

**Aviation Safety Investigation Report
199402845**

**Bell Helicopter Co
JetRanger III**

05 October 1994

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Occurrence Number: 199402845 **Occurrence Type:** Accident
Location: 5km NW Paraburdoo
State: WA **Inv Category:** 4
Date: Wednesday 05 October 1994
Time: 1040 hours **Time Zone** WST
Highest Injury Level: None

Aircraft Manufacturer: Bell Helicopter Co
Aircraft Model: 206B (III)
Aircraft Registration: VH-BLN **Serial Number:** 2846
Type of Operation: Charter Passenger
Damage to Aircraft: Substantial
Departure Point: Point Sampson WA
Departure Time: 0550 WST
Destination: Paraburdoo WA

Crew Details:

Role	Class of Licence	Hours on	
		Type	Hours Total
Pilot-In-Command	ATPL 1st Class	500.0	3200

Approved for Release: Wednesday, August 2, 1995

The aircraft was being used for a pipeline survey, involving a number of landings and takeoffs, prior to the accident. As the aircraft approached Red Hill, a survey check point, the pilot noticed that the fuel gauge indicated that the equivalent of 170 l of fuel remained. He elected to proceed to Paraburdoo, 116 NM away, to refuel. The pilot calculated that the trip would take 77 minutes and he would arrive at Paraburdoo with approximately 40 l of fuel remaining (the minimum operational requirement).

About 20 minutes after leaving Red Hill the pilot noted that the fuel gauge still indicated 170 l. It remained at this reading for a further 10 minutes before beginning to oscillate and fall rapidly. The pilot reassessed the readings and determined that he still had sufficient fuel for the flight.

Approximately 5 km north-west of Paraburdoo, as the aircraft was descending through 3500 ft, the turbine temperature and engine RPM began to fluctuate. The pilot assumed an engine malfunction and entered an autorotational descent rather than risk a more significant problem during a normal approach.

When 500 ft above the ground the pilot observed that the area he had selected for landing was unsuitable. He adjusted his approach to land at a more suitable site however, it was further away. During the extended glide, to the new site, the pilot allowed the rotor RPM to decrease (the low RPM warning sounded during the approach) and in the ensuing heavy landing a main rotor blade struck and damaged the tail boom. The engine continued to run at idle during the approach and was shut down by the pilot after landing.

A post accident inspection found that the fuel gauge indicated the fuel tank contained the equivalent of 19 l of fuel. Draining the tank retrieved around 15 l of a fuel/water mixture (confirmed by laboratory testing) from the aircraft. Additional fuel/water was found when the fuel contents sender units were removed for testing. Tests on the fuel contents sender units indicated that it was possible for the gauge to stick between readings of 114 and 190 l.

Calculations indicate that the helicopter left Port Sampson with an endurance of 220 minutes and that it had been operating for about 206 minutes at the time of the engine malfunction. The low fuel pressure lights did not illuminate during the accident sequence indicating that the fuel inlet remained covered at all times. Background information indicates that the turbine engine fitted to the Bell 206 helicopter is tolerant of water held in suspension in the fuel however, ingestion of a fuel/water mixture where the percentage of water has increased as a result of its settling out of the fuel into the bottom of the tank, may cause fluctuations similar to those reported by the pilot.

The most likely reason for the engine malfunction was that the low fuel state raised the percentage of water in the fuel/water mixture to a point where it began to effect engine performance.

Evidence indicates the pilot did not carry out water disclosing check at Port Sampson prior to departure. Had he done so he may have determined that water was present and taken action to correct the situation before it led to an emergency landing.

The low RPM state prevented the pilot from arresting the descent sufficiently to prevent a heavy landing.

The pilot did not complete a flight plan or a fuel log for or during the flight. Consequently, he had to rely solely on the fuel gauge indications which, in this case, may have been incorrect.

