

No: 1/89

Ref: EW/C1084

Category: 2c

**Aircraft Type
and Registration:**

Robinson R22 Beta, G-SMIF

No & Type of Engines:

1 Lycoming O-320-B2C piston engine

Year of Manufacture:

1988

Date and Time (UTC):

10 September 1988 at 1130 hrs

Location:

Prescott, near Cheltenham

Type of Flight:

Private

Persons on Board:

Crew - 1

Passengers - 1

Injuries:

Crew - 1 (Serious)

Passengers - 1 (Serious)

Nature of Damage:

Aircraft destroyed

Commander's Licence:

Private Pilot's Licence (Helicopters)

Commander's Age:

33 years

**Commander's Total
Flying Experience:**

122 hours (of which 120 were on type)

Information Source:

AAIB Field Investigation

HISTORY OF THE FLIGHT

The helicopter departed Wycombe Air Park (Booker) at 1034 hrs for a private flight to a house at Prescott near Cheltenham. The weather was fine with a light westerly wind and a temperature of +15°C. The pilot, who was the owner of the aircraft, had gained his Private Pilot's Licence (Helicopters) in March 1988 and had a total of 120 hours on Robinson R22 aircraft. Following take-off at close to the maximum permitted weight, an uneventful flight was made to the vicinity of the proposed landing site.

Although the pilot had obtained directions to the site he had not received a briefing on its dimensions nor on the extent of obstructions surrounding it. Having located the site, the pilot carried out one medium level and two low level passes to satisfy himself that it was suitable for landing and planned a near vertical landing in order to clear obstructions on the approach. The surface wind at Staverton Airport at the time was 240°/8-10 kts and the final approach was made in this direction.. A meteorological aftercast confirmed that this wind was valid for the landing site. The site was a level paddock 48 metres by 19 metres, 460 feet above mean sea level, and surrounded by trees. The up-wind side of the site was bounded by trees up to 70 feet high and there were trees up to 30 feet high on the approach, down-wind, side. The other boundaries of the site had trees ranging from 20 to 40 feet high. Following its final approach, G-SMIF came to a virtual hover 20-30 feet above the tallest tree (about 100 feet above the paddock) and well into the landing site.

This position was held for about 30 seconds with the helicopter moving slowly forward. The carburettor heat control had been selected to the mid range of its travel before the approach began. The pilot stated that he was not entirely happy with the approach and elected to go-around for a further approach. He states that he banked to the right and raised the collective lever but was not aware of any response from the engine. He then became aware of the helicopter juddering and noticed that the rotor rpm had fallen to less than 50%. The pilot could recall the operation of both the rotor low rpm light and the rotor low rpm warning horn but could not recall at what stage they operated.

The passenger, who was familiar with the Robinson's systems, although not a pilot, stated that the aircraft started to yaw and roll while still in the hover and that both the rotor warning light and horn operated before the pilot raised the collective lever. Ground witnesses stated that they observed the aircraft start to yaw and roll and became aware of a lack of engine noise coincident with the onset of pitching and yawing. The aircraft then descended into tall trees some 300 metres from the intended landing site. The aircraft suffered substantial damage while falling through the trees and both occupants suffered serious injuries. Observers from the landing site were quickly on the scene and extricated both occupants from the wreckage. Despite extensive fuel spillage and live electrical circuits, there was no fire.

ENGINEERING INVESTIGATION

Examination of the accident site and the wreckage by AAIB showed that G-SMIF had descended steeply through the trees, at an angle of about 70° to the horizontal and at very low rotor speed. The ground impact was at an attitude of approximately 25° nose-down on a soft earth bank and the helicopter had then rolled to the right through 270°, coming to rest against a wire fence with the fuselage lying on its left-hand side. In this position the contents of the auxiliary fuel tank were able to flow through the vent pipe into the airframe, although the fuel system had not been disrupted in the impact. The severity of the vertical deceleration at impact, and thus the occupants' injuries, was largely reduced by the progressive plastic deformation of the landing gear cross-tube and the sheet metal seat-bases.

The nature of the damage to the airframe and the rotor blades indicated that the initial rotor strike occurred between one main rotor blade and the tailcone and that this occurred at a low rotor speed. The tailcone then became detached from the fuselage as the helicopter descended through the trees and was found folded around one of the main rotor blades.

The flight control, fuel, engine control and dynamic systems were examined in detail after removal of the wreckage to the AAIB at Farnborough and all of the mechanical failures in these systems were found to be consistent with the impact sequence. The engine, which drives the rotor system through a V-belt pulley system, was subsequently removed and transported to an overhaul facility where it was run against a dynamometer on an engine test-bed. With its original spark plugs, magnetos and carburettor installed, the engine produced 157 horsepower at 2700 rpm, within 2% of the engine's rated power and above its reduced rating of 131 horsepower at 2650 rpm as installed in the Robinson R22 Beta.

The examination of the helicopter revealed no failure or unserviceability that could have resulted in a loss of rotor speed.