Aviation Safety Investigation Report 198901561

Hughes 269C

11 December 1989

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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: 198901561 **Occurrence Type:** Accident
Location: 5km W of Gisborne VIC
Date: 11 December 1989 **Time:** 1500
Highest Injury Level: Minor
Injuries:

	Fatal	Serious	Minor	None
Crew	0	0	0	0
Ground	0	0	0	-
Passenger	0	0	0	0
Total	**0**	**0**	**2**	**0**

Aircraft Details: Hughes 269C
Registration: VH-AHQ
Serial Number: 1190854
Operation Type: Aerial Work
Damage Level: Destroyed
Departure Point: Essendon VIC
Departure Time: 1440
Destination: Bacchus Marsh VIC

Approved for Release: 6th August 1990

Circumstances:

The Examiner-of-Airmen was flight testing a pilot for his commercial helicopter licence. At 3000 feet above sea level the Examiner closed the throttle without warning, to simulate an engine failure. The Examiner had preselected what he considered to be a suitable clearing within autorotative distance for the practice forced landing. The terrain was undulating, tree covered but with scattered clearings. Ground level averaged 1500 feet above sea level. The candidate was not expecting a simulated emergency; he was not holding the collective lever. However, he performed a normal entry into autorotation straight ahead. The main rotor RPM initially reduced to the bottom of the green arc (390 RPM). Instead of reducing to idle RPM, the engine stopped when the throttle was closed. The Examiner immediately took over control of the helicopter and turned right into wind and towards the clearing. Rotor RPM was soon established in the middle of the green arc (at about 450 RPM) but there was no response to the throttle. During the descent towards the clearing, the pilots unsuccessfully attempted to restart the engine. During the autorotative descent the helicopter undershot the clearing. At the tops of 15 metre high trees, about 20 metres short of the clearing, the Examiner flared the helicopter and applied some of the collective pitch to reduce the rate of descent. As the helicopter settled through the trees with about 20 knots forward speed, he pulled the remaining collective pitch. At about five metres above ground level the helicopter settled on to saplings at the edge of the clearing. The saplings cushioned the descent and diminished the forward speed. The main rotors struck the ground and the helicopter came to rest on its right side about eight metres into the clearing. The two pilots were wearing a full harness. Both inertia reels locked (as designed) at ground impact. Both harnesses severed at the point where the straps exit the reels. The investigations determined that both reels had been installed upside down before the Australian Certificate of Airworthiness was issued in 1988, despite the existence of a detailed CAA Airworthiness Directive warning that erroneous installation could jeopardise restraint in an accident. Engineering bench tests and subsequent engine ground runs revealed that fuel injector servo fuel flow at engine idle setting was excessively rich.

The fuel injector servo had been fitted to the helicopter six days before the accident and the helicopter had successfully carried out several simulated engine failures in training during that period. There is little doubt that the engine stopped as the result of a "rich cut" when the Examiner closed the throttle to simulate an engine failure.

Significant Factors:

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

1. The fuel injector fuel flow was excessively rich at engine idle.

2. The engine stopped during the simulated engine failure because of a "rich cut".

3. It is more difficult for a pilot to judge a helicopter's autorotative glide distance over undulating terrain than over flat terrain.

4. The Examiner-of-Airmen misjudged the range cabability of the helicopter's autorotative descent.