bureau

Enquiries 1800 020 616
Notifications 1800 011 034
REPCON 1800 011 034
Web www.atsb.gov.au
Twitter @ATSBinfo
Email atsbinfo@atsb.gov.au

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation

Wirestrike involving Cessna 182A, VH-SGB
Burrum River, Queensland - 17 December 2012

AO-2012-170
Final – 5 June 2014