

ACCIDENTS INVESTIGATION BRANCH
Department of Trade

Cessna F172H G-AVHI
Report on the accident in the sea
44 nm east of Wick, Scotland
on 11 December 1972

List of Civil 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	<i>(forthcoming)</i>
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	<i>(forthcoming)</i>

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

29 May 1974

The Rt Honourable Peter Shore MP
Secretary of State for Trade

Sir,

I have the honour to submit the report by Mr P J Bardon, an Inspector of Accidents, on the circumstances of the accident to Cessna F172H G-AVHI which occurred in the sea 44 nm east of Wick, Scotland on 11 December 1972.

I have the honour to be
Sir
Your obedient Servant

W H Tench
Chief Inspector of Accidents

ADDENDUM

On 4 July 1974, subsequent to the date of this report, an engine with propeller attached was recovered from the sea bed by a trawler operating in the area where G-AVHI ditched. The engine was subsequently identified by its serial number as the one installed in G-AVHI at the time of the accident flight. A strip examination was carried out and no evidence of pre-crash mechanical failure or fire was found. The condition of the propeller indicates that it was not under power on impact with the sea.

As it is considered that this evidence does not in any way contradict the findings of the Report, they therefore remain unchanged.

Accidents Investigation Branch
Civil Aircraft Accident Report No 14/74
(EW/C430)

Aircraft: Cessna F172H G-AVHI
Engine: Rolls-Royce Continental 0-300-D
Registered Owner: Kamtec Limited
Operator and Pilot: Mr H A Kornelson - missing, believed killed
Passengers: Nil
Place of Accident: In the sea 44 nm east of Wick, Scotland
Position - 58°27'N 01°43'W
Date and Time: 11 December 1972 at 1850 hrs
All times in this report are GMT

Summary

The aircraft was on a private flight from Aberdeen to Manchester via Newcastle. The pilot 'booked out' and left Aberdeen at 1438 hrs and subsequently reported his position as over Dundee, after which he was in constant radio contact with Air Traffic Control (ATC) indicating his apparent progress towards Newcastle. He did not at any time indicate that he was either lost or in difficulty however. The aircraft was eventually located by radar at a position over the North Sea about 90 nm North-Northeast (NNE) off Aberdeen. The pilot was given a course to steer for the nearest land, and provided with a Royal Air Force (RAF) Nimrod aircraft escort, but he 'ditched' 44 nm from land when his aircraft ran out of fuel.

The area was searched during the night, and throughout the daylight hours of the following day. Neither wreckage nor the body of the pilot has since been found.

It is concluded that the pilot who was attempting a flight beyond his training, experience and ability became lost without realising it whilst flying in extremely bad weather conditions. As a result the aircraft flew too far out over the sea to be able to return over the land before running out of fuel.

1. Investigation

1.1 History of the flight (see Appendix)

The aircraft took off from Aberdeen at 1438 hrs on a private Visual Flight Rule (VFR) flight to Manchester from where it had flown earlier in the day. The pilot, who was the sole occupant, had been advised before take-off of a strong southerly wind over his intended route. At 1512 hrs, the pilot contacted Scottish Flight Information (FIR) and reported that he was flying on top of broken cloud at an airspeed of 'one hundred' en route to the Newcastle non-directional beacon (NDB). He stated that his heading was 'six zero'. He later reported overhead Arbroath and that he had been unable to make radio contact with Leuchars. In response to a query at this time he indicated that he expected to cross the FIR boundary at 55°N at 1615 hrs.

The last position report from the aircraft was made at 1552 hrs when the pilot stated that he was overhead Dundee at 1,250 feet in Visual Meteorological Conditions (VMC) on a heading 'due east nine zero'. At 1606 hrs he reported approaching North Berwick, but did not confirm passing overhead.

For the next 1½ hours the pilot was in almost constant radio contact with Scottish FIR, except when he made several abortive attempts to contact Newcastle and Border Radar. During this time he reported reaching a height of about 6,000 feet, and indicated that he was out of sight of the ground. He also continued to advise the FIR that he was homing towards the Newcastle NDB.

At 1657 hrs the pilot reported that he had a reciprocal bearing on his Automatic Direction Finder (ADF) indicating that he had passed overhead Newcastle, but repeated attempts to locate the aircraft in this position by radar were unsuccessful, despite the use of secondary radar equipment. At this stage the pilot then asked the FIR: 'What is the Newcastle Beacon?' When advised that the Newcastle NDB frequency was 352 kHz, he repeated back 325 and indicated that he was already tuned to that frequency. After being corrected twice, the pilot eventually acknowledged the correct frequency. At 1708 hrs the pilot confirmed that he was then on course for the Newcastle NDB and steering 200°. At about this time another aircraft reported that the Newcastle NDB was subject to a considerable amount of static and G-AVHI was advised to try the Newcastle VHR Omni-Range (VOR), the frequency of which was also passed to him. A few minutes later, he reported that he was unable to receive this beacon.

Coincident with these events, a light aircraft was seen at about 1700 hrs to be flying in a northeasterly direction over Peterhead, which is a coastal town some 20 nm north of Aberdeen. This aircraft has not been identified or traced, but it seems highly probable that it was G-AVHI.

At 1725 hrs an aircraft was noticed by Highland Radar out over the North Sea, and at 1732 hrs this was positively identified as G-AVHI. Its position was 90 miles NNE off Aberdeen, which is about 210 nm from its assumed position at that time. Highland Radar then took over control of the aircraft and commenced homing it towards land, while at the same time vectoring an RAF Nimrod aircraft towards it to act as escort. The Nimrod established radio contact with the pilot of G-AVHI and gave him as much advice as could be given in the circumstances. The airfield at Wick was opened up and all emergency services were alerted. However at 1850 hrs, the aircraft ran out of fuel and ditched some 44 nm due east of Wick. The Nimrod which had laid a flare path in the sea to indicate the best direction for ditching, reported that in the area the wind velocity was 185°/50 knots, and the cloud base at 800 feet, with rain and snow showers. An air search was continued throughout the night and during the following day but neither the body of the pilot nor any of the wreckage was found, or has since been recovered.

1.2 Injuries to persons

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

1.3 Damage to aircraft

Destroyed.

1.4 Other damage

None.

1.5 Pilot information

Mr Hans Albert Kornelson.

1.5.1 Age:	48.
Licence:	Private Pilot's Licence with night rating: valid until 19 June 1977.
R/T Licence:	Restricted VHF only.
Instrument rating/	
IMC rating:	Nil.
Aircraft ratings:	PA 28: Group A.
Total flying experience:	173 hours 55 minutes (last recorded flight 27.11.72).
Flying hours on type:	48 hours 50 minutes (total); 39 hours 20 minutes (in command).
Instrument flying instruction:	5 hours 20 minutes.
Medical certificate:	Valid until 7 August 1973. No restrictions.

1.5.2 There is evidence that the return flight from Manchester to Aberdeen and back was the first occasion the pilot had flown a long distance on his own. In the opinion of other pilots who had flown with him, Mr Kornelson found difficulty in making proper use of radio navigation equipment when flying in IMC conditions due to his lack of instrument flying experience. The pilot himself had admitted that only two weeks before the accident he had lost control of the aircraft in cloud. Nevertheless he still appeared to others to be confident of his own ability to undertake flights in weather conditions which in their opinion were beyond his training and experience. A pilot who knew Mr Kornelson and who was airborne at the time of the accident flight, heard Mr Kornelson on the R/T and has since stated that he thought it probable that in the weather conditions prevailing Mr Kornelson would have been experiencing considerable difficulty with trying both to fly and navigate the aircraft.

1.6 Aircraft information

Cessna F172H G-AVHI.

1.6.1 Certificate of Airworthiness:	General Purpose Category: valid until 17 May 1974.
Total flying since new:	1,240 hours.
Survival equipment:	None.
Radio navigation and communications equipment:	Twin VHF communications equipment. One Automatic Direction Finding Receiver (ADF). Twin VOR/ILS. Transponder.
Fuel type:	AVGAS (petrol).
Quantity at time of take-off:	Full (38 US gallons).
Endurance at 5,000 feet: (Owners Manual)	Four to six hours to dry tanks depending upon the rev/min selected.

1.6.2 The aircraft had been maintained in accordance with an approved schedule. The last check which included a compass swing had been carried out on 24 November 1972. No defects were recorded since that date. During the same month, the twin VOR/ILS equipment had been installed and the ADF overhauled and swung. An airtest to check the radio installation was carried out, and a radio survey by the Civil Aviation Authority completed on 14 November 1972.

1.7 Meteorological information

An appreciation of the weather conditions prevailing in the region of the east coast of Scotland between 56N and 59N during the period the aircraft was airborne was made by the Meteorological Office and included the following information:

General situation:	A deep depression crossed the area with associated frontal occlusion.
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Weather:	Moderate or heavy continuous rain.
Cloud:	Patches of stratus, base 600-1,000 feet. Varying amounts of strato cumulus base 2,000 - 5,000 feet.
Visibility:	10-20 kilometres but 5-10 kilometres in heavy rain.
Wind:	Surface: Southeast to South 25-35 knots. 6,000 feet: 210° - 220°, 60-75 knots.
Turbulence:	Marked turbulence over land areas.
Icing:	Probability of icing above 1,500 - 2,000 feet.

The pilot visited the Aberdeen meteorological office before departure and was advised that there was a strong southerly wind over his intended route. He was also given the Manchester Terminal Forecast for the period 1300 - 2200 hrs, indicating generally cloudy conditions with rain. In addition, gale force southerly winds with rain, snow and severe turbulence had been forecast for the Scottish FIR during the day.

1.8 Aids to navigation

The route from Aberdeen to Newcastle is well served with NDBs and VORs, all of which the aircraft was equipped to receive. The radio communications recording however indicates that the pilot attempted to navigate solely by use of the Newcastle NDB. This operates on a frequency of 352 kHz, with a nominal range of 40 nm. At no time was the aircraft within range of this beacon. It seems likely that for a considerable portion of the flight, namely until 1702 hrs, the pilot may have inadvertently mistuned his ADF receiver to 325 kHz, the frequency of the Glasgow 'AC' and Oil Rig 'BW' beacons.

The VHF direction finding (VDF) stations from which navigational assistance could have been obtained by the pilot were Aberdeen, Perth, Leuchars and Edinburgh.

The aircraft was eventually located by Highland Radar, and then only because the aircraft's transponder equipment was operating.

1.9 Communications

The aircraft was in almost continuous communication with the Scottish FIR until being handed over to Highland Radar and then the RAF Nimrod aircraft. The tape record of these transmissions show that the aircraft was in satisfactory communication throughout the flight, though some confusion arose due to the pilot's use of non-standard phraseology.

1.10 Aerodrome and ground facilities

Not applicable.

1.11 Flight recorder

None required and none fitted.

1.12 Examination of the wreckage

The wreckage was not located.

1.13 Medical and pathological information

The pilot's body was not recovered.

1.14 Fire

There was no report of fire.

1.15 Survival aspects

The aircraft was not equipped with any survival equipment.

The pilot did not at any time state that he was lost, but it can be construed from the R/T recording that he became unsure of his position about 40 minutes after passing his position as over Dundee. Similarly the ATC services did not realise that the pilot was lost until 1640 hrs when they began to appreciate that he was having difficulty with his navigation, and accordingly increased their efforts to locate the aircraft. By 1720 hrs, when the position of the aircraft still had not been fixed, the ATC supervisor was preparing to declare an 'Alert Phase'. However five minutes later when Highland Radar observed an unidentified signal which was shortly afterwards identified as the aircraft the pilot was advised of his position and given a course to steer for Aberdeen. Subsequently, after the escorting Nimrod had calculated that the headwind component on a course towards Wick would be more advantageous than that towards Aberdeen, the course was altered for Wick. The aircraft eventually ditched after dark in gale force winds, when it ran out of fuel and its engine stopped. It was then about 44 nm due east of Wick and 75 nm north of Aberdeen. When the pilot told the Nimrod that his engine had stopped, the Nimrod laid a flare-path on the water into wind ahead of the Cessna on a heading of 185°.

Shortly after the ditching a Search and Rescue (SAR) Nimrod took over, and carried out a search in the area marked by a buoy dropped from the first Nimrod. The search by this aircraft was curtailed when engine and generator problems developed, but the area was searched during the night by an American C-130 and five ships. Another SAR Nimrod searched the area throughout the daylight hours of the following day, but without success.

In view of the circumstances in which the ditching was carried out, the accident must be considered non-survivable.

2. Analysis and Conclusions

2.1 Analysis

All attempts to plot the track flown by the aircraft during the period from 1438 hrs, when it left Aberdeen, to 1732 hrs when its position was positively established 90 nm northeast of that point were unsuccessful. The reason for this was that it could not be determined from the headings passed by the pilot at various times whether these were accurate compass courses or were relative bearings as seen on his ADF indicator. From a study of the R/T transcript, it seems likely that he slavishly followed the indications of his ADF to the exclusion of all else, believing all the time that he was flying towards Newcastle. As it is probable that the ADF was not locked on to any beacon throughout the entire flight, the courses flown would therefore have been haphazard and not tending in any particular direction. The one certain fact is that during the whole of this period the aircraft was being blown steadily in a northeasterly direction by winds of up to 60 to 75 knots. No blame can be attached to the ATC organisation for the outcome. The aircraft was on a VFR flight and the pilot repeatedly indicated that he was approaching Newcastle. Despite this, considerable efforts were made to locate the aircraft on radar, and in the absence of any other indications it was only reasonable that the search should have been concentrated in the Newcastle area. It was only when Highland Radar queried an unidentified aircraft out over the North Sea, that the mystery as to the whereabouts of G-AVHI were swiftly resolved. By that time of course, it was too late to save the aircraft from certain disaster. The aircraft ran out of fuel after flying for 4 hours and 12 minutes. This is approximately equal to the lowest endurance figure quoted in the Owners Manual and suggests that the pilot had used a high rev/min or a richer mixture than necessary. Had he not done so, he could have increased the endurance to six hours and thus, in the event, had enough fuel to reach land.

The mistakes made by the pilot and which led to his death, were elementary enough and despite his inexperience, should not have been beyond his competence to avoid. Firstly, he appears not to have prepared a navigation flight plan before departure, which was essential in view of the weather prevailing at the time. This would have at least alerted him to the fact that his ground speed was going to be very low and that he would not reach Manchester with adequate reserves without refuelling en route. Secondly, once airborne, he appears to have tuned into the Newcastle NDB immediately when he was still well outside its range. He then persisted in following quite erroneous ADF indications for almost two hours. Had he checked his compass during this period, which he appears not to have done, he would have realised his error sooner. Also, there were a number of NDBs, VORs and VDF stations between Aberdeen and Newcastle which he could have used to check his navigation and had he done so, would probably not have become lost.

From all accounts, it appears that the pilot relied too much on the extensive radio navigation equipment with which the aircraft was fitted, without realising that he did not fully understand how to make the best use of it. Furthermore, he did not seem to appreciate that he was demonstrably unable to cope when required both to fly the aircraft on instruments and navigate at the same time.

2.2 Conclusions

(a) Findings

- (i) The aircraft had been maintained in accordance with an approved maintenance schedule and its documentation was in order.
- (ii) The aircraft's tanks were full at the time of take-off.
- (iii) The pilot held a valid Private Pilot's Licence though he was unqualified to fly under Instrument Flight Rules.
- (iv) The pilot was inexperienced in instrument flying and navigation and unfitted to make the intended flight to Manchester in the prevailing weather conditions.
- (v) The pilot was unable to make proper use of the radio navigation equipment with which the aircraft was fitted due to insufficient training.
- (vi) The pilot became lost en route due to inadequate pre-flight preparation, together with improper use of the aircraft's radio navigation and compass equipment.
- (vii) The aircraft was carried substantially off its intended track without the knowledge of the pilot by very strong winds at cruising altitude.
- (viii) The air traffic control authorities were unable to provide navigation assistance in good time due to misleading information being unintentionally provided by the pilot.

(b) Cause

The accident was caused by the engine stopping due to fuel exhaustion whilst the aircraft was over the sea. A gross navigation error by the pilot in extreme weather conditions was a major contributory factor.

P J Bardon
Inspector of Accidents

Accidents Investigation Branch
Department of Trade
May 1974

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