



AIRCRAFT ACCIDENT REPORT
OCCURRENCE NUMBER 99/2824
ROBINSON R22 BETA
ZK-HPN
35 KM EAST-SOUTH-EAST OF OPOTIKI
29 SEPTEMBER 1999

Glossary of abbreviations used in this report:

CAA	Civil Aviation Authority
E	east
ELT	emergency locator transmitter
hPa	hectopascals
IIC	Investigator in Charge
kg	kilogram(s)
km	kilometre(s)
m	metre(s)
MHz	megahertz
NZST	New Zealand Standard Time
rpm	revolutions per minute
S	south
UTC	Coordinated Universal Time
VHF	very high frequency

AIRCRAFT ACCIDENT REPORT

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Aircraft type, serial number and registration:	Robinson R22 Beta, 523, ZK-HPN
Number and type of engines:	One Lycoming O-320-B2C
Year of manufacture:	1985
Date and time:	29 September 1999, 0815 hours* (approx)
Location:	35 km south-south-east of Opotiki Latitude: S 38° 06.5' Longitude: E 177° 41.4'
Type of flight:	Private – deer hunting
Persons on board:	Crew: 1
Injuries:	Crew: Fatal
Nature of damage:	Aircraft destroyed
Pilot-in-command's licence	Commercial Pilot Licence (Helicopter)
Pilot-in-command's age	45 years
Pilot-in-command's total flying experience:	650.9 hours, 629.7 on type
Information sources:	Civil Aviation Authority field investigation
Investigator in Charge:	Mr A J Buckingham

* Times are NZST (UTC + 12 hours)

Synopsis

The Civil Aviation Authority was notified of the accident at 1629 hours on Wednesday 29 September 1999. The Transport Accident Investigation Commission was in turn notified shortly thereafter, but declined to investigate. A CAA site investigation was commenced next day.

The pilot and shooter were deer hunting, and had shot two deer near the top of a large slip above the Motu River. The pilot hovered close to the slip face to allow the shooter to alight, but immediately after the shooter left the helicopter, the main rotor blades struck the steep face. The pilot was unable to maintain control, and the helicopter struck the ground and rolled some 200 metres to the bottom of the slip. The pilot was thrown out part way down, and when the shooter was able to reach him, he found that the pilot had died.

1. Factual information

1.1 History of the flight

- 1.1.1 At about 0540 hours on Wednesday 29 September 1999, the owner/pilot of ZK-HPN and his shooter took off from their base near Waimana, to hunt deer in the Otipi forest area, some 50 km to the east.
- 1.1.2 On arrival in the hunting area, they dropped off a container of fuel on the Otipi helipad, and proceeded with the intended mission. Over the next two hours, the shooter killed 13 deer, the last two on a large steep slip above the Motu River, near the Mangaotana Stream confluence.
- 1.1.3 The last deer fell part way down the slip and into the adjacent bush. The crew could see movement in the bush and inferred that the deer was still alive. They discussed how to get to the deer, and decided that the shooter should alight and go in on foot.
- 1.1.4 The pilot hovered the helicopter near the top of the slip, but was unable to find an area clear enough that he could put a skid on the ground. He found a point where he could get the front of the left skid within about a foot of the slope, and the shooter placed one foot on the external step in preparation for alighting. The shooter then transferred his weight from his seat to the ground in one movement.
- 1.1.5 Immediately after alighting, the shooter heard two loud bangs from above his head, and saw the helicopter pulling back from the slope, “shaking” and with the pilot “fighting the controls”. He described the engine sound as “groaning” as the rpm bled off. The helicopter lurched forward and down, striking the ground less than two metres below the shooter, then fell down the slope.
- 1.1.6 The pilot was thrown from the helicopter during its descent, and was later found by the shooter part way down the slip. The vertical extent of the slip was 500 feet, with an average slope estimated at 60 degrees. The helicopter rolled and tumbled all the way to the bottom.

- 1.1.7 The shooter attempted to resuscitate the pilot, but realised after a time that there was nothing further he could do. After checking that the ELT was operating, and leaving sufficient clues to indicate that he had left the scene, he set about walking out to summon help. This took approximately five hours, over very difficult terrain.
- 1.1.8 The accident occurred in daylight, at approximately 0815 hours NZST, in the Motu River valley, at an elevation of 1300 feet. Grid reference 260-X16-213328, latitude S 38° 06.5', longitude E 177° 41.4'.

1.2 Injuries to persons

<i>Injuries</i>	<i>Crew</i>	<i>Passengers</i>	<i>Other</i>
Fatal	1	0	0
Serious	0	0	0
Minor/None	0	0	

1.3 Damage to aircraft

- 1.3.1 The helicopter was destroyed.

1.4 Other damage

- 1.4.1 Nil.

1.5 Personnel information

- 1.5.1 The pilot held a Commercial Pilot Licence (Helicopter) and a C category instructor rating. His Class 1 medical certificate had expired earlier in the month, but he was still in possession of a valid Class 2 certificate. The lower certificate met the requirements for the type of operation engaged in at the time of the accident.
- 1.5.2 He had flown a total of 650.9 hours, which included 629.7 on type. His logbook recorded a total of some 17 hours “hunting”, but there were also numerous other entries described as “bush flying”, some with and some without additional reference to sling loads.
- 1.5.3 The shooter, aged 26, described his own role experience as comprising about four months full-time equivalent, spread over the four years preceding the accident. Although he described himself as not being an “experienced” shooter, he considered that he was proficient in boarding and alighting from the helicopter in the hover and was aware of the effects of changing loads on the centre of gravity.
- 1.5.4 He had to date undergone some 15 hours of piloting instruction on the R22 type, but had not yet flown solo. He held a current Class 2 medical certificate.

1.6 Aircraft information

- 1.6.1 Robinson R22 Beta, ZK-HPN, had flown 1897.8 hours up to the time of the accident. The most recent maintenance check was a 100-hourly inspection on 17 July 1999, and this was carried out concurrently with an Annual Review of Airworthiness.
- 1.6.2 The Lycoming O-320-B2C engine, serial number L-14031-39A, had run a total of 1897.8 hours since new. The Aircraft Technical Log carried a recommendation for a 50-hour check at 1921.4 hours.
- 1.6.3 Although precise calculations were not carried out, the all-up weight and centre of gravity were estimated to be within the prescribed limits both before and after the shooter's exit from the helicopter.
- 1.6.4 The shooter reported that the helicopter had been operating normally throughout the morning's flying activity, right up until the instant the rotor blades struck the ground.

1.7 Meteorological information

- 1.7.1 On the day of the accident, the Bay of Plenty region was under the influence of a ridge of high pressure extending from a large anticyclone over the Tasman Sea. Fine weather and light winds prevailed over most of the country.
- 1.7.2 The shooter described the weather during the hunting flight as fine and clear with no wind at all in the area.

1.8 Aids to navigation

- 1.8.1 Not applicable

1.9 Communications

- 1.9.1 Not applicable.

1.10 Aerodrome information

- 1.10.1 Not applicable.

1.11 Flight recorders

- 1.11.1 Not applicable.

1.12 Wreckage and impact information

- 1.12.1 Because of the steep and unstable nature of the site, an on-ground site examination was not feasible. The CAA investigators carried out a close inspection from a Hughes 500D helicopter, and a slash mark corresponding to a main rotor strike was found on the slope near the top of the slip. It was evident that the helicopter had fallen from that point down to the riverbank at the bottom, with a trail of wreckage marking its path.

1.12.2 The difficulty of the terrain was noted, the pilot of the investigators' helicopter being unable to find a point on the slip where he could even touch a skid on the ground without danger of striking the slope with the main rotor. In particular, it was observed that in the area of the blade strike, it was very difficult to judge the distance of the rotor tip path plane from the steep surface.

1.12.3 The R22 helicopter was comprehensively destroyed during the descent down the slip.

1.12.4 In light of the shooter's evidence and the site observations, the IIC considered that a detailed post-recovery inspection of the wreckage was not warranted.

1.13 Medical and pathological information

1.13.1 Post-mortem examination found that the pilot died of multiple severe head and chest injuries consistent with the accident sequence.

1.13.2 There was no evidence of any pre-existing condition that would have led to in-flight incapacitation of the pilot, or adversely affected his ability to control the helicopter.

1.13.3 Toxicological testing revealed no trace of alcohol, commonly-used medicinal drugs or recreational drugs.

1.14 Fire

1.14.1 Fire did not occur.

1.15 Survival aspects

1.15.1 The pilot was restrained by a standard (manufacturer's) lap and shoulder harness and was wearing a protective helmet. However, the forces involved in the multiple, random ground collisions during the helicopter's fall down the slope were clearly not survivable.

1.16 Tests and research

1.16.1 Nil.

1.17 Organisational and management information

1.17.1 Not applicable.

1.18 Additional information

1.18.1 Nil.

1.19 Useful or effective investigation techniques

1.19.1 Nil.

2. Analysis

- 2.1 It was clear from the site inspection that the helicopter was being operated in a situation that left absolutely no margin for error at the time of the accident.
- 2.2 As the shooter alighted from the helicopter in the hover, there would have necessarily been a rearward centre of gravity shift as his weight transferred to the ground. To maintain the hover position, the pilot would have to tilt the rotor disc forward by means of his cyclic control. It was at this point that the blade tips contacted the slip face.
- 2.3 Any damage, even minor, to the outer portion of the blades will result in increased drag, requiring more power to maintain rotor rpm. Should the power required exceed the power available, the rotor rpm will decrease with consequent loss of lift. The shooter's observations that the machine was "shaking" and the pilot was "fighting the controls" suggest severe damage to the rotor blades.
- 2.4 The initial pull back from the slip may have been a natural reaction to the blade strike, or an attempt to avoid injuring the shooter, or both. The subsequent forward movement may have been an attempt by the pilot to place the machine on the ground once he realised that the situation was irretrievable. However, both of these possibilities are unsubstantiated.
- 2.5 Once the helicopter had commenced its uncontrolled descent of the slope, damage and injury were completely beyond the control of the pilot.
- 2.6 The shooter's attempts to resuscitate the pilot, and his subsequent walk to summon help, are worthy of note.

3. Conclusions

- 3.1 The pilot was appropriately licensed and fit for the flight.
- 3.2 The helicopter had a valid Airworthiness Certificate and had been maintained in accordance with normal aviation practice.
- 3.3 At the time of the accident, the helicopter was being operated in a situation that left no margin for error.
- 3.4 The main rotor blades struck the slip face after the shooter alighted, probably as a result of pilot correction for centre of gravity change.
- 3.5 Blade impact damage rendered the helicopter incapable of further sustained flight.
- 3.6 Once the helicopter had touched down after the initial strike, the pilot had no control over the subsequent descent down the slip face.
- 3.6 The accident was not survivable.

4. Safety recommendations

4.1 Nil.

(Signed)

Michael G Hunt
Assistant Director Safety Investigation and Analysis
20 December 1999