Aviation Safety Investigation Report 199100006

Robinson R22 Beta

13 February 1991

Readers are advised that the Australian Transport Safety Bureau investigates for the sole purpose of enhancing transport safety. Consequently, Bureau reports are confined to matters of safety significance and may be misleading if used for any other purposes.

Investigations commenced on or before 30 June 2003, including the publication of reports as a result of those investigations, are authorised by the CEO of the Bureau in accordance with Part 2A of the Air Navigation Act 1920.

Investigations commenced after 1 July 2003, including the publication of reports as a result of those investigations, are authorised by the CEO of the Bureau in accordance with the Transport Safety Investigation Act 2003 (TSI Act). Reports released under the TSI Act are not admissible as evidence in any civil or criminal proceedings.

NOTE: All air safety occurrences reported to the ATSB are categorised and recorded. For a detailed explanation on Category definitions please refer to the ATSB website at www.atsb.gov.au.

Occurrence Number: 199100006 **Occurrence Type:** Accident
Location: Mount Dudley 3 km north of Trunkey Creek NSW
Date: 13 February 1991 **Time:** 1124
Highest Injury Level: Fatal
Injuries:

	Fatal	Serious	Minor	None
Crew	1	0	0	0
Ground	0	0	0	-
Passenger	0	1	0	0
Total	**1**	**1**	**0**	**0**

Aircraft Details: Robinson R22 Beta
Registration: VH-LER
Serial Number: 1566
Operation Type: Private
Damage Level: Substantial
Departure Point: Trunkey Creek NSW
Departure Time: 1115
Destination: Trunkey Creek NSW

Approved for Release: 20th June 1991

Circumstances:

The pilot had hired the helicopter to fly a friend to his property situated about 2500 feet above sea level. On arrival the pilot landed next to the homestead and removed the passenger door so that his friend could take aerial photographs. The weather was fine, with a 10 knot wind from the north-west, and a temperature of 30 degrees Celsius. The density altitude was 5500 feet. After flying the helicopter around the property boundary, the pilot considered that it may be more advantageous if they climbed higher from where a more panoramic view of the property could be obtained. A climb was made in an easterly direction, at a slow forward speed, to about 500 feet above ground level, at which point the helicopter began to pitch and fishtail from side to side before descending rapidly. This was witnessed by a farmer working nearby, who said that he did not hear any change to the normal sound of the helicopter before it disappeared behind a ridge. The helicopter contacted the tops of the trees at a very slow forward speed and low main rotor RPM. During its descent through the trees to the steeply sloped forest floor the helicopter struck, and broke off, a large branch which entered the cabin resulting in a fatal injury to the pilot. The helicopter came to rest on its side, 19 metres from the initial contact point with the trees. The pilot had only recently qualified for his Private Pilot Licence (Helicopter) and had not received instruction in the methods for conducting helicopter survey or photography operations. There was no evidence that the helicopter was not capable of normal operations prior to the accident. Investigation found that the helicopter, which had been relatively heavy but within limitations, was operating at a high density altitude and a slow forward speed while climbing in a downwind direction. The subsequent loss of translational lift and true airspeed (TAS), combined with a reduction in engine performance due to the conditions, required the pilot to use considerably more power and collective pitch than normal to commence and maintain the climb. When the helicopter's operation became erratic, the pilot told the passenger they would fly out of the situation and mentioned autorotation. He was observed by the passenger to be making rapid movements of the controls with his hands and feet. The circumstances of the accident were consistent

with the pilot probably allowing the main rotor speed to decay due to overpitching of the rotor system, then using large left pedal inputs to prevent the helicopter from turning. The increase of tailrotor pitch further assisted decay of the main rotor speed. The low inertia rotor system used on this type of helicopter makes it susceptible to rapid rotor speed decay, but it can be regained quickly if there is no delay in effecting recovery action. The speed and height of the helicopter placed it in the avoid area of the height-velocity curve, and the action by the pilot of entering an autorotation failed to restore the main rotor RPM. If the helicopter had been allowed to weathercock into wind, then flown away towards the lower cleared terrain, a successful recovery may have been accomplished. As the helicopter descended rapidly towards the trees, the natural reaction of the pilot would have been to pull up on the collective pitch lever in order to arrest the descent, causing a further reduction to the remaining main rotor speed. This was evident by the lack of rotational damage to the main and tail rotor blades, however this action probably reduced the helicopter's vertical descent speed sufficiently to prevent more serious injuries to the passenger. When the rotor speed decreases below 95 percent a warning horn sounds and an amber light illuminates. During the descent the passenger could not remember hearing a horn blowing, but had seen lights flashing on the instrument panel. When the problem commenced he may not have registered any noises, but did notice the warning light. There are several warning lights in the Robinson R22 helicopter, and each associated system was checked and found serviceable. The type of operation, and prevailing weather conditions, would have required the manufacturer's performance criteria to be observed, and a considerable amount of attention given to flying the helicopter.

Significant Factors:

The following factors were considered relevant to the development of the accident

1. The helicopter's performance was affected by the hot weather and high density altitude conditions.

2. The pilot had not received training to perform aerial photography.

3. The pilot climbed the helicopter downwind at a low forward speed.

4. The pilot did not adequately compensate for the prevailing weather conditions, probably due to diverting his attention to photographic considerations.

5. The pilot overpitched the rotor system, and then did not effect a successful recovery of the main rotor speed.