Australian Government
Australian Transport Safety Bureau

Publication Date: February 2009 ISBN 978-1-921602-11-5

ATSB TRANSPORT SAFETY REPORT
Aviation Occurrence Investigation AO-2008-058
Final

Wire Strike – Mataranka, NT – 23 August 2008

INFRA - 08391

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

Abstract

On 23 August 2008, at about 1200 Central Standard Time, a Robinson Helicopter Company R22 Beta, registered VH-HPY, with a pilot and passenger on board, departed the sports ground at Mataranka, NT.

Witnesses reported that the helicopter was flying at about tree-top height when it struck powerlines before impacting the ground.

Bystanders were able to remove the seriously-injured passenger from the wreckage; however, the pilot received fatal injuries. The helicopter was seriously damaged.

Examination of the wreckage did not identify any mechanical defects that would have affected the safe operation of the helicopter.

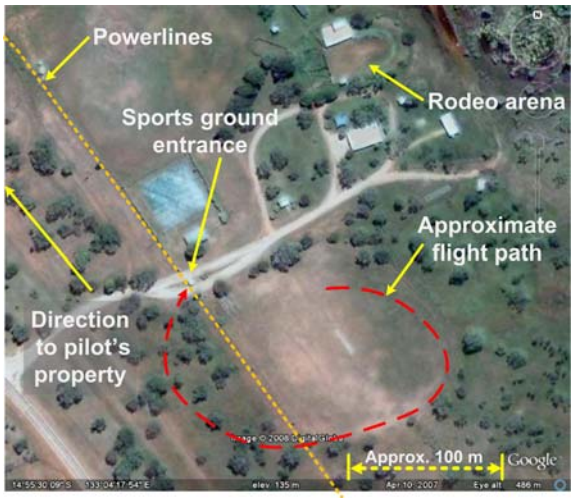
FACTUAL INFORMATION

History of the flight

On the morning of 23 August 2008, the owner-pilot of a Robinson Helicopter Company R22 Beta, registered VH-HPY, departed his property about 40 km north-west of Mataranka, NT on a private visual flight rules (VFR) flight to the Mataranka sports ground. Also onboard the helicopter was one passenger.

The passenger recalled that, on arrival at Mataranka, the pilot flew low over the rodeo arena at the sports ground before carrying out what the passenger described as a 'bumpy' landing at about 1030 Central Standard Time[1]. After landing, the pilot and passenger interacted with people at the sports ground who were preparing for a rodeo that afternoon at the nearby rodeo arena (Figure 1). A number of those people, who also reported knowing the pilot, commented that he appeared to them to be affected by the effects of alcohol.

Figure 1: Aerial view of sports ground



Shortly before midday, the pilot and passenger boarded the helicopter to return to the pilot's property. Witnesses nearby reported that, soon after takeoff, the helicopter turned right towards the approximate direction of the pilot's property. Moments later, the helicopter turned further right and circled back toward the sports ground at a reported 'very low height'. The passenger reported that he had the impression that the pilot was flying the helicopter toward the rodeo arena.

The helicopter was observed to strike powerlines that were set at about tree-top height at the entrance to the sports ground. The passenger stated that the helicopter appeared to be operating normally until that time.

Witnesses recalled that the helicopter's forward speed decreased abruptly as it rotated around the

1 The 24-hour clock is used in this report to describe the local time of day, Central Standard Time (CST), as particular events occurred. Central Standard Time was Coordinated Universal Time (UTC) + 9½ hours.

wire, yawing and rolling to the right before descending and heavily impacting the roadway on its right side.

Bystanders were able to remove the seriously-injured passenger from the wreckage. However, the pilot, who was seated in the right seat, received fatal injuries. The helicopter was seriously damaged[2].

Although fuel was reported to have been leaking from the helicopter's ruptured fuel tanks, there was no post-impact fire. A small grass fire, which was indicated by witnesses to have started as a result of sparks from a fallen powerline, was extinguished by emergency workers.

Pilot information

The pilot was issued with his Private Pilot (Helicopter) Licence on 11 April 2007 and was qualified for the flight. Since obtaining his licence, the pilot had accumulated about 43 hours of additional flying experience.

Details of the pilot's licence, experience and endorsements are listed at Table 1.

Table 1: Pilots licence, experience and endorsements

Type of Licence	Private Pilot (Helicopter) Licence issued 11 April 2007
Medical certificate	Class 2 valid, issued 6 December 2006
Flying experience total hours[3]	107 (estimated)
Endorsements	Robinson R22
Hours flown in the last 90 days	20 (estimated)

The pilot did not have any low-level ratings or endorsements.

The pilot was described by his family as being fit and healthy, with a busy lifestyle, but no unusual stresses.

Based on interviews and witness statements, the pilot attended a social gathering in Katherine on the evening prior to the accident, during which it was understood that he consumed an unknown amount of alcohol. The pilot was reported to have had an estimated 5 hours sleep before waking at 0600. Shortly after, the pilot was driven to his property, where he prepared the helicopter for the flight to Mataranka.

Helicopter information

The helicopter, serial number 3047, was manufactured in the US in February 2000. It was equipped with a Lycoming O-320 engine, and had accumulated 1,726.1 hrs total time in service (TTIS).

A review of the maintenance logs indicated that the helicopter was maintained in accordance with the manufacturer's maintenance schedule. The last maintenance on the helicopter was a 100-hourly inspection that was carried out on 19 May 2008, at 1,703.1 hrs TTIS.

The published maximum take-off weight (MTOW) for the helicopter was 622 kg. Whereas the passenger, who was not a pilot, advised that he refuelled the helicopter to full prior to the departure from the pilot's property, the investigation was unable to verify whether that included both of the helicopter's fuel tanks.[4] In any case, it was calculated that the take-off weight for the departure was close to the helicopter's MTOW. It was estimated that about 3 US Gallons or 8 kg of fuel would have been consumed during the flight to the sports ground.

Powerline information

The powerline consisted of three parallel aluminium alloy cables that were set at 10 m above the ground and spanned the roadway at the entrance to the sports ground, across the helicopter's direction of flight (Figures 1 and 2).

2 The Transport Safety Investigation Regulations 2003 definition of serious damage includes destruction of the transport vehicle.

3 The last entry in the pilot's flying log book was for a flight on 19 June 2008.

4 The helicopter included two interconnected, gravity-fed fuel tanks. The capacity of the main fuel tank was 19.8 US Gallons (equivalent to about 51 kg of fuel) and, of the auxiliary tank, 10.9 US Gallons (about 28 kg).

The Australian Standards for marking powerlines and their supporting structures were discussed in a number of Australian Transport Safety Bureau (ATSB) investigation reports (most recently AO-2007-058, available at www.atsb.gov.au), and included that, in general, there was no requirement for the marking of powerlines with a height above roads of less than 90 m (295 ft).

The powerline that was struck by the helicopter did not require marking in accordance with those standards.

Meteorological information

The Bureau of Meteorology (BoM) reported that, at the time of the accident, fine conditions prevailed in the Mataranka area. The temperature was in the low 20s and there was low relative humidity. The BoM report suggested that moderate, tending gusty south-east winds at up to 25 kts in the Mataranka area, would have resulted in light to moderate turbulence.

The passenger reported that the wind seemed quite strong when the helicopter approached the sports ground.

Wreckage information

The main wreckage came to rest on its right side facing the opposite direction to the flight, about 10 m from the powerlines (Figure 2). A number of the helicopter's structural components separated from the helicopter during the impact sequence.

Examination of the wreckage did not identify any mechanical defects that would have affected the safe operation of the helicopter. The damage to the main rotor blades indicated that the engine was supplying significant power to the drive train at the time of the accident.

There were powerline contact marks on the belly of the helicopter, on the upper surface of the right skid landing gear, and on the front face of the right forward skid landing gear crosstube. The right skid landing gear was fractured at the right forward crosstube attachment point, and was located a few metres from the main wreckage. The lack of powerline marks on the left skid landing gear indicated that the helicopter was in a right wing-low attitude at the time of impact with the powerlines.

Relative to the direction of flight, the damage to the powerline included that the:

- first cable was fractured in ductile overload
- middle cable showed evidence of bending
- last cable appeared to be undamaged.

Figure 2: Main wreckage, looking opposite to the direction of flight.

Medical and pathological information

Toxicological testing of the pilot revealed an alcohol concentration of 0.254%. The post mortem report indicated that this alcohol level was '...sufficient to have caused some degree of both mental and motor dysfunction' and that, although not related to the condition causing death, acute alcoholic toxicity was a significant condition contributing to the death.

Organisational information

Alcohol and flying

Flying an aircraft is an activity requiring high levels of cognitive functioning and psychomotor skill. These areas of human performance are generally impaired following the use of substances such as alcohol. As such, the use of alcohol by pilots can compromise their ability to safely operate an aircraft.[5]

The consumption of alcohol by pilots was regulated by Civil Aviation Regulation (CAR) 256. That regulation mandated that a pilot must not fly

5 A review of the effects on pilot performance of the consumption of alcohol is available in ATSB aviation research paper *Alcohol and Human Performance from an Aviation Perspective: A review* (available at www.atsb.gov.au).

within 8 hours of consuming alcohol or if the ability to do so was impaired by alcohol. The extent of residual alcohol impairment at the 8-hour mark will depend on a multitude of factors such as; the amount of alcohol consumed, an affected pilot's metabolism and elimination of alcohol, as well as differences in pilots' individual tolerance and body size.

The requirements for drug and alcohol management plans and testing were introduced into the Australian aviation industry by Civil Aviation Safety Regulation (CASR) Part 99 on 23 September 2008 (available at www.casa.gov.au). CASR Part 99 consisted of two main components:

- Sub-part A, which required certain organisations to develop a Drug and Alcohol Management Plan (DAMP). DAMPs were subject to monitoring and audit by the Civil Aviation Safety Authority (CASA) and comprised a number of elements, including; education, intervention and self-referral, drug and alcohol testing components, and so on.
- Sub-part B, which included a CASA testing component for application to all safety-sensitive activities, including by private pilots and other individuals who were not part of a DAMP organisation.

The CASA testing regime resulted in effectively 'no notice' testing of any personnel that conducted safety-sensitive aviation activities. In the case of private pilots, the CASA testing was analogous to the random testing of drivers at the roadside.

Low flying

Low flying in Australia was regulated by CAR 157. In part, that regulation stated that:

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

Those requirements did not apply if the aircraft was in the course of actually taking off or landing, or as a result of any other unavoidable cause where it was essential that a lower height be maintained – for example, due to weather.

Day VFR Syllabus Helicopters – low flying competencies

The Day VFR Syllabus Helicopters[6] defined the flying and ground standards necessary to exercise the privileges, with relevant restrictions, of the Student, Private and Commercial pilot licences in a single-engine helicopter. A limited exposure of all prospective pilots to low-level operations and the associated hazards was achieved via the content of the flying and aeronautical training components of that syllabus, including:

- the ability to recall the requirements relating to the minimum heights for flights over populous and other areas (CAR 157)
- takeoff, fly a low-level circuit not above 500 ft above ground level (AGL), approach to the hover and land
- a knowledge of human factors and their impact on pilot performance in the low-level environment, including; the limitations of the eye with respect to the ability to discern objects during flight (other aircraft, transmission lines and so on), spatial disorientation and illusions.

A number of other low-level ratings and approvals affected the conduct of agricultural and aerial stock mustering operations in the low-level environment. The additional pilot competency requirements of those ratings and approvals were most recently discussed in the ATSB investigation report AO-2007-058, and represented an attempt by CASA to mitigate the risk associated with low-level operations.

It could be expected that those additional pilot competencies would enhance the ability of pilots carrying out low-level operations to identify and avoid wires and other low-level hazards.

ANALYSIS

The witness and on-site physical evidence was consistent, and confirmed that the helicopter struck the powerline that spanned the entrance to the sports ground. There was no evidence of any technical or other failure of the helicopter, or its associated systems prior to that wirestrike.

6 Issue 2.0 – Effective 1 June 2004.

The passenger's recollection and witnesses' statements suggested a conscious decision by the pilot to undertake a turn-back and overflight of the rodeo arena, rather than to make an approach and landing. In that case, and given the reported fine weather conditions in the Mataranka area, there ought to have been no reason for the turn-back and overflight to have been at low level. Had the pilot continued the flight to his property after initially appearing to have established himself on that track, the wire strike would not have occurred.

Operating a helicopter at tree-top height at high gross weight and in windy or turbulent conditions is a demanding task with little margin for error. In this instance, the pilot had limited overall flying experience and most likely minimal exposure to low-level operations. The extent to which the pilot's limited sleep on the night prior to the accident, and the possibility for post-alcohol impairment to have negatively affected the pilot's performance, could not be quantified.

While any death is a tragedy, given the circumstances surrounding this accident, the ATSB determined that the safety benefits of further investigation did not warrant the ongoing commitment of resources when compared with other priorities.

SOURCES AND SUBMISSIONS

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

A draft of this report was provided to the Civil Aviation Safety Authority (CASA), a number of witnesses who provided information in support of the investigation, the Northern Territory Police investigating officer, the Northern Territory Coroner's Office and the next-of-kin of the deceased. Submissions were received from the next-of-kin of the deceased. The submissions were reviewed and where considered appropriate, the text of the report was amended accordingly.