

AS332L, G-TIGT

AAIB Bulletin No: 12/2000 Ref: EW/C2000/02/05 Category: 2.1

Aircraft Type and Registration: AS332L, G-TIGT

No & Type of Engines: 2 Turbomeca Makila 1A turboshaft engines

Year of Manufacture: 1983

Date & Time (UTC): 15 February 2000 at 0901 hrs

Location: Approximately 4 nm west of Brent B oil rig

Type of Flight: Oil Charter

Persons on Board: Crew - 2 - Passengers - 18

Injuries: Crew - None - Passengers - None

Nature of Damage: 4 main rotor blades showing lightning damage

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

Commander's Age: 49 years

Commander's Flying Experience: 8,400 hours (of which 4,600 were on type)

Last 90 days - 91 hours

Last 28 days - 39 hours

Information Source: AAIB Field Investigation

The Captain (PNF) reported that as the aircraft was leaving the Brent Bravo oil rig, bound for Scatsta, an area of weather which had been circumnavigated on the outbound flight had developed into two areas west of the Brent Field, ie approximately on the intended return track. No vertical cloud development was visible but red radar returns were left and right of the inbound track with rain in between. Offshore installations to the west were visible through the gap. The aircraft commenced a climb to the assigned altitude of 2,000 feet and, as it passed through 1,500 feet between the areas of weather, rain and hail were encountered, followed by ADF fluctuations and static on the intercom/radios.

A flash, bang and momentary heat pulse then occurred but nothing was felt through the airframe. There was no malfunction of the instruments or abnormality in the flying controls. The crew deduced that a lightning discharge had occurred in close proximity but had not struck the aircraft.

In view of the absence of indications that the aircraft had been struck, the flight continued towards Scatsta. A lightning report was made to Brent Approach and subsequently to Shetland Radar. The helicopter almost immediately cleared the weather and entered sunny conditions with over 40 kilometres visibility. The remainder of the flight and landing were uneventful.

The Captain commented that fifteen minutes after take off on the outbound leg, (ie from Scatsta) whilst at 2,000 feet, he had observed mammato cumulous clouds (ie clouds having pendulous under-surfaces) forming part of the overcast some 2,000 feet above. This prompted him to contact his company base at Scatsta to establish whether any lightning activity was being shown on the MIST meteorological display. It is understood that none was visible at that time. On crossing the East Shetland Basin Zone Boundary, a red radar return was seen on track and the flight path was altered to pass through the edge of this weather.

The conditions in which the strike occurred were summarised as, altitude 1,500 feet, airspeed 90 kt, OAT+4°C, cloud ceiling 2,500 to 2,900 feet with scattered cumulous. At the time the aircraft was judged to be between clouds, below the ceiling, in conditions of nil turbulence with falling hail and no flashes or St Elmo's fire visible.

Examination of the aircraft revealed some lightning damage on each of the four main rotor blades, with extensive burning of one tip cap. The blade damage took the form of local skin separations and bonding foil ruptures.

Replay of the CVR/FDR unit confirmed that the strike occurred close to the beginning of the recording. The recording of the navigational co-ordinates, however, was not functioning. It was found that an error had taken place in the implementation of a modification to enable the recorder to receive signals from a new item of navigation equipment recently installed on the aircraft fleet.

The aircraft manufacturers reported that all 4 main rotor blades could be repaired without complication, and confirmed that one tip cap had extensive burn damage and would require replacement.

Comparing the damage with that experienced by AS 332 aircraft G-BWZX during a lightning strike on 12/12/97, it is clear that damage to G-TIGT was less severe. On the previous event, although two blades were damaged beyond repair, and continued integrity of those two blade structures could not be guaranteed, it was clear that the damage was restricted to a limited depth from the blade surfaces and only affected the outermost plies of the CFRP structure. It was thus unlikely that this strike to G-TIGT would have immediately affected the mechanical properties to a such an extent as to create a hazard during the remainder of the incident flight.

The absence of either significant mass loss at the blade tips or any alteration of the aerodynamic profile of the blades on G-TIGT, as a result of the strike, permitted the aircraft to continue its flight without any noticeable increase in vibration occurring.