ACCIDENTS INVESTIGATION BRANCH
Department of Trade

Piper PA 28-140 G·AVBM
Report on the accident at Kingscote, near Dursley, Gloucestershire on 6 August 1973

LONDON: HER MAJESTY'S STATIONERY OFFICE
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1. Investigation

1.1 History of the flight

The aircraft was on a private flight from Blackpool to France via Hurn, but due to deteriorating weather conditions en route, the aircraft diverted to Staverton where it remained overnight.

The following morning, 6 August, after collecting his route forecast the pilot experienced some difficulty in making radio contact with the tower during his pre-flight ground checks. Following numerous calls the aircraft finally established satisfactory two-way communication. The pilot then filed a VFR flight plan to Hurn and taxied out for take-off. While the aircraft was being held at the take-off point due to other air traffic, the pilot of another departing aircraft radioed the tower that he had encountered severe turbulence and heavy rain after take-off and said it would be advisable to hold G-AVBM until the squall had passed. This was done and at 0921 hrs the aircraft finally took off.

When airborne, the pilot called Staverton three times and although the tower replied, it appears that the aircraft was not receiving these transmissions. At 0932 hrs the pilot again called Staverton and said: 'I'm not receiving you, changing to London on 124.75 MHz.' A few minutes later two separate witnesses observed a light aircraft of the Piper type flying to the south of Staverton. The aircraft was seen flying below cloud, and occasionally passing through the base of cloud. It was particularly noticed that it was being buffeted to a considerable extent. At about 0945 hrs, the sound of an aircraft engine believed to be that of G-AVBM was heard at high power for a short period. After a minute or so the same engine note was heard again and then it finally faded. There was no eyewitness to the crash.

Between 0930 and 0945 hrs the weather at the accident site was described as raining heavily with gale force winds. At 1015 hrs the wreckage of G-AVBM was discovered in a field 760 feet above mean sea level, approximately 19 nm south of Staverton airfield. It had been completely destroyed on impact and both occupants had been killed. There was no fire.

1.2 Injuries to persons

Injuries	*Crew*	*Passengers*	*Others*
Fatal	1	1	–
Non-fatal	–	–	–
None	–	–	–

1.3 Damage to aircraft

The aircraft was destroyed by impact with the ground.

1.4 Other damage

Damage to a stone boundary wall.

1.5 Pilot information:

Mr Brian H Mangnall.

1.5.1

Age:	40 years.
Licence:	Private Pilot's Licence endorsed for Group A aircraft only.
Medical validity:	Until 3 September 1973.
Licence validity:	Until 3 September 1973.
Instrument IMC rating:	Nil.
Night Rating:	Nil.
Radio Telephony (R/T) Licence:	Nil.
Total flying hours:	137.
Total in command:	95.
In command on type:	70.
Hours last 28 days:	2.
Total dual instrument flying instruction:	0.55 minutes.

1.6 Aircraft information:

Piper PA 28-140 G-AVBM.

1.6.1

Manufacturer:	Piper Aircraft Corporation (USA).
Date of manufacture:	1967.
Certificate of Airworthiness:	General Purpose Category, validity 26 August 1973. The aircraft had been maintained in accordance with an aircraft maintenance schedule approved by the CAA.
Total hours since new:	5,109.
Maximum weight authorised:	2,150 lb.
Accident weight:	1,753 lb (estimated).
Centre of gravity range:	84 ins to 95.9 ins.
Accident CG:	86.5 ins (estimated).
Fuel type:	Avgas (petrol).

1.7 Meteorological information

(a) *Route forecast*

There is no meteorological office or forecaster available at Staverton but full facilities are available from the Gloucester meteorological office. There is no evidence that the pilot contacted Gloucester direct but he had booked a route forecast to France the previous day and this was seen by him when he visited the tower before departure.

It contained the following information:

Period 0900 to 1200 hrs, 6 August 1973.

Inference:	Strong southwest (SW) air flow and a large anti-cyclone covering most of Europe. Cold front now over West Wales moving into NW France during the morning.
Wind:	2,000 feet, 220°/50 knots over the UK, decreasing to 25 knots over NW France. 5,000 feet, 220°/60 knots over the UK, decreasing to 40 knots over NW France.
Cloud:	Low cloud with base 400 to 800 feet covering high ground with 8/8 total from 1,000 feet – 1,500 feet tops up to 20,000 feet. This cloud thinning out over the channel, base 1,500 feet tops up to 10,000 feet with patches of low cloud covering the hills.
Visibility:	5 kilometres in rain over the UK with 200m in hill fog, becoming 10 kilometres and better over France, but occasionally 6 kilometres in rain.
Freezing level:	12,000 feet.
Weather:	Gales, turbulence.
Hurn forecast:	0900 to 1100 hrs, wind 200°/25 knots, gusts 35 knots, visibility 6 kilometres rain, 7/8 cloud 800 feet, 8/8 1,200 feet, temporarily 3 kilometres, 7/8 300 feet.
Airframe Icing Index:	Low.

There were also three separate 'MET WARNINGS' received by Staverton on 6 August available to the pilot. These indicated that low stratus, gales, and moderate to severe turbulence at levels below 8,000 feet were expected over and to the lee of high ground in the Gloucester area during the day.

(b) *Other weather information provided to the pilot*

Prior to arriving at the airfield, the pilot was seen to pay particular attention to a pre-baratic chart in one of the national newspapers. This chart had been drawn up the previous day and was therefore based on information twenty one hours old when the aircraft took off from Staverton. It showed that the cold front would lie over to the east of the United Kingdom by midday and that the weather to the west would be cloudy with rain at first but becoming brighter with showers.

Before take-off, Mr Mangnall also discussed the weather with an experienced pilot who had just arrived at Staverton that morning from the Isle of Wight. This pilot, who had been flying at 4,500 feet on a track to the east of that intended by Mr Mangnall, described the weather en route as reasonable, except for some heavy rain. He also stated that Hurn airport was reporting a cloud base of 700 feet and a surface wind of 42 knots.

(c) *Weather appreciation:*

An appreciation of the weather prevailing in the area of the accident at 0930 hrs, 6 August 1973 prepared by the Gloucester Meteorological office gave the following information:

Inference:	A vigorous cold front passed the area at 0930 hrs.
Wind:	At 2,000 feet, SW/50 knots.
Cloud:	Broken low cloud ahead of the front, base 500 feet with heavy rain in the frontal zone. Probably low stratus 7-8/8 at 500 feet on S and SW facing slopes of the Cotswolds, giving hill fog layered clouds, base 2,000 feet becoming 8/8 total, tops 14,000 feet in the frontal zone.
Visibility:	7 to 10 kilometres falling to 3 kilometres in heavier rain and probably 500 m or less in hill fog on the Cotswolds.
Significant weather:	Heavy rain near the front, hill fog on SW slopes of the Cotswolds, moderate to severe turbulence in the frontal zone and also below 3,000 feet especially over the Costwolds with the strong surface winds.

(d) *Weather in the area of the accident site:*

At Nympsfield gliding site on the edge of the Cotswold escarpment, (700 feet above mean sea level) near to where the accident occurred, the weather on 6 August was described as follows:

During the morning there was moderate rain with strong winds and a cloud base lowering to ground level in frequent heavy showers. The Chief Flying Instructor (CFI) stated that he did not consider it safe to fly gliders at the site until 1300 hrs, and for powered aircraft, conditions were unsuitable the whole day. The CFI also said that with the strong winds, a severe 'curlover' effect can be experienced in the lee of the escarpment close to the gliding site, which can cause a sudden loss or gain of height of 100 feet or more.

1.8 Aids to navigation

The aircraft was equipped to receive VOR only and therefore the only beacons available to the pilot were the VORs at Hurn and Brecon. The pilot had listed these frequencies on his flight log sheet. The VHF navigation receiver selector switch was found in the 'off' position.

1.9 Communications

Transcripts of radio telephone recordings at Staverton indicate, that reception by G-AVBM on 122.9 MHz on 5 August when it diverted to Staverton was not satisfactory. The aircraft requested clearance to land five times and each time Staverton replied. This would indicate a defect in the aircraft radio as other stations at this time were receiving Staverton satisfactorily. On 6 August during the pre-flight checks, the pilot had to make repeated test calls to Staverton tower to establish two-way communication. During the period when the aircraft was taxying out for take-off, the R/T recordings indicate that its radio receiver was operating satisfactorily. However after the aircraft took off and left the circuit, the pilot called four times and Staverton replied five times. Finally the pilot said 'I'm not receiving you and changing to London on 124.75 MHz.' The recording of this frequency indicated one call being received by London at about 0930 hrs which was acknowledged, after which nothing further was heard from the aircraft.

1.10 Aerodrome and ground facilities

Not relevant.

1.11 Flight recorder

A flight recorder was neither fitted nor required to be fitted.

1.12 Wreckage

1.12.1 *Wreckage site*

The aircraft had crashed on open terrain 760 feet above mean sea level on a westerly heading, in the lee of an escarpment overlooking Wooton under Edge. There was evidence that the aircraft was descending right wing low with its flaps up on first impact. The aircraft went through a dry stone wall and a hedge which resulted in the right wing being severed and the main wreckage coming to rest 32 m further on, with minor debris scattered up to a distance of 85 m. There was no fire although the ground showed evidence of fuel spillage.

1.12.2 *General examination*

The right wing, front bulkhead, engine and propeller were broken off during the crash and there was evidence that the propeller was under power. There was heavy impact damage to the fuselage, left wing and tail unit. There was

no evidence of malfunction of the engine or flying controls and a strip examination of the engine indicated no pre-crash defects. Both the pilot's and passenger's lap straps had been fastened. It is estimated that approximately 23 gallons of fuel remained at the time of the accident.

1.13 Medical and pathological information

A post mortem was carried out but no indications of any medical cause as being contributory to the accident were found.

1.14 Fire

There was no fire.

1.15 Survival aspects

The accident was not survivable; the impact forces being such that the provision of a shoulder harness and/or protective helmet would not have affected the outcome.

1.16 Test and research

None.

2. Analysis and Conclusions

2.1 Analysis

The circumstances of the accident were such that the outcome was almost inevitable. Despite abundant warnings before departure of gale force winds, turbulence and low cloud, the pilot nevertheless set off at a low-level across hilly terrain in a light single-engined aircraft. Shortly afterwards he found himself in a dangerous situation from which escape was difficult for him. To climb up into cloud was virtually out of the question as the pilot lacked the necessary instrument flying ability. He was therefore forced to maintain visual flight close to the ground where the turbulence was at its most severe. In such circumstances he would have had to devote all his concentration and skill to keeping the aircraft approximately level. Accurate navigation would have been extremely difficult. At some stage, it seems likely that the pilot may have decided to turn back and it is probable that whilst he was making this turn at low altitude he lost control because of the effects of severe turbulence. The pilot's decision to attempt the flight was based either on a lack of appreciation of the dangers involved in flying at low-level in gale force conditions, or in the mistaken belief that the weather was not as bad as forecast. There is some evidence that the latter may have been the case, as he may have been unduly influenced by the pre-baratic chart in a national newspaper forecast which he is known to have considered. This showed that by midday the cold front would lie east of his proposed track. The pilot may not have realised that this forecast, of necessity, related to information some twenty hours old.

He was probably further influenced by his conversation with the pilot who had just flown from the Isle of Wight, from whom he may also have gained the impression that the weather was not as bad as forecast, probably not realising that this pilot had flown at 4,500 feet, well clear of the worst of the turbulence due to ground effects and on a track some distance to the east of that from Staverton to Hurn. From his actions it would appear the pilot was anxious to continue the flight, which had been delayed by the stop-over at Staverton. It seems that not only was he prepared to take a chance on the weather, but he was also prepared to continue his flight into a control zone in IFR conditions without the possession of an instrument rating and with a radio he knew to be defective.

There is little that can be said in extenuation except that his lack of experience was a major contributory factor. He must or should have known that he was not properly qualified to attempt the flight as he possessed neither an IMC nor RT rating. Had he received the training necessary to obtain each of these ratings his judgment as to the wisdom of flying on such a day might have been more soundly based.

2.2 Conclusions

(a) *Findings*

(i) The aircraft had been properly maintained and its documentation was in order.

(ii) The aircraft's VHF communications receiver was partly unserviceable, prior to take-off and did not function correctly in the air.

(iii) The pilot lacked sufficient experience for the proposed flight, though he held a valid licence.

(iv) The pilot filed a VFR flight plan when the forecast conditions were unsuitable.

(v) The pilot was not qualified to fly under IFR conditions.

(vi) The pilot did not hold a valid R/T licence, though one was required for the proposed flight.

(vii) The aircraft encountered extreme turbulence at low-level over hilly terrain and a loss of control occurred resulting in the aircraft striking the ground.

(b) *Cause*

The accident was caused by a loss of control in extreme turbulence at a very low altitude. Pilot inexperience and lack of training were contributory factors.

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Department of Trade

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