

No: 1/91

Ref: EW/C1181

Category: 2c

Aircraft Type and Registration: (1) Aerospatiale AS350B Ecureuil, G-MARC
(2) Bell 206B, G-BNIT

No & Type of Engines: (1) 1 Turbomeca Arriel 1B turboshaft engine
(2) 1 Allison 250-C20 turboshaft engine

Year of Manufacture: (1) 1982
(2) 1971

Date and Time (UTC): 13 November 1990 at about 1145 hrs

Location: Loch Moidart, Scotland

Type of Flight: Commercial (aerial photography)

Persons on Board: Crew - (1) - 1 Passengers - (1) - 1
(2) - 1 (2) - 1

Injuries: Crew - (1) - None Passengers - (1) - None
(2) - None (2) - None

Nature of Damage: (1) Damage to the tips of all three main rotor blades
(2) Three rotor blade slashes on the rear of the right landing skid

Commander's Licence: (1) Airline Transport Pilot's Licence (H)
(2) Airline Transport Pilot's Licence (H)

Commander's Age: (1) 41 years
(2) 43 years

Commander's Total Flying Experience: (1) 9,400 hours rotary wing (of which 200 hours were on type)
(2) 8,400 hours rotary wing (of which 1,200 hours were on type)

Information Source: AAIB Field Investigation

The two helicopters were temporarily based at Plockton aerodrome, in the northwest Highlands of Scotland, for the purpose of carrying out aerial photography flights. The sortie planned for 13 November 1990, was an air-to-air photography flight in order to film a helicopter against the background of Loch Moidart and its surroundings. The Bell 206, G-BNIT was to be the camera helicopter, and the pilots briefed that G-BNIT would establish level flight at 200 feet agl with G-MARC forming in close line astern. At a suitable moment G-MARC was to move forward and slightly below the right side of G-BNIT, when filming was to start, and then take up a position in the lead. Due to the restricted view out of the left side of an AS350, the pilot of G-MARC was to call losing sight of the other helicopter, when G-BNIT would take up the responsibility of maintaining formation and separation in line astern.

The helicopters took off from Plockton at 0930 hrs to rehearse the agreed manoeuvres and both pilots were satisfied with the arrangements. However, after the rehearsal was completed it was apparent that the weather to the south towards Loch Moidart was cloudy and unsuitable for filming, and so they landed back at Plockton to await improving weather. At about 1100 hrs the weather cleared and they took off and headed south for Loch Moidart. The transit took about 40 minutes and on their arrival the weather conditions appeared to be suitable for photography. The pilots' weather estimates gave a south-southwesterly wind of 15 knots with light turbulence, visibility in excess of 10 nm, temperature plus 14°C, and 4 oktas of cloud at 1500 feet.

The helicopters were positioned for a photographic run and entered Loch Moidart on an easterly heading, at an altitude of 200 feet agl with G-BNIT in the lead and G-MARC in close line astern. When conditions were considered to be suitable, the call was given for G-MARC to accelerate and pass to the right side of G-BNIT in order to take the lead position. As G-MARC started to accelerate, and was overtaking G-BNIT, the tips of its main rotor blades contacted the rear section of G-BNIT's right side landing skid. The relative position of the two helicopters at the moment of contact is shown in Figure 1. Both pilots were aware at once of the contact and they broke away immediately with G-MARC descending towards a small island, Eilean an Eheidh, where it made a precautionary landing. G-BNIT followed the other helicopter down and, after a visual inspection of the condition of the landing skids by the pilot on the ground, was landed close by.

After landing on the island both pilots assessed the degree of damage to their helicopters. It was decided that the minor degree of damage to the landing skid of G-BNIT would not preclude a return flight to Plockton. After examining the rotor blade tips of G-MARC it was decided to run the engine and check for vibration and abnormal engine/gearbox indications. When all appeared to be normal the helicopter was lifted into the hover where the checks were repeated. Control responses were also checked and considered to be normal. The helicopter was next flown on a short test flight around the island, when the checks were repeated. Again it appeared to handle normally with no excessive vibration or unusual engine/gearbox indications. It was therefore decided to fly G-MARC back to Plockton, at reduced power and airspeed, and in company with G-BNIT. Both helicopters landed back at Plockton without further incident.

The damaged components of the helicopters were examined; the Bell 206 landing skids at Inverness after their removal from G-BNIT; and the AS350 main rotor blades at Plockton. From this it was established that all three rotor blades had struck the right rear skid area of G-BNIT, once each, causing different levels of damage to each blade tip. By comparing the details of the damage to each blade with that on the skid structure, and considering the direction of rotation of the main rotor, it was established that the yellow blade had been first to strike, causing local severe damage to the aftmost 6 inches of the entry step beam which was clamped across the front and rear downtubes. The blue blade was the next to strike, making a relatively light contact with the skid mounting socket, followed by the red blade which sliced through the centre of the rearmost 14 inches of the skid tube itself. This damage is illustrated in Figures 2 and 3.

Both helicopters had valid Certificates of Airworthiness, and their maintenance documentation was examined and found to be in order.

The operating company held a valid Air Operator's Certificate (AOC) which was issued by the CAA on 19 October 1990. The AOC included certain special conditions and exemptions, all valid until 31 January 1992. Two of these were relevant to the accident flight as follows:

(i) Special condition B4 to the AOC stipulates that no passenger may be carried on any flight made pursuant to this Certificate other than a passenger who is engaged in making a film or broadcast and who is carried in connection with the making of that film or broadcast.

(ii) Exemption 2 (c) to the Rules of the Air and Air Traffic Control Regulations 1985 allows that 'no helicopter (other than a helicopter engaged in lifting or lowering a load during an aerial crane operation) shall fly pursuant to this Exemption within 200 feet of any person, vessel, vehicle or structure.'

The accident flight was conducted in accordance with the operating company's AOC and associated Operations Manual. Both pilots possessed the required licences and were well experienced in carrying out aerial photography flights.

An aftercast of the weather conditions that most likely prevailed over the north west Highlands at the time of the accident was provided by the Meteorological Office, Bracknell. This confirmed that the pilots' estimates of the actual weather conditions prevailing at the time was probably accurate.

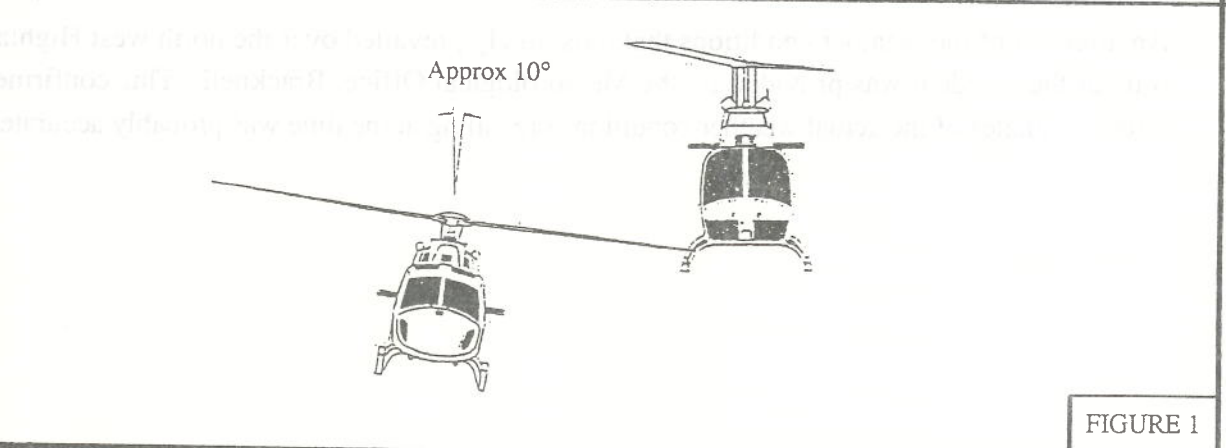
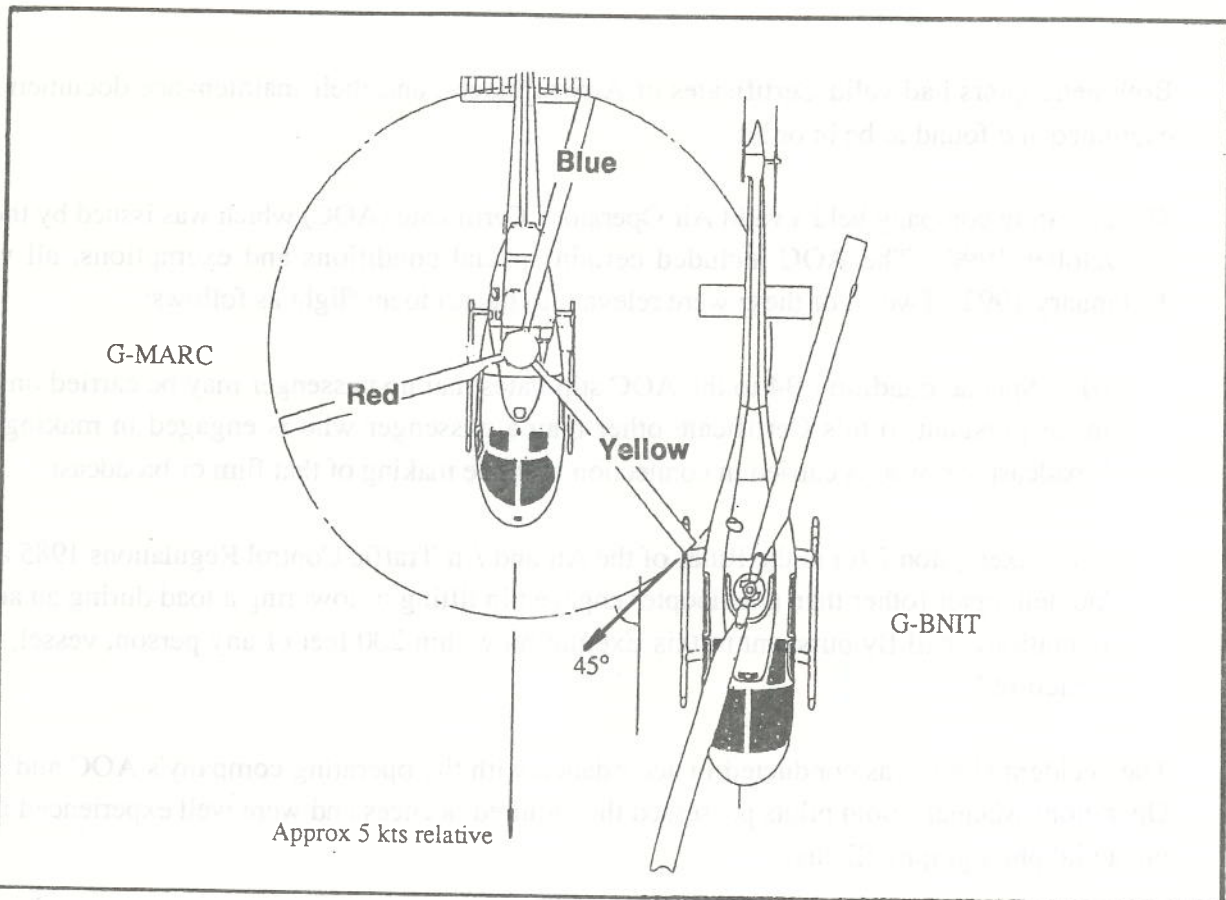


FIGURE 1

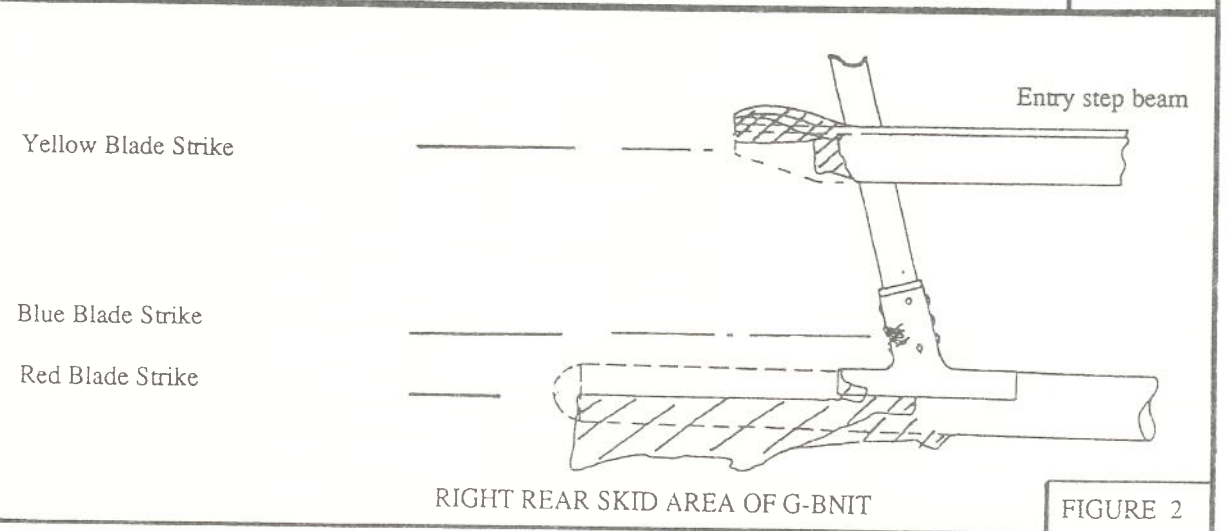
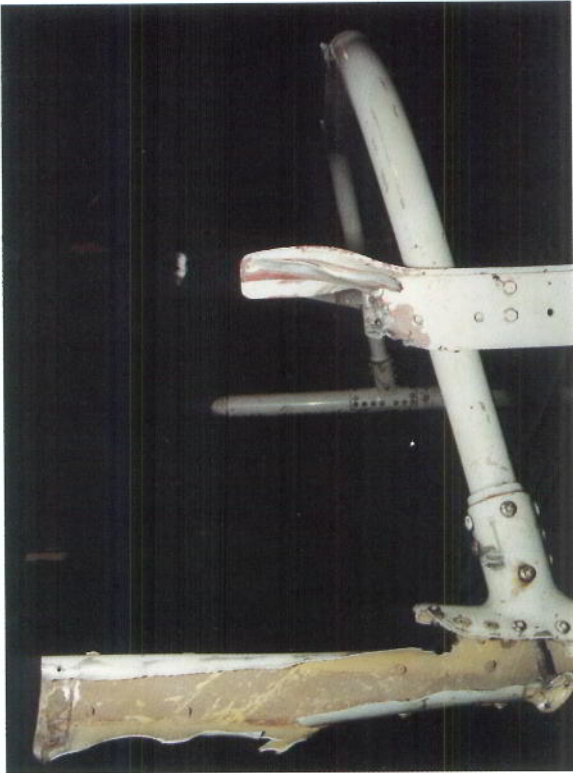


FIGURE 2



DAMAGE TO RIGHT REAR SKID OF G-BNIT, ABOVE, MADE BY MAIN ROTOR BLADE TIPS FROM G-MARC, BELOW

BLADE

YELLOW

BLUE

RED



UPPER SURFACE



LOWER SURFACE



TIP