Aviation Safety Investigation Report 199403799

Hughes Helicopters 500 "C"

16 December 1994

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Aviation Safety Investigation Report

199403799

Occurrence Number: 199403799 **Occurrence Type:** Accident
Location: 10km N Leongatha
State: VIC **Inv Category:** 3
Date: Friday 16 December 1994
Time: 1207 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	0	0	0	0	0
Total	**1**	**0**	**0**	**0**	**1**

Aircraft Manufacturer: Hughes Helicopters
Aircraft Model: 369HS
Aircraft Registration: VH-YEA **Serial Number:** 1240678S
Type of Operation: Commercial Aerial Agriculture - Other
Damage to Aircraft: Destroyed
Departure Point: Arawata (area) VIC
Departure Time: 1155 ESuT
Destination: Arawata (area) VIC

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	Commercial	57.0	1488

Approved for Release: Wednesday, January 3, 1996

The helicopter had been hired to spray noxious weeds on steep, hilly terrain and had sprayed several local properties in the two days prior to the accident. On the day of the accident, the pilot began his preparations at 0410 local time but did not begin spraying until 1030 because of fog in the treatment areas. He then sprayed three sites before arriving at about midday over the property where the accident occurred.

The pilot conducted an aerial inspection before commencing to spray a very steep rocky area at the northern end of the property. He systematically flew about ten short spray runs north of the powerline then crossed to the southern side of the powerline and flew two spray runs over a small paddock. Ground witnesses then observed the helicopter flying north, at about 100 ft towards a previously-treated area. They became very concerned that it was flying towards the powerline at about the same height as the wires. One witness used hand signals in an attempt to prompt the pilot to climb but the aircraft struck the powerline. It pitched steeply nose-down and began breaking up before impacting the ground, inverted, about 70 m beyond the powerline, then rolled 15 m before coming to rest. There was no fire.

At the time of the accident, the temperature was about 24 degrees celsius, there was a light breeze but no cloud or turbulence, and visibility was at least 20 km.

The wreckage was subsequently examined by engineers. Evidence was found in the engine compressor and the combustion chamber to confirm that power was still being produced at ground impact. No pre-existing faults were found with the aircraft which may have contributed to the accident.

Wire strike marks on the helicopter showed that it first contacted the powerline with the forward right fuselage at about cabin floor level. Two wires then slid down the chin and snagged on the right spray boom which then separated from the aircraft. The helicopter pitched nose down so severely that the tail boom, along with much of the airframe directly above the engine, was severed by the main rotor blades, one of which detached from the aircraft.

The helicopter carried fuel sufficient for the flight, and was within its approved centre of gravity and gross weight limits at the time of the accident.

The pilot was endorsed on the Hughes 396HS helicopter and held an Agricultural Rating Class 2. His total agricultural flying experience was 1079 hours. He had been provided with detailed maps of the treatment areas.

The pilot was seen wearing a crash helmet minutes before the accident but it came off during the accident sequence. Damage to the seat belt inertia reel housing was consistent with the pilot wearing the full harness at ground impact.

The helicopter was equipped with a survival beacon which did not transmit a distress signal because it had not been either armed or switched on by the pilot.

The powerlines did not carry markers on the wires. Treatment areas were either side of the powerline and not far apart so the pilot should have been aware of the powerline even though it traversed the valley with a span of 478 metres between poles. However, due to poor contrast between the powerline and the terrain, the pilot probably found it difficult to detect the two wires in time to avoid them. It could not be determined if the pilot applied an appropriate method of identifying the position of the wires from the air before he began spraying.

VH-YEA was not fitted with a wire-strike protection system (WSPS). The Hughes 500 may be fitted with a WSPS as an optional extra. A standard helicopter WSPS includes one wire-cutter fitted forward on the roof of the cabin and a second cutter forward on the belly, plus devices to guide the wires into the cutters. VH-YEA was fitted with a Simplex agricultural spray kit which included a belly tank, pressure pump and boom. When fitted, this particular model Simplex tank protruded so far forward that there was not enough available space for a lower wire-cutter to be installed on the fuselage. Other helicopter spray tanks are available which, when installed, allow space for both cutters to be fitted.

Had an approved WSPS been fitted to VH-YEA, the lower cutter would probably have severed both wires and the helicopter may have received minor wire-strike damage.

Significant Factors

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

1. the powerline was probably difficult to detect due to a lack of contrast with the background terrain; and

2. the helicopter was not fitted with wire-strike protection equipment.

Safety Action

Helicopters are not specifically designed for agricultural work, unlike most modern agricultural aeroplanes which come with re-enforced cabin and wire deflectors/cutters. Helicopters have been adapted for agricultural operations and have approved spray kits or spreaders attached. However, most helicopters used for agricultural operations do not have added crashworthiness built into their cockpits; nor do they have WSPS fitted.

WSPS have been developed and approved for several helicopter types, mostly as a result of low level military roles. However, rescue operators, fire bombers, medical retrieval helicopters and particularly agricultural helicopters are often in the low level environment where powerlines exist.

Analysis of Bureau records indicate that, wire-strikes account for about 9% of helicopter accidents in Australia. Since 1984 there have been 73 reported occurrences of wire strikes by helicopters. Of these approximately 50% may have benefited by having an approved WSPS fitted, including 12 occurrences that resulted in fatalities. It is probable that had a WSPS been fitted to this helicopter, the accident would not have occurred.

Recommendation R950120

The Bureau of Air Safety Investigation recommends that the Civil Aviation Authority:

(i) require the fitment of approved wire-strike protection system kits for all helicopters engaged in low flying activities for which a kit exists; and,

(ii) that only agricultural spray kits compatible with wire-strike protection systems be approved for fitment to these helicopters.