

AAIB Bulletin No: 11/94

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Category: 2.3

Aircraft Type and Registration: Robinson R22 Beta, G-OPAC

No & Type of Engines: 1 Lycoming O-320-B2C piston engine

Year of Manufacture: 1989

Date & Time (UTC): 14 August 1994 at 1330 hrs

Location: Northchurch Farm, Berkhamsted, Hertfordshire

Type of Flight: Private

Persons on Board: Crew - 1 Passengers - None

Injuries: Crew - Serious Passengers - N/A

Nature of Damage: Damaged beyond economic repair

Commander's Licence: Private Pilot's Licence

Commander's Age: 42 years

Commander's Flying Experience: Rotary wing: 64 hours (all on type)
Last 90 days - 3 hours
Last 28 days - 1 hour
Fixed wing: 339 hours

Information Source: Field Investigation

History of flight

The surface wind was northerly at 12 to 14 kt, the visibility was 20 km and there was no significant weather. The helicopter was on the helipad at Northchurch Farm; the intention was to climb initially to the north and then to land in a paddock to the south of the helipad to pick up passengers. About 30 metres to the north, there were power cables which crossed the intended flight path. The helicopter lifted into the hover and, as it accelerated, the pilot reported that he heard what he described as a loud 'bang/pop' which appeared to come from behind him; there were no other indications of a malfunction, however, he instinctively lowered the collective lever and eased the cyclic forward to set up for a 'run on' landing straight ahead. The helicopter yawed to the right and the pilot felt severe vibration through the controls; there appeared to be no response to his cyclic inputs. It then dropped vertically, impacted the ground firmly in a level attitude, left skid first, and bounced a short distance before coming to rest, on its left side, a short distance north of the line of the power cables. The pilot was severely injured by the impact; he was unable to complete the shutdown drills but did manage to release his seat belt. Unfortunately he then fell to the lower, left side of the cockpit. With great difficulty he managed to stand up and haul himself through a hole in the perspex on the right-hand canopy. He dropped to the ground and managed to crawl some 10 feet from the wreckage.

Pilot's injuries

The pilot suffered injury to the lower vertebrae which were entirely consistent with a near vertical impact; a similarity to injuries suffered by military pilots post ejection was noted. His left arm was broken in a manner commensurate with the attempted application of down collective lever at impact.

The power cables

The three 11 kV hard drawn copper cables were horizontally disposed and were, at the pole, about 28 feet above the ground; they were green in colour due to normal oxidation. The distance between the two outer cables was 7 foot 4 inches; the middle cable is normally offset about 2 inches from the central position. Subsequent inspection of the cables by Eastern Electricity engineers found that all three cables had been severed and both outer cables showed signs of burning; the middle cable showed no such signs.

Protection is provided by an autoreclosing circuit breaker which will break and remake the circuit in the event of a transient short. The circuit breaker had tripped and locked off thereby removing power from the cables.

Examination of the wreckage

Examination of the wreckage confirmed that the impact with the ground had been almost vertical. There were no signs of wire strikes on either the skids or the body of the helicopter including the main rotor mast fairing. The tailcone and tail rotor were virtually undamaged. There was evidence of wire strikes on upper part of the main rotor mast and a length of the power cable was wrapped tightly around the swash plate assembly; the pitch links had been severed. The swash plate assembly was locked in a position commensurate with the collective lever being at about half travel; the cockpit lever was found in this position and it could not be moved.

Both rotor blades had suffered upward bending and there were two areas of identical chordwise slashes on the outboard underside of each blade. The marks appeared to have been a result of contact with the power cables.