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- independent investigation of transport accidents and other safety occurrences
- safety data recording, analysis and research
- fostering safety awareness, knowledge and action.

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Collision with terrain, VH-TCG 44 km WSW Rolleston, Queensland 9 November 2010

Abstract

On 9 November 2010, the student pilot of a Robinson Helicopter Company R22 Beta II, registered VH-TCG, was engaged in a helicopter aerial stock mustering operation on a private station near Rolleston, Queensland. During the muster, after losing communication with the helicopter, one of the mustering party found the wreckage of the helicopter. The student pilot, who was the sole occupant, was fatally injured and the helicopter seriously damaged as a result of the collision with terrain.

The investigation found that the pilot had not met the competency standards to operate a helicopter solo, and had not received any training towards low flying or aerial stock mustering.

The investigation did not identify any organisational or systemic issues that might adversely affect the future safety of aviation operations. However, the accident does provide a timely reminder of the importance of ensuring that flight crews have the appropriate competencies and currency before engaging in highly-skilled tasks.

FACTUAL INFORMATION

History of the flight

On 9 November 2010, the sole occupant student pilot of a Robinson Helicopter Company R22 Beta II, registered VH-TCG (TCG), was engaged in a helicopter aerial stock mustering operation at Mt Ogg, near Rolleston, Queensland (Qld).

At about 1100 Eastern Standard Time¹, the pilot contacted the ground component of the mustering party via radio, advising them that several cattle had been located. That component, which was on horseback, headed towards the location identified by the pilot. One of the ground party had a discussion over the radio with the pilot at about 1115. Another call was made about 5 minutes later, but without success.

At about 1130, one of the ground party discovered the wreckage of the helicopter near the position where the pilot had reported finding the cattle. The pilot was fatally injured and the helicopter sustained serious damage.²

Pilot information

Pilot qualifications and experience

The pilot held a Student Pilot Licence (SPL) that was issued by the Civil Aviation Safety Authority (CASA) on 3 June 2010, with no additional rating or endorsement entries. He had logged a total of 43.7 flight hours, of which 4.2 flight hours were solo. The last recorded training flight was on 22 September 2010.

The pilot held a valid Class 1 Civil Aviation Medical Certificate issued by CASA without any

1 The 24-hour clock is used in this report to describe the local time of day, Eastern Standard Time (EST), as particular events occurred. Eastern Standard Time was Coordinated Universal Time (UTC) +10 hours.

2 The *Transport Safety Regulations 2003* define 'serious damage' as including the 'destruction of the transport vehicle.'

restrictions. It had an expiry date of 16 March 2011.

Student pilot training file

According to the pilot's training file, he had fallen behind the anticipated standard during his training and not progressed beyond a SPL level. Comments in the training file stated that the pilot wanted to start mustering as soon as possible, but was advised by his instructor that, at that stage, this was not a 'good idea'.

The last entry in the training file indicated that the pilot needed more work on basic handling and control of the helicopter. A review of the pilot's training file did not find any evidence that the pilot had conducted any low flying or aerial stock mustering training.

Aircraft information

General information

The helicopter, serial number 3271, was manufactured in the United States (US) in 2001, and had accumulated 4,111.1 hours total time in service at the last recorded entry on 28 October 2010. It was powered by a Textron Lycoming O-360-J2A, four-cylinder, normally-aspirated, air-cooled, horizontally-opposed piston engine.

The pilot had been the registered owner of TCG since 3 June 2010.

Airworthiness and maintenance

A review of the maintenance documents indicated that the helicopter was maintained in accordance with the Robinson Helicopter R22 maintenance schedule. The helicopter had a current Certificate of Registration and Certificate of Airworthiness. The current maintenance release showed that the last recorded daily inspection was on 28 October 2010.

A 100-hourly periodic inspection was carried out 4 months prior to the accident with no major defects identified. New main rotor blades were fitted to the aircraft in April 2010.

The engine was changed at the previous 100-hourly inspection. At the time of installation, the engine had accumulated 187 hours since it was last overhauled.

Meteorological information

The Bureau of Meteorology (BoM) advised that there was a moist easterly surface flow in the Rolleston area at the time of the occurrence. BoM forecasts indicated isolated showers for the area. The Emerald weather radar image recorded at 1100 on 9 November 2010 showed weak returns in the Rolleston area that were indicative of scattered showers.

Another R22 operator, who assisted the emergency services personnel to access the accident site, reported that the weather was fine, with a light breeze, and that there was scattered³ cloud with a base of about 4,000 ft above mean sea level (AMSL). He advised that the temperature was about 25 °C at 1400.

Wreckage information

The Australian Transport Safety Bureau (ATSB) did not attend the accident site. Information on the wreckage was based on photographs and witness reports.

Wreckage distribution

The wreckage was located in a heavily-timbered valley at about 1,800 ft (Figure 1). The trees in the area were reported to be up to about 150 ft tall.

Photographic and witness information indicated that the main wreckage was located at the base of an iron bark tree. Score marks on the tree were consistent with the helicopter sliding down the trunk. The helicopter had impacted the ground in an almost inverted, right side-low, nose-down attitude. All of the major components, including the main rotor blades, tail boom and tail rotor were attached to the helicopter. Several branches from a gum tree were identified amongst the wreckage.

³ Cloud amounts are reported in oktas. An okta is a unit of sky area equal to one-eighth of total sky visible to the celestial horizon. Few = 1 to 2 oktas, scattered = 3 to 4 oktas, broken = 5 to 7 oktas and overcast = 8 oktas.

Figure 1: Accident site⁴



Rotor and drive train

As evidenced in the photographs provided to the investigation, one of the main rotor blades had an impact mark and forward bending on the leading edge, near the blade tip. In addition, that blade had rearwards chord-wise bending along its span. The other blade was bent in several directions, most likely as a result of the impact.

Figure 2: Main rotor blade damage⁵



One tail rotor blade had impact damage, but had not separated from the tail rotor hub. Continuity of the tail rotor drive was confirmed by a police officer who attended the site. Photographs showed that both of the engine-to-main rotor drive belts were in place, as well as the alternator drive belt.

Fuel

Witnesses reported that there was a strong aroma of fuel at the accident site. There was no fuel reported visible in the left tank, and the right tank was not accessible by the emergency services personnel at the site. The other R22 operator who

assisted the emergency services personnel reported using the same fuel stock that was used by the pilot of TCG, with no reported problems.

Medical and pathological information

The pilot's post-mortem examination found no evidence of any medical condition that may have affected the pilot's performance. Toxicological testing for the presence of drugs and alcohol was negative.

Additional information

Student pilot licence - solo flight requirements

Civil Aviation Regulation (CAR) 5.66 detailed what a student pilot was authorised to do, within the scope of a SPL, including that:

A student pilot must not fly an aircraft as pilot in command if each of the following requirements is not satisfied:

- (a) An authorised flight instructor gives the student permission to conduct the flight as pilot in command;
- (b) The student conducts the flight in accordance with that permission and any conditions subject to which the permission is given.

The occurrence flight was not authorised by an authorised flight instructor.

Pilot qualifications required for aerial stock mustering

Civil Aviation Order (CAO) 29.10 (6) detailed the following pilot qualifications for aerial stock mustering:

A pilot shall not engage in aerial stock mustering unless he or she:

- (a) Has been approved for the purpose by CASA; and
- (b) Holds a valid pilot licence, appropriate to the class of operation and has gained the minimum experience prescribed in subsection 7.

⁴ Image courtesy of Capricorn Helicopter Rescue, Rockhampton, Qld.

⁵ Image courtesy Queensland Police Service.

CAO 29.10 (7) stated:

7.1 An applicant for approval to conduct aerial stock mustering in an aeroplane, a helicopter or registered gyroplane shall have gained the total number of hours in aeronautical experience applicable to the grant of a commercial pilot licence. The aeronautical experience shall include:

- a) 100 hours as a pilot in command of an aircraft which shall include at least fifty hours in command of the kind of aircraft for which the approval is sought; and
- b) 5 hours low flying in the appropriate kind of aircraft in accordance with the syllabus at Appendix I; and
- c) 10 hours training in aerial stock mustering operations in the appropriate kind of aircraft in the preceding 90 days in accordance with the syllabus at Appendix I; and
- d) 5 hours experience in the type of aircraft to be used for mustering.

7.2 The 10 hours operations training specified at paragraph 7.1 shall consist of a minimum of 6 hours dual training and the remainder may, at the discretion of the approved pilot, be in command under supervision training or solo operations under his or her direct supervision.

Previous occurrences

A review of the ATSB occurrence database identified over 70 accidents involving student pilots over the last 10 years, including nine accidents involving helicopters. However, there were no previous cases where the student pilot was undertaking aerial mustering or a specific task well beyond their skill level and training.

ANALYSIS

The impact mark, forward bending and chord-wise creasing on the main rotor blades was consistent with the rotor system contacting at least one tree. The level of disruption to the main rotor blades as a result of contacting foliage would have significantly reduced the effective lift from the main rotor system, resulting in an uncontrolled descent into terrain.

From the evidence provided to the investigation, there was no pre-existing airframe or engine mechanical defect associated with the potential to

have contributed to the accident. The weather at the time was benign, with good visibility.

While the exact reasons that the aircraft hit the trees were not clear, it is notable that the aircraft was being used at low level for a mustering task by a pilot with limited experience, without the requisite low-level qualifications and approvals, and without authorisation for the solo flight by an authorised flight instructor. Without those specific qualifications and approvals, it could not be reasonably expected that the pilot had the skills necessary to perform the task.

The investigation did not identify any organisational or systemic issues that might adversely affect the future safety of aviation operations. However, the accident does provide a timely reminder of the importance of ensuring that flight crews have the appropriate competencies and currency before engaging in highly-skilled tasks.

FINDINGS

Context

From the evidence available, the following findings are made with respect to the collision with terrain that occurred 44 km west-south-west of Rolleston, Queensland on 9 November 2010 during an aerial stock mustering operation involving Robinson Helicopter Company R22 Beta II, registered VH-TCG. They should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing safety factors

- The pilot had not met the competency standard required to operate a helicopter unsupervised.
- The pilot was conducting aerial stock mustering without having received any training for low flying or mustering tasks.

SOURCES AND SUBMISSIONS

Sources of Information

The sources of information during the investigation included the:

- student pilot's flying training school
- maintainer of the helicopter
- Queensland Police Service
- Bureau of Meteorology
- Civil Aviation Safety Authority (CASA).

Submissions

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

A draft of this report was provided to the student pilot's flight instructor, CASA and the maintainer of the helicopter. There were no submissions from those parties.