

Department of Trade

ACCIDENTS INVESTIGATION BRANCH

**Beechcraft 95-B55 (BARON) G-AZZJ  
Report on the accident at Pavis Wood,  
Cholesbury cum St. Leonards,  
Buckinghamshire, on 4 January 1974**

LONDON: HER MAJESTY'S STATIONERY OFFICE  
1975

List of Aircraft Accident Reports issued by AIB in 1974

<i>No</i>	<i>Short title</i>	<i>Date of publication</i>
1/74	McDonnell-Douglas DC8 – 63 CF N 801 WA and Aerospatial Caravelle 6 N 00-SRG approximately 10 nautical miles southeast of Lands End VOR, March 1973	April 1974
2/74	Piper PA 30 Twin Comanche G-AXRW at Shipdham Aerodrome, Norfolk, January 1973	April 1974
3/74	Slingsby T61A G-AYUO near Wycombe Air Park, Bucks., February 1973	May 1974
4/74	Viscount 802 G-AOHI at Ben More, Perthshire, Scotland, January 1973	May 1974
5/74	Owl Racer 65-2 G-AYMS at Greenwich Reach, River Thames, London, May 1971	May 1974
6/74	British Caledonian Airways BAC 1-11 at Corfu Airport, Greece, July 1972	May 1974
7/74	Wallis WA-117 Autogyro G-AXAR at Farnborough, Hants., September 1970	January 1975
8/74	AA-1 Yankee G-AYHD at Beverley Nursery, near Uxbridge, Middlesex, April 1973	July 1974
9/74	Cessna F172H G-AYDC near Humphrey Head, Lancashire, December 1972	June 1974
10/74	Beagle A.61 Series 2 (Terrier) G-ARZT near Tonbridge, Kent, August 1973	July 1974
11/74	Beagle A.61 Series 2 (Terrier) G-ATMS near Saltby, Leicestershire, August 1973	July 1974
12/74	Piper PA-30 (Twin Comanche) G-ASLD at Newchurch, Isle of Wight, May 1972	August 1974
13/74	Tiger Moth G-APVT and Rollason Beta G-ATLY at Nottingham Airport, September 1973	January 1975
14/74	Cessna F172H G-AVHI in the sea 44 nm east of Wick, Scotland, December 1973	October 1974
15/74	AESL Airtourer T6/24 G-AYMF near Lands End, Cornwall. June 1972	September 1974
16/74	Piper PA 28-140 G-AVBM near Dursley, Gloucestershire, August 1973	September 1974
17/74	Avions Pierre Robin DR 360, Robin Knight G-AZOX at Biggin Hill Aerodrome. Kent, July 1973	November 1974

## List of Aircraft Accident Reports issued by AIB in 1974

<i>No</i>	<i>Short title</i>	<i>Date of Publication</i>
18/74	Piper PA 23-250E Aztec G-AZIF near Great Sampford, Essex, January 1972	November 1974
19/74	Chipmunk DH C1 Series 22A G-ARCR at Windlesham, Surrey, September 1973	November 1974
20/74	Jodel D117 G-ZFK at Doncaster Aerodrome, April 1973	December 1974
21/74	Societe Aeronautique Normande Jodel D117 G-AVEI at Brixham, Devon, September 1973	January 1975
22/74	Rollason Condor DB62B G-ATSK near Fair Oaks Aerodrome, July 1973	February 1975
23/74	Piper PA 34 Seneca G-BBFF at Machrins airstrip Scotland, May 1974	April 1975
24/74	Avions Marcel Dassault Fan Jet Falcon LN- FOE near Norwich Airport, December 1973	April 1975

Department of Trade  
Accidents Investigation Branch  
Shell Mex House  
Strand  
London WC2R 0DP

29 January 1975.

*The Rt Honourable Peter Shore MP*  
*Secretary of State for Trade*

Sir,

I have the honour to submit the report by Mr G C Wilkinson, an Inspector of Accidents, on the circumstances of the accident to Beechcraft 95 – B55(BARON) G-AZZJ which occurred at Pavis Wood, Cholesbury cum St Leonards, Buckinghamshire on 4 January 1974.

I have the honour to be  
Sir  
Your obedient Servant

W H Tench  
*Chief Inspector of Accidents*

Accidents Investigation Branch  
Aircraft Accident Report No. 1/75  
(EW/C475)

**Aircraft:** Beechcraft 95 – B55(BARON) G-AZZJ

**Engines:** Two Continental IO-470-L

**Registered Owner  
and Operator:** Rowlen and Company (Holdings) Ltd

**Crew:** One pilot – Killed

**Passengers:** One – Killed

**Place of Accident:** Pavis Wood, Cholesbury cum St Leonards, Buckinghamshire  
Latitude 51°46'30"N. Longitude 00°40'30"W

**Date and Time:** 4 January 1974 at 1923 hrs

All times in this report are GMT

## Summary

The aircraft was making a private flight at night from Birmingham to Leavesden (near Watford). As it approached a ridge of high ground on the northern slopes of the Chiltern Hills the aircraft lights were seen below cloud. It was apparently flying normally but at a low altitude. Shortly afterwards it collided with the high ground, exploded, caught fire and was destroyed. The pilot and his passenger were killed.

The weather at the time of the accident was overcast with low cloud, strong southerly winds and rain.

Attempts to provide the pilot with radar surveillance had been unsuccessful because of precipitation clutter. It is concluded that the accident was caused by the pilot attempting to complete the flight in adverse conditions at too low a height to ensure safe terrain clearance.

# 1. Investigation

## 1.1 History of the flight

The aircraft was making a private flight at night from Birmingham to Leavesden.

The pilot did not file a flight plan before his departure but requested on R/T an Air Traffic Control (ATC) clearance to leave the Birmingham Control Zone under special Visual Flight Rules (VFR). Prior to take-off on Runway 16 at 1848 hrs Birmingham ATC passed the pilot a special VFR clearance to leave the control zone at an altitude not above 2,500 feet on the Birmingham sea level altimeter setting (QNH) of 1000.5 mbs. At about this time the reported cloud base at Birmingham was 900 to 1,100 feet above aerodrome level (aal).

Examination of R/T recordings made during the flight showed that just after 1833 hrs the pilot reported flying on a track of 130° (M) to Daventry at an altitude of 2,000 feet on the Birmingham QNH. At 1854 hrs Birmingham radar saw the aircraft leave controlled airspace abeam Coventry and advised the pilot accordingly. In reply he informed Birmingham of his intention to change to the Cranfield R/T frequency.

At 1900 hrs the pilot called Luton on 129.55 MHz but two-way radio communication was not established until 1904 hrs when he reported overhead Daventry in Instrument Meteorological Conditions (IMC), advised that his estimated time to pass 'west abeam Luton' was 1915 hrs, and that on arrival at Leavesden he wished to make a radar controlled approach to land. At that time Luton ATC passed the Luton QNH of 1004.5 mbs to the pilot. At 1907 hrs the pilot reported flying at an altitude of 2,000 feet on the Luton QNH of 1004.5 mbs, repeated his estimated time to pass 'west abeam Luton' as 1915 hrs and requested radar cover to pass through the Luton Special Rules Zone. He was advised at the time and three times subsequently during the flight that attempts to provide radar cover were proving unsuccessful because of precipitation clutter on the radar screen.

Shortly before 1908 hrs Luton asked the pilot if he had passed abeam of Cranfield and in reply were told 'estimate we're just passing - well we're just north of Cranfield at this time'. He was then asked to report passing Cranfield at 2,000 feet and at 1912 hrs informed Luton 'estimating we're just passing Cranfield this time' and confirmed that he was flying at an altitude of 2,000 feet. However, one minute later he reported north of Bovingdon VORTAC\* with a DME distance to the station of 24 nm. This would have placed the aircraft three miles to the west of the Cranfield non directional beacon (NDB).

While continuing their attempts to establish radar contact with the aircraft Luton asked the pilot to make R/T transmissions for VHF direction finding (VDF). The first of these bearings, obtained at 1914 hrs, was passed to the pilot as a magnetic course to steer (QDM) to Luton of 120° and at the same time he was advised that radar contact had not been established. He replied with the information that he was 'a bit low' and then said that he was flying at 2,000 feet. Shortly afterwards he asked for and was given the current Luton airport weather information.

Luton asked for the aircraft radial from Bovingdon VORTAC at 1917 hrs and were told that it was 160°(M) (the bearing to Bovingdon) with a DME distance to the station of 16.8 nm. At 1919 hrs the pilot was advised that the aircraft's QDM to Luton was 110°. He was then asked if he was in IMC and replied that he was flying in and out of cloud.

---

\* A Distance Measuring Equipment (DME) facility at Bovingdon is provided by TACAN co-located and frequency paired with the VHF omni directional range (VOR)

The pilot again asked if radar had identified the aircraft and when told that no contact had been made remarked that he was flying 'a bit low', at 1,500 feet on the Luton QNH of 1 004.5 mbs, that he did not dare to descend, but wanted to stay 'Victor Mike (ie VMC) sort of', and gave his DME distance to Bovingdon as 12 nm.

At 1920 hrs the pilot requested and was given permission to change radio frequency to Leavesden. Before doing so he was advised that the aircraft QDM to Luton was 100°, and that the precipitation clutter affecting Luton radar would probably also affect Leavesden. He acknowledged this information and informed ATC that he had encountered severe turbulence.

The pilot called Leavesden several times on 122.15 MHz shortly after 1920 hrs. Although these calls were acknowledged, two-way contact was not established until approximately one and a half minutes later when the pilot reported flying in severe turbulence below cloud with a DME distance to Bovingdon of 6 nm and requested a surveillance radar approach. As R/T transmissions from the aircraft did not activate the Cathode Ray Direction Finding (CRDF) equipment at Leavesden the pilot was asked to report his height and at 1922½ hrs approximately replied that he was flying at 1,500 feet on the Luton QNH of 1004.5 mbs. Shortly before 1923 hrs Leavesden passed the airfield weather information including the airfield altimeter setting (QFE) of 993 mbs to the pilot and asked for the aircraft's heading. There was no reply to this and subsequent calls.

The Leavesden controller contact Luton ATC and London Approach Radar for information on the aircraft and when this proved fruitless reported to London Air Traffic Control Centre (LATCC) that R/T contact with it had been lost. He confirmed by telephone with Elstree aerodrome that the aircraft had not landed there, requested that Elstree called the aircraft on their local R/T frequency then checked that Birmingham ATC had no information on its whereabouts before alerting the appropriate authorities at LATCC.

Shortly before the accident, witnesses located below the northern slope of the Chiltern Hills near to Pavis Wood saw the lights of the aircraft as it passed them at a low height on a southerly heading. They heard no irregularity in engine noise and it appeared to them that the aircraft did not deviate from straight and level flight. Seconds later they heard an explosion and saw a fire break out on the sky line. They reported this to the police and requested fire and ambulance services.

Rescuers who arrived at the scene some minutes later found parts of the aircraft still on fire. There were no survivors.

## 1.2 Injuries to persons

<i>Injuries</i>	<i>Crew</i>	<i>Passengers</i>	<i>Others</i>
Fatal	1	1	—
Non-fatal	—	—	—
None	—	—	—

## 1.3 Damage to aircraft

Destroyed by ground impact and fire.

## 1.4 Other damage

One tree was uprooted and minor damage was done to others.

## 1.5 Crew information

Pilot:	Aged 44
Licence:	Private Pilots licence (PPL) valid until 7 December 1974
R/T Licence:	Restricted VHF only
IMC rating:	Valid until 27 October 1974
Night rating:	Issued 12 October 1971. Not current
Aircraft rating:	Groups 'A' and 'B'
Approximate total flying experience:	410 hours
Approximate flying hours on type:	147 hours, in command by day 2 hours 30 minutes in command by night
Medical certificate:	Last medical examination 17 July 1973 Valid until 31 July 1974 No restrictions

The pilot's flying log book was recovered from the wreckage but because of crash damage it was not possible to extract accurate summaries of his flying experience. However, so far as can be established, he had not carried out the minimum number of night take-offs in the six months immediately preceding the accident as required by The Air Navigation Order (ANO) 1972, Part IV, specified in Schedule 9 in order to maintain a current Night Rating on his licence.

The pilot had received instrument flying instruction at regular bi-monthly intervals between June 1973 and December 1973. Although in the opinion of his instructors he had achieved a satisfactory standard of instrument flying, he had experienced considerable difficulty in interpreting information from radio aids during navigation flying exercises.

During a flight from Halfpenny Green to Birmingham earlier on the day of the accident, as he approached controlled airspace below cloud the pilot had requested and had been given a surveillance radar approach to Birmingham where the reported cloud base was 3/8 900 feet, 6/8 1,100 feet above aerodrome level (aal) and the visibility was 15 km in rain. Examination of the R/T recordings for this portion of the flight showed that the pilot had flown in IMC within controlled airspace, that he had experienced difficulty in obeying ATC instructions and had altered height on two occasions without advising ATC that he was doing so before finally descending below cloud.

## 1.6 Aircraft information

### 1.6.1 Construction and Maintenance

The Beechcraft 95 – B55(BARON) is a six seater, twin engined, low wing, all metal monoplane. Each Continental 10-470-L fuel injection engine drives a two-bladed constant speed, fully feathering metal propeller. Provision is made for seating two pilots located side by side. Dual rudder pedals and a single 'throw over' control wheel are fitted.

G-AZZJ was constructed in the United States of America in 1968, and after operating in that country was imported into the United Kingdom in 1972. It was registered in the name of Rowlen and Company (Holdings) Ltd in July 1972 and was issued with a Certificate of Airworthiness (C of A) in the General Purpose Category on 26 July 1972.



The C of A was valid until 25 July 1974. The aircraft was fitted with two VHF communications transceivers, two VHF navigation receivers, single DME, single Automatic Direction Finding (ADF) receiver and a Radar Transponder. It was also fitted with a full instrument flying panel, a second altimeter, full night flying equipment, a Brittain B5 automatic pilot, and strobe anti-collision lights.

The aircraft had flown a total of 605 hours since new, including 156 hours since its registration in the United Kingdom and had been satisfactorily maintained in accordance with an approved maintenance schedule. In April 1973 both the altimeters fitted to the aircraft were reported to be out of tolerance and were replaced. Work was carried out in June 1973 to rectify a reported defect on the No. 1 VHF/NAV receiver. The automatic pilot was reported unstable and the turn co-ordinator unserviceable in July 1973. Replacement of the turn co-ordinator effectively rectified both defects. The aircraft subsequently operated without incident.

Prior to its departure from Birmingham on the accident flight the aircraft had been refuelled with AV Gas 100L to its maximum capacity of 118 imperial gallons.

#### 1.6.2 *Weight and balance*

The exact weights of the pilot, the passenger and their personal equipment are not known, nor was it possible to ascertain which of the available seats was occupied by the passenger. Estimated weights indicate that the take-off weight of the aircraft was less than the maximum total weight authorised, and that at all times during the flight the Centre of Gravity was within the prescribed limits irrespective of which of the seats available to him had been occupied by the passenger.

#### 1.7 **Meteorological information**

Before departing from Birmingham on the accident flight the pilot telephoned Leavesden ATC and was passed the weather forecast for the area within 30 nm of Luton Airport. The forecast issued by the Meteorological Office at London, Heathrow, and covering the period 1200 to 2000 hrs predicted cloudy conditions and outbreaks of rain, with 3/8 to 6/8 of low cloud base 1,500 feet, tops 5,000 feet and with layered cloud above extending from 7,000 feet to 14,000 feet. Later in the period the cloud was expected to increase from the west to 6/8 to 8/8 base 2,000 feet with 4/8 to 7/8 base 800 to 1,000 feet in rain. Visibility was forecast as 10 km falling to 4 to 8 km later in the period. The forecast wind at 2,000 feet was 210° 30 knots, and the freezing level was given as 5,000 feet.

After receiving the Luton area forecast the pilot visited the Meteorological Office at Birmingham where he looked at the 1600-0100 hrs weather forecasts for airfields in the London area, and was given the 1700 hrs weather report for Leavesden, also the 1750 hrs weather reports for Luton, Heathrow, Gatwick and Southend. He did not ask for weather conditions on his route and expressed surprise when told that the wind at 2,000 feet was 210° 50 knots. It is not known if he saw a warning of local severe turbulence forecast at heights below 10,000 feet west of longitude 1° east in the London Flight Information Region which was displayed in the Meteorological Office.

Airfields in the London area were forecasting almost total cloud cover with the base of cloud varying between 1,000 to 1,500 feet aal for the period 1600-0100 hrs and with the cloud base lowering to 800 to 1,000 feet aal temporarily between 1600-2000 hrs.

The 1700 hrs weather report for Leavesden was:

Weather:	Intermittent slight rain
Surface wind:	210° 20 knots gusting to 35 knots

Visibility: More than 10 km  
Cloud (aal): 6/8 base 1,000 feet. 8/8 base 1,500 feet

At 1750 hrs the weather report for Luton was:

Weather: Continuous slight rain  
Surface wind: 210° 20 knots gusting to 30 knots  
Visibility: More than 10 km  
Cloud (aal): 8/8 base 1,200 feet

The 1850 hrs weather report for Birmingham Airport (elevation 325 feet above mean sea level) was:

Weather: Continuous moderate rain  
Surface wind: 160° 23 knots gusting to 33 knots  
Visibility: More than 10 km  
Cloud (aal): 1/8 base 700 feet, 6/8 base 900 feet, 8/8 base 1,100 feet

Apart from a small increase in cloud amounts at heights below 1,100 feet the weather was substantially the same as that reported at 1820 hrs.

The following Luton weather report was passed to the pilot by Luton ATC at 1915 hrs:

Weather: Continuous slight rain  
Surface wind: 210° 20 knots gusting to 30 knots  
Cloud (aal): 8/8 base 1,000 feet

The Luton QNH during the period of the flight was 1 004.5 mbs.

Leavesden ATC passed the pilot the following weather information for their airfield at about 1923 hrs:

Surface wind: 200° 25 knots occasional gusts to 32 knots  
Visibility: 9 km  
Cloud (aal): 8/8 base 1,500 feet (estimated)  
Aerodrome QNH: 1005 mbs Aerodrome QFE 993 mbs

At 1927 hrs during unsuccessful attempts to re-establish R/T contact with the aircraft Leavesden ATC transmitted the following information:

Surface wind: 210° 15 knots gusting to 30 knots  
Visibility: 9 km  
Cloud (aal): 4/8 base 1,000, 8/8 base 1,500 feet (estimated)  
Aerodrome QNH: 1005 mbs Aerodrome QFE 993 mbs

An appreciation of the weather for the route from Birmingham to Leavesden and for the local area of the accident covering the period 1830-1930 hrs prepared by the Meteorological Office contained the following information:

*Route:* Birmingham-Leavesden

Weather: Continuous moderate rain, perhaps heavy in places  
Cloud (amsl): Total cloud cover with the base of cloud varying between 1,500 to 2,000 feet amsl, falling at times to 1,000 feet, possibly touching the tops of the higher hills. Layered cloud extended to above 20,000 feet

Visibility:	5 to 10 km, possibly 1,000 metres or less in any hill fog patches	
Winds:	1,000 feet	210° 40 knots
	2,000 feet	210° 50 knots
Turbulence:	Moderate to severe at low levels especially near high ground	
Freezing Level:	6,500 feet	

Weather within a 5 nm radius of Hastoe and including the accident site.

A warm front moving from south-west to north-east was close to Hastoe at about the time of the accident.

Weather:	Continuous slight or moderate rain, heavy at times
Surface wind:	South to south-easterly 15 knots gusting to 40 knots
Visibility:	5 to 10 km below cloud, but 500 to 1,000 metres in any hill fog patches
Cloud (amsl):	8/8 base 1,000 to 1,200 feet possibly covering the tops of the higher hills
Turbulence:	Moderate to severe at low levels over hills

The accident occurred in darkness. The moon was three quarters full but according to a witness at the time of the accident the night was 'dark' with poor visibility in rain.

## 1.8 Aids to navigation

During the period of the flight Daventry VOR, Bovingdon VORTAC, Bovingdon NDB and Luton NDB were operating and serviceable as were Luton radar and Luton VDF. Cranfield aerodrome had closed for the night. However Cranfield VOR and NDB were radiating and although transmissions from these aids were not monitored, as far as can be ascertained they were serviceable at the relevant times.

Attempts to identify the aircraft on Luton radar were unsuccessful because of precipitation clutter nor could it be identified by Leavesden radar in the latter stages of the flight.

## 1.9 Communications

The aircraft made contact on three different frequencies during the flight, the last being with Leavesden on 122.15 MHz. Each of these frequencies were recorded on tape for the relevant period and were subsequently transcribed. The pilot encountered difficulty in establishing initial contact with Luton and subsequently with Leavesden, otherwise normal two-way communication was maintained with the aircraft.

## 1.10 Aerodrome and ground facilities

CRDF equipment installed at Leavesden was operating and serviceable at the time of the accident. R/T transmissions from the aircraft did not activate the equipment.

Leavesden aerodrome which has an elevation of 335 feet amsl is equipped with surveillance radar, used as an approach aid. This was manned during the exchange of radio messages with the aircraft.

## 1.11 Flight Recorder

Not required and not fitted.

## 1.12 Wreckage

Inspection at the accident site indicated that the aircraft had been laterally level, in a slightly nose down attitude, and on a heading of 170°(M) when it struck the wooded northern slope of one of the Chiltern Hills just below the crest at a height of 800 feet amsl. It had cut a swathe through the light upper branches of the trees before the wings and fuselage were broken up by contact with heavier branches and tree trunks.

The general damage and wreckage scatter forward through the trees was consistent with impact at the aircraft's cruising speed – approximately 170 knots. The port wing had been broken into pieces during its passage through the trees to the ground and the starboard wing had been torn off at the root. The engines and their separated propellers had detached from the remnants of the mainplane. In the ensuing fire, parts of the forward fuselage, the cockpit, the passenger cabin and the starboard wing were destroyed. The undercarriage and the flaps were found in the retracted position. No evidence was found of any pre-impact structural failure of the airframe or defect in the flying control circuits nor was there any indication that fire had occurred in flight. Disruption of the fuselage made it impossible to determine the trim settings at impact. It was not possible to establish if the autopilot was engaged at the time of the accident.

Both engines were developing power at impact and there is no evidence of pre-crash failure or malfunction of the engines or propellers. The fuel cocks were set to main tanks 'ON' and both engine driven vacuum pumps were in good condition. The instrument flying panel and its components had been broken up and scattered over the wreckage trail. Because of the degree of damage sustained it was not possible to determine the operating condition of the gyro driven instruments.

From fragments of the altimeters retrieved from the wreckage it was established that the barometric scale settings on both instruments were approximately 994 mbs. It was not possible to make any functional or calibration check of the instruments or to determine the condition of the static system.

Both VHF communications transceivers were extensively damaged on impact.

Because of fire and impact damage it was impossible to ascertain if the radio navigation equipment fitted to the aircraft had been functioning correctly prior to impact. As no report of any difficulties or defects was received from the pilot it is considered that the equipment was operating satisfactorily. The radar transponder was severely damaged on impact. There was no evidence that it had been in use during the flight.

The following frequencies were found to have been selected:

No. 1 VHF/Comm transceiver:	122.15 MHz (Leavesden)
No. 2 VHF/Comm transceiver:	123.20 MHz (Cranfield)
No. 1 VHF/NAV receiver:	112.3 MHz (Bovingdon VORTAC)
No. 2 VHF/NAV receiver:	115.0 MHz (Daventry VOR)
DME:	112.3 MHz (Bovingdon VORTAC)
ADF receiver:	214 MHz (Bovingdon NDB)

## 1.13 Medical and pathological information

Post mortem examination revealed no evidence of disease in the pilot or his passenger. Tests for alcohol and drugs were negative. In the opinion of a medical expert a 3 per cent level of carboxyhaemoglobin found in the pilot's blood is considered not to be significant. Death in both cases was caused by multiple injuries.

## 1.14 Fire

Fire occurred shortly after impact and destroyed parts of the forward fuselage, the cockpit, the passenger cabin and the right wing.

## 1.15 Survival aspects

It was impossible to determine the seating position of the passenger or if the occupants had been wearing lap straps. However, because of the nature of the impact the accident is considered non-survivable.

## 1.16 Tests and research

A Beechcraft 95 – B55 equipped with slightly less powerful VHF communications transmitters but otherwise similar to G-AZZJ was flown along the final track of the crashed aircraft. Three runs were made at a height of 1,500, 1,000 and 800 feet amsl. Satisfactory two-way radio communication was established with Leavesden Control on the first two runs, and CRDF bearings were obtained on R/T transmissions from the test aircraft.

On the final run at 800 feet amsl R/T transmissions from the aircraft were heard albeit at low signal strength by Leavesden but these failed to activate the CRDF equipment at the aerodrome.

## 1.17 Other information

1.17.1 The Air Navigation Order (ANO) 1972, Schedule 9, current at the time of the accident specified the privileges of the Night Rating and the IMC rating both of which may be included in the PPL.

(a) The night rating entitles a PPL holder to act as pilot in command of an aeroplane at night in which any passenger is carried provided that the aeroplane is any of the types included in the aircraft rating of the licence. Unless the licence includes an instrument rating the holder must have carried out within the immediately preceding six months not less than 5 take-offs and 5 landings at a time when the depression of the centre of the sun was not less than 12° below the horizon.

(b) The IMC rating entitles a PPL holder to act as pilot in command of any aeroplane included in the aircraft rating of the licence

(i) On a flight outside controlled airspace in IMC.

(ii) On a special VFR clearance in a control zone in a flight visibility of less than 5 but not less than 1½ nm.

### 1.17.2 *Special VFR clearance*

The United Kingdom Air Pilot is the official document for notifying the requirements of the ANO's. The following information is contained in the RAC section, Chapter 3, Paragraph 6, which reads in part:

6.1 'Clearance for special VFR flights within a control zone may be granted by ATC to pilots who are unable to comply with Instrument Flight Rules.'

6.4 'It is implicit in all special VFR clearances that the aircraft shall remain clear of cloud and in sight of the surface.'

## 2. Analysis and Conclusions

### 2.1 Analysis

There is no evidence that the accident was caused by any pre-crash failure of the aircraft, its engines or equipment. It is necessary, therefore, to examine the manner in which the pilot operated the aircraft in the prevailing weather conditions.

Earlier on the day of the accident during a short flight from Halfpenny Green to Birmingham the pilot had exceeded the privileges of his licence by flying in IMC after entering controlled airspace at Birmingham. When carrying out a surveillance radar approach at that airport he had experienced difficulty in flying the aircraft accurately in IMC and in obeying ATC instructions.

After take-off from Birmingham on the accident flight the pilot had reported flying at an altitude of 2,000 feet on the Birmingham QNH shortly before the aircraft was seen by Birmingham radar to leave controlled airspace. The reported cloud base at Birmingham at the time was 900 to 1,100 feet aal (1,225 to 1,425 feet amsl). There is little doubt that the pilot had flown in cloud while still in controlled airspace and in doing so had not complied with his special VFR clearance and had again exceeded the privileges of his licence. It is evident that the pilot's instrument flying capability was limited and that he was either unaware of the restrictions of the IMC rating for flight within controlled airspace or that he disregarded these restrictions.

En route the flight does not appear to have been conducted with sufficient precision. The radio navigation equipment fitted to the aircraft would have enabled the pilot to fly direct from Daventry to Bovingdon. He reported overhead Daventry, at a position 24 nm DME distance north of Bovingdon and on radial 160 to Bovingdon with a DME distance of 16.8 nm. A reconstruction of the aircraft's track shows that it had flown in a south-westerly direction from the position 24 nm north of Bovingdon to the next reported position on the 160 radial to Bovingdon, DME distance to the station 16.8 nm and had then turned south in the approximate direction of Bovingdon. It is possible that during this part of the flight the pilot had endeavoured to avoid controlled airspace at Luton as the aircraft had not been identified on radar, although there is no evidence that he made a conscious attempt to do so. Moreover, his requests for radar cover suggest that he was relying on radar for navigational assistance.

The altitude that the aircraft maintained must also be in question. When leaving Birmingham the pilot had reported flying at an altitude of 2,000 feet and had confirmed flying at this altitude to Luton at intervals during the flight until shortly after 1914 hrs. Approximately four minutes before the accident occurred he informed Luton that he was flying in and out of cloud at an altitude of 1,500 feet and stated that he did not dare to descend but wanted to maintain some visual reference to the ground. It is unlikely that he would have been able to do this at his last reported altitude. Although radar assistance was not forthcoming because of precipitation clutter, the possibility that the aircraft's low altitude was partially the reason, cannot be completely dismissed, while the absence of radar assistance may have influenced the pilot in his decision to continue the flight with some visual reference to the ground.

Prior to his departure from Birmingham the pilot had obtained weather information for the latter part of his route. When he approached the higher ground north of Bovingdon the low cloud base was likely to be of concern to him as an aftercast of the weather at the relevant time gave the base as 1,000 to 1,200 feet possibly covering the tops of the higher hills. Furthermore at about this time he was advised that due to precipitation clutter a satisfactory radar approach at Leavesden was by no means certain.

Whatever the reasons, the evidence suggests that the pilot decided to continue the flight with visual reference to the ground. Shortly before the accident he reported flying below cloud, and in the last part of the flight witnesses saw the aircraft's lights as it headed towards the hills, at a low altitude in apparently straight and level flight. During this part of the flight R/T transmissions from the aircraft did not activate the CRDF at Leavesden, most probably because of the height at which it was being flown (See 1.16). Moreover, inspection at the accident site indicated that the aircraft had flown into the rising ground 800 feet amsl in an almost level attitude, while in a cruising configuration.

Because of impact and fire damage detailed examination of the altimeters and the static system was not possible, however, the pilot did not report any discrepancies during the flight. Both altimeter sub scales were found set to a reading which closely corresponded to the Leavesden QFE transmitted to the pilot immediately before the impact. The evidence indicates that he reset the sub scales about this time. It is possible that while doing so at a time that he was flying in severe turbulence the aircraft descended from its already dangerously low height thus making a collision with the high ground inevitable.

The pilot was neither entitled to carry passengers at night nor to fly in IMC in controlled airspace (ANO 1972, Schedule 9). He had apparently planned the subject flight on the assumption that he could do both, although his reasons for this incorrect assumption are not known. The possession of an IMC rating does not give the holder the privileges of an instrument rating.

It is apparent that the pilot was insufficiently experienced (and qualified) to conduct the flight under the prevailing conditions of weather and darkness. There is a strong implication that it was his intention to rely on radar assistance during the flight and when this was not forthcoming he was incapable of using the comprehensive radio navigation equipment available to him in the aircraft in such a way as to complete the flight safely.

## 2.2 Conclusions

### (a) Findings

- (i) The loading and centre of gravity of the aircraft was within the prescribed limits during the flight.
- (ii) The aircraft had been satisfactorily maintained in accordance with an approved maintenance schedule.
- (iii) There was no evidence of pre-crash failure or malfunction of the aircraft, its engines, or equipment.
- (iv) The pilot's Night rating was not current therefore he was not entitled to carry passengers at night, otherwise he was properly licensed to carry out the flight, provided that he did not fly in IMC in controlled air space.
- (v) The navigation of the aircraft was conducted with insufficient precision.
- (vi) Attempts to provide radar assistance to the pilot during the latter part of the flight were unsuccessful because of precipitation clutter on the radar. It is also possible that the aircraft may have been too low for radar contact to be made.
- (vii) The pilot attempted to continue the flight in turbulent conditions, below cloud, at night whilst unsure of his exact position and at too low a height to ensure safe terrain clearance.

(b) Cause

The accident was caused by the pilot attempting to complete the flight in adverse conditions at too low a height to ensure safe terrain clearance.

G C Wilkinson  
Inspector of Accidents

Accidents Investigation Branch  
Department of Trade

January 1975