

No: 8/88

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Category: 2c

**Aircraft Type and Registration:** Bell 206 L-1, G-CINE

**No & Type of Engines:** 1 Allison 250-C28B

**Year of Manufacture:** 1980

**Date and Time (UTC):** 25 April 1988 at 1940 hrs

**Location:** Dolgellau, Wales

**Type of Flight:** Ariel application

**Persons on Board:** Crew - 1                      Passengers - None

**Injuries:** Crew - None                      Passengers - N/A

**Nature of Damage:** Tail boom distorted

**Commander's Licence:** Commercial Pilot's Licence (Helicopters)

**Commander's Age:** 48 years

**Commander's Total Flying Experience:** 6624 hours (of which 350 were on type)

**Information Source:** Aircraft Accident Report Form submitted by the Pilot

The helicopter had been ferried from an adjoining private farm. Upon landing the pilot considered the helicopter was too near a farm track to leave overnight and decided to look from the air for a more suitable tie-down area. After lift-off to a height of 30-50 feet, and while moving to the left, the machine gave a distinct shudder and the engine-out warning sounded. The pilot pitched the helicopter downwards and then immediately flared over the only piece of available ground. However, this turned out to be sloping and rather unsuitable. During the landing the tail boom was damaged by inertial forces, but there was no other damage to the helicopter.

The fuel system was examined by the maintenance organisation. The Long Ranger version of the Bell 206 is fitted with additional long range tanks which are mounted beneath the front seats. Fuel from these tanks is fed into the rear main tank by a fuel ejector pump which is driven from the two electric fuel pumps in the rear tank. The electric fuel pumps feed fuel through a manifold which distributes the fuel to the engine and to the ejector pump by means of check valves. Approximately 130 lbs of fuel were removed from the helicopter, more than 100 lbs from the rear tank and a small amount from each forward tank. The airframe mounted fuel filter was found to be contaminated with water and very fine foreign matter. The fuel tanks were also found to be contaminated. The fuel governor and fuel control unit were examined and found to be free of contamination and defects, but the fuel control unit

scheduling was slightly out of adjustment. Contamination was also found in the manifold check valves and in the nozzle filters between the electric pumps and the ejector pump. The ejector pump itself was free from any contamination. The helicopter had flown 20.23 hours since its last inspection, which was an annual check.

The functioning of the electric fuel pumps and manifold were checked and it was found that the left pump delivered fuel satisfactorily to the engine but, because of the manifold contamination, no fuel was delivered to the ejector pump. The right pump supplied fuel to the ejector pump, but not to the engine, due to contamination. Thus if the left pump stopped for any reason the fuel supply to the engine would have been lost, whilst failure of the right pump would have prevented fuel transfer from the forward tanks. Both pumps functioned however, and no defect was found in the electrical supplies or indications. It was noted that the low rotor rpm audio warning was of a broadly similar pitch and intensity to the engine failure audio warning, however, the latter was an intermittent sound and the former continuous.

The maintenance organisation reported that this had been the third Long Ranger which they had examined where contaminated fuel had affected the operation of parts of the fuel system. They suggested that particular attention to fuel cleanliness is required on the Long Ranger if problems with the ejector pump, and consequent fuel transfer problems, are to be avoided.