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Turboprop aircraft

Weight and balance event involving Fairchild SA-227AC, VH-UUO

What happened

Fairchild SA-227AC

Source: ATSB

On 30 January 2013, at about 0300 Eastern Daylight-saving Time[1] a Fairchild SA-227AC, registered VH-UUO (UUO), departed Melbourne Airport, Victoria for Launceston Airport, Tasmania on a scheduled freight flight. The pilot was the only person on board.

The pilot reported that he conducted the flight planning in an office located away from the aircraft. The pilot prepared a trim sheet to confirm the weight and balance information for the aircraft, then provided an uplift figure to the freight organisation that prepared a loading plan that they used to load the aircraft.

When the pilot approached the aircraft, the freight had been loaded with all cargo access doors closed and the cargo support strut (tail stand) removed. The pilot completed the pre-flight checks in the cockpit and then removed the wheel chocks and wing tip safety markers and placed them in the main cabin area.

During the take-off, the pilot reported that he needed more forward elevator trim than usual to climb out at a 10° nose-up attitude. The pilot noticed that in straight and level flight, the aircraft had full nose-down trim and the aircraft was flying at a 5° nose-up attitude. When the autopilot was engaged, the pilot reported that the autopilot struggled to maintain straight and level flight and the aircraft 'porpoised'.[2]

The pilot conducted a normal landing at Launceston and checked the freight located in the nose locker. The pilot estimated that the nose locker contained 35 kg of freight when it should have contained about 100 kg. After off-loading the freight at Launceston, the aircraft was reloaded for the next flight, to ensure that the aircraft was within the centre of gravity limits.

Operator investigation

The aircraft operator conducted an investigation into the incident and determined that there was no formalised approach to the loading and unloading of the aircraft, which included:

- freight transferred from other flights not being re-weighed
- the marked weight of freight placed on pallets did not include units of measure or if it was net or gross weight
- the supervisor and ground personnel had not been trained in the loading procedure for the aircraft
- no strict control over the weight being loaded into each zone of the aircraft
- a certain amount of estimating freight weights going into each zone
- no procedures available for where to load cargo when the zone could no longer fit the cargo that was allocated to it.

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

2 In flight the aircraft oscillates up and down in the pitch axis.

The loading plan for the aircraft indicated 100 kg of freight in the nose locker of the aircraft. The operator determined that one of the loaders had removed about 70 kg of freight from the nose locker and moved it to the rear of the aircraft.

A test aircraft trim sheet was prepared with the 70 kg of freight removed from the nose locker and added to the rearmost cargo area (zone 5). The centre of gravity remained within limits. The operator determined on the test aircraft trim sheet that moving a further 25 kg of freight from the forward zone to the rear zone would result in the aircraft being at the rear most centre of gravity limit. The freight for the aircraft was not re-weighed at Launceston, so they were not able to determine the exact centre of gravity that existed at the time of take-off from Melbourne. The flight characteristics of the aircraft suggest that the aircraft was either at the most rearward centre of gravity, or just outside the rear centre of gravity limitations.

Safety action

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

Operator

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

Aircraft operations safety action

- A Safety Alert was issued to all pilots to advise of several freight loading occurrences reminding pilots that they are to remove the cargo support strut and that they are to ensure that the aircraft is loaded in accordance with the load plan.
- The flight operations department will conduct random ramp checks. The ramp checks will include weighing all freight in given zones of the aircraft as well as complete weighing of all freight in all zones.
- A review of the standard operating procedures for the Metro and ATR fleet.

Ground handling safety action

- Review and publish revisions to the ground handling manual.
- Develop a ground handling training manual.
- Identify and provide training for all employees in ground handling that require training or retraining including agents.
- Establish ramp handling manual that includes all operators.
- Establish risk management plan specific to unloading/loading of aircraft.
- Establish change management plan for revised ground handling arrangements.
- Establish project plan for ground handling.
- Conduct ground support equipment needs/gap analysis at all ports.

Organisational safety action

- Develop a plan to provide training for all employees.
- Establish audit program for oversight.
- Establish standard operating procedures for all facets of operation.
- Identify all managers and supervisors that require training or retraining including agents.

General details

Manufacturer and model:	Fairchild SA-227AC	
Registration:	VH-UUO	
Type of operation:	Freight	
Occurrence category:	Incident	
Primary occurrence type:	Weight and balance event	
Location:	Melbourne Airport, Victoria	
	Latitude: 37° 40.40' S	Longitude: 144° 50.60' E
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Piston aircraft

Landing gear separation involving Piper PA28, VH-JXR

What happened

VH-JXR

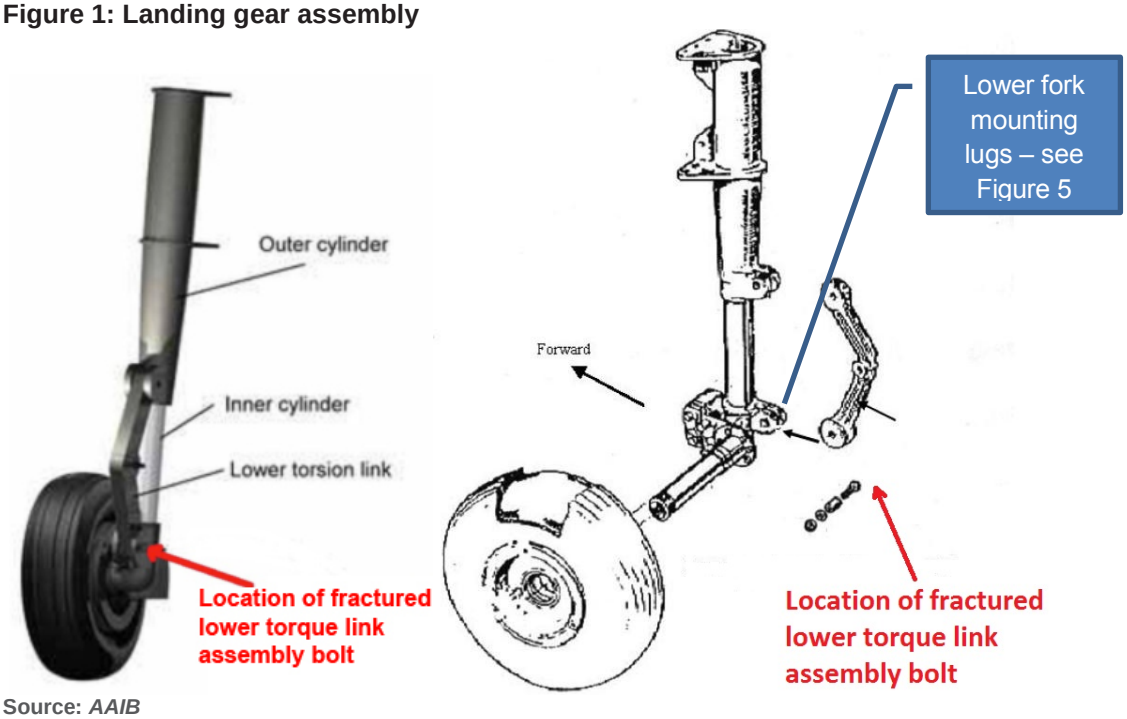
Source: Operator

On 7 January 2013 at 0900 Eastern Daylight-saving Time[1] a Piper PA28, registered VH-JXR, departed Mangalore Airport, Victoria on a navigation training exercise. The student pilot experienced a slight vibration prior to rotation, otherwise the takeoff was normal. The student pilot was the only person on board.

An instructor on the ground watched the aircraft depart and observed an object trailing behind the aircraft. The instructor advised the student via the radio and instructed the student to return and perform a low-level pass so that they could ascertain what the object was. Following the low-level pass, the right main wheel and inner cylinder of the landing gear assembly were observed to have detached from the upper cylinder and to be hanging off the brake line (Figure 1). After a second low-level pass, it was observed that the wheel had completely detached.

The instructor advised the student to hold over the airfield to burn off fuel and allow time for a plan to be formulated. After several hours and with emergency services in attendance, the student was instructed to make a normal approach to runway 36. The aircraft touched down on the runway and slid off to the side coming to rest on the grass. The student was uninjured, however the aircraft was substantially damaged.

Figure 1: Landing gear assembly



Source: *AAIB*

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

Engineering examination

The right landing gear assembly and lower torque link bolt were subsequently located and forwarded to the ATSB for examination. The examination of the right landing gear assembly revealed that the lower torque link attachment bolt (Figure 2) had fractured through the final thread. This fracture had allowed the inner cylinder to become detached from the torque link[2] and to fall from the outer cylinder when the aircraft became airborne.

The examination indicated that the failure of the bolt was due to single-point bending fatigue due to asymmetrical loading (bending from one side) (Figure 3).

Figure 2: Failed lower torque link attachment bolt

Source: ATSB

Figure 3: Bolt fracture surface

Source: ATSB

The bending failure mode of the lower torque link attachment bolt differed from its function of transferring bearing loads from the lower torque link onto the fork's lugs and so further investigation of the source of this asymmetric loading was carried out.

The mating, U-shaped, brake hose support bracket was mounted on to the lower fork lugs. There were circular brinelling[3] marks and flat-bottomed dishing[4] of both arms of the bracket. However, the dishing depth of the arms was not uniform, being deeper on the forward side of each bracket arm. This indicated an asymmetric loading state (Figure 4). Examination of the lower-fork mounting lugs showed that they were tapered and had been spot faced to accommodate the square faces of the torque link bolt and mating nut. The tapering of the mounting lugs resulted in a variable depth of the spot-faced area and was a source of asymmetry if the bracket was directly attached to them (Figure 5). The circular brinelling marks resulted from heavy contact with the corner shoulder of these spot-faced areas.

There was a witness mark on the bracket, indicating the presence of a washer-like component at some point in time. However, the examination concluded that the specified washer thicknesses were insufficient to prevent an asymmetrical loading state being present.

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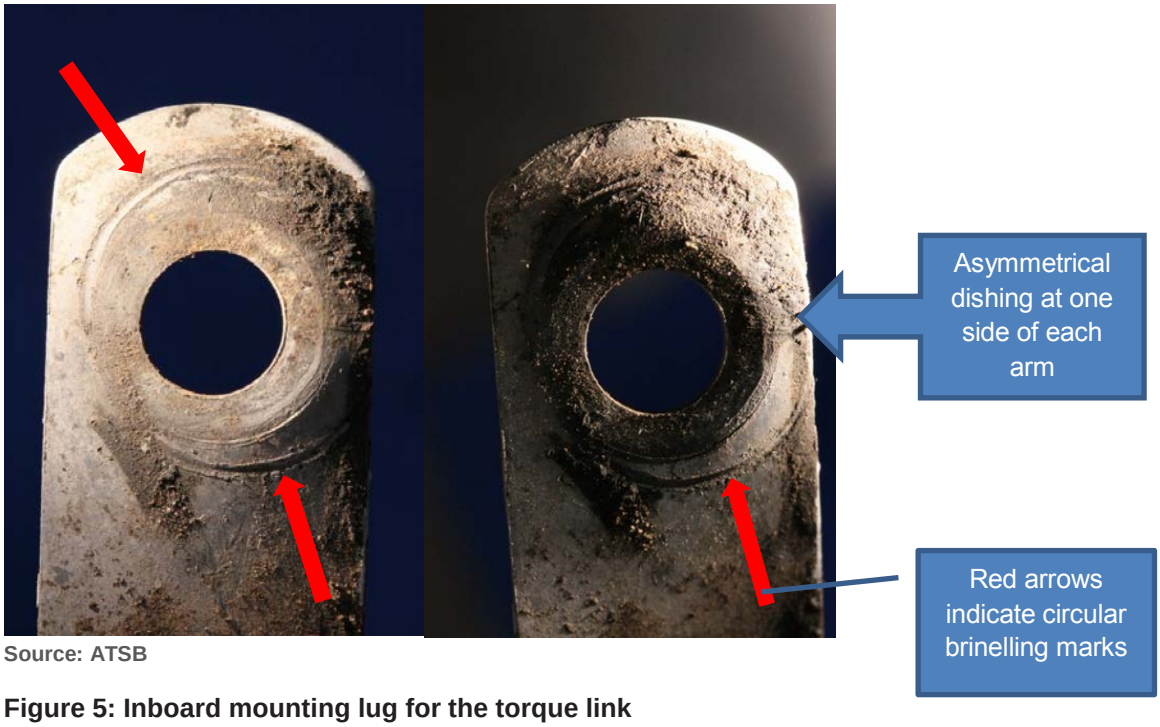
2 The torque links not only prevent rotation between the inner and outer cylinder; they also provide a means of retaining the inner cylinder in place during flight.

3 Brinelling is a material surface failure caused by contact stress that exceeds the material limit. This failure is caused by just one application of a load great enough to exceed the material limit. The result is a permanent dent or "brinell" mark

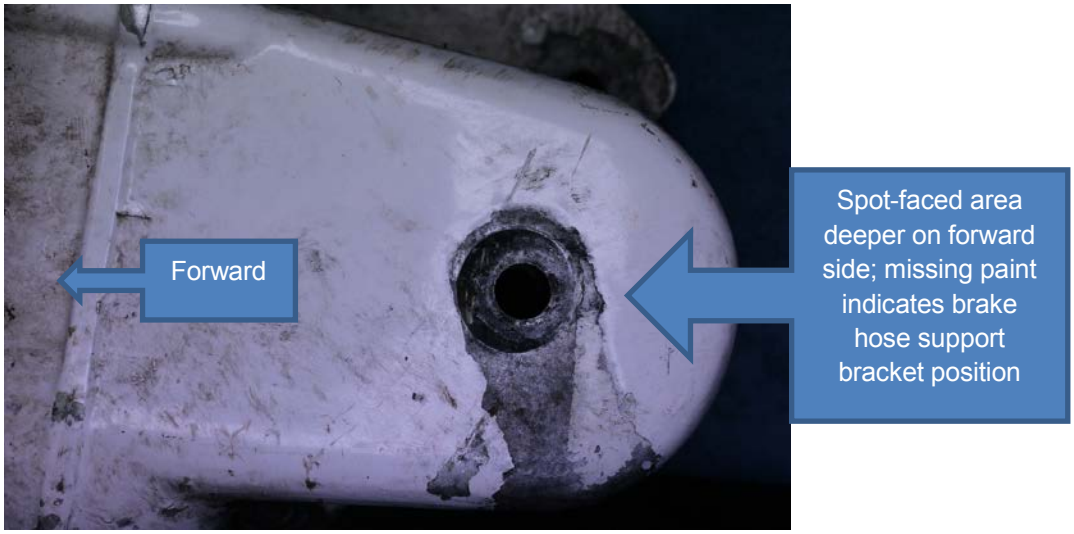
4 Dishing is out-of-plane distortion.

Figure 4: Inside surfaces at each end of brake hose support bracket



Source: ATSB

Figure 5: Inboard mounting lug for the torque link



Maintenance

In September 2011, the Civil Aviation Safety Authority (CASA) issued an Airworthiness Directive (AD) AD/PA-28/35, which applied to the main landing gear torque links on all PA-28 aircraft with fixed landing gear. This AD required compliance with Piper Service Letter No. 1199, unless Piper Service Letter 600 had previously been complied with. Piper Service Letter No 1199 required the inspection of the 'old style' oval shaped torque links for cracks every 100 hours and replacement with the 'new style' rectangular square shaped torque links at 5,000 hours total time in service irrespective of condition.

JXR had a total time of 9,388 hours and the torque links had been replaced with the 'new style' torque links in accordance with the manufacturer's requirements. The last maintenance was performed 9.8 hours prior to the accident, however there was no requirement to inspect the torque link attachment bolts. The only maintenance requirement defined by the manufacturer, for the attachment bolts, was to carry out a lubrication of the lower torque link fitting every 100 hours. It was not known how long the bolt had been fitted, or when it was last disturbed.

Safety action

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

Operator

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

Replacement of torque link bolts

Since this incident, the aircraft operator has undertaken to replace all torque link attachment bolts during the next scheduled maintenance on any Piper PA-28 aircraft they operate.

Landings with a sideways loading

The operator advbised that they will be treating all landings where a sideways load may have occurred with caution.

General details

Manufacturer and model:	Piper PA28	
Registration:	VH-JXR	
Type of operation:	Training	
Occurrence category:	Accident	
Primary occurrence type:	Landing Separation	
Location:	Mangalore Airport, Victoria	
	Latitude: 36° 53.30'S	Longitude: 145° 11.05' E
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

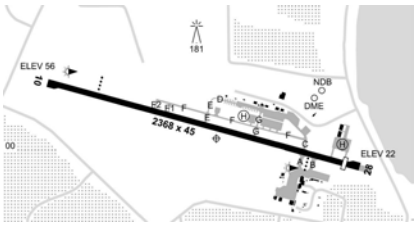
Wheels up landing involving Cessna 210M, VH-PBV

What happened

On 23 February 2013, a Cessna 210M, registered VH-PBV (PBV), was returning to Broome Airport, Western Australia, from Lombadina with a pilot and four passengers onboard.

The conditions on the day were windy and wet with thunderstorms and rain moving through the area, requiring the pilot of PBV to alter the aircraft's flight plan and flight path to divert around the weather.

Broome Airport



Source: Airservices Australia

The aircraft tracked to a position north of the airport, in order to land on runway 10. The pilot reported selecting the landing gear down as part of his landing checks, and a passenger later reported that he heard what he believed to be the landing gear being lowered.

The air traffic controller (controller) cleared PBV to land when the pilot reported turning base and advised the pilot of an 18 knot crosswind. Just prior to PBV crossing the runway threshold, the controller sighted the aircraft on short final and conducted a final scan of the runway to ensure it was still clear

Shortly before landing, at about 1410 Western Standard Time,[1] the pilot completed his final checks, but did not look out the window to visually check that the landing gear was down. However, he reported he did observe a green light, indicating that the landing gear was down and locked. To compensate for the crosswind, the pilot operated the aircraft at a slightly higher throttle setting, until flaring to land. PBV then landed on the runway with the landing gear retracted and skidded about 300 to 350 m down the runway on the underbelly (Figure 1). The controller activated the airfield emergency response.

The pilot later reported that the landing gear warning horn had not activated.

Insurance assessment

Following the accident, an assessment conducted by an insurance assessor found that the pilot did not extend the landing gear prior to landing. The assessor noted that the micro switch that activated the landing gear warning horn was set for a throttle setting lower than that used by the pilot during the landing.

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

Figure 1: VH-PBV on the runway

Source: FlightAware

Safety message

Bad weather and changed plans can distract attention away from a pilot's primary function – to safely fly the aircraft. However, the failure of the gear warning horn to activate removed a defence against landing with the landing gear retracted.

An accident investigation report produced by the United Kingdom Air Accidents Investigation Branch provides further information on the link between throttle settings and the activation of the gear warning horn in Cessna 210 aircraft. The report is available at: www.aaib.gov.uk/cms_resources.cfm?file=/dft_avsafety_pdf_507729.pdf

General details

Manufacturer and model:	Cessna Aircraft Company 210M	
Registration:	VH-PBV	
Type of operation:	Charter	
Occurrence category:	Serious incident	
Primary occurrence type:	Wheels up landing	
Location:	Broome airport, Western Australia	
	Latitude: 17° 56.98' S	Longitude: 122° 13.67' E
Persons on board:	Crew – 1	Passengers – 4
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Minor	

Collision with terrain involving Grob G-115, VH-ZTM

What happened

Grob G-115

Source: Operator

On 15 March 2013, a student pilot was conducting solo circuit training at Jandakot Airport, Western Australia, in a Grob G-115C, registered VH-ZTM (ZTM).

At 1135 Western Standard Time,[1] on the student's third solo circuit to runway 06R, ZTM began to drift to the left of the runway centreline. The student elected to go-around and applied full power. Following the application of power, the nose pitched up abruptly and the aircraft then rolled to the left before pitching nose down. The left wing tip contacted the ground and the nose gear and right main gear collapsed before the aircraft came to a stop. The student pilot was able to exit the aircraft without injury, however the aircraft sustained substantial damage.

Weather

Weather observations were obtained from the Bureau of Meteorology with the following conditions observed:

- At 1130 – the wind was from the east north-east at 5 knots gusting 7 knots
- At 1200 – the wind was from the north-east at 5 knots gusting 7 knots

Pilot experience

The student had a total of 30.1 hours, all of which were on the Grob G-115. Earlier that day, the student had completed a dual check with an instructor of 1.1 hours duration. The dual check comprised of seven circuits, including normal approaches, flapless approaches and a glide approach. The student was assessed as competent to a solo standard.

Figure 1: Aircraft damage

Source: Operator

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

ATSB comment

The aircraft was reported to be in the landing configuration, with landing trim selected together with full flaps which is consistent with photographs taken shortly after the accident. The pitch up together with the reported roll and yaw is consistent with the application of full power, without adequate corrective control inputs being made to correct for the change in power setting. The rapid pitch down is consistent with one or both wings stalling.[2]

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.

Flight Training School

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

- Increased emphasis on Stabilised Approach Criteria to be made during pre-flight briefings.
- Instructor training and standardisation to include more emphasis on the essential use of rudder.
- Inclusion on the training syllabus of an upper air exercise prior to first solo, to check student use of rudder and go-around procedures.
- A more detailed brief on landing technique, for the G115C, to be included in the standard operating procedures.

Safety message

A go-around is an aborted landing of an aircraft that is on final approach. The US Aircraft Owners and Pilots Association (AOPA) has identified that for the ten-year period, between 1994 and 2003, accidents that occurred during a go-around accounted for approximately 6 % of the total accident rate for general aviation.[3] During a go-around the aircraft is trimmed for landing, not for going around and the pilot will need to be positive with attitude changes as power is applied.

For further reading on go-around technique please see:

US AOPA – Go around, do this if an approach or landing isn't working out.

flighttraining.aopa.org/students/presolo/skills/goaround.html

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

3 *General Aviation Accidents – 10 Year Trend*, AOPA Foundation (2005).

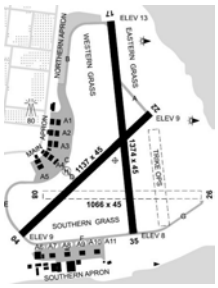
General details

Manufacturer and model:	Grob - G-115 C2	
Registration:	VH-ZTM	
Type of operation:	Flying Training	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	Jandakot Airport, Western Australia	
	Latitude: 32° 05.08’ S	Longitude: 115° 52.09’ E
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Aircraft proximity event between a Piper PA-44, VH-TYS and a Cessna 172S, VH-EUH

What happened

Point Cook aerodrome



Source: Airservices Australia

On 19 March 2013 at about 1016 Eastern Daylight-saving Time,[1] the pilot of a Cessna 172S aircraft, registered VH-EUH (EUH), made a 10 NM inbound broadcast on the Point Cook common traffic advisory frequency (CTAF) abeam Station Pier, a visual flight rules (VFR) reporting point south of Melbourne. In the broadcast, the pilot advised that he intended to track overhead Point Cook for Avalon at 2,500 ft.

At about the same time, a Piper PA-44-180 aircraft, registered VH-TYS (TYS), became airborne at Point Cook, for an instrument flight rules (IFR) training flight.

The pilot of EUH reported monitoring both the Point Cook CTAF and Melbourne Centre frequency and remembered hearing broadcasts on the CTAF, specifically one from an aircraft lining up. Although he reported seeing an aircraft airborne over the runway at Point Cook, he did not remember hearing a departure broadcast.

The pilot under training of TYS was flying under the hood[2] and the instructing pilot was making all radio calls to Melbourne Centre and broadcasts on the CTAF. The flight crew of TYS did not hear the 10 NM CTAF broadcast made by EUH.

As TYS tracked southbound about 3 NM east of Point Cook and passing about 2,000 ft on climb to 3,000 ft, the instructing pilot deselected the CTAF as the aircraft would shortly be entering controlled airspace. The pilot flying then turned right to track in a northerly direction, in anticipation of an airways clearance to enter Melbourne controlled airspace.

At about the same time, as EUH passed abeam Point Cook to the north-west, the pilot broadcast that he was leaving 2,500 ft for 4,500 ft.

At 1022, as TYS was levelling off at 3,000 ft about 1 NM west of Point Cook, the instructing pilot looked to the right and observed a C172 in their 2 o'clock position about 100 m away at the same level (Figure 1). He called 'taking over' and immediately pushed the control column forward to descend below the traffic. The C172 flew about 50 to 100 ft above and about 9 to 12 m behind TYS. The instructing pilot then climbed the aircraft to 3,000 ft and the flight continued with no further incident. While the incident was recorded on Airservices Australia radar system, the incident occurred outside of controlled airspace. The lower limit for controlled airspace was 4,500 ft.

The pilot of EUH reported that he did not see TYS.

A pilot of another aircraft operating in the Point Cook circuit at the time reported hearing a broadcast by EUH on the CTAF.

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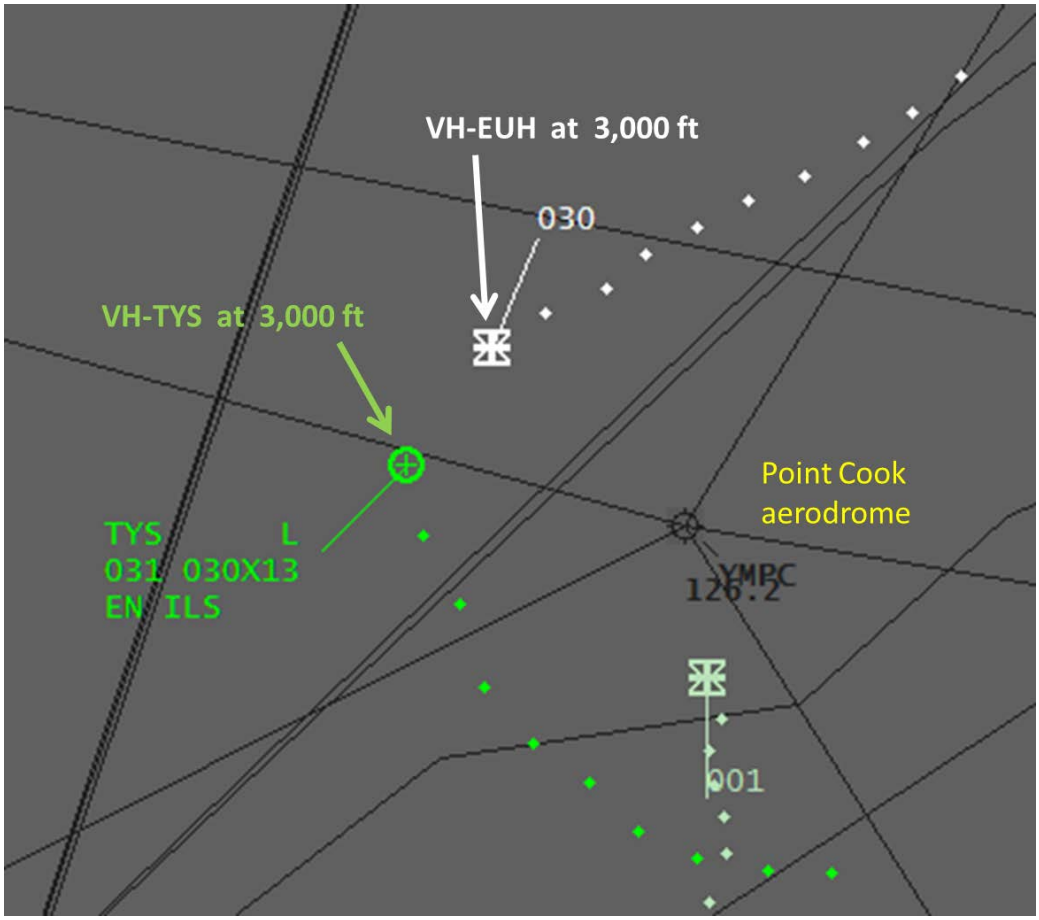
1 Eastern Daylight-saving Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

2 Under the hood – instrument flight training in which the student is prevented from seeing outside the aircraft.

Figure 1: Aircraft positions at 1022, lateral distance 0.4 NM and reducing



Source: Airservices Australia

Safety message

The ATSB often receives reports from pilots that another aircraft is flying too close to them in uncontrolled airspace. Three quarters of these reports involve pilots flying within 10 NM of a non-towered aerodrome. As a result, the ATSB has highlighted safety around non-towered aerodromes as one of its SafetyWatch priorities.

The ATSB publication *A pilot's guide to staying safe in the vicinity of non-towered aerodromes*, AR-2008-044(1), noted that over 200 occurrences between 2003 and 2008 were found where pilots flying within 10 NM of a non-towered aerodrome may not have been broadcasting or maintaining a continuous listening watch on the CTAF.

Broadcasting on and monitoring the CTAF are key ways for pilots to establish traffic awareness, in the vicinity of non-towered aerodromes. The ATSB's *Limitation of the see-and-avoid principle* study has shown that the effectiveness of a search for other traffic is eight times greater under alerted see-and-avoid circumstances, when a radio is used effectively in combination with a visual lookout, than when just un-alerted, when no radio is used.

The following ATSB publications provide additional information:

- SafetyWatch: Safety around non-towered aerodromes
  www.atsb.gov.au/safetywatch/safety-around-aeros.aspx
- A pilot's guide to staying safe in the vicinity of non-towered aerodromes, AR-2008-044 (1)
  www.atsb.gov.au/publications/2008/ar-2008-044(1).aspx
- Limitation of the see-and-avoid principle
  www.atsb.gov.au/publications/1991/limit_see_avoid.aspx

General details

Occurrence details

Primary occurrence type:	Airprox	
Occurrence category:	Serious incident	
Location:	1 km NW Point Cook Aerodrome, Victoria	
	Latitude: 37° 55.60'	Longitude: 144° 44.28'

Piper Aircraft Corporation PA-44-180

Manufacturer and model:	Piper Aircraft Corporation PA-44-180	
Registration:	VH-TYS	
Type of operation:	Flight training	
Persons on board:	Crew – 2	Passengers – 0
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Cessna Aircraft Company 172S

Manufacturer and model:	Cessna Aircraft Company 172S	
Registration:	VH-EUH	
Type of operation:	Flying training	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Landing gear collapse involving Piper PA-30, VH-HPR

What happened

VH-HPR

Source: Insurer

On 29 March 2013, at about 1000 Eastern Daylight-saving Time,[1] a Piper PA-30 aircraft, registered VH-HPR (HPR), departed Bankstown Airport for Griffith Airport on a private flight. On board were the pilot and two passengers.

HPR was cleared to take off on runway 11 on a Bankstown six standard instrument departure.[2] Following the take-off, the pilot selected the landing gear up. Passing through 400 ft, the tower advised that the landing gear was still down. The pilot responded that he would continue with the departure and hold at 2,000 ft to troubleshoot the problem.

At 2,000 ft, the pilot engaged the autopilot and confirmed that the gear was selected up, but the gear down and locked light remained illuminated. The pilot checked the circuit breakers and could not see any that had tripped. The pilot then cycled the gear a number of times, however, the gear did not retract and the gear down and locked light remained illuminated.

The pilot then advised the tower that HPR would be returning and was cleared for a straight in approach to runway 11L at Bankstown. On short finals, the tower advised HPR to 'check wheels', the pilot confirmed that the green down and locked light was still illuminated and that the gear selector was in the down position. The pilot replied, 'undercarriage down green light'.

HPR touched down on the main wheels followed by the nose wheel, which collapsed when it contacted the ground, followed by the left main wheel and right main wheel. HPR then slid on its belly between 300 and 400 m, before coming to rest to the right of the runway centreline. The pilot and passengers exited the aircraft without injury and the aircraft sustained substantial damage.

Aircraft information

The aircraft had a total flight time of 10,434.4 hours at the time of the flight. The last maintenance inspection was performed on 19 June 2012 and the aircraft had flown 65.7 hours since that date.

Landing gear examination

Inspection of the aircraft by a licenced maintenance organisation was arranged by the insurer. The landing gear mechanism was visually inspected and the worm drive was almost to the full retraction position, indicating the gear was retracted electrically. A number of partial retractions were able to be performed within the limits permitted by the damage and the system operated normally.

The reason for this electrical retraction despite the gear selector being in the down position was not determined. However, it was considered that an electrical fault within the squat switch[3] system may have been a factor in the failure of the gear to retract.

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1 Eastern Daylight Saving Time was Coordinated Universal Time (UTC) + 11 hours.

2 A SID is an air traffic control (ATC) coded departure procedure that has been established at certain airports to simplify clearance delivery procedures. It is optimised for ATC route of flight and will not always provide the lowest climb gradient. It strikes a balance between terrain and obstacle avoidance, noise abatement and airspace management considerations.

3 Switch triggered by compression of the main or nose landing-gear struts on touchdown.

General details

Manufacturer and model:	Piper PA-30	
Registration:	VH-HPR	
Type of operation:	Private	
Occurrence category:	Accident	
Primary occurrence type:	Landing gear collapse	
Location:	Bankstown Airport, New South Wales	
	Latitude: 33 55.5 S	Longitude: 150 59.3 E
Persons on board:	Crew – 1	Passengers – 2
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Wheels up landing involving Piper PA-24-260, VH-DRB

What happened

On 11 April 2013, at about 1100 Western Standard Time[1] a Piper PA-24-260, registered VH-DRB (DRB), departed Albany Airport, Western Australia, to conduct an annual aeroplane flight review,[2] with the pilot and testing officer on board.

After conducting the aerial work component of the flight review, DRB returned to the circuit for a touch and go, followed by a flapless touch and go, on runway 14. On take-off after the flapless touch and go, the testing officer informed the pilot that the circuit would be at low-level for a full stop landing. On early downwind, the testing officer asked the pilot if a glide approach could be made for runway 23 and the decision was made to conduct a practice forced landing on runway 23. The pilot moved the throttle lever to reduce engine power and extended the flaps to slow the aircraft. On final, the testing officer thought she saw the pilot move his hand to the landing gear selector. The aircraft subsequently landed with the landing gear retracted just past the intersection with runway 14/32, skidded and then came to a stop (Figure 1). The pilot and testing officer were not injured and the aircraft sustained minor damage.

Figure 1: VH-DRB

Source: Aircraft owner

1 Western Standard Time (WST) was Coordinated Universal Time (UTC) + 8.0 hours.

2 Aeroplane flight review is a test of the aeronautical skills and aeronautical knowledge relevant to aeroplane flight of the person undertaking the review.

Pilot comment

The pilot reported that his most recent flying experience was in single-seat fixed landing gear aircraft.

The pilot stated that he would normally extend the gear at a mid-downwind circuit position, with an indicated air speed of about 130 knots and look for the green landing gear light. He would also normally do his pre-landing checks, which included checking the gear was down, as he turned onto base leg.

As the landing for runway 23 was initiated during a low-level circuit and on early downwind, the pilot reported that he was not following his normal pre-landing sequence. He expected to hear the landing gear warning horn activate as he closed the throttle in order to slow the aircraft for a landing on runway 23. The pilot remembered hearing the landing gear horn activate, but could not remember exactly when.

The approach appeared a little fast, however, the pilot reasoned that it was because the aircraft type normally floated a little on landing and there was a slight crosswind that may have had a small tailwind component.[3]

Testing officer comment

The testing officer reported that she did not have a lot of time in the aircraft type, and mainly flew aircraft with a fixed landing gear.

During final approach, she heard a horn and assumed that it was the stall warning horn, as she expected to hear it and she thought the pilot had selected the landing gear down.

She reported that while the approach looked a little fast, she reasoned that was because the runway has a slight down slope, there may have been a small tailwind component and it was similar to the speed of the prior flapless landing.

Safety message

This accident highlights that when practicing emergency procedures the defences that are usually in place, such as having a normal place in the circuit to put the gear down, audible alarms and checklist items can be missed or go un-actioned.

The US Federal Aviation Administration (FAA) has published a pamphlet *On Landings Part lll,* which focuses on some landing challenges, including the avoidance of gear-up landings. The pamphlet is available at www.faasafety.gov/files/gslac/library/documents/2011/Aug/56411/FAA%20P-8740-50%20OnLandingsPart%20III%20%5bhi-res%5d%20branded.pdf .

The Flight Safety Foundation[4] approach-and-landing accident reduction briefing note 6.1 – *Being prepared to go around* contains important lessons for general aviation including the elements of a stabilised approach and being prepared to abandon the approach if these elements are not met. The briefing note is available at www.flightsafety.org/files/alar_bn6-1-goaroundprep.pdf .

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3 Pilot reported the wind was about 5 knots between 120° - 130°.

4 The Flight Safety Foundation (FSF) is an independent international organisation that was formed in 1947 to pursue the continuous improvement of global aviation safety through research, auditing, education, advocacy and publishing.

General details

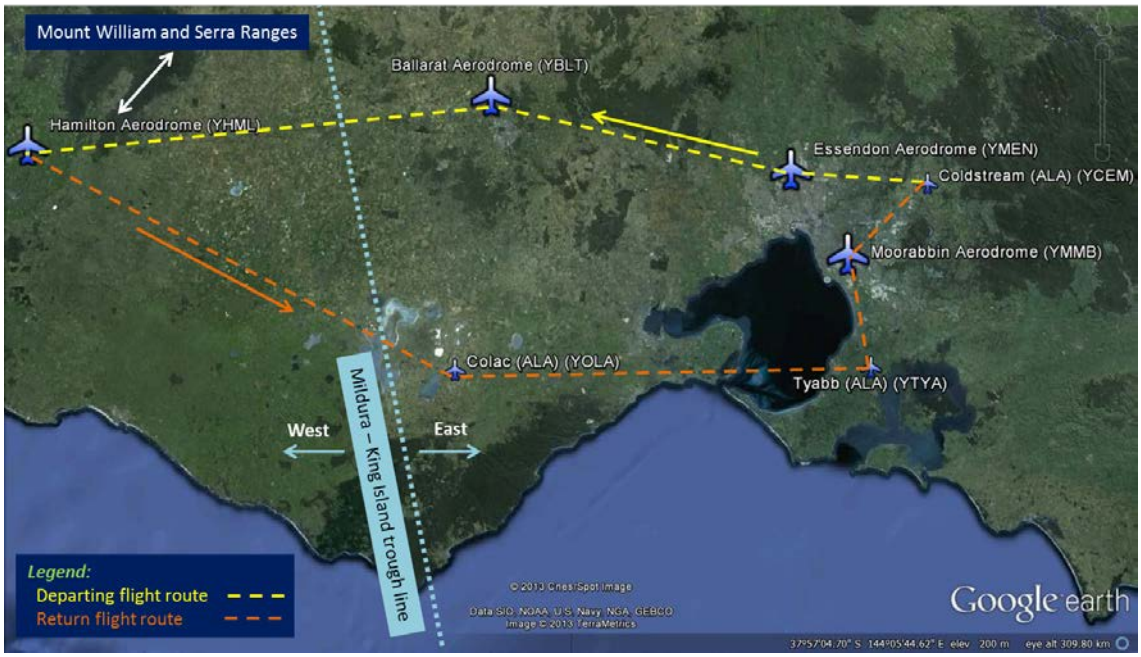
Manufacturer and model:	Piper PA-24-260	
Registration:	VH-DRB	
Type of operation:	Aerial work	
Occurrence category:	Serious incident	
Primary occurrence type:	Wheels up landing	
Location:	Albany Airport, Western Australia	
	Latitude: 34° 56.60' S	Longitude: 117° 48.53' E
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Minor	

Weather related precautionary landing involving a Piper a PA-28, VH-MSG

What happened

On 13 April 2013, a student pilot of a Piper PA-28 aircraft, registered VH-MSG, was preparing for a navigation training flight from Coldstream, Victoria and return, operating under the visual flight rules (VFR). The planned flight route was from Coldstream to Essendon, Ballarat, Hamilton and return via Colac, Tyabb and Moorabbin (Figure 1).

Figure 1: Planned flight route



Source: Google earth

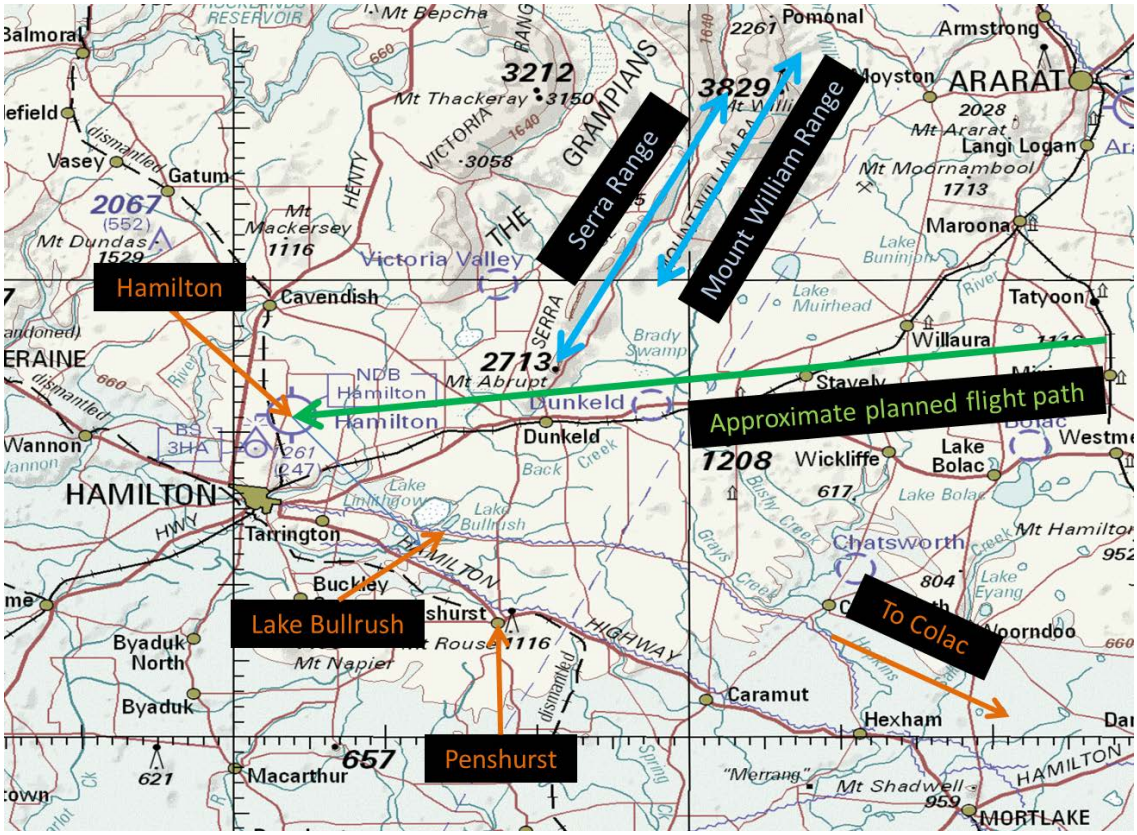
In preparation for the flight, the pilot obtained the weather forecasts for the planned route, including Hamilton. The pilot reported that strong winds and turbulence was expected, and a trough was forecast to pass through the Hamilton area after his planned departure time from Hamilton. Overall, the pilot determined that the weather conditions were suitable for the flight, which was verified by his flight instructor.

The aircraft departed Coldstream at about 1030-1100 Eastern Standard Time.[1] The pilot reported that a stronger than forecast headwind was experienced, which resulted in the aircraft's ground speed being about 20 kt slower than planned and a subsequent increase in flight time. The aircraft flew overhead Ballarat and tracked for Hamilton, maintaining 6,500 ft. At that time, the pilot stated that the cloud base was at 12,000 ft and visibility was greater than 30 km.

When approaching the Mount William and Serra Ranges, the pilot observed low cloud ahead, and experienced rain showers and moderate turbulence. The pilot diverted 45° to the left and tracked towards Penshurst, with the intent of tracking to Hamilton from the south-east (Figure 2). At about the same time, the pilot commenced a descent.

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

Figure 2: Hamilton and surrounding area



Source: Airservices Australia

When about 10 NM from Hamilton, the pilot broadcast an inbound call on the Hamilton common traffic advisory frequency (CTAF).

Overhead Lake Bullrush, the pilot was confronted with a 'wall of cloud'. The pilot determined that he would not be able to land at Hamilton and commenced tracking for Colac. Shortly after, he received a call on the CTAF from persons on the ground (ground personnel)[2] at Hamilton aerodrome. The pilot informed them that he was diverting to Colac.

The ground personnel advised the pilot that the weather had improved and suggested that he could fly to the south of the Ranges and then track west to the aerodrome. The pilot turned the aircraft around and commenced tracking towards the Ranges. Soon after, the pilot realised that the conditions had not improved and he descended to 1,800 ft. As a precaution, the pilot commenced looking for a suitable landing location and identified a road.

The ground personnel continued talking to the pilot and suggested he attempt to land at Hamilton. However, as the pilot could not see the aerodrome and the weather had closed in around him, he elected to conduct a precautionary search and landing onto the road. The pilot advised the ground personnel that he would contact them after landing.

The pilot overflew the road on two occasions to inspect the area for obstructions. He observed a power pole, but did not see any powerlines. He elected to land further along the road as a precaution.

The ground personnel continued talking to the pilot on the radio, which became a distraction. He turned the radio off so he could focus on the landing. Soon after, at about 1430, the aircraft landed on the road (Figure 3).

[2] The pilot reported that the ground personnel were also pilots, with varying experience.

The pilot reported that the actual headwinds experienced on the flight were stronger than that forecast, which resulted in a reduced ground speed and increased flight time. He estimated that his actual arrival time at Hamilton was 1 hour or more after his planned arrival time. It was likely that the forecast trough was passing through the area at that time.

Figure 3: VH-MSG after landing (left) and moved off the road shortly after (right)

Source: Pilot

Pilot comments

The pilot provided the following comments regarding the incident:

- he recognised that you would normally broadcast a 'PAN PAN'[3] call on the Melbourne Centre frequency in such a situation to advise air traffic control of the situation, however, he was busy formulating a plan and focusing on landing
- be cautious when receiving advice from persons on the ground
- if faced with a similar situation again, he would divert at an earlier stage in the flight.

Meteorological information

Area forecast (ARFOR)

In order to facilitate the provision of aviation weather forecasts by the Bureau of Meteorology (BoM), Australia is divided into a number of forecast areas. Hamilton aerodrome was located within Area 30. The Area 30 ARFOR, valid from 0900 to 2100 on 13 April 2013 included:

- at 1500, a trough to west, extending from Mildura, Victoria to King Island, Tasmania was expected (Figure 1)
- low cloud patches west of the trough, mainly associated with showers
- patches of broken[4] stratus cloud between 1,000 ft and 3,000 ft to the west of the trough, mainly associated with rain showers
- the winds for the flight, to the east of the trough, were 330° (True) at 35 kt at 5,000 ft and 320° (True) at 35 kt at 7,000 ft.

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[3] An internationally recognised radio call announcing an urgency condition which concerns the safety of an aircraft or its occupants but where the flight crew does not require immediate assistance.

[4] Cloud cover is reported using expressions that denote the extent of the cover. The expression Few indicates that up to a quarter of the sky was covered, Scattered indicates that cloud was covering between a quarter and a half of the sky. Broken indicates that more than half to almost all the sky was covered, while Overcast means all the sky was covered.

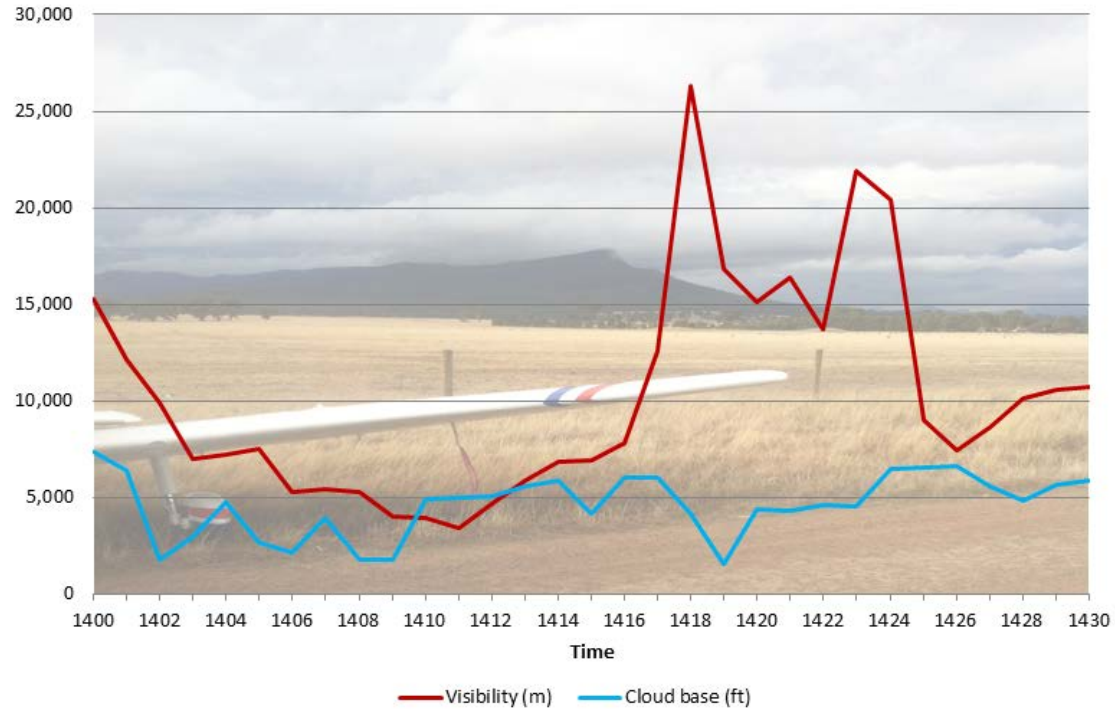
Aerodrome special weather reports (SPECI)[5]

The BoM automatic weather station (AWS) located at Hamilton aerodrome generated aerodrome weather reports. The following SPECI reports were issued:

- At 1406: indicated that the wind was 280° (True) at 18 kt gusting to 31 kt; visibility was greater than 10 km, scattered cloud at 2,200 ft, broken cloud at 3,300 ft, and overcast cloud at 7,700 ft.
- At 1412: indicated that the wind was 280° (True) at 20 kt gusting to 31 kt; visibility was 5,000 m, scattered cloud at 1,800 ft, broken cloud at 3,500 ft, and overcast cloud at 5,100 ft.
- At 1429: indicated that the wind was 300° (True) at 19 kt, visibility was greater than 10 km, scattered cloud at 1,700 ft, broken cloud at 4,400 ft, and overcast cloud at 6,000 ft.

The BoM also provided the ATSB with one-minute interval data recorded by the AWS. A graphical depiction of the visibility (m) and cloud base (ft) between 1400 and 1430 is shown in Figure 4.

Figure 4: Bureau of Meteorology one-minute data



Source: Bureau of Meteorology

Safety action

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

Aircraft operator

As a result of this occurrence, the aircraft operator has advised the ATSB that they are considering incorporating into their operations manual, minimum weather criteria for student pilots conducting solo navigation flights. These criteria would exceed the visual meteorological conditions (VMC) minima and the VFR alternate aerodrome requirements stipulated in the Aeronautical Information Publication (AIP)[6], and also include a minimum time buffer on forecast changes to non-VMC.

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[5] A special weather report used to identify when conditions are below specified levels of visibility and cloud base; when certain weather phenomena are present; and when temperature, pressure or wind change by defined amounts..

[6] AIP ENR 1.2 paragraph 2 and ENR 1.1 paragraph 58.2.13.

Safety message

Weather does not stay constant, and may not behave in a manner consistent with the forecast conditions. It can deteriorate rapidly. When the actual conditions differ from that forecast, pilots need to consider the impact this may have on the planned flight. They need to continually assess the weather enroute and lookout for deteriorating conditions behind, around, and ahead of you. Make decisions early and when in doubt, turn about. The European Aviation Safety Agency (EASA) recognises that, if you turn back when the weather conditions ahead seem poor, it does not mean you are a bad pilot. It shows you have good judgement and assess situations realistically.

It is also important to be aware that the presence of others may influence your decision-making process. The EASA notes that pilots who fly in marginal weather conditions may have more skill than others, have better equipment, or might be willing to accept more risk. Their apparent ability does not mean that others can safely achieve the same outcome. Succeeding in a difficult situation depends on many other factors, which observers cannot see. To be competent, pilots must know, and fly within their own personal limitations on that particular occasion.

The following provide additional information on operations in marginal weather conditions:

- ATSB SafetyWatch – General Aviation, reduced visibility: www.atsb.gov.au/safetywatch/ga-pilots.aspx
- Avoidable Accidents No. 4 – Accidents involving Visual Flight Rules pilots in Instrument Meteorological Conditions: www.atsb.gov.au/publications/2011/avoidable-4-ar-2011-050.aspx
- General Aviation Pilot Behaviours in the Face of Adverse Weather: www.atsb.gov.au/publications/2005/pilot_behaviours_adverse_weather.aspx
- Decision making for general aviation pilots: easa.europa.eu/essi/egast/2011/04/decision-making/
- General Aviation Pilot's Guide to Preflight Weather Planning, Weather Self-Briefings, and Weather Decision Making: www.faa.gov/pilots/safety/media/ga_weather_decision_making.pdf
- 'Weather to fly' DVD available from the Civil Aviation Safety Authority's website at casa.cart.net.au/store/weather-to-fly-revised-2011.html

General details

Manufacturer and model:	Piper Aircraft Corporation PA-28-151	
Registration:	VH-MSG	
Type of operation:	Flying training - solo	
Occurrence category:	Serious incident	
Primary occurrence type:	Weather related	
Location:	20 km NE of Hamilton aerodrome, Victoria	
	Latitude: 37° 33.224' S	Longitude: 142° 11.495' E
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Helicopters

Collision with terrain, involving AS350, VH-EWM

What happened

On 7 February, 2013 at about 1655 Eastern Daylight-saving Time[1] a Eurocopter AS350 B2 helicopter[2], registered VH-EWM (EWM) was conducting water-bombing operations near Hobart, Tasmania, when it collided with terrain (Figures 1 and 2). The pilot, the sole person on board, suffered minor injuries and the helicopter sustained substantial damage.

A Bambi bucket

Source: SEI Industries Ltd website

EWM was one of a group of helicopters involved in mitigation of a large bushfire about 31 km west-south-west of Hobart, Tasmania. At about 1030 that morning, the pilot departed from Cambridge airport to the forward staging area on the Molesworth oval (Figure 1). EWM was one of four helicopters tasked to work on spot fires ahead of the main fire front. The four pilots arranged the spot-fire water-bombing runs between themselves.

The helicopter had been uploading water from a small dam, using a Bambi bucket suspended on a 50ft line (see picture inset). The pilot dumped the water onto spot-fires, and then returned to the dam to upload more water. This routine had continued throughout the day, with the pilot having a couple of rest breaks during refuelling stops.

The particular spot fire EWM was working on was not particularly large, but was on a downhill slope and in a gully. The pilot reported that the overall wind was north-north-westerly, but the fire created a localised westerly in-draft, within the gully. He had just uploaded water from the dam, south-east of the accident site, and was manoeuvring to have the nose of the helicopter slightly off to the left of the local wind.

The pilot slowed EWM in preparation of making the next water drop. Approaching the hover at about 80 ft above ground level, and immediately following the loss of translational lift [3] (TL), the helicopter suddenly commenced an uncommanded left yaw and descent. Without any warnings or alarms, the helicopter rotated rapidly 2-3 times to the left. The pilot raised the collective to decrease the rate of descent, and countered the yaw with anti-torque pedal input; however the rate of yaw increased. The pilot reported that “in a very short period of time” the helicopter was in the trees. The speed of events did not give the pilot time to dump the Bambi bucket, release the water, or broadcast a Mayday call. The helicopter came down in the upright position but when close to the ground, it rolled to the left, about 130° from the vertical (Figure 2).

After coming to rest, the pilot undid his seatbelt, turned off the fuel and master switches and exited the helicopter taking the survival kit. The pilot had landed about 20-30 metres from the spot-fire and less than 100 metres from the main fire front.

One of the remaining three pilots broadcast that EWM had collided with terrain. Another pilot from the group, flying a Bell 212, registered VH-NEN, heard the broadcast, and quickly flew to the accident site, and emptied water on the spot fires near the pilot. He also relayed the details and Global Positioning System (GPS) position to the Incident Management Team (IMT) in Cambridge.

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

2 VH-EWM had been converted to an AS350 SD2 by Soloy, with the replacement of the engine with a Honeywell LTS101-700D2 engine under a FAA approved supplemental type certificate (SR01647SE)

3 Additional lift gained by helicopter in horizontal flight resulting from a reduction in induced airflow through main rotor(s) gained from forward airspeed.

He requested the immediate assistance of a rescue helicopter to extract the pilot of EWM, given the proximity of the fire to the downed pilot. While waiting for the arrival of the rescue helicopter, NEN and the remaining two helicopters continued to drop water around the area of the crashed helicopter and its pilot.

In a few minutes, it became apparent that the pilot of EWM was in imminent danger, and with the rescue helicopter still some time off, the pilot of NEN positioned the Fast bucket[4], on a 100 ft line next to the downed pilot. The pilot climbed into the bucket and was lifted to a nearby fire service tanker and taken to hospital.

Figure 1: Satellite view of accident site and Cambridge aerodrome

Source: Google earth

Experience and comments of PIC of EWM

The pilot held a European Air Transport Pilot (Helicopter) Licence, and an Australian Commercial Pilot (Helicopter) Licence with approximately 4,100 hours total time. This included 1,557 hours on the AS350, and 328 hours in sling operations. This was the pilot's first season involved in water bombing operations, but as it had been a busy fire season in Tasmania, he had been involved in water bombing, airborne reconnaissance, mapping and infrared scan activity. At the beginning of the fire season, the pilot had been trained in water-bombing techniques by the company base manager / acting chief pilot.

The pilot reported that no specific briefing was given to the helicopter pilots on the accident day, although a map was used to detail where they were to be deployed.

The pilot reported that another pilot flying EWM on 5 February, two days before the accident, could not obtain full power from the helicopter and consequently the fuel filter had been replaced by a Licensed Aircraft Maintenance Engineer. The pilot also reported that he checked the performance of the helicopter after departing Cambridge enroute to the fire, and noted that the governor was slow to control the main rotor RPM.

[4] The Fast bucket is a different shape, size and functionality to the Bambi bucket.

Following the accident when egressing from the helicopter, the pilot reported that he noted that the engine was not running.

Figure 2: VH-EWM at the accident site

Source: Supplied by Simon Taylor

VH-EWM

VH-EWM had been converted to an AS350 SD2 by Soloy, and fitted with a Honeywell LTS101-700D2 engine under an FAA approved supplementary type certificate. The helicopter was on cross-hire from a Queensland company, and was in support of a contract the operator had with the Fire Service of Tasmania.

The maintenance release current at the time of the accident, showed the helicopter had 2,041.8 hours total time, and had completed a 50 hourly engine inspection at 2,004 hours. The maintenance release was endorsed with a requirement at 2,004 hours for the pilot to carry out a power check and to contact the engineers. That endorsement had been signed off as completed.

Recent maintenance

The following maintenance had been carried out on EWM in the previous four weeks.

- 15 January – Engine power check conducted, and found satisfactory, although the Rotor RPM (Nr) was low and was adjusted.
- 22 January – Fuel filler boot replaced, Nr[5] adjusted again and auto Nr (low pitch stops) adjusted
- 1 February – Torque meter[6] was found to be over reading by 11% and was adjusted and a power check performed
- 5 February – Following illumination of the fuel filter light, the engine fuel filter was replaced, airframe fuel filter replaced and drum pump fuel filter replaced.

[5] Main Rotor RPM

[6] Instrument for measuring torque in a turbine engine, usually oil-pressure system sensing axial load

Following reports of two accidents where LTS 101 engines suddenly lost power, the Federal Aviation Administration (FAA) in November 2011 issued an Airworthiness Directive (AD) (2011-23-13 Honeywell International Inc) requiring the initial replacements of certain power turbine governor (PTG's) spool bearings and thereafter replacement every 900 hours. This AD had been complied with on EWM, approximately 200 hours prior to the accident.

Meteorological information

Area forecast (ARFOR)

In order to facilitate the provision of aviation weather forecasts by the Bureau of Meteorology (BoM), Australia, is divided into a number of forecast areas. The accident site is situated in Area 70. The Area 70 ARFOR, valid from 1600 on 7 February 2013 to 0400 on 8 February 2013 included:

- A front stretching from approaching from the SW, with severe turbulence lee of the ranges below 8000 ft
- Wind from the north-west at 35 knots at 2000 ft

Aerodrome terminal area forecast (TAF)

- The latest amended TAF for Hobart, 31 km to the east, covering ther period 1700 on 7 February 2013, to 1100 on 8 February 2013 included:
- Wind from 150° (True) at 15 knots, gusting to 25 knots,forecast to be changing to 320°T at ten knots from 1800
- Moderate turbulence forecast below 5000 ft from 2300.

The pilot of EWM reported that the winds had dropped in intensity, prior to the accident, and were not reflective of the area forecast or nearby Hobart TAF.

Comments of PIC of NEN (rescue helicopter)

The pilot commented that during the accident day, there was significant fire activity, making conditions through both the smoke and terrain very challenging. He reported that due to the fire activity, the twenty knot northerly winds were 'aggressive' with gusts of up to 30 knots.

He used a 1,500 L Fast water bucket attached to a 100 ft long line, to drop loads of water around the crash site, and the pilot whom he could see had exited the helicopter. He did not know the extent of the pilot's injuries, but could see the imminent danger from the fast approaching main fire front. The other pilots made the decision that the Bell 212, being a twin-engine helicopter with a 100 ft line and a Fast bucket, would be the most suitable for the rescue.

Operator comment

The operator completed an investigation of the crash site, and interviewed the pilot in command. After collating this information, coupled with the environmental and flying conditions both prior to and during the accident sequence, they suggested the helicopter may have experienced settling with power.

Comment from the Bureau d'Enquêtes et d'Analyses pour la sécurité de l'Aviation Civile) (BEA)

BEA noted that if the uncommanded descent could be associated with vortex ring phenomenon or a loss of power, the left yaw could not have been triggered by one of them. They added that the left yaw could be explained by a loss of the tail rotor effectiveness (LTE).

ATSB comment

As the ATSB did not attend the accident site, or examine the helicopter, the reason for the accident could not be conclusively established. The described behaviour of the helicopter by the

pilot was consistent with Loss of Tail rotor Effectiveness (LTE). In this condition of flight, the tail rotor loses aerodynamic efficiency. Factors which contribute are:

- Low airspeed
- High power
- An adverse relative wind

The area forecast had several amendments throughout the day, as did the TAF for Hobart. With the combination of an approaching front, a large main fire-front and rugged, hilly, terrain, it is expected that the wind near the accident site would have been constantly changing.

Water-bombing helicopters operate at very low altitudes, in very challenging and often rapidly changing conditions. Any sudden onset of an abnormal condition of flight presents negligible time for recovery.

Eurocopter circulated Service Letter No 1673-67-04 in 2005 regarding the yaw axis control features for all helicopters under certain flight conditions. The link is available at:

www.eurocopter.com/site/docs_wsw/RUB_36/1673-67-04en.pdf

Safety message

Courses are available for those involved in support roles in bushfire fighting activities. Information on a Basic Wildfire Awareness is available from the Australian Fire and Emergency Service Authorities Council at:

www.afac.com.au/services/training/awareness

General details

Manufacturer and model:	Eurocopter AS350B2 converted to an AS350 SD2 by Soloy	
Registration:	VH-EWM	
Type of operation:	Aerial Work – Fire Control	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	31 km WSW of Hobart Airport, Tasmania	
	Latitude: 42° 50.88' S	Longitude: 147° 07.62' E
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 (minor)	Passengers – Nil
Damage:	Substantial	

Wirestrike involving Enstrom 480B, VH-VDC

What happened

Wirestrike - Enstrom 480B

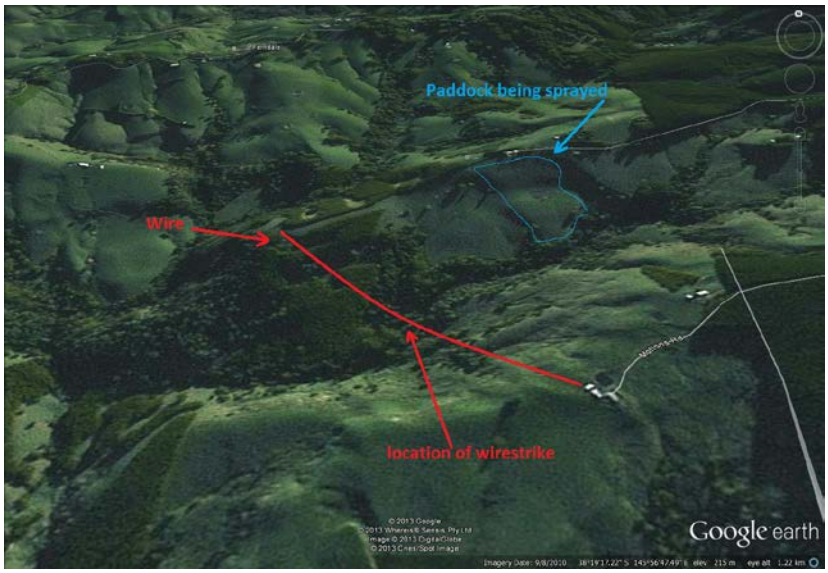
Source: Aircraft Operator

On 17 February 2013, an Enstrom 480B helicopter, registered VH-VDC (VDC), was engaged in Agricultural operations, spraying blackberry and ragwort weed near Trida, Victoria (Figure 1). The pilot was the only person on board and had commenced spraying the paddock at about 1200 Eastern Daylight-saving Time[1]. On the 4th and final load of chemical to be applied to the paddock the Global Positioning System (GPS) lost reception during the application run. The pilot immediately aborted the run and climbed to about 400 ft above ground level and attempted to resolve the issue with the GPS.

Once the GPS regained reception, the pilot commenced a left turn at about 50 knots indicated airspeed to return to the paddock and recommence the application run. The pilot then heard a loud bang and felt a shudder through the airframe.

The pilot performed a run on landing in the nearest clearing, as he had some difficulty in maintaining yaw control, because the tail rotor control cables had lost tension. The pilot was able to exit the helicopter without injury, however, the helicopter was substantially damaged.

Figure 1: Location of paddock and wire



Source: Google Earth

Pilot experience and comments

The pilot held a Commercial Pilot Licence (CPL) Helicopter and Aeroplane and Grade 1 Agricultural rating. He had about 18,500 hours total time, with about 6,000 hours in helicopters, the majority being in low level agricultural type operations. The pilot had previously completed a wire awareness course.

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1 Eastern Daylight-saving Time (EDT) was Coordinated Universal Time + 11 hours

The pilot commented that he aborted the application once he realised that there was a problem with the GPS. This was in accordance with the standard procedure, recommended by the Aerial Agricultural Pilots Association of Australia, not to attend to any problem below 300 ft above ground level other than flying the helicopter.

The pilot commented that he initially thought that he had an inflight failure, due to his height above ground level and did not consider a wirestrike, until he caught a glimpse of a wire falling way from the airframe. The pilot considered that the wire had impacted the right side of the helicopter in front of the door, before going up the mast and being severed by a main rotor blade.

The pilot added that in the event of a similar situation he would not only climb, but also turn and remain within the area previously surveyed for low level hazards while resolving the problem.

ATSB comment

The wire struck was a single, three strand 2.75mm galvanised steel wire with a voltage of 12.7 kv. The span of the wire was approximately 841.2 m with a height above ground that varied from 8.3 m (27 ft) at the lowest point to 106.3 m (348 ft) at the highest point.

Marking wires can enhance the visibility of wires. Wires that fall under certain criteria, such as in areas where regular low-level flying operations take place, are recommended[2] to be marked by the Australian Standards.[3] Further, wires are recommended to be marked if any section of cable has a height greater than 90 m (295 ft) and a continuous span greater than 50 m.[4]

The owner of the wire advised the ATSB that the wire struck was marked with five marker discs. However, the pilot of VDC advised that the wire was unmarked at the time of the wirestrike. The ATSB was unable to independently confirm that the marker discs were still in place at the time of the wirestrike.

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.

Wire owner

The owner of the wire has advised the ATSB that they are taking the following safety action:

Wire marking

The broken cable was replaced to restore electricity supply as soon as possible and was replaced without new markers being installed. However, arrangements are being made to install markers on the line.

Safety message

Wirestrikes pose an on-going problem to aerial agricultural operations. There are 180 wirestrike accidents in the ATSB database for the period between 2001 and 2010. Of these, 100 involved agricultural flying.

Despite the advantages of marking a wire, not all wires are marked and it is simply not feasible to mark all wires. It is important that pilots and operators raise any concerns they may have about

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[2] Standards are voluntary consensus documents that are developed by industry agreement and their application is by choice unless their use is mandated by government or called up in a contract.

[3] Australian Standard 3891.2, 2008, Part 2: Marking of overhead cables for planned low level flying operations.

[4] Australian Standard 3891.1, 2008, Part 1: Permanent marking of overhead cables and their supporting structures for other than planned low level flying.

the visibility of a wire with the wire owner. Electricity distribution and transmission companies may install aerial markers on wires upon request. Land owners can request to have wires on their property marked and pilots who have a need to fly low-level near powerlines can also request wires to be fitted with markers.

General details

Manufacturer and model:	Enstrom 480 B	
Registration:	VH-VDC	
Type of operation:	Agricultural	
Occurrence category:	Accident	
Primary occurrence type:	Wirestrike	
Location:	18 km east of Ballarat, Victoria	
	Latitude: 38° 19.95' S	Longitude: 145° 54.27' E
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Australian Transport Safety Bureau

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

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

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

Purpose of safety investigations

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

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

About this Bulletin

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

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

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

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

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

Conducting these Short investigations has a number of benefits:

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

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