

Aircraft Type and Registration: Bell 206B JetRanger III, G-STOX

No & Type of Engines: 1 Allison 250-C20B turboshaft engine

Year of Manufacture: 1974

Date & Time (UTC): 24 January 1995 at 1510 hrs

Location: 6 nm west of Kettering, Northamptonshire

Type of Flight: Pipeline inspection

Persons on Board: Crew - 1 Passengers - 2

Injuries: Crew - None Passengers - None

Nature of Damage: Complete separation of empennage, tail rotor and aft portion of tail boom

Commander's Licence: Airline Transport Pilot's Licence (Helicopters)

Commander's Age: 34 years

Commander's Flying Experience: 2,816 hours (of which 954 were on type)
Last 90 days - 46 hours
Last 28 days - 16 hours

Information Source: AAIB Field Investigation

The helicopter was being flown on a pipeline patrol from Conington to Cranfield, with an experienced observer occupying one of the rear seats and a trainee observer in the front. During this exercise the pilot decided to demonstrate to the trainee observer the action taken on observing a pipeline encroachment, manoeuvring the helicopter and coming to a hover. After checking that the area was clear, the pilot entered an expeditious descending turn to come to a hover into wind and during this descent he used gentle applications of collective lever to contain the rotor speed while in the low power range.

The pilot reports that, as he levelled off from the descent, he 'tightened' the flare as he came into wind and gently raised the collective lever to bring the NR (rotor speed) and N₂ (power turbine speed) together. Up to this point the pilot believes that the engine was responding normally. As the effect of the flare diminished, he started to raise the collective lever in a smooth and progressive manner, so as to apply engine power, but the rotor speed began to droop and continued to droop until the Low Rotor RPM audio warning and caption were activated. At about this point the experienced observer in the rear seat noted a distinctive series of sounds from the engine/transmission area. The

pilot lowered the lever and attempted to use his remaining forward airspeed to restore the rotor speed, which stabilised at about 85% NR. During this time the helicopter descended and the pilot used the remaining rotor speed to cushion the touchdown, which the pilot believed to be level, into wind and at little or zero forward speed.

After touchdown the pilot was aware of the nose pitching down, the main rotor blades flapping violently and the aircraft rocking wildly. After closing the fuel valve, applying the rotor brake and switching off the battery the pilot and passengers exited safely; outside they discovered that the main rotor blades had cut off the tail and that the helicopter was facing 180° from the initial direction of the touchdown.

Examination of the ground marks at the accident site showed that, as the skids touched the ground, the helicopter still had some forward ground speed. As the tips of the skids dug into the ground, softened by the winter rains, the helicopter had tipped forward onto its nose transparency, giving a steep nose-down pitch attitude. This had put the tail in a position to be struck by the main rotor blades.

Examination of the aircraft following the accident showed the engine controls to be in place and correctly rigged and the various pressure signalling lines to be secure. The engine was removed from the aircraft and taken to an overhaul agency where, because of the sudden rotor stoppage, it was bulk-stripped rather than run on a testbed. This examination showed only minor defects, none of which should have resulted in a substantial loss of power. The powerplant has three major mechanical fuel system components (fuel pump and filter, gas producer fuel control unit and power turbine fuel governor) and these were separately bench-tested. These tests also showed some minor discrepancies in comparison with the acceptance criteria but, again, none which would be expected to result in a substantial loss of power.

The pilot reports that, during checks on the ground before flight, the engine in G-STOX had shown unusual symptoms. For instance, the engine had responded correctly to 'slam' decelerations but the pilot had found that, on re-advancing the throttle, the engine would tend to 'surge'. The experienced observer in the rear seat described the series of sounds he heard as the pilot applied power in the flare as a "whuff-whuff-whuff": he also states that this was very similar to the sounds accompanying the application of power after the 'slam' decelerations during the ground checks before flight.