

**Aviation Safety Investigation Report  
199601324**

**Robinson Helicopter Co  
R22**

**25 April 1996**

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**Occurrence Number:** 199601324      **Occurrence Type:** Accident  
**Location:** 194 km WSW Windorah, (ALA)  
**State:** QLD      **Inv Category:** 3  
**Date:** Thursday 25 April 1996  
**Time:** 1745 hours      **Time Zone** EST  
**Highest Injury Level:** Fatal  
**Injuries:**

|              | Fatal    | Serious  | Minor    | None     | Total    |
|--------------|----------|----------|----------|----------|----------|
| Crew         | 1        | 0        | 0        | 0        | 1        |
| Ground       | 0        | 0        | 0        | 0        | 0        |
| Passenger    | 0        | 0        | 0        | 0        | 0        |
| <b>Total</b> | <b>1</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>1</b> |

**Aircraft Manufacturer:** Robinson Helicopter Co  
**Aircraft Model:** R22 BETA  
**Aircraft Registration:** VH-EWQ      **Serial Number:** 1090  
**Type of Operation:** Miscellaneous Ferry  
**Damage to Aircraft:** Destroyed  
**Departure Point:** Windorah QLD  
**Departure Time:** 1620 EST  
**Destination:** Cadelga Station SA

**Crew Details:**

| Role             | Class of Licence | Hours on |             |
|------------------|------------------|----------|-------------|
|                  |                  | Type     | Hours Total |
| Pilot-In-Command | Commercial       | 253.4    | 344         |

**Approved for Release:** Monday, January 13, 1997

**FACTUAL INFORMATION**

**History of the flight**

The pilot had been tasked to ferry the helicopter from Windorah to Cadelga Station in preparation for cattle mustering. Several witnesses saw the helicopter depart at about 1620 EST. It was last seen some time after 1630 as it flew past South Galway Station, 61 km south-west of Windorah.

The track distance was 239 km with an expected flight time of about 1 hour and 40 minutes and an estimated time of arrival of 1800. The helicopter was expected at Cadelga Station before last light at 1829. When it had not arrived, the helicopter was reported missing. An extensive aerial search commenced at first light the next morning. The wreckage of the helicopter was found about 2 km to the right of the direct track and 31 km short of the destination.

#### Pilot information

The pilot was 20 years of age and had commenced his flying training on Bell 47 helicopters in March 1995. He gained an endorsement on Robinson R22 helicopters in May 1995. He passed his commercial helicopter licence test on 22 June 1995. In February 1996, the pilot passed a check flight with an instructor and obtained mustering training. Since then, he had been employed as a mustering pilot on a full-time basis.

The post-mortem examination report did not reveal any pre-existing physiological problems.

#### Wreckage examination

The helicopter wreckage was examined initially at the accident site and later transported to a maintenance facility at Archerfield Airport where a more detailed examination was possible. These examinations revealed that the helicopter had impacted in an attitude about 60 degrees nose-low and banked to the right. The skid gear had separated at impact and the remaining structure of the helicopter was severely compressed.

Significantly, the main rotor had ceased rotating and the engine had stopped by the time the helicopter struck the ground. Sections of the tailboom were scattered to the right of the main wreckage. Heavy items, such as a jerry can full of oil and the tail rotor assembly, were strewn ahead, along track (approximately 245 degrees M). Lighter items, such as paint flakes and perspex pieces, were scattered downwind, generally to the north of the main wreckage.

Examination of the main rotor blades found that both pitch-link rods were broken in overload and that both blades were bent into an "S" shape. The tailboom had suffered several main rotor blade strikes. The first blade struck on the flat with the top surface, distorting the tailboom and swinging the tail rotor assembly into the main rotor disc. The cabin was also struck by one or both main rotor blades.

The engine was bulk stripped at an engineering workshop. Nothing was found that would have prevented the normal operation of the engine. Examination of the exhaust manifold showed that the engine was still hot at impact. Both fuel tanks were holed, subsequently only a small quantity of clean fuel was recovered. The helicopter had undergone a periodic maintenance inspection prior to the flight.

Examination of the helicopter wreckage and of the maintenance documentation did not reveal any abnormalities which could have led to a loss of control.

#### Weather and environmental issues

An assessment of the weather conditions was obtained from the Bureau of Meteorology and local sources. The wind at 2,000 ft was a southerly at 10-15 kts. The surface wind was a light south-south-easterly, less than 5 kts. Cloud was scattered cumulus at 3,000-4,000 ft with patches of higher altocumulus. Sunset at the crash site was at 1808.

#### Robinson Helicopter Company research

Research undertaken by the Robinson Helicopter Company found that when the main rotor RPM decreases below 75% RPM, it will continue to decrease regardless of input from the pilot. In a short time span, the engine will stall and the rotor system will stop completely. During flight with rotor RPM in the normal range, the blades are relatively straight due to centrifugal force. As rotor RPM decreases below the normal range, the main rotor blades bend upwards in a permanent set, the pitch link rods break in overload and the droop stop tusks also break or bend. The main rotor blades are then free to swivel at the mast and flail, striking the tail and cabin structure.

#### Cabin luggage

Any luggage has to be carried in the cabin of the helicopter: in the space under each seat, on the passenger's seat, or on the cabin floor in front of the passenger's seat.

The pilot carried three bulky items in the cabin: a swag (bedroll), a full 20-L jerry can, and a small overnight bag. The rolled-up swag was later measured at 1,060 mm long by 350 mm in diameter. It was held upright by the lap/sash seat belt on the passenger's seat. The location in the cabin of the 540 x 300 x 200mm overnight bag could not be determined. The jerry can containing engine oil was ejected from the helicopter, indicating that it was not restrained and probably lying on the cabin floor in front of the passenger's seat.

The swag and overnight bag were removed from the wreckage before the investigation team arrived on site. Therefore any evidence of control interference caused by the luggage was lost. The Bureau's records show that since 1989 there have been four other similar occurrences, three of which resulted in accidents. In each occurrence, control was lost either totally or partially, due to inadequately restrained cargo in the cockpit. The 1989 accident was due to the in-flight movement of a swag and other equipment, held only by the passenger's seat belt.

#### Emergency locator transmitter

An emergency locator transmitter was not fitted to the helicopter, nor was one carried by the pilot.

### ANALYSIS

#### Loss of control

The loss of main rotor RPM and engine stoppage was preceded by an event which resulted in loss of control. This event was sudden and severe enough to prevent the pilot from taking timely corrective action. An assessment of the helicopter's attitude at impact and the wreckage distribution indicated that this event occurred at an altitude in excess of 500 ft.

There was no physical evidence found to indicate that the swag shifted and interfered with the flight controls.

The event which led to a loss of control could not be identified.

### SAFETY ACTION

Since 1989 there have been four similar occurrences, three of which resulted in accidents. In each occurrence, control was lost either totally or partially, due to inadequately restrained cargo in the cockpit.

The Bureau of Air Safety Investigation is considering an article for publication in Asia-Pacific AIR SAFETY highlighting the risks to safety from carriage of cargo in the cockpit of the Robinson R22 helicopter.