Aviation Safety Investigation Report 199200018

Hughes Helicopters
Hughes 500

20 December 1992

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Aviation Safety Investigation Report

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Occurrence Number: 199200018 **Occurrence Type:** Accident
Location: Near Lake Burrinjuck
State: NSW **Inv Category:** 3
Date: Sunday 20 December 1992
Time: 1735 hours **Time Zone** ESuT
Highest Injury Level: Fatal
Injuries:

	Fatal	Serious	Minor	None	Total
Crew	1	0	0	0	1
Ground	0	0	0	0	0
Passenger	2	0	0	0	2
Total	**3**	**0**	**0**	**0**	**3**

Aircraft Manufacturer: Hughes Helicopters
Aircraft Model: 369E
Aircraft Registration: VH-LLD **Serial Number:** 0133E
Type of Operation: Non-commercial Pleasure/Travel
Damage to Aircraft: Destroyed
Departure Point: Lake Burrinjuck NSW
Departure Time: 1730 ESuT
Destination: Cootamundra NSW

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	Private	650.0	1255

Approved for Release: Tuesday, July 19, 1994

The aircraft departed private property located at Tates Straight on Lake Burrinjuck NSW for Cootamundra NSW at about 1730 ESuT. On board were the pilot and two passengers. After takeoff the helicopter was seen to transit at a low altitude in a northerly direction. Three to four minutes after the helicopter departed, witnesses heard a sound like a muffled gunshot and shortly after, smoke was seen to rise from the direction in which the helicopter was headed.

The accident site was located in a valley about 3.5 km from the point of departure. The ground level at the south end, the direction from which the helicopter approached, was the highest ground elevation along the flight path. From this point the valley floor descended relatively steeply and the upper ridges of the valley sloped more gently with the distance between the ridges widening along the direction of flight. Trees about 15 m in height covered the valley and ridges.

Weather conditions observed at the lake were fine with little or no wind.

The main aircraft wreckage was located in the centre of the valley. Wreckage was distributed for a distance of about 180 m in the direction of flight, from an area adjacent to the estimated position of a power line which was suspended across the valley. The majority of the wreckage was located under the flight path. However the main rotor head with three blades attached, two separated main blades, and the tail rotor gearbox with damaged blades were distributed adjacent to the flight path. The fuselage and the main transmission were located about 180 m from the power line and were consumed by fire. The aircraft had descended at an angle of about 15 degrees through the tree canopy. After striking the ground, it slid about 10 m before coming to rest. The engine was located about 13 m beyond the fuselage. The three persons on board received fatal injuries.

About 1 km from the south end of the valley, a power line extended across the valley at right angles to the direction of flight. The power poles were located on the tops of each ridge which resulted in a wire suspension distance of about 832 m. The east ridge is about 510 m AMSL and the west ridge is about 480 m AMSL. The wreckage was located at about 380 m AMSL or between 100 and 120 m below the ridge heights. The power poles were located in clear spaces among the trees at the top of each ridge and could only be observed from a position in line with the suspended wire. The conductor was 4.2 mm in diameter and constructed of three strands of steel wire. The wire sag was reported by the electricity company to be about 41 m. The conductor was broken.

Examination of the recovered fuselage and tail boom showed evidence of a wire strike to the area of the helicopter just above the cockpit and repeated main rotor blade strikes to the fuselage and tail boom. The wreckage scatter both in the trees and on the ground was indicative of an in-flight breakup. There was no evidence of in-flight fire.

The engine exhibited signs of high speed rotation at impact and the damage was consistent with ground impact damage. Failues to the main rotor head, tail rotor and gearbox, and rotor blades were analysed as overload failures.

It could not be determined why the pilot departed to the north rather than to the north west direct to Cootamundra, nor why he was conducting the flight at an altitude which placed the aircraft below the valley ridge lines.

The sun was positioned left of and at near right angles to the direction of flight and would not have interfered with the pilots vision. The wire conductor was dull and would not have reflected sunlight. Consequently, the wire would blend in with the background features of trees, grass, water and sky making it difficult for the pilot to see and avoid.

Evidence gathered at the accident site indicated that the helicopter struck the suspended wire conductor while in normal cruise flight at a height of about 60 to 80 m above the ground. Wire contact occurred first on the upper fuselage and then on the main rotor head. The contact would have applied abnormal gyroscopic loads to the main rotor disc. These loads would result in the blades travelling outside their normal paths and striking the helicopter fuselage and tail boom. Metal components recovered from the fuselage and tail boom, and main rotor blade damage, indicates that there were multiple main rotor blades strikes on the aircraft structure. The main and tail rotors separated from the helicopter before it descended into the trees.

Significant Factors

1. The aircraft was being flown at low altitude and struck a power line.

2. An in flight breakup of the helicopter occurred.