Australian Government
Australian Transport Safety Bureau

Collision with terrain involving Cessna 182, VH-TSA

Tomahawk, Tasmania | 20 January 2018

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2018-008
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Addendum

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Safety summary

What happened

On 20 January 2018, the pilot of a Cessna 182P aircraft, registered VH-TSA, departed The Vale Airstrip, Sheffield, for a private airfield at Tomahawk, Tasmania. On arrival, the pilot conducted a number of orbits prior to approaching the runway. The aircraft touched down more than halfway along the runway before bouncing several times. In response, the pilot commenced a go-around but the aircraft collided with a tree beyond the end of the runway and impacted the ground. The passenger was fatally injured and the pilot sustained serious injuries. The aircraft was substantially damaged.

What the ATSB found

The ATSB identified that the selected approach direction exposed the aircraft to a tailwind that significantly increased the groundspeed on final approach and resulted in insufficient landing distance available. Additionally, the final approach path was not stable. In combination with the tailwind, that resulted in the aircraft being too high and fast with a bounced landing well beyond the runway threshold.

Finally, the go-around was initiated at a point from which there was insufficient distance remaining for the aircraft to climb above the tree at the end of the runway in the landing flap configuration and tailwind conditions.

Safety message

The ATSB reminds pilots of the importance of obtaining all relevant information about the local conditions, including wind direction and strength, prior to commencing an approach to an aerodrome. While a windsock is not required for all aircraft landing areas, it provides a simple visual means for pilots to assess the wind direction and strength.

This accident highlights the importance of conducting a standard approach to an aerodrome. This enables assessment of the environmental and runway conditions and allows checks to be completed in a predictable manner. When approaching a non-controlled aerodrome, pilots are required to join a leg of the circuit and, if joining on final, to establish the aircraft on final approach at least 3 NM from the runway threshold to ensure a stable approach path. If a safe landing cannot be assured, a pilot should initiate a go-around early, and ensure the aircraft is configured in accordance with the operating handbook.

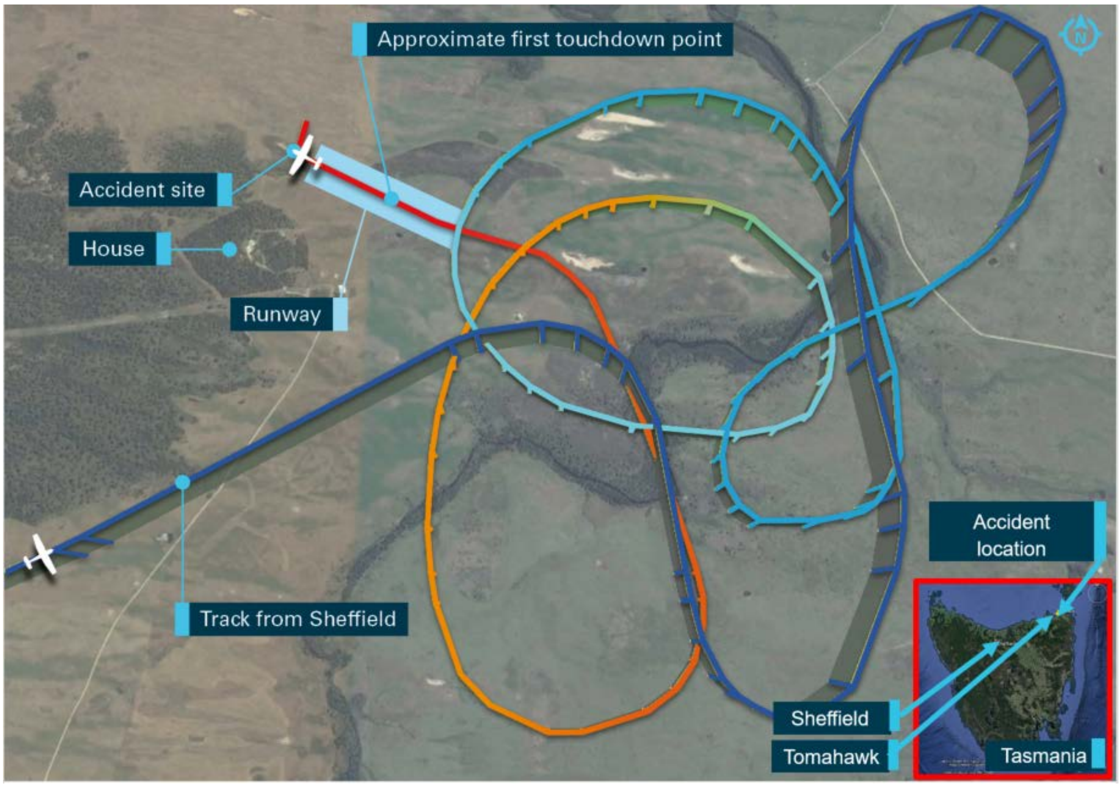
The occurrence

On 20 January 2018, at about 1645 Eastern Daylight-saving Time,[1] a Cessna 182P aircraft, registered VH-TSA (TSA), departed The Vale Airstrip, Sheffield, Tasmania for a private airfield at Tomahawk, 146 km to the east-north-east (Figure 1). The private flight was conducted under the visual flight rules[2] at 3,500 ft above mean sea level (AMSL). On board were the pilot occupying the front left seat and a passenger (also a qualified pilot), seated in the front right seat.

The pilot broadcast on the multicom frequency (126.7 MHz) when the aircraft was 10 NM (19 km) from, and inbound to, Tomahawk. Recorded data showed that the aircraft commenced descent from its cruising altitude at 1712. The pilot stated that airfield was hard to identify visually and that he sighted it after descending to about 1,000 ft AMSL. There was no windsock at the airfield to identify the wind speed and direction. The pilot reported that he anticipated that the wind would be from the same north-westerly direction encountered during the flight, and therefore decided to land towards the north-west.

On arrival at Tomahawk, the pilot conducted a number of orbits to the right and left in the vicinity of the airfield (Figure 2). He reported that he manoeuvred the aircraft in that manner prior to approaching the runway because the aircraft was too high, and its groundspeed was faster than normal, for the approach.

Figure 1: Recorded aircraft track



Source: AvPlan data – annotated by ATSB

The pilot stated that he felt some pressure to land due to the weather, with clouds at about 1,400 ft and light showers of rain in the area. Additionally, it was later than their original estimated arrival time of 1700. He was aware that the passenger had advised the airfield owner that their arrival time would be closer to 1730.

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1 Eastern Daylight-saving Time (EDT): Coordinated Universal Time (UTC) + 11 hours.

2 Visual flight rules (VFR): a set of regulations that permit a pilot to operate an aircraft only in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.

At about 1720, the airfield owner saw and heard the aircraft operating south-east of the airfield. A second witness, who was standing between the house and airfield, saw the aircraft approaching the runway heading in a westerly direction.

The airfield owner was working outside at the time the aircraft arrived. He was also a pilot, and reported that he was concerned that the pilot of TSA was attempting to land the aircraft towards the west, which would result in a tailwind he estimated to be about 15 kt. In response, the airfield owner drove his vehicle onto the runway towards the approaching aircraft, with headlights on and hazard lights flashing, in an attempt to communicate to the pilot to abort the landing. The pilot reported that he thought the driver was indicating where to land, and so he continued the approach. Having determined that the pilot intended to continue the landing, the airfield owner vacated the runway.

Tyre marks on the grass identified that the aircraft first touched down 433 m beyond the runway threshold, with 284 m of runway remaining. Subsequent wheel marks showed that the aircraft then bounced several times, with the last wheel marks visible on the runway 161 m before a 7 m high tree, located on rising terrain 36 m beyond the end of the runway. The pilot reported that, following the bounced landing, the passenger instructed him to initiate a go-around. In response, he applied full power and recalled that the engine appears to have responded normally.

The aircraft started to climb, however it collided with a branch of the tree 5.6 m above the ground. The impact damaged the right wing, and the aircraft then collided with terrain and came to rest on its right side (Figures 2 and 3). The passenger sustained fatal injuries and the pilot was seriously injured. The aircraft was substantially damaged.

Figure 2: Accident site facing west, showing the tree branch struck by the aircraft's right wing and the rising terrain in the background

Source: Tasmania Police

Pilot information

The pilot held a current Private Pilot (Aeroplane) Licence issued by the Civil Aviation Safety Authority on 17 February 2016, a single-engine aeroplane class rating and a manual propeller pitch control design feature endorsement, as required for operation of VH-TSA.

The pilot also held a Class 2 Aviation Medical Certificate valid until 8 November 2019 with the restriction of vision correction. In conjunction with a flight review conducted on 18 December 2017, the pilot had successfully completed an operational check of his vision following eye surgery.

The pilot had about 560 hours total aeronautical experience and 46.7 hours on the Cessna 182P.

The passenger also held a current Private Pilot (Aeroplane) Licence and Class 2 Aviation Medical Certificate, and had about 1,280 hours total aeronautical experience.

The pilot and passenger had conducted many flights together around Australia. Although the passenger had been the pilot in command for the majority of those flights, both had exposure to operating at remote and unfamiliar airfields. They had also completed a bush pilots training course. Additionally, at his flight review two months prior to the accident, the pilot had conducted a simulated forced landing, in which he demonstrated his ability to select an appropriate landing site.

Aircraft information

The Cessna Aircraft Company 182P is a four-seat, high-wing, single-engine aircraft equipped with fixed tricycle landing gear. The aircraft was powered by a Teledyne Continental Motors O-470-S engine and fitted with a McCauley two-blade, constant-speed propeller, model 2A34C203.

VH-TSA was a 1976-model 182P aircraft, recorded as being manufactured in the United States in 1977. It was first registered in Australia in 1978 and registration was transferred to the current operator in 2012. The aircraft's total time in service was 6,160 hours. The engine had exceeded the manufacturer's recommended time between overhauls but was permitted to continue in service and was assessed by the maintainer as serviceable at the last 100-hourly scheduled maintenance at 6,064 hours on 15 February 2017.

The aircraft was operated in the private category and was loaded within its weight and balance limitations on the day of the occurrence.

Aerodrome information

An aerodrome is defined as an area of land or water that is intended for use for the arrival, departure or movement of aircraft. The airfield in Tomahawk was a privately owned, non-controlled aircraft landing area and met the definition of an aerodrome. The prepared grass surface of the east-west runway was 717 m long, orientated in a direction of 281° magnetic, and had a short grass surface. The runway sloped down towards the west at an average slope of 1.5° for the first 500 m, and was then level. There was rising ground at both ends of the runway and a tree about 7 m high on the rising ground at the western end (Figure 3).

A shorter runway heading 050°/230° magnetic intersected the main runway just east of its midpoint. White plastic markers indicated the eastern and western thresholds and the crossing runway intersection.

There was no windsock at the airfield and one was not required to be there. The Civil Aviation Safety Authority (CASA) Civil Aviation Advisory Publication CAAP 92-1(1) – *Guidelines for aeroplane landing areas* paragraph 8.7 stated:

> A method of determining the surface wind at a landing area is desirable. A wind sock is the preferred method.

Although there was no windsock, other means were available by which the pilot could assess the local wind. These included the ability to observe the water surface pattern on several waterholes in the circuit area, including the dam adjacent to the runways depicted in Figure 3, or a comparison of airspeed versus GPS groundspeed during the final approach.

The CAAP referred to the requirements of Civil Aviation Regulation 92 (1), which detailed that a pilot shall not land an aircraft unless, having regard to all circumstances, including the prevailing weather conditions, the aircraft can land at the place in safety.

A document containing information pertaining to the airfield was found in the cockpit. The document depicted the runways as 11/29 725 m in length and 24/06 400 m in length. There was no text adjacent to the 'windsock' section, nor was there any mention of rising terrain or a tree to the west of the runway, reducing the runway's effective length. The following text was under 'Special procedures and remarks':

- runway 29/11 slopes down to the north-west
- pilot to ensure the landing area is suitable
- taxi on marked runways
- slight undulations on runways
- short strip 400 m rising to the north slightly
- both strips are ok for use in each direction.

Figure 3: Airfield looking in the landing direction (west) from runway threshold, showing dam surface. Note: image was taken 2 days after the accident, in a westerly wind

Source: ATSB

Landing distance required

CAAP 92-1(1) stated that 'a runway length equal to or greater than that specified in the aeroplane's flight manual…is required'. Additionally, paragraph 5.2 of the CAAP recommended that a 15 per cent factor safety factor be applied to required runway lengths.

Based on the landing distance chart in the Pilot's Operating Handbook (POH), the total distance required for the Cessna 182P to clear a 50 ft obstacle when landing at sea level pressure altitude in nil wind, on short dry grass at 30°C was 1,648 ft (502 m). Therefore, in nil wind conditions, there was sufficient length available for a landing on the runway used by the pilot.

While landings are normally conducted into wind to reduce the groundspeed and landing distance required, it is possible to conduct landings with a limited tailwind. The POH stated that a

50 per cent increase in landing distance was required with a tailwind up to 10 kt. In this instance, that equated to a required distance of 2,472 ft (753 m). Therefore, if the POH guidance was followed, the longest available runway length at the airfield was too short for landing with a 10 kt tailwind.

Approach to land

A stabilised approach is one in which the pilot maintains a constant descent angle to the aiming point for landing on the runway. The advantages of conducting such an approach is that it enables the pilot to:

- configure the aircraft for landing and complete all checks
- assess the local environmental and runway conditions, including the wind speed and direction
- reduce their workload, particularly at unfamiliar aerodromes.

CAAP 166-01 *Operations in the vicinity of non-controlled aerodromes*, stated that:

- The turn onto final approach should be completed 500 ft above the aerodrome elevation. This will allow sufficient time for the majority of aircraft to fly a stabilised approach and landing.
- Where a pilot is unfamiliar with the aerodrome layout, or when its serviceability, wind direction, wind speed or circuit direction cannot be ascertained prior to arrival, an overfly procedure should be used.
- Aircraft must join the circuit (or avoid the circuit – i.e. when overflying).
- When conducting a straight-in approach, the aircraft must be established on final not less than 3 NM from the runway threshold.
- Pilots are required to determine the wind velocity and runway in use prior to conducting a straight-in approach.
- Only minor corrections to speed and flight path, to maintain a stable approach, should be required within 3 NM on final.
- CASA recommends that pilots join the circuit on crosswind (midfield) or downwind leg.
- Pilots who choose to join on base should do so only if they have determined a number of factors including the wind direction and speed.

Analysis of the recorded flight track information identified that the pilot of TSA did not join a leg of the circuit or establish the aircraft on final approach from at least 3 NM.

Conduct of a go-around

The POH stated that for a go-around or 'Balked Landing', the wing flap setting should be reduced to 20° immediately after full power is applied.

The pilot reported that the passenger stated she ‘would get the flaps,’ during the go-around and he assumed that she had selected the flap lever to the 10° position. Examination of the wreckage identified that, while the flap lever was in that position in the cockpit after impact, measurement of the flap actuator showed that the flaps were still in the fully extended position. Given that discrepancy, the ATSB concluded that either the lever had not been selected up for sufficient time to enable the flaps to start to retract before the aircraft collided with the tree, or the lever moved during the accident sequence.

The aircraft is required by Civil Aviation Order 20.7.4.9.1 to climb at a minimum of 3.2 per cent in the landing configuration, that is, with the flaps extended 40°. To out-climb the tree, the top of which was 7 m high, at that minimum gradient with the flaps extended, the pilot would have had to commence the go-around 224 m before the tree in nil wind conditions. A go-around conducted with a tailwind reduces the angle of climb and therefore increases the distance required to out-climb obstacles. The last wheel contact marks were 160 m before the impacted tree.

Data provided to the ATSB by the aircraft manufacturer identified that the aircraft type was capable of out-climbing a 7 m tree from 160 m in nil wind when flown in the landing configuration (full flap) and within 3 kt of the aircraft's best angle of climb speed (59 kt indicated airspeed). However, with a 15 kt tailwind, the remaining distance was insufficient to climb 7 m in the landing configuration at any airspeed.

Weather information

Weather forecast

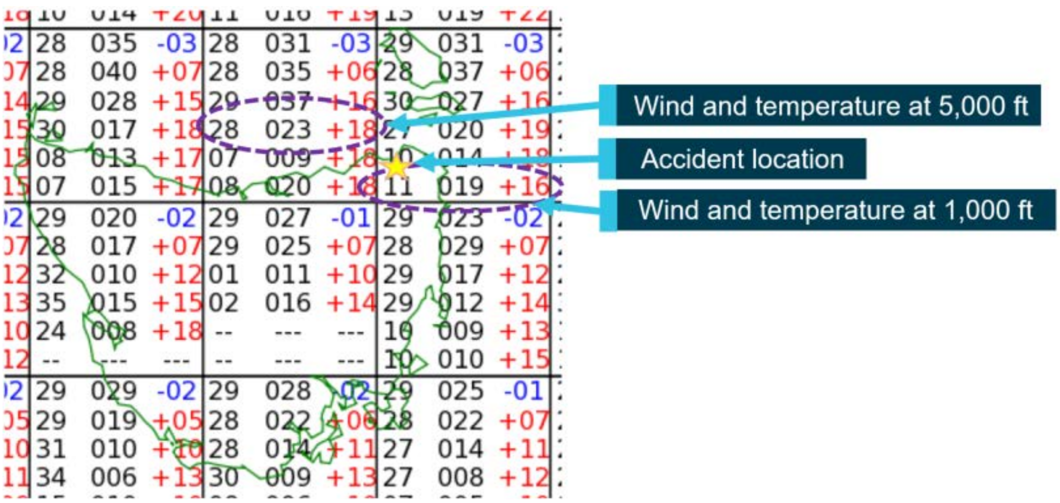
A report provided to the ATSB by the Bureau of Meteorology (BoM) detailed that several layers of cloud were forecast in the Tomahawk area around the time of the accident. These included scattered[3] altocumulus and altostratus above 10,000 ft, scattered cumulus and stratocumulus with bases between 2,500 and 4,000 ft, and broken stratus with bases between 1,000 and 2,000 ft with isolated showers of rain.

The BoM also identified that, due to a strong temperature inversion at about 4,500 ft AMSL, there were westerly winds above that level, with an easterly sea breeze below it. An extract of the forecast grid point wind and temperature chart valid for the flight is depicted in Figure 4.

The Tomahawk area is located in the top right grid and shows the wind at 1,000 ft above mean sea level (AMSL) was forecast to be from 110° true[4] at 19 kt and temperature 16°C. In the top centre grid, where the aircraft was en route from Sheffield to Tomahawk at 3,500 ft, the forecast wind at 5,000 ft AMSL was from 280° true at 23 kt and temperature 18°C.

The terminal aerodrome forecast (TAF) for Devonport Airport, 124 km from Tomahawk on a north-facing coastline, indicated a northerly wind of 9 kt.

Figure 4: Grid point wind and temperature chart showing en route and destination forecast



Source: Bureau of Meteorology annotated by ATSB

Actual conditions

The actual conditions at Tomahawk around the time of the accident were consistent with the forecast. Witnesses reported an easterly wind of 15 to 20 kt at the time of the accident. There was high overcast cloud and the pilot reported encountering some lower level cloud with a base of

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3 Cloud cover: in aviation, cloud cover is reported using words that denote the extent of the cover – 'scattered' indicates that cloud is covering between a quarter and a half of the sky, 'broken' indicates that more than half to almost all the sky is covered, and 'overcast' indicates that all the sky is covered.

4 Forecast winds are given in degrees true. The magnetic variation at Tomahawk is 14 degrees east, giving a wind coming from 096 degrees M.

about 1,400 ft and some showers in the vicinity of the destination airfield. An experienced pilot who had operated numerous times at the airfield reported that the location was frequently affected by a sea breeze.

Pilot's weather assessment

The pilot reported having obtained the weather forecast prior to departure, including the area forecast and the TAF for Devonport. He reported that he did not identify the forecast difference in wind direction between 5,000 and 1,000 ft and commented that he found the grid point wind and temperature graphical information provided by the BoM more difficult to interpret than the text format used until November 2017. Information about interpreting the new format forecasts is available on the [BoM website].

Recorded flight data

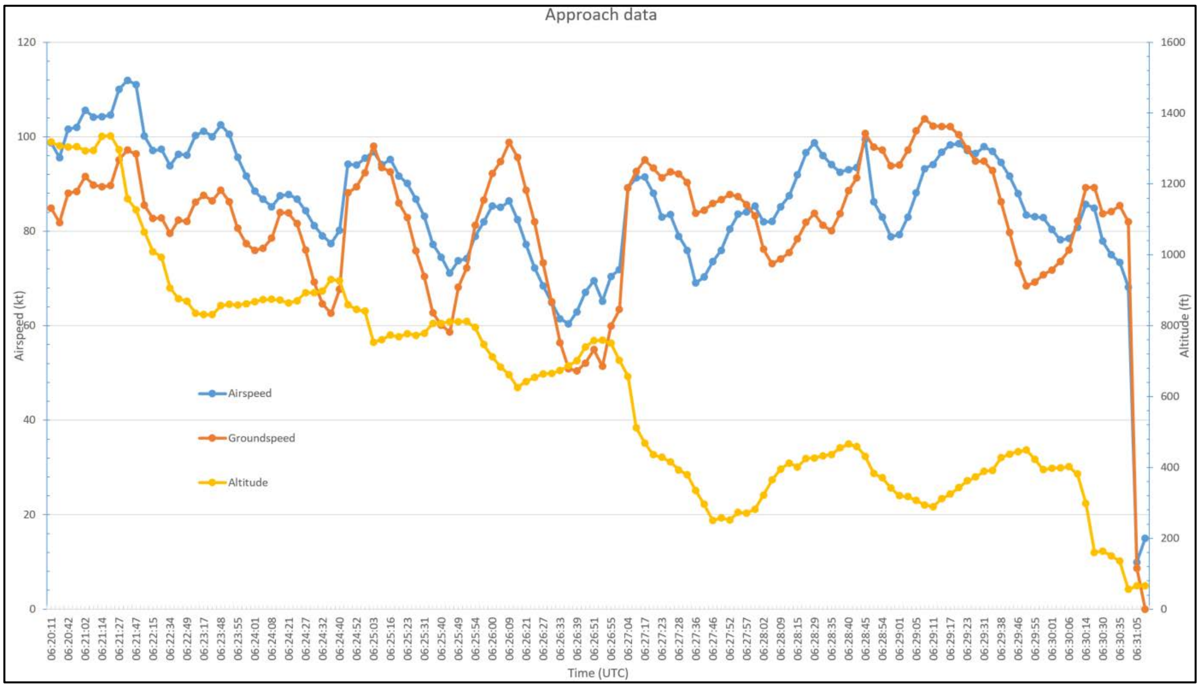
The aircraft was not equipped with a flight data or cockpit voice recorder and neither was it required to be. However, the aircraft was fitted with a GPS capable of recording flight data. The aircraft's track was also recorded on a personal device carried in the aircraft. A review of the data recorded on the device identified that the aircraft cruised on a direct track from The Vale to Tomahawk at 3,500 ft AMSL at a groundspeed between 136 and 150 kt.

During the descent from 3,500 ft, the groundspeed reduced in a manner consistent with both a reduction in power and the aircraft passing through a wind change from a westerly to an easterly direction. After the aircraft descended to about 900 ft AMSL, the pilot conducted a number of orbits on approach to the airfield. While conducting those orbits during the last 4 minutes of the flight, the aircraft's altitude and groundspeed varied before the descent to land.

To estimate the aircraft's airspeed from the recorded groundspeed, the ATSB applied a 15 kt easterly wind to the approach data. This showed that the airspeed varied between about 60-100 kt throughout the approach (Figure 5).

The last data for the flight was recorded at 1731.

Figure 5: Approach data showing altitude, groundspeed and derived airspeed based on a 15 kt easterly wind



Source: ATSB

Wreckage and impact information

Examination of the accident site and aircraft wreckage indicated that the aircraft's right wing struck the branch of a tree 5.6 m above, and about 36 m beyond, the end of the runway.

The right wing strut fractured on contact with the tree and separated from the aircraft. The wing failed, but remained connected to the fuselage. The aircraft subsequently rolled to the right and pitched nose-down. The propeller and the front of the engine struck the ground and the aircraft rotated about the impact point before coming to rest on its right side. During the impact sequence, the left wing strut fractured at the fuselage and the left wing came to rest on top of the right wing (Figure 5).

Fuel leaked from aircraft's ruptured wing fuel tanks, but there was no fire.

Examination of the aircraft did not identify any pre-existing faults and the pilot reported that the aircraft, including the engine, was operating normally at the time of the accident. The bending and impact marks on the propeller blades indicated that the engine was producing significant power when the blades struck the ground.

The right flap detached following impact with the tree and the left flap was extended. The flap actuator extension indicated that the flaps were in the fully extended position of 40°.

The lap sash and shoulder strap of both seatbelts were fastened at impact.

Figure 5: Damage to VH-TSA

Source: ATSB

Survivability

The passenger's seat was found in the fully forward and raised position, and the occupant was seated with a supplemental cushion (also called a booster seat) behind her back and one on the seat base. The United States Federal Aviation Administration (FAA) reported that as supplemental cushions are considered 'carry-on' items, they are not regulated.

When the FAA certifies a seat, a specific seat reference point (SRP) is identified, which relates the seat structure to the Anthropomorphic Test Dummy position during certification. If a manufacturer wants to alter the cushion on the seat it must maintain the SRP within an established tolerance, otherwise the seat will have to be re-certificated. When the occupant adds a supplemental cushion it moves them away from the nominal position, which changes how they flail with respect to their surroundings, as well as where their body is relative to the installed restraints.

In this accident, the effect of the supplemental cushions moved the occupant's body upwards and forwards. This put her at an increased risk of impacting the surrounding structure during the accident sequence. The use of supplemental cushions can also affect the occupant's vertical acceleration relative to the seat structure increasing the risk of spinal injury. It could not be determined if this alteration from the nominal seating position increased the severity of the injuries sustained.

By adding supplemental cushions, a short-statured pilot increases their flail envelope,[5] which increases their injury potential. However, without the supplemental cushion they may have reduced visibility or may not be able to operate the flight controls effectively.

5 The flail envelope is the body displacement envelope likely to be traversed by an occupant's body during a crash.

Safety analysis

Wind assessment

The pilot identified the predominantly westerly tailwind at the cruising altitude while the aircraft tracked east-north-east towards an airfield in Tomahawk. However, the easterly local surface wind at the airfield, although forecast, was not identified.

The pilot reported that before landing at an aerodrome, he normally overflew and assessed the windsock then joined the circuit depending on the direction of the wind. However, on this occasion there was no windsock available. While a windsock provides a simple visual means to assess wind strength and direction (and is the preferred method recommended by the Civil Aviation Safety Authority), there were a number of other means by which the pilot could have assessed the wind prior to commencing the approach. These included:

- interpretation of the wind-effect on the surface of a nearby dam or vegetation
- a comparison of the airspeed with the GPS-derived groundspeed during a stabilised segment of flight associated with either an upwind or downwind circuit leg or long final approach.

The pilot had previously demonstrated his ability to assess local wind conditions, without a windsock, while conducting a simulated forced landing as part of a flight review. On this occasion however, the landing runway was selected in anticipation of a similar westerly wind direction to that encountered during cruise. The resultant approach direction exposed the aircraft to about a 15 kt tailwind, which significantly increased the groundspeed on final approach and resulted in a manufacturer-calculated landing distance in excess of that available. It also significantly reduced the available climb gradient in the event of a go-around.

The pilot was unfamiliar with the airfield and also reported the presence of low cloud and reduced ambient lighting conditions on arrival at Tomahawk. He also stated that arrival time was later than planned. It is possible that these factors may have influenced the approach preparation and conduct.

Unstable approach and go-around

On arrival at Tomahawk, the pilot conducted a number of orbits south-east of the airfield at varying height and airspeed rather than joining the circuit or conducting a straight-in approach. This manoeuvring reduced the stability of the final approach and the opportunity for the pilot to assess the local wind conditions via a comparison of airspeed and GPS groundspeed.

The pilot recalled realising just prior to landing that the groundspeed was higher than the airspeed – indicative of a tailwind. Despite that, a go-around was not conducted at that point and the aircraft touched down over halfway along the prepared runway surface, with insufficient remaining runway to come to a stop.

Following a number of subsequent bounces, the pilot assessed that the aircraft was not going to be able to stop before the end of the runway. In response, he increased the power and raised the aircraft’s nose to go-around but the flaps were not altered from the landing configuration. This reduced the aircraft’s climb performance and, combined with the tailwind, led to insufficient distance remaining for the aircraft to climb above the tree at the end of the runway. The aircraft’s wing struck the tree and was damaged to the extent that the aircraft became uncontrollable. The aircraft then rolled to the right, pitched nose-down and collided with the terrain.

Findings

From the evidence available, the following findings are made with respect to collision with terrain involving Cessna Aircraft Company 182P, registered VH-TSA, that occurred at Tomahawk, Tasmania on 20 January 2018. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing factors

- The selected approach direction exposed the aircraft to a tailwind that significantly increased the groundspeed on final approach and resulted in insufficient landing distance available.
- The pilot did not conduct a stabilised approach, which combined with the tailwind, resulted in the aircraft being too high and fast and a bounced landing well beyond the runway threshold.
- From the point at which the go-around was initiated, there was insufficient distance remaining for the aircraft to out-climb the tree at the end of the runway in the landing flap configuration and tailwind conditions.

Other factors that increased risk

- There was no windsock at the airfield to enable a simple visual assessment of the wind strength and direction.

General details

Occurrence details

Date and time:	20 January 2018 – 1731 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	Tomahawk, Tasmania	
	Latitude: 40° 53.78' S	Longitude: 147° 51.38' E

Pilot details

Licence details:	Private Pilot (Aeroplane) Licence, issued 17 February 2016
Endorsements:	Manual Propeller Pitch Control
Ratings:	Single Engine Aeroplane Class Rating
Medical certificate:	Class 2, valid to 8 November 2019
Aeronautical experience:	560 hours
Last flight review:	18 December 2017

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 182P	
Year of manufacture:	1977	
Registration:	VH-TSA	
Operator:	Private	
Serial number:	18264969	
Total Time In Service	6,160 hours	
Type of operation:	Private – Pleasure/Travel	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – 1 Serious	Passengers – 1 Fatal
Damage:	Substantial	

Sources and submissions

Sources of information

The sources of information during the investigation included

- the pilot of VH-TSA
- several pilots operating in the local area
- the airfield owner
- AvPlan
- Airservices Australia
- the Civil Aviation Safety Authority
- the United States National Transportation Safety Board
- Textron Aviation

References

Rolfe ST& Barsom JM 1977, *Fracture and fatigue control in structures, applications of fracture mechanics*, Prentice-Hall New Jersey, pp. 414-440.

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 pilot, the airfield owner, the aircraft manufacturer, the Civil Aviation Safety Authority and the United States National Transportation Safety Board and Federal Aviation Administration.

Submissions were received from the airfield owner and the Federal Aviation Administration. The submissions were reviewed and where considered appropriate, the text of the report was amended accordingly.

Australian Transport Safety Bureau

The ATSB is an independent Commonwealth Government statutory agency. The ATSB 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 operations involving the travelling public.

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 factors related to the transport safety matter being investigated.

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

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Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation

Collision with terrain involving Cessna 182, VH-TSA
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