Australian Government
Australian Transport Safety Bureau

Wirestrike involving Maule M-5, VH-HOG

50 km WSW of Casino, New South Wales | 12 April 2014

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2014-068
Final – 29 January 2015

Cover photo: Northern Region Westpac Life Saver Rescue Helicopter Service

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

Publishing information

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Addendum

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Safety summary

What happened

Submerged aircraft in river

Source: NSW Police Force

On 12 April 2014, a Maule M-5 aircraft, registered VH-HOG, collided with a powerline spanning the Clarence River, approximately 50 km west-south-west of Casino, New South Wales. The pilot was accompanied on the private category flight by two passengers, an adult and a child. The aircraft departed controlled flight after the wirestrike and impacted the water, coming to rest inverted with the cabin submerged.

The pilot and front-seat adult passenger escaped the cockpit through one of the forward doors and attempted to free the rear-seat child passenger from the flooded cabin. After repeated attempts by the pilot to open the rear-right cabin door, the rear-seat passenger was recovered through a cockpit door. Sustained attempts to resuscitate the rear-seat passenger were unsuccessful.

What the ATSB found

The aircraft was capable of normal operation prior to the wirestrike. The weather conditions in the vicinity were suitable for visual flight.

The wirestrike and resulting loss of aircraft control was an unintended consequence of the pilot's spur of the moment decision to fly at very low level along the river, in an unfamiliar environment and below the minimum stipulated height for flights over unpopulated areas. The pilot reported seeing the powerline cables just before the collision, but with insufficient time to avoid a wirestrike. The pilot did not hold an approval to conduct low-flying operations and had not completed any training to identify the hazards associated with such operations. The powerline was not fitted with visual warning markers, nor was there any requirement for such markers in this case.

The submerged, flooded and inverted cabin increased the difficulty experienced by the occupants in exiting the aircraft. Furthermore, impact damage sustained by the right wing likely rendered the rear-right cabin door unusable as an emergency exit, delaying the recovery of the rear-seat passenger.

Safety message

This accident reaffirms the risk of unnecessary and unauthorised low flying.

Operations at low altitude expose an aircraft and its occupants to a number of environment-specific hazards and result in significantly reduced safety margins. Powerline cables and other wires, which can be encountered even in relatively remote locations, are typically very difficult to see and present a critical hazard to any low-flying aircraft. In recognition of these and the other specific risks and hazards of low-level flying, the Civil Aviation Safety Authority requires pilots to receive special training and endorsements before conducting low-level operations.

The operation of an aircraft in close proximity to terrain or water limits the opportunity to recover from any loss of control or respond to any in-flight emergency when compared to flight at higher altitudes.

Contents

The occurrence

On the morning of 12 April 2014, a Maule M-5 aircraft, registered VH-HOG, was being operated by its owner-pilot on a series of private category flights under the visual flight rules. The flights took place in the north-eastern region of New South Wales.

As part of the series of flights, the pilot planned to fly to Bonshaw, about 175 km west of Casino, to visit a family member. By prior arrangement, the pilot was going to collect a work colleague at an intermediate landing point, who would then accompany him on the flight to Bonshaw.

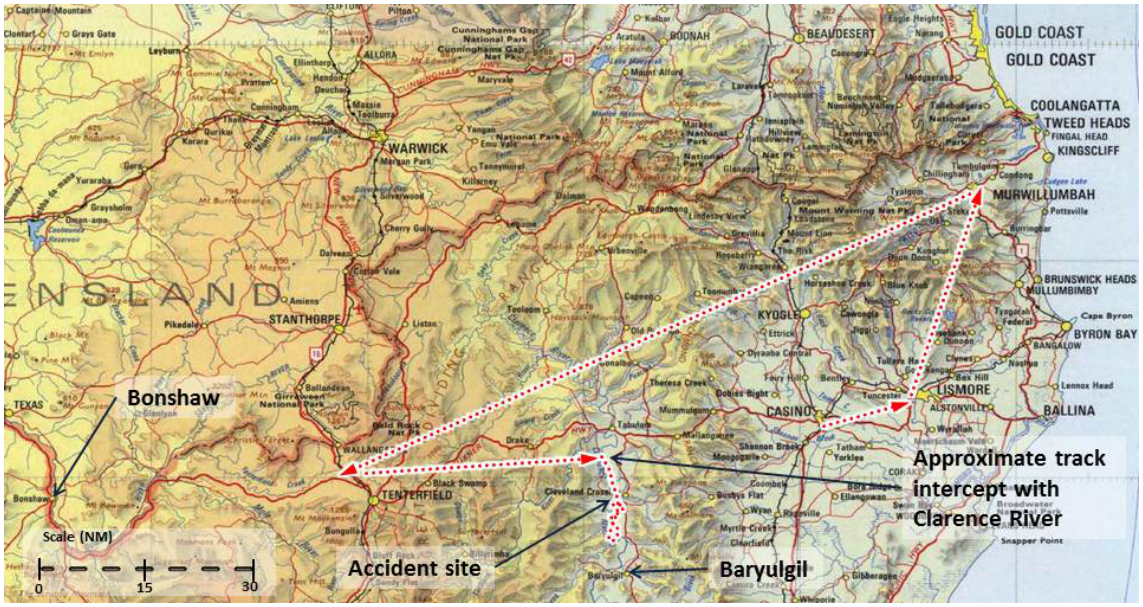
The aircraft was hangared at Casino Airport. The pilot arrived at the airport at about 0730 Eastern Standard Time[1] and completed his pre-flight inspection before flying the aircraft the short distance to Lismore Airport to refuel. The aircraft was fully fuelled at Lismore and the pilot departed for Murwillumbah to pick up his passenger (Figure 1). At short notice, arrangements were also made for the passenger's daughter to accompany them on the flight to Bonshaw.

The adult passenger was seated in the front-right seat (next to the pilot) for the flight and his daughter in the rear passenger seat. The pilot helped the rear-seat passenger adjust and fasten their seatbelt. The front-seat passenger did not recall the pilot briefing them about the use of the seatbelts, but understood it was a requirement to keep them fastened throughout the flight. They departed Murwillumbah shortly after 0900.

The pilot initially intended to track to Bonshaw via Tenterfield but, due to strong headwinds (affecting the aircraft's flight endurance) and a lowering cloud base west of the ranges, decided to discontinue the planned flight and landed at Tenterfield Aerodrome. After a short break and a discussion with his passengers, the pilot decided to track towards Ballina and look at the Clarence River along the way.

The weather conditions improved as the aircraft tracked back across the ranges from Tenterfield. Arriving at the Clarence River, the pilot descended to about 800–1,000 ft above the ground and flew south along the river, tracking towards a section of the river over which he had flown previously and was familiar.

Figure 1: Approximate track flown by aircraft on day of the accident



Source: Map extract copyright Geoscience Australia 2008, annotated by the ATSB

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

Just north of Baryulgil, the pilot identified the familiar section of river that he thought was called 'The Cascades', turned the aircraft north and descended to about tree-top height to track back along the river in the direction from which he had come. The pilot recalled broken clouds overhead, a slight ripple from the wind on the surface of the water, good visibility and flying conditions that were generally smooth. He thought he may have been flying along the river at an airspeed of about 100 kt (185 km/h).

A witness on the western bank of the Clarence River about 5 km north of the Cascades reported that, sometime between 1030 and 1100 that day, they saw a small, white, four-seater aircraft flying very low along that section of river. The aircraft was reported flying at 'normal speed', there was no unusual noise from the aircraft's engine such as spluttering and it 'seemed okay'.

The pilot recalled that as the aircraft approached a sharp westerly bend in the river he pulled up, climbing to about 400–500 ft above the ground. He recalled then making a spur of the moment decision to descend back down to tree-top height and fly further north along the river. This included a section of the river with which he was less familiar and along which the terrain on the west bank was slightly higher than the eastern bank (Figure 2).

Figure 2: Looking south towards river bend and showing the elevated west bank

Source: Northern Region Westpac Life Saver Rescue Helicopter Service, annotated by ATSB

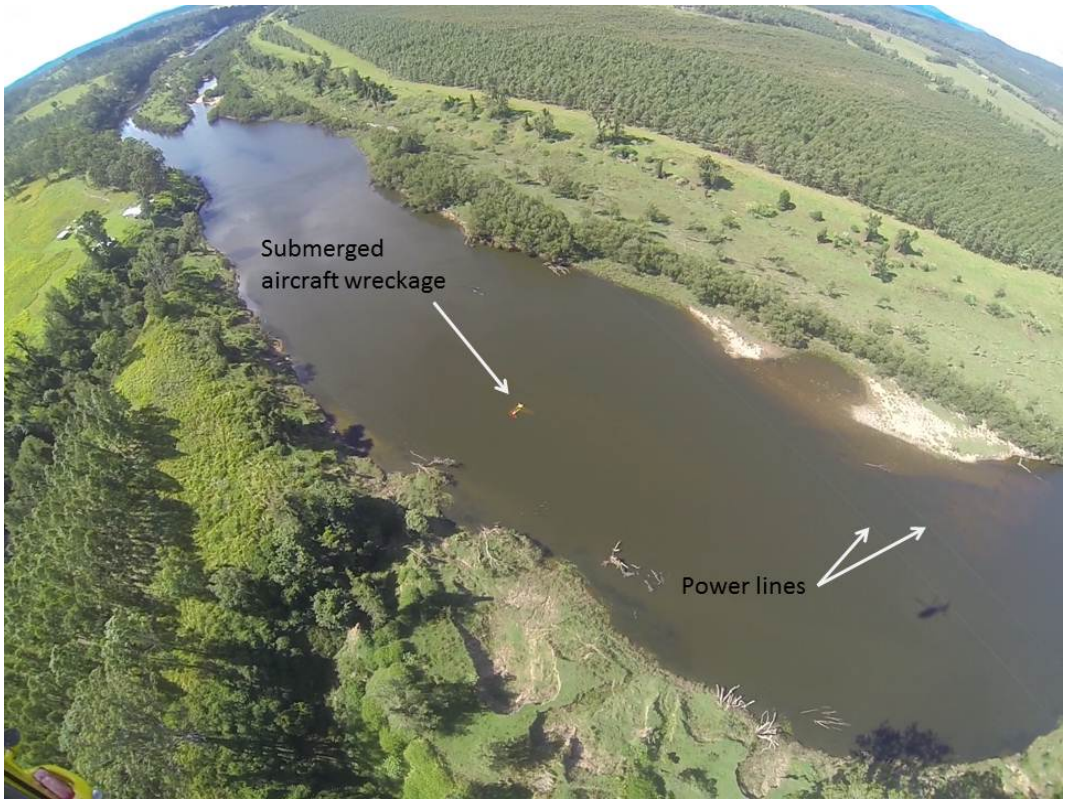
The pilot stated that, soon after descending back to tree-top height, he glimpsed wires immediately ahead of the aircraft but was unable to avoid a wirestrike. Control of the aircraft was lost and it impacted the water, coming to rest upside down a short distance from the powerline (Figure 3).

Although the cockpit was inverted, fully submerged and flooded, the pilot was able to release his seatbelt and escape through the forward-left cockpit door. The front-seat passenger exited the cockpit shortly after.

The rear-seat passenger was still in the submerged cabin and, despite repeated attempts, the pilot was unable to release the right-rear cabin door to assist this passenger from the aircraft. Ultimately, the rear-seat passenger was recovered through a cockpit door. The pilot did not recall unfastening the passenger's seatbelt.

The pilot and front-seat passenger each sustained serious injuries but ongoing attempts by the pilot and passenger to resuscitate the rear-seat passenger were unsuccessful. The aircraft was substantially damaged.

Figure 3: Image captured from a rescue helicopter crew member's head-mounted camera,[2] with the aircraft wreckage to the north-east of the helicopter's position



Source: Northern Region Westpac Life Saver Rescue Helicopter Service, annotated by ATSB

[2] The head-mounted camera used an ultra-wide angle lens that resulted in a 'barrel' distortion of the image.

Context

Pilot information

The pilot obtained his private pilot licence in October 2012 and had a total of 148 hours flying experience in powered aircraft, of which 94 hours were as pilot in command. The pilot also had 332 hours prior flying experience in gliders. His pilot licence was appropriately endorsed to operate the special design features of the Maule M-5 aircraft (tailwheel undercarriage and manual propeller pitch control). A review of the pilot's logbook indicated that he typically flew his aircraft several times a month. The pilot had not received any low-flying training, nor did he hold a low-flying approval.

The pilot's Class 2 Aviation Medical Certificate was issued by the Civil Aviation Safety Authority (CASA) on 13 February 2012 and included a requirement to have reading glasses available whilst exercising the privileges of the licence. The 2-year validity of this certificate expired on 13 February 2014. The pilot indicated that he had omitted to monitor the status of his medical certificate and, at the time of the accident, was unaware of its expiry.

The pilot reported being examined by a Designated Aviation Medical Examiner a few weeks after the accident in order to renew his medical certificate. Although the renewal was deferred on the basis of his recent accident-related injury and some temporary mobility restrictions, the pilot's eyesight was assessed as normal and all other elements of the renewal were reported to have been completed satisfactorily.

The pilot recalled being well rested prior to the series of flights and no recent illness or medical issues that might have affected his operation of the aircraft.

At the time of the accident the pilot was wearing a pair of sunglasses fitted with polarised lenses. While these lenses can reduce reflected glare from horizontal surfaces, they can also mask the 'sparkle' of light reflecting off shiny surfaces.[3]

Aircraft information

The aircraft was manufactured in the United States in 1980 and was placed on the Australian civil aircraft register in 1986. It was a high-wing, four-seat, light utility tailwheel aircraft, equipped with a 235-horsepower engine.

The last scheduled periodic maintenance was completed on 12 July 2013, with a maintenance release issued for operations in the private category that was valid until 12 July 2014 or 1,538.9 hours total time in service – whichever came first. Although the aircraft's maintenance release was not recovered at the accident site, the ATSB calculated the aircraft's total time in service at the time as about 1,495 hours.

The pilot reported that the aircraft and its systems operated normally during the series of flights conducted on the day and immediately preceding the accident. He also recalled that the cockpit windscreen was in good condition, with a few minor scratches but no defects that significantly affected visibility.

The pilot and front passenger seats were each fitted with a three-point seatbelt, comprising lap and shoulder restraints. The rear passenger seats were fitted with two-point seatbelts that provided lap restraint only. The relevant certification standard at the time of aircraft manufacture did not require the provision of shoulder restraints for the rear passenger seats.

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[3] The CASA Designated Aviation Medical Examiner's Handbook recommends polarised lenses not be used when flying. Additional information is also available from the United States Federal Aviation Administration Medical Facts for Pilots publication AM-400-05/1 *Sunglasses for Pilots: Beyond the Image* at http://www.faa.gov/pilots/safety/pilotsafetybrochures/media/sunglasses.pdf.

The pilot and front passenger seats had an access door on their respective side of the aircraft. The rear passenger seats were accessed by a rear cabin door, located on the right of the aircraft.

Wreckage

The ATSB did not attend the accident site. A review of photographs taken at the site by the New South Wales Police Force indicated damage consistent with the left wing striking cables at two different locations along the leading edge. The relative movement between the cables and the wing had partially cut through the structure of the wing's outboard leading edge (Figure 4), and also the mid-section leading edge and wing support strut (Figure 5). The orientation of the damage along the leading edge of the wing was consistent with the wing striking two cables whilst banked to the right. This accorded with the pilot manoeuvring the aircraft to follow the course of the river, which turned to the north-east in the vicinity of the powerline (Figure 3).

Figure 4: Damage to the left wing outboard leading edge

Source: New South Wales Police Force

Figure 5: Damage to the left wing mid-section leading edge and wing support strut

Source: New South Wales Police Force

The aircraft's windscreen had shattered and there was substantial damage to the forward cockpit section, consistent with the uncontrolled impact with the water. The leading edge of the right wing also sustained significant damage as a result of this impact, with the wing folded rearwards and the lower inboard wing skin and structural components obstructing the area adjacent to the rear cabin door (Figure 6). Both rear seatbelts were found unfastened after the recovery of the aircraft from the river.

Figure 6: Damage to right wing and also in proximity to the right rear cabin door

Source: New South Wales Police Force

Weather

The flight was conducted within the northern part of aviation weather forecast Area 20.[4] The weather conditions encountered during the flight were consistent with the relevant Area 20 forecast issued by the Bureau of Meteorology. Although the pilot recalled he did not obtain briefing products from the Airservices Australia pilot briefing service, he indicated that he reviewed the forecast conditions from the Bureau of Meteorology website before departing.

At the time of the accident, the sun was in the north-eastern sky, about 50° above the horizon.

Minimum height requirements

The minimum specified height for flying an aircraft was 1,000 ft above terrain or any obstacle on that terrain when over any city, town or populous area and 500 ft over any other area.[5] These minimum heights did not apply if through stress of weather or any other unavoidable reason it was essential a lower height be maintained. Aircraft could also operate below those heights while conducting certain approved low-flying operations, during take-off or landing at an aerodrome and during the conduct of a search and rescue operation. None of these exceptions were relevant to the final stages of the flight leading up to the wirestrike.

Specialised training and endorsements are required to conduct approved low-flying operations. This training includes the relevant operating techniques and procedures to safely operate in a low-level environment, the procedures to follow prior to descending to commence low-flying operations, and identifying the types of ground-based infrastructure frequently associated with hazards such as powerlines. This includes power poles and the cleared easement that often exists in the immediate vicinity of a powerline (Figure 7).

Powerline information

The powerline carried 11 kV of electricity and comprised power poles and two electrical conductor cables. The cables were of galvanized steel construction, comprising three wound strands of 2.75 mm diameter wire, giving an overall cable diameter of about 6 mm.

The conductor cables spanned a distance of 665 m between supporting poles that were situated on each river bank (Figure 7). The height of the cables overhead the river varied from 16.2 m (53 ft) above the waterline on the eastern bank to 25.0 m (82 ft) above the waterline on the western bank. The cable conductors themselves had a weathered and dull-grey appearance.

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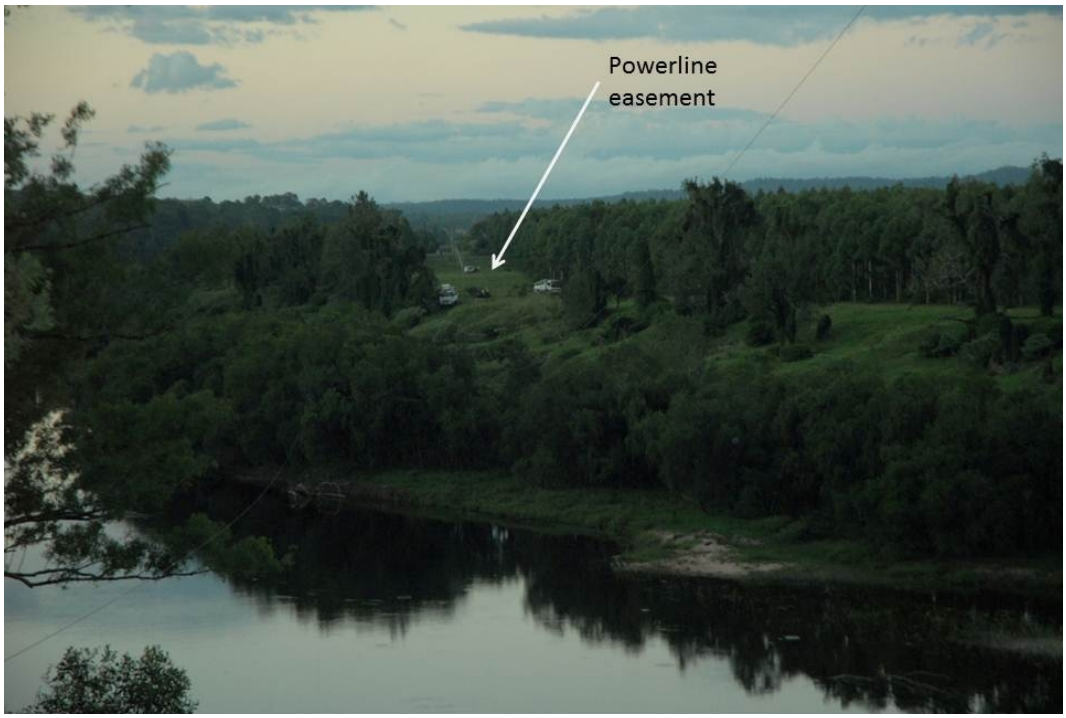
4 To facilitate the provision of aviation weather forecasts to pilots, Australia is subdivided into a number of forecast areas.

5 Civil Aviation Regulation (1988) 157.

Figure 7: Photograph from the western bank of the river, looking north-east across the river in the direction of the powerline



Source: New South Wales Police Force, annotated by the ATSB

The powerline was not in the vicinity of an aerodrome or an aircraft landing area and the flight was not part of an approved low-level operation. In this case, the requirements for permanent marking of overhead cables and their supporting structures were detailed in Australian Standard AS 3891.1 - *Air navigation–Cables and their supporting structures-Marking and safety requirements*. In general terms, this standard recommended permanent marking of overhead cables that exceeded a height of 90 m (295 ft). Consequently, the relevant standard did not require permanent marking of the conductor cables spanning the river at the accident site.

Although the aircraft did not break either of the conductor cables, several power poles and their associated infrastructure were damaged and a significant amount of cable dislodged from the poles. The powerline network was equipped with high-voltage protection devices at numerous locations. One of these devices, about 3 km from the accident site, detected a fault in the power supply at 1102 and isolated the power. The time of that power interruption broadly corresponded with the aircraft's collision with the powerline and dislodgement of cables.

Medical and pathological information

The pilot and surviving passenger sustained serious injuries as a consequence of the collision with water and chemical burns from exposure to aviation fuel. The pilot recalled being bruised across his left shoulder and left and right hip. This was consistent with the pilot's reported use of their three-point seatbelt. The front-seat passenger did not recall any bruising from their seatbelt, although it was being worn at the time of the accident.

The relevant state authorities conducted a post-mortem examination on the rear-seat passenger. The examining pathologist indicated that the passenger sustained fatal neck injuries. The pathologist was unable to definitively conclude whether the passenger was wearing a seatbelt at the time of the accident.

Survival aspects

Although this aircraft was not fitted with floats, it did remain at the surface of the river after impact with the water, albeit inverted. The fully-submerged and flooded cockpit and cabin required the occupants to escape from a particularly difficult environment that was substantially similar to seaplane accidents involving the flooding of the cabin. In that context, research into seaplane accidents can provide insight into the survival aspects for this accident.

A 1994 study by the Transportation Safety Board of Canada (TSB) identified 103 fatal seaplane accidents that terminated in water, involving a total of 276 occupants and resulting in 168 deaths.[6] Fatalities in those accidents were frequently the result of post-impact drowning, with most drownings occurring inside the aircraft cabin. Most survivors who were able to exit the aircraft experienced some difficulty doing so. The study also found that 10 per cent of the fatally-injured occupants were incapacitated during the initial impact sequence and subsequently drowned.

Another TSB publication, a report of an investigation into a seaplane loss of control and collision with water in 2012, noted that occupants may drown in a sinking aircraft if they are unconscious and that loss of consciousness was normally caused by head trauma. The report went on to note that if the occupant was restrained and protected during the impact sequence, they may maintain consciousness and stand a better chance of successfully exiting a sinking aircraft.

Crashworthiness studies of small, general aviation aircraft have consistently demonstrated the importance of upper-torso restraint in an accident, increasing the probability of the occupant surviving the impact forces.[7,8,9]

Physiological factors and limitations of the human eye

A number of physiological and other factors could have affected the pilot's ability to identify the powerline in sufficient time to avoid the wirestrike. The following discussion examines several of these factors.

Under ideal conditions, humans can detect an object the size of a 20 cent coin at a distance of 200 m. However, in real world conditions a variety of factors will limit the ability to achieve this level of performance. For example, research has shown that pilots find it difficult to detect another aircraft even when its size in their visual field (or subtended visual angle) is 50 or more times greater than the detection threshold. Research has also shown that long thin objects, such as wires and cables in this case, are more difficult to detect than other objects of the same overall size.[10]

A major influence on the ease of seeing an object is the difference between its luminance (or brightness) and that of its background. In many situations, powerline cables have a low contrast relative to the background terrain and consequently, are difficult to detect. In this instance, and as indicated by Figures 2, 3 and 7, the difference in luminance between the powerline and its background could be expected to have been low.

A number of environmental factors can reduce the apparent contrast between a target and its background. In this case, the pilot reported that the visibility was good and there was no haze. With the sun located 50° above the north-eastern horizon and on the opposite side of the aircraft

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6 Transportation Safety Board of Canada, (1994). *A Safety Study of Survivability in Seaplane Accidents* (Report No. SA9401).

7 Federal Aviation Administration, Aviation Safety, Alaskan Region, (2010). *Fatal and Serious Injury Accidents in Alaska, A retrospective of the years 2004 through 2009 with Special Emphasis on Post Crash survival*.

8 Canadian Aviation Safety Board, (1987).*Study of the Influence of Shoulder Harnesses in Aviation Safety*.

9 National Transportation Safety Board, (1985). *General Aviation Crashworthiness Project, Phase Two – Impact severity and potential injury prevention in General Aviation accidents* (Safety Report, NTSB/SR-85/01).

10 See appendix C of ATSB Safety Investigation Report 200201846 *Bankstown midair collision, Piper PA-28-161, VH-IBK, Socata TB-9, VH-JTV, 5 May 2002*. See also ATSB Research Report *Limitations of the See-and-Avoid Principle*. All of the reports are available at www.atsb.gov.au.

to the pilot's seating position, and the aircraft flying in a north-westerly direction immediately before commencing the right turn, sun glare was unlikely to have significantly affected the pilot's ability to see obstructions ahead.

Related occurrences

The ATSB has investigated numerous accidents involving operations at low level, a significant number of which involved wirestrikes and resulted in fatal injuries to those on board. Tragically, many of these accidents related to low-flying operations that were unauthorised and unnecessary. That is, the aircraft was not taking off or landing and there was no operational reason for flight close to the ground or water.

Investigation reports into these types of accident include:[11]

- 200400437, involving a wirestrike at Eildon Weir, Victoria (Vic.) on 7 February 2004
- 200607801, an investigation into a wirestrike at Nelson, Vic. on 24 December 2006
- AO-2007-058, which investigated a wirestrike 20 km north of Elliott, Northern Territory on 10 November 2007
- AO-2008-017, involving a collision with terrain 7 km north-north-west of Hornsby, New South Wales on 1 March 2008
- AO-2008-082, an investigation into a wirestrike that occurred 25 km north-west of Leongatha Aerodrome, Vic. on 25 December 2008
- AO-2012-170, which investigated a wirestrike at Burrum River, Queensland on 17 December 2012.

Most of the above accidents involved private pilots, none of whom had completed the requisite specialised low-flying training or held an endorsement to conduct low-flying operations.

In September 2006, the ATSB reissued an aviation research paper titled *Wire-strike Accidents in General Aviation: Data Analysis 1994 to 2004*. The paper found that, although the majority of wirestrike accidents were associated with aerial agriculture operations, a significant number involved private and business category operations. The research paper concluded:

> It is crucial that pilots must be aware of the inherent dangers associated with operating at low levels. This is especially true of other aerial work and private/business operations where an additional responsibility for passengers might exist.

The ATSB publication titled *Avoidable Accidents No. 1 – Low-level flying* was published in February 2010 and highlighted the risks associated with unnecessary and unauthorised low-level flying. Of the seven accidents discussed in the report, only one had survivors. The ATSB identified the significant risk posed by powerlines during operations at low level and discussed a number of accidents where the wirestrike occurred in an otherwise remote area, possibly where pilots would least expect to encounter a powerline.

The second in this series of ATSB publications, titled *Avoidable Accidents No. 2 – Wirestrikes involving known wires: A manageable aerial agricultural hazard* and published in May 2011, discussed the issue of wirestrikes during aerial agriculture operations. The publication also discussed the strategies developed by the Aerial Agriculture Association of Australia to help agricultural pilots manage the ongoing risk of wirestrikes during spraying operations.

[11] All available at www.atsb.gov.au.

Safety analysis

Introduction

The wirestrike and resulting loss of aircraft control was an unintended consequence of the pilot flying the aircraft at low level along the river. Although the pilot saw the power cables just before the collision, there was insufficient time for him to alter the flight path of the aircraft to avoid the wirestrike. The aircraft was operating normally and the weather conditions in the vicinity of the Clarence River were benign at the time.

This analysis considers the pilot's decision to descend to low level, the hazards affecting such flight and a number of potential risk controls in response. The aircraft occupants' exit from the submerged and flooded aircraft cabin is also examined.

Operation of the aircraft and hazards at low level

The pilot seemed to be aware of the hazard represented by the presence of powerlines during flight at low level. He reported scanning the river for powerlines as he flew south and before descending to low level and recalled a powerline in another section of the river to the south of the accident site, the identification of which had likely been assisted by the installation on that line of high visibility markers.

The powerline in the vicinity of the accident site was no more than 25 m above the terrain, nor was it in proximity to an aerodrome or aircraft landing area. The flight was not part of an approved low-level operation. Therefore, in accordance with the relevant Australian Standards for marking powerlines and their supporting structures, the powerline was not required to be, and was not, fitted with high visibility markers. This contrasted with the possible expectation by the pilot that, given the installation of such markers on the powerline previously identified to the south of the accident site, all powerlines in the area would be similarly marked.

Powerline cables can be very difficult to see, particularly during flight at low level. This is at least in part due to the difficulty experienced by the human eye when detecting long but very thin objects at any significant distance. Cables can also weather over time to a dull-grey colour. The resulting reduced contrast between the cable and any trees/terrain in the background would have made the cables even more difficult to see. In addition, the two 6 mm diameter powerline cables presented a small and narrow visual profile, towards which the aircraft was flying at a speed of about 100 kt (185 km/h). All of these factors would have impacted on the pilot's ability to identify and avoid the powerline.

As a consequence of these and other hazards, operations at low level require pilots to have completed specialised training and obtain appropriate endorsements to operate safely in that environment. A significant component of that training equips the pilot to identify the low-level hazards specific to the intended area of operation, and provides a number of tools and techniques that can be applied to the operation to mitigate the associated risks.

In the event, the pilot's reported spur of the moment decision to return to low level after the climb to 400–500 ft, over an area of river with which he was less familiar, increased the risk of a wirestrike. The pilot's lack of training for operations at low level effectively meant that the only means to identify any obstacles, powerlines or other low-level hazards was by their unalerted, visual acquisition.

In this respect cues did exist in the vicinity of the accident site, including the powerline easement through the nearby scrub and plantation timber and power poles close to each river bank. Unfortunately, most probably a result of the combination of his not having received any low-flying training, and his unfamiliarity with the area, the pilot did not identify those cues; either as he flew south along the river, or after he descended to low level. Given the approach speed towards the

powerline, and the already discussed difficulty of seeing the powerline, it was not surprising the pilot did not see the cables until too late to avoid the wirestrike.

This accident reaffirms the risk of unnecessary and unauthorised low flying, and the importance of flying at a height that assures obstacle clearance. The minimum stipulated operating height of 500 ft above terrain in this instance, or any obstacle on that terrain over unpopulated areas provides such an assurance.

Collision with water and exit from the aircraft

The pilot was following the course of the river and banking right when the first cable struck the left wing. The drag from this cable would have significantly reduced the speed of the wing relative to the rest of the aircraft, yawing the nose of the aircraft such that the second cable then impacted the wing leading edge inboard of the first strike. The asymmetric drag of the unbroken cables on the left wing and significant loss of airspeed resulted in the loss of control of the aircraft and the subsequent collision with the water. Even if the cables had broken, it was likely the significant damage sustained by the left wing would have resulted in a similar outcome.

The impact damage and aircraft's inverted attitude allowed water to instantaneously flood the cabin. This required the surviving occupants to escape the aircraft in difficult and disorienting circumstances for which they had no time to prepare.

The pilot and front-seat passenger reported wearing their seatbelts. Although both rear seatbelts were found unfastened, the pilot could not recall unfastening them during the recovery of the passenger from the cabin. Based on the post-mortem report and other evidence, it was not possible to reach any conclusion about the rear-seat passenger's use of the seatbelt at the time of the accident, nor how they sustained their non-survivable neck injury.

Findings

From the evidence available, the following findings are made in relation to the wirestrike involving a Maule M-5 aircraft, registered VH-HOG, which occurred 50 km west south west of Casino, New South Wales on 12 April 2014. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing factors

- The pilot made a spur of the moment decision to fly along an unfamiliar section of a river at very low level and collided with a powerline, which resulted in a loss of aircraft control and uncontrolled ditching.

Other factors that increased risk

- The pilot did not hold any approval to conduct low flying, nor had they received training to identify hazards or in the operating techniques for flight close to the ground.

Other findings

- The powerline was not fitted with visual warning markers, nor was there a requirement for such markers in accordance with the relevant Australian Standard.

General details

Occurrence details

Date and time:	12 April 2014 – 1102 EST	
Occurrence category:	Accident	
Primary occurrence type:	Wirestrike	
Location:	50 km west-south-west of Casino, New South Wales	
	Latitude: 29° 03.552' S	Longitude: 152° 33.943' E

Pilot details

Licence details:	Private Pilot (Aeroplane) Licence, issued 11 October 2012
Endorsements:	Single Engine Aeroplanes not exceeding 5,700 kg Maximum Take-off Weight; Manual Propeller Pitch Control; Tailwheel Undercarriage
Ratings:	Nil
Medical certificate:	Class 2, valid to 13 February 2014
Aeronautical experience:	148 hours powered aeroplanes, 332 hours gliding

Aircraft details

Manufacturer and model:	Maule Aircraft Corp M-5-235C	
Year of manufacture:	1980	
Registration:	VH-HOG	
Serial number:	7322C	
Total Time In Service	1,495 hours	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 2
Injuries:	Crew – 1 serious	Passengers – 1 fatal, 1 serious
Damage:	Substantial	

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- New South Wales Police Force
- pilot of VH-HOG and surviving passenger
- operator/owner of the powerline, Essential Energy
- Civil Aviation Safety Authority (CASA).

References

Australian Standard AS 3891.1-2008, *Air navigation—Cables and their supporting structures—Marking and safety requirements, Part 1: Permanent marking of overhead cables and their supporting structures for other than planned low-level flying,* Standards Australia.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the 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 CASA, the pilot in command of VH-HOG and Essential Energy. A submission was received from the pilot in command. The submission was reviewed and where considered appropriate, the text of the report was amended accordingly.

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The 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 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 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

Wirestrike involving Maule M-5, VH-HOG
50 km WSW of Casino, New South Wales, 12 April 2014

AO-2014-068
Final – 29 January 2015