Department of Trade

ACCIDENTS INVESTIGATION BRANCH

Piper PA32R (Cherokee Lance) PH-PLY
Report on the accident at Holly Hill, near Snodland, Kent, on 29 April 1978

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1/79	Piper PA32R(Cherokee Lance) PH–PLY Holly Hill Snodland Kent April 1978	

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Department of Trade
Accidents Investigation Branch
Kingsgate House
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1 February 1979

The Rt Honourable John Smith MP
Secretary of State for Trade

Sir

I have the honour to submit the report by Mr C C Allen, an Inspector of Accidents, on the circumstances of the accident to Piper PA32R (Cherokee Lance) PH–PLY which occurred at Holly Hill, near Snodland, Kent, on 29 April 1978.

I have the honour to be
Sir
Your obedient Servant

W H TENCH
Chief Inspector of Accidents

Accidents Investigation Branch
Aircraft Accident Report No. 1/79
(EW/C624)

Operator:		Flyourself Holland B.V.
Aircraft:	*Type:*	Piper PA 32 R (Cherokee Lance)
	Model:	PA 32R – 300
	Nationality:	Netherlands
	Registration:	PH –PLY
Place of Accident:		Holly Hill, near Snodland, Kent.
		Latitude 51° 19′ 30″ N Longitude 00° 23′ 30″ E
Date and Time:		29 April 1978 at approximately 0820 hrs.
		All times in this report are GMT.

Synopsis

The accident was notified by the Kent police at 0905 hrs on 29 April 1978. Personnel from the Accidents Investigation Branch commenced an investigation the same day. No accredited representative was appointed by the State of Registry of the aircraft but the Netherlands and Belgian authorities provided information.

The aircraft was making a private flight from Amsterdam (Schipol) Airport to Biggin Hill on a Visual Flight Rules (VFR) flight plan. It encountered poor visibility after passing the Dover very high frequency omni-directional range (VOR) and descended to 1000 feet above mean sea level. Approximately four minutes after passing a routine position report over Detling VOR it flew, while in a substantially level attitude, into a steep escarpment on the edge of the North Downs at an elevation of between 500 and 550 feet. The aircraft was destroyed and the six occupants killed. The weather near the accident site was overcast with poor visibility, and the top of the hill which the aircraft struck was covered in mist and low cloud. It is concluded that the accident was caused by the aircraft being flown in poor visibility below the level of the adjacent high ground in the course of the pilot's attempt to continue a visual flight in deteriorating weather conditions.

1. Factual Information

1.1 History of the flight

The pilot had hired the aircraft in order to make a private flight with some friends from Amsterdam Airport to Biggin Hill. He filed a VFR flight plan routing over Rotterdam, Costa, Koksy, Dover and Detling. There is no evidence that he visited the meteorological office at the airport before departure but a telephone call was received there between 0530 and 0550 hrs from an unidentified person who requested information for a flight to Biggin Hill. Before departure the aircraft was refuelled to near the maximum tank capacity of 78 imperial gallons.

At 0656 hrs the aircraft departed Amsterdam and after an apparently uneventful flight entered United Kingdom airspace at 0754 hrs at an altitude of 2,500 feet. At 0802 hrs the pilot reported over the Dover VOR and after requesting descent to a lower altitude was cleared by the Kent radar controller to maintain visual meteorological conditions (VMC) at 1,500 feet. When he reported reaching 1,500 feet he was asked to keep the controller advised if he was unable to maintain VMC. At 0810 hrs the pilot reported that the visibility was very bad and requested clearance to fly at 1,000 feet. He was informed by the radar controller that flight below 1,500 feet was at his own discretion and that the Chatham regional altimeter setting was 1002 mb. Shortly afterwards he reported reaching 1,000 feet. At 0815 hrs he reported that the aircraft was passing Detling VOR at 1,000 feet and was estimating Biggin Hill at 0825 hrs. The aircraft was then cleared to call Biggin Hill. The radar controller has stated that the aircraft was correctly on track during the time that he had radar contact with it. However he was unable to check the aircraft's position over Detling VOR because by that time its target had disappeared from the radar screen.

The pilot passed to the Biggin Hill air traffic controller his Detling position and the estimated time of arrival (ETA) at Biggin Hill. He reported that he was flying VMC at 1,000 feet. The controller then relayed to the aircraft the weather conditions for Biggin Hill at 0800 hrs, which included the following information: wind 030 degrees at 08 knots; visibility 2,000 metres in haze; cloud 5 oktas at 400 feet and 8 oktas at 1,000 feet. At 0825 hrs the controller called the aircraft in order to ascertain its position and altitude relative to another aircraft which was awaiting descent clearance from 2,500 feet over Biggin. In spite of repeated efforts to regain contact he received no reply.

Subsequent investigation showed that, after passing over the Detling VOR, the aircraft had continued on track towards Biggin Hill. Several witnesses in the area west of the village of Snodland, Kent, which lies in the gap in the North Downs through which the River Medway flows, heard the aircraft flying overhead without being able to see it because of the low cloud which covered the area. From their reports it appears that it made one orbit to the right. It was then briefly sighted flying fairly low in a substantially level attitude. It was passing in and out of the base of the cloud as it disappeared into the mist in a north-westerly direction. Shortly afterwards a loud bang was heard from the direction of the high ground ahead of it, and the emergency services were alerted. However, the latter were hampered by the mist and low cloud which covered the tops of the North Downs to the west of Snodland. They eventually found the wreckage of the aircraft lying in a thicket just below the top of the high ground in the vicinity. The aircraft had initially collided with some tall trees on the side of the south-east facing steep escarpment. In the course of the impact sequence it disintegrated and all six occupants were killed, but there was no fire.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	1	5	–
Serious	–	–	–
Minor/None	–	–	–

1.3 Damage to aircraft

Destroyed.

1.4 Other damage

Several trees suffered damage when they were struck by the aircraft.

1.5 Personnel information – the pilot

Age:	30 years
Nationality:	Netherlands
Licence:	Private Pilot's Licence (Netherlands) valid until 30 November 1979
Medical certificate:	Valid until 25 October 1979
Total pilot hours:	204
Total pilot hours on PA32:	7

The pilot received 5 hours instrument flying instruction in a Piper Cherokee 140 in 1972. He was fully acquainted with the operation of the VOR equipment which was fitted in PH–PLY. He had previously flown to the United Kingdom (UK) on two occasions, once in a Piper Cherokee 180 in July 1972 to Gatwick and Thruxton and once in a Cessna 172 in February 1977 to Biggin Hill.

1.6 Aircraft information

(a)	Type:	Piper PA 32R–300 (Cherokee Lance)
	Date of manufacture:	1977
	Engine:	one – Lycoming 10–540–K1G5D
	Certificate of airworthiness:	Normal category (Netherlands) valid until September 1978
	Maintenance:	The aircraft had been maintained in accordance with an approved maintenance schedule.
	Total hours flown:	264
(b)	Maximum weight authorised:	3600 lb
	Estimated take off weight:	Approximately 3600 lb (exact passenger weights and fuel quantity not available)
	Estimated weight at time of accident:	Approximately 3425 lb

Centre of gravity range at accident weight:	88.5–95.0 inches aft of the datum
Estimated centre of gravity at time of accident:	93.63 inches aft of the datum
(c) Type of fuel:	Avgas 100 L

Prior to departure the pilot requested that the aircraft be refuelled with 130 litres. Including residual fuel, the estimated total quantity on board was near to the maximum tank capacity of 78 imperial gallons.

1.7 Meteorological information

The pilot did not visit the meteorological office at Amsterdam Airport to get a weather briefing. However, between approximately 0530 and 0550 hrs the forecaster there received a telephone call from an unidentified person who requested the weather information for a flight to Biggin Hill. The call was not recorded and, therefore, full details are not available. However, a general route briefing was given, mentioning the presence of fog banks and lifting fog. Because there was no weather reporting station at Biggin Hill there were no actual weather reports for the aerodrome available for the forecaster to pass on to the caller. The forecaster thought, however, that the weather there would be 'good enough' at the time of the aircraft's arrival, but he stated later that he had not expected the aircraft to make such an early departure from Amsterdam nor to arrive at Biggin Hill as early as it did.

An aftercast prepared by the UK Meteorological Office for the period covering the accident showed that a slack pressure gradient existed over south-east England. The general conditions were:

Cloud:	Broken stratus base 500 feet and tops 1000–1500 feet Broken stratus and strato-cumulus base 1500–2000 feet Overcast strato-cumulus between 4000 and 5500 feet.
Visibility:	5 kilometres with 3000 metres locally, reduced to 100–500 metres where the low stratus covered the tops of the hills.
Freezing level:	4000 feet.

A more detailed analysis of the weather in the accident area indicated that the wind was less than 8 knots but variable in direction from either the south or the north-east. The post dawn fog and low stratus was generally clearing over the south-east of England but patches probably lingered in the area close to the River Medway. In addition there could have been local deterioration in the general weather, especially where the drift of easterly moist winds encountered rising ground. Local residents confirmed that at the time of the accident the sky was overcast with a low cloud base and that the tops of the North Downs to the west were obscured. Below the low cloud the visibility was considered 'reasonable'. The weather gradually improved during the morning.

At approximately 0815 hrs the following actual weather report for Biggin Hill at 0800 hrs was passed to the aircraft:

Surface wind:	030 degrees at 08 knots
Visibility:	2,000 metres in haze
Cloud:	5 oktas at 400 feet 8 oktas at 1000 feet

Temperature:	+6 degrees Celsius
QNH:	1006 millibars
QFE:	986 millibars

The accident occurred in overcast conditions in daylight.

1.8 Aids to navigation

The aircraft was equipped with two VOR receivers, one automatic direction finding (ADF) receiver, one distance measuring equipment (DME), and one transponder. All ground radio navigation aids applicable to the aircraft's route in the UK were serviceable at the time of the accident.

Three copies of the ICAO 1:500,000 aeronautical chart number 2170D, Low Countries - Amsterdam, were found in the wreckage. This chart covers the whole of the area between Amsterdam and Biggin Hill and the route which the pilot intended to follow had been marked on one copy.

1.9 Communications

After entering UK airspace the aircraft maintained normal two-way communication with Kent radar until reporting over the Detling VOR station when it was advised to change to the Biggin Hill air/ground frequency, 129.4 MHZ. Communication was established between the aircraft and the air traffic controller at Biggin Hill but no further radio transmissions from the aircraft were heard after the Detling position report had been passed. The communications with Biggin Hill were not recorded because of the absence of recording equipment at the aerodrome.

1.10 Aerodrome information

Not applicable.

1.11 Flight recorders

None required and none fitted.

1.12 Examination of the wreckage

The aircraft had initially struck some tall trees which were growing on the side of a south-east facing escarpment. The impact with the tree trunks removed both wings and part of the tailplane but the main fuselage and cabin section continued forward and struck the side of the hill. The fuselage then bounced into the air and fell into a thicket of small trees and bushes which covered the top of the hill. The elevation of the accident site was between 500 and 550 feet. The aircraft's heading on impact was 317° (M) and the impact marks on the trees indicated that it was banked 4° to the right and in a 3½° climb at the time.

Examination of the wreckage revealed that the aircraft was intact when it first struck the trees, and the degree of damage sustained was consistent with a speed in the region of 140–150 miles per hour. Damage to the propeller and marks it had made on the trees indicated that it was under power at the time of the accident. Both pairs of wing tanks were ruptured by impact with the trees and there was evidence of fuel spillage on the ground around the site.

The undercarriage was in the retracted position prior to impact and the flaps were fully up. The control surfaces and runs were complete with no evidence of pre-crash failure. Witness marks on the fuselage side made by the stabilator were consistent with a neutral stabilator setting at the time of impact with the trees. The pitch trim was found to be just forward of neutral. No evidence of a defect or malfunction was found in the aircraft or its engine.

Very little information could be gained from the aircraft's instruments because of disturbance during the crash sequence. The pressure setting indicator on the altimeter was set to 1002 mb (the Chatham regional altimeter setting) and the direction indicator showed a heading of 316°. Due to the extent of the damage, it was impossible to establish the state of serviceability of the radio and navigational equipment before impact.

1.13 Medical and pathological information

Post mortem examination of all the occupants revealed no evidence of any medical condition which could have contributed to the cause of the accident.

1.14 Fire

There was no fire.

1.15 Survival aspects

The accident was non-survivable.

1.16 Tests and research

None.

1.17 Additional information

None.

1.18 New investigation techniques

None.

2. Analysis

Immediately prior to the accident the aircraft was flying below the level of the adjacent high ground in conditions of poor visibility and low cloud such that it was not possible for the pilot to see the escarpment ahead in sufficient time to be able to take successful avoiding action. The aircraft's altitude at impact was also considerably lower than when last reported. Although on track to Biggin Hill, it was heading in a north-westerly direction, having apparently just completed one full turn to the right. In order to attempt to determine the cause of the accident, the possible reasons for this departure from the expected flight path require examination in some detail.

There is no evidence that the pilot suffered from any medical condition which might have had a bearing on the cause of the accident, indeed the flight path and attitude of the aircraft when last seen, just before it crashed, suggests that it was being flown under the control of the pilot. The power being developed by the engine at impact would have been sufficient to have enabled the aircraft to maintain level flight and there was no evidence of any defect or malfunction which might have necessitated a forced or precautionary landing. Although it was not possible to establish positively that all the aircraft's radio-navigational equipment was functioning correctly up to the time of the accident, the aircraft was apparently being navigated with reference to en route VOR stations and was on track when it crashed. Therefore it seems unlikely that the pilot was in navigational difficulties and trying to identify his position when he circled just prior to the accident. Nor does it seem likely that he descended in the belief that he was over his destination, because the accident occurred several minutes before his estimated time of arrival. The altimeter had been adjusted to the Chatham regional pressure setting and because the pilot was in any case flying in visual contact with the ground shortly before impact it is unlikely that he had misinterpreted his altitude information. It appears therefore that the explanation of the cause of the accident is related to the weather conditions combined with the pilot's experience and ability.

The pilot was reputed to have been meticulous in pre-planning his cross country flights and there seems little doubt that it was he who telephoned the Amsterdam meteorological office for a weather briefing. The briefing was in general terms and although the forecast gave a warning of the presence of fog patches and lifting fog, the actual cloud intensity associated with these conditions appears to have been greater over south-east England than that which existed over the Continent. It is possible that the pilot may not have appreciated this before departure, nor have realised that local deteriorations might exist. Most of his previous flying had been carried out in Holland and it is therefore also possible that he was not sufficiently alert to the type of local weather disturbances which can be caused by hilly ground.

As the aircraft approached south-east England it encountered the weather typically associated with a moist easterly airstream coupled with a local deterioration due to the hilly terrain of the North Downs along which the track lay. Faced with these conditions the pilot made what must be deemed an unwise decision to continue towards his destination. With only limited instrument flying experience he would have been anxious to avoid prolonged flight in cloud, and to do so he was forced to descend progressively. He obviously did not anticipate that the deterioration in the weather would be as rapid or substantial as it was, to the extent that the lowering cloud base eventually covered the tops of the hills and, when associated with the decrease in visibility, made it impossible to fly safely whilst maintaining visual contact with the ground. Faced with this predicament he apparently decided to make an orbit to the right in an area of low lying ground. It is a matter of speculation whether he intended to lose height at the same time in order to keep the ground in sight or whether the descent was unintentional while he was preoccupied with the question of what he should do next. The result, however, was that the aircraft descended below the level of the tops of the local high ground. The 1:500,000 route

charts carried on the flight were not suitable for the low level map reading required in these circumstances; the scale was too small to show the topography in sufficient detail to establish a precise position or to circumnavigate obstacles. When last observed, the aircraft was flying in and out of the cloud base in conditions of such poor visibility that the pilot would have been unable to see the steeply rising ground ahead of him in time to take successful avoiding action.

This accident is unfortunately a typical example of a case in which a pilot with limited instrument flying experience continued a flight in spite of increasing amounts of cloud and deteriorating visibility until conditions became so bad that visual flight was no longer possible. The cross-country flight which must be conducted in VMC is particularly sensi-sensitive to en route conditions at low level. However it is well known that it is often very difficult to forecast the presence of small local disturbances which are not depicted in a general weather synopsis. The pilot of such a VMC flight therefore needs to be constantly alert to weather changes. Whenever the weather makes it impossible to maintain the minimum safe altitude without reverting to instrument flight he must be prepared either to divert or to return to his departure aerodrome. All temptation to descend in order to try and find a way through below the cloud base should be resisted.

3. Conclusions

(a) *Findings*

(i) The pilot held a valid licence but had very little instrument flying experience. There was no evidence that any medical condition contributed to the accident.

(ii) The aircraft had a valid certificate of airworthiness and had been maintained in accordance with an approved maintenance schedule.

(iii) No defect or malfunction was found in the aircraft, its engine or its equipment which could have had a bearing on the cause of the accident.

(iv) The centre of gravity of the aircraft was within the prescribed limits.

(v) It is highly probable that, prior to departure, the pilot obtained by telephone from the Amsterdam meteorological office a general briefing on the forecast weather for the flight to Biggin Hill.

(vi) After crossing the English coast the aircraft flew into deteriorating weather conditions in the area of the North Downs which forced it to descend to progressively lower altitudes in order to maintain VMC.

(vii) The aircraft made a right hand orbit in an area of low lying ground in the course of which it descended below the level of the adjacent high ground.

(viii) In these circumstances the only charts carried on the flight were of too small a scale to be of assistance in the avoidance of local obstacles.

(ix) The aircraft subsequently struck the side of a steep escarpment which the pilot could not have seen in time to take successful avoiding action, because it was obscured by mist and low cloud.

(b) *Cause*

The accident was caused by the aircraft being flown in poor visibility below the level of the adjacent high ground in the course of the pilot's attempt to continue a visual flight in deteriorating weather conditions.

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Inspector of Accidents

Accidents Investigation Branch
Department of Trade

February 1979

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