

No: 10/89

Ref: EW/C1129

Category: 2b

**Aircraft Type
and Registration:**

MBB Bolkow BO 105 D, G-BEZH

No & Type of Engines: 2 Allison 250-C20 turboshafts

Year of Manufacture: 1973

Date and Time (UTC): 5 August 1989 at 0905 hrs

Location: 1 mile north northwest of Strathpeffer, Inverness-shire, Scotland

Type of Flight: Positioning

Persons on Board: Crew - 1 Passengers - 1

Injuries: Crew - None Passengers - 1 (Minor)

Nature of Damage: Substantial damage to fuselage, main rotor blades destroyed, tail rotor drive sheared through.

Commander's Licence: Airline Transport Pilot's Licence (Helicopters) with valid Instrument Rating

Commander's Age: 41 years

**Commander's Total
Flying Experience:** 6,065 hours (of which 477 were on type)

Information Source: AAIB Field Investigation

History of the flight

The pilot and engineer had remained with their helicopter overnight at Plockton, Ross-shire, and were to reposition to their base at Longside, Aberdeenshire on the morning of the accident. The pilot had obtained a weather report from the destination and it was similar to the prevailing conditions at Plockton. It was generally fair with low cloud between 500 and 1000 feet and occasional showers in which visibility and cloud base were reduced. After the helicopter had been inspected and found satisfactory for flight, it took-off at 0825 hrs and followed the recognised low level route eastwards following the railway line towards Dingwall. The flight was conducted in VMC. As the flight progressed, the weather improved somewhat with clear patches of sky becoming visible. When some 4 miles west of Dingwall and in the area of Loch Garve the pilot noticed a rain shower ahead with cloud extending towards the surface of the small pass through which his intended route passed. He decided against continuing and initiated a left turn but, realising that he had insufficient airspace in which to complete the turn, he initiated a climb with the intention of achieving a safe height in IMC.

Initially the airspeed reduced to quite a low value, at least below 40 kt, but the pilot states that he made an appropriate control movement to correct this and maintained about 80% torque as climb power. At this stage he became uneasy with the indications of his artificial horizon (AH). He was aware that this instrument had a history of sometimes presenting attitudes that differed from those shown on the left hand stand-by instrument. He therefore transferred his attention to the left hand AH which was positioned at the far left side of the instrument panel. The climb continued to an estimated height of 2000 feet amsl when the pilot sensed that the helicopter had begun to descend although he had not commanded such a manoeuvre. He felt unable to arrest this descent and became uneasy about the indications of the left hand AH which was indicating wings level and slightly nose up but the aircraft's compass was indicating a left turn. By now the pilot considered that he had become disorientated and he transferred his attention outside the cockpit in the hope of gaining some external reference from the ground as the helicopter descended towards it. He was next aware that the helicopter was approaching trees and shortly afterwards it contacted the trees in a gentle right hand turn. Meanwhile, the pilot had flared the helicopter and applied full collective pitch such that the audio warnings of low rotor rpm and rotor droop sounded.

The helicopter crashed through the trees down a 25° slope for about 20 metres before it tumbled about its nose and came to rest on its left side and facing roughly the direction from which it had come. The pilot immediately shut down the engines and then exited the helicopter prior to helping out his engineer who was complaining of pain in his back. Then the pilot noticed flames issuing from the jet pipe of the right engine and his engineer exited the helicopter carrying a hand held extinguisher. This he discharged into the right engine before both occupants withdrew to a safe distance but, once it appeared to them that there was no further immediate danger of fire, they returned several times to recover equipment from the wreckage. This included a portable telephone by which means they were able to report the accident to their base at Longside. Later they received telephoned instructions from the local police to proceed towards the railway line that ran to the south of their position where, after a difficult passage through dense forest, they eventually met up with police officers who guided them to Dingwall.

Meteorological information

At 0850 hrs a meteorological observation was made at Inverness Airport, some 13 miles south east of the accident site. The wind was 050°/5 kt, visibility was 16 km, cloud was 1 okta at 200 feet: 5 oktas at 600 feet :7 oktas at 1100 feet. The temperature was +13°C and dewpoint was +11°C. A special observation at 0901 hrs differed little except that cloud at 600 feet was 3 oktas.

Examination of the wreckage

The helicopter had come to rest on its left side in dense forest. The main rotor blades had been torn from the rotor head. The tail rotor was still attached although the blades had been damaged and the drive shaft completely severed. The main gearbox "A" frame had broken. The helicopter was recovered from the forest using the sling facility of an AS332L and then transported by road to the company's base at Longside. Both AH instruments (SFENA Type 903 BD Part No 6610-14-268-

1620) and their respective static inverters were removed for bench testing and strip examination by an approved overhaul organisation under the supervision of AAIB. The right hand AH was found to be unserviceable and, upon dismantling, it was found that one of the balance weights of the erection mechanism had jammed causing a progressive right roll indication. It is possible that the fault was intermittent in that the jammed erecting balance weight could have become free periodically during start-up and shut-down cycles of the instrument. Thus on occasions the instrument would have indicated correctly. The left hand AH was found to be serviceable.