

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Piper PA-28-140 Cherokee, G-BBBK	
<b>No &amp; Type of Engines:</b>	1 Lycoming O-320-E3D piston engine	
<b>Year of Manufacture:</b>	1967	
<b>Date &amp; Time (UTC):</b>	3 February 2007 at 1713 hrs	
<b>Location:</b>	In the sea close to Blackpool Beach, Lancashire	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - 1
<b>Injuries:</b>	Crew - 1 (Fatal)	Passengers - 1 (Fatal)
<b>Nature of Damage:</b>	Aircraft destroyed	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	26 years	
<b>Commander's Flying Experience:</b>	110 hours (of which 105 were on type) Last 90 days - 4 hours (flown on the day of the accident) Last 28 days - 4 hours (flown on the day of the accident)	
<b>Information Source:</b>	AAIB Field Investigation	

## Synopsis

The aircraft was returning to Blackpool Airport following a VFR flight from Exeter Airport. The weather conditions at Blackpool were poor, with low cloud and limited visibility. The pilot was unable to locate the airfield visually and, while descending through cloud with a base of around 100 ft, at twilight, the aircraft flew into the sea. It sank in shallow water; neither of the two persons on board survived.

## Background to the flight

The pilot had originally planned to go to Blackpool Airport on the day of the accident, to carry out refresher training in the circuit with an instructor from a Flying Training Organisation (FTO) based there. According to his logbook, he had not flown in the preceding

three months. However, on the morning of the day of the accident he was telephoned by the Chief Flying Instructor<sup>1</sup> (CFI) of the FTO who left a message with a proposal for a flight.

The proposal was for him to fly a Piper PA-28-140 Cherokee, G-BBBK, from Blackpool to Exeter and back, taking two passengers who were to pick up another aircraft and fly it to Blackpool. The financial terms for the use of the aircraft would be the same as had been arranged on some previous occasions; the pilot would

## Footnote

<sup>1</sup> The CFI of the FTO has stated in correspondence to the AAIB that he had relinquished his position as CFI on 31 January, although he maintained that role on a 'de facto' basis until the FTO was closed down at end of May. Where referred to in this report, the term CFI relates to this de facto position.

pay for the cost of the fuel for the flight, at £25 per hour. The pilot responded by leaving a message to say that he could not carry out the flight because he was out of current practice. However, the CFI called him again clarifying that he did not mean for him to fly solo but that a more experienced pilot would accompany him. It was not established whether the pilot understood this to mean that the 'experienced pilot' was an instructor. However, the pilot agreed to this arrangement and shortly afterwards went to the airport.

### History of the flight

The accompanying pilot was contacted on the morning of the accident by the CFI and asked if he would go on the flight to Exeter. He agreed and arrived at Blackpool Airport during the morning and made arrangements to refuel the aircraft.

When the pilot arrived at the airport, at around 1200 hrs, the aircraft had reportedly been refuelled to full tanks, and the two passengers were waiting to depart. He went out to the aircraft where he met the accompanying pilot and the passengers, all of whom were associated with the FTO, and they prepared to depart.

The aircraft took off from Runway 25<sup>2</sup> at 1225 hrs and, on climbing through 200 ft to 300 ft, entered cloud. At around 1,000 ft aal, the aircraft came out on top and continued to climb to its cruise altitude. The flight continued above a solid overcast layer of cloud until the aircraft was south of the Liverpool area, where it was clear. The weather conditions were clear for the remainder of the flight and an uneventful landing was made at Exeter at 1431 hrs.

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#### Footnote

<sup>2</sup> Several witnesses saw the departure of the aircraft from Blackpool and commented that it seemed low. One became concerned that the aircraft was not going to clear a railway embankment close to the end of the runway.

The pilot taxied to the north side of the airport where the aircraft was shut down and the passengers disembarked. One went directly to the Aztec aircraft which was to be collected, the other had a conversation with the accompanying pilot. This included a discussion about the amount of fuel on board and a visual inspection of the fuel quantity in the tanks. The accompanying pilot apparently decided it was not necessary to refuel at Exeter and was heard to comment that "they could drop in somewhere on the way back if it became necessary". The opinion of the passenger, an experienced pilot who later flew the Aztec, was that there was sufficient fuel available in the tanks for around 2½ hours of flight.

It was not established whether the pilot himself was involved in these discussions but, from 1442 hrs until 1456 hrs, he was talking on the telephone. He made one call, to his mother, to ask if she could leave some cash out ready for him so that he could pay for the aircraft when he returned; another was to a friend at Blackpool, during which he asked about the weather and was told that it was "still misty".

The aircraft took off from Exeter at 1513 hrs; the Aztec aircraft with the two original passengers departed shortly afterwards. There was no contact between the aircraft en-route and the Aztec landed without incident at Blackpool at 1639 hrs.

A photograph recovered from the pilot's mobile telephone after the accident, showed the view from the aircraft in flight, at 1620 hrs, Figure 1. This revealed the conditions to be VMC, and it was assessed to have been taken in the area of Welshpool Airfield.

The pilot of G-BBBK contacted Blackpool Approach at 1652 hrs and reported his position as overhead Formby, 13 nm to the south of the airport. The controller passed



**Figure 1**

Photograph taken from G-BBBK in the Welshpool area at 1620 hrs on 3 February 2007, some 52 minutes before the accident

the latest weather information, which was a visibility of 2,800 m, FEW clouds at 100 ft, BROKEN clouds at 200 ft and the QNH pressure of 1039 mb.

At 1658 hrs, the pilot reported at the Visual Reference Point (VRP) ‘Marshside’, 3.6 nm to the south-south-west of the airport, and requested a Surveillance Radar Approach (SRA). The controller replied that they were not likely to ‘get in’ from an SRA because the cloud was solid at 200 ft. The controller then asked if the aircraft was equipped with a transponder; the pilot replied in the negative. The controller advised, therefore, that he would not be able to see the aircraft on radar because the present weather conditions were causing clutter on the screen. At this point the accompanying pilot transmitted to the controller “Well, we’re low on fuel so need to get down somehow”. ATC then requested whether the aircraft was fitted with an ILS receiver, to which the accompanying

pilot responded, in the vernacular, to the effect that there was no navigational equipment available. From this time on, most of the radio transmissions were made by the accompanying pilot.

At 1700 hrs, the controller asked for the altitude of the aircraft. On receiving the reply “2,000 feet”, advised that, although there was no radar ‘paint’, the DF (radio direction finder) showed the aircraft to be north-east of the airfield. The accompanying pilot then asked the controller what he could suggest they do.

By 1702 hrs, the controller was concerned that the aircraft could be in difficulty; he asked the pilot for the number of persons on board. He contacted the ATC Distress and Diversion (D&D) unit and also initiated a ‘local standby’ for the airport emergency services. He then replied to the earlier question and the only suggestion he could

make was that perhaps the pilot could fly out over the sea, descend and use the airfield NDB or onboard GPS equipment to find the airfield.

At 1704 hrs, in response to a transmission from the aircraft of “inbound from Kirkham”, a VRP 5.75 nm to the east, the controller asked if they had any ground contact; the reply was “no, none at all”.

The accompanying pilot then said to the controller that they intended to “go out over the sea and descend”. The controller advised that Leeds Airport was CAVOK. The reply from the aircraft was that there was not enough fuel on-board to get to Leeds. The controller now dealt with some inbound commercial traffic, directing them to a holding pattern.

At 1710 hrs, the controller asked for the height of the aircraft. The reply, which came from both pilots at once, was “400 ft”. He then cleared the aircraft to land on any easterly facing runway. The accompanying pilot requested a QDM (DF reciprocal bearing) and the controller advised it was “138 Class B”. For the next two minutes the controller passed several more QDM readings. At 1712 hrs, he requested the aircraft’s altitude; the reply was “200 feet”. He gave a warning to the pilot about obstructions on the land rising to 242 ft, if the aircraft was to cross the coastline, and then advised that the aircraft was tracking east but was to the north of the field. The accompanying pilot replied “copied”, after which there was a brief continuation transmission, in which one pilot appeared to be speaking to the other, to the effect of “go south”. The sound of the engine could be heard in the background to this transmission. The controller now advised that he had a faint contact on radar showing the aircraft on the shoreline, but also that it might not be accurate.

He then dealt with some other traffic before calling G-BBBK with updated weather information of overcast cloud at 100 ft. There was no reply to his transmission and, at 1714 hrs, after several further calls, he initiated aircraft accident action.

#### **Location of the accident site**

A number of vehicles and an inshore lifeboat searched along the shoreline for the aircraft. A Search and Rescue (SAR) helicopter was tasked from RAF Valley, Anglesey, and arrived in the area at 1815 hrs. The helicopter pilot reported that he had been unable to operate over the water because of the poor weather conditions, but that he was able to hover-taxi at low level along the shore. At 1907 hrs, the wreckage of the aircraft was located by both the inshore lifeboat and the helicopter. G-BBBK had come to rest in shallow water with just the top of its tail section visible above the surface. There was no sign of survivors at the site. Two bodies were recovered from within the aircraft the following morning.

#### **Meteorological information**

A meteorological aftercast for the region, obtained from the Met Office, gave the general synoptic situation between 1200 hrs and 1800 hrs and showed a static area of high pressure covering the British Isles feeding a very light north-westerly airflow over the Blackpool area. The satellite image at 1200 hrs showed low cloud covering the area from Blackpool to the south of the Crewe/Ternhill area; further south there was clear sky. For the return flight, extensive stratus cloud was present in the Manchester-Liverpool-Blackpool area with a base at 100 ft to 200 ft, and tops estimated at 1,000 ft to 1,500 ft.

The weather forecast for Blackpool, available for the pilot before the flight to Exeter, was the 1000 hrs to 1900 hrs

Terminal Area Forecast (TAF), issued at 0904 hrs. This contained the following information:

*'Surface wind variable direction at 4 kt, visibility 500 m in fog, broken cloud at 100 ft; becoming between 1000 and 1200 hrs, visibility 3,000 m; becoming between 1100 and 1300 hrs visibility 6,000 m. No significant weather forecast and a 40% probability between 1300 and 1900 hrs of CAVOK.'*

At 1156 hrs a new TAF was issued, valid from 1300 to 2200 hrs:

*'Surface wind variable direction at 3 kt, visibility 1,200 m in mist, fog in the vicinity, broken cloud at 200 ft; temporarily between 1300 and 2200 hrs, visibility 400 m, broken cloud on the surface; a 30% probability of temporarily visibility between 1300 and 2200 hrs of 4,000 m.'*

At 1216 hrs an update to the 1000 to 1900 hrs TAF was issued:

*'Surface wind variable direction at 4 kt, visibility 300 m in fog, broken cloud on the surface, temporarily between 1200 and 1900 hrs visibility 1,200 m in mist, fog in the vicinity, broken cloud at 200 ft, a 30% probability between 1200 and 1800 hrs of visibility 4,000 m in mist.'*

The METAR for Blackpool issued at 1220 hrs, close to the time of departure of the outbound flight, was:

*'Surface wind calm, visibility 1,500 m few cloud at 100 ft, overcast cloud at 200 ft temperature 5°C dewpoint 4°C pressure 1041 mb.'*

The METAR for Blackpool issued at 1720 hrs, shortly after the accident was:

*'Surface wind calm, visibility 2,500 m overcast cloud at 100 ft, temperature 4°C, dewpoint 3°C, pressure 1039 mb.'*

Airport Low Visibility Procedures (LVPs) were in force at Blackpool throughout the day. This information was broadcast by means of the ATIS. The time of sunset was 1657 hrs.

The weather conditions in the local area around Blackpool in the late afternoon appear to have been similar. The meteorological visibility at both Manchester and Liverpool airports was reported as being 100 m. A satellite image at 1630 hours showed that there was an extensive area of unbroken fog around Blackpool.

#### **Pilot information**

The pilot started learning to fly in 1994 at the same FTO from which he departed on the day of the accident. He had also carried out all his initial flying training and subsequent flying there. He qualified for his Private Pilot's Licence (PPL) in August 2003, at which time he had achieved 70 hours of flight time. Since then he had worked towards obtaining an Airline Transport Pilot's Licence (ATPL); he completed the necessary technical exams for this in 2005. He had also been gradually accumulating flight time in order to meet the minimum 150 hours requirement for the flying training element of the Modular ATPL course. In 2006 he recorded three flights, the total duration of which was 3 hours and 45 minutes. His most recent flight prior to the day of the accident was on 28 October 2006. At the time of the accident, he had accumulated a total of 110 hours of flight time and had recorded a total of 1.3 hours of instrument flying experience.

On several occasions, the FTO had offered him the opportunity to fly an aircraft on a ferry or other similar flight. The arrangement was that he would fly the aircraft, sometimes with another more experienced pilot, for the cost of the fuel. These flights appeared to have been annotated with an 'x' in the pilot's personal flying logbook.

The passenger in the accident, who was the accompanying pilot, had a broad experience in general aviation. He had formerly held a PPL with an instructor rating and, in 1990, was issued a Basic Commercial Pilot's Licence (BCPL) for the purposes of instruction only. However, in 1991, he became medically unfit and his licence was withdrawn. He then did not hold a licence again until September 2003, when he obtained a National PPL (NPPL). He had recorded a total flying experience of 1,778 hours and it was reported that also had considerable time as a glider pilot. It was also reported that he had known the CFI for at least 21 years, and had often accompanied less experienced members of the FTO as a safety pilot. His most recent recorded flight prior to the accident was on 27 January 2007.

### Regulation of flight

The flight was conducted as a private flight under the terms of the Air Navigation Order (ANO) 2005. There are a number of restrictions within the ANO which apply to PPL licence holders without an Instrument or IMC rating. Two of these are:

- *'a pilot must fly in sight of the surface and must not fly in a visibility of less than 3,000 m.'*
- *'a PPL holder is not allowed to carry passengers unless, within the preceding 90 days, unless he has made at least three*

*takeoffs and three landings as the sole manipulator of the controls of an aeroplane of the same class as that being flown.'*

There are a number of restrictions which apply separately to a NPPL holder, some of which are:

- *'a pilot must not fly when the flight visibility is less than 5 km.'*
- *'a pilot must not fly when out of sight of the surface.'*
- *'a pilot must not fly at night or in circumstances which require compliance with the Instrument Flight Rules.'*

### Aircraft details

The PA-28-140 aircraft has a fuel capacity of 41.6 Imp gal, of which 4 Imp gal are unusable, and it uses around 8 Imp gal/hr in normal use. A fuel tank is contained in each wing and a selector valve in the cockpit is used to select fuel from either tank to the engine; fuel cannot be drawn from both tanks at the same time.

G-BBBK was fitted with a combined VHF/VOR radio/navigational unit, but was not equipped with a transponder. An ADF receiver was installed but it is believed that this, and the VOR receiver, were inoperative. The accompanying pilot carried with him a handheld GPS receiver.

### Weight and balance

The Basic Empty Weight of the aircraft was 586 kg. The estimated combined weight of the fuel (136 kg) and passenger load (320 kg) on departure from Blackpool was 456 kg, giving a takeoff weight of 1,042 kg. The maximum takeoff weight (MTOW) for the aircraft was 975 kg. The return flight from Exeter with less fuel

and two fewer people on board was within the MTOW limit. For both flights, the Centre of Gravity position was within limits.

**Airport information**

The aircraft departed from Runway 25 at Blackpool; this runway has an asphalt surface with a Take Off Run Available (TORA) of 799 m. There is a railway line on a raised embankment a short distance from the end of the runway, crossing the departure track. Runway 28 at Blackpool has a TORA of 1,869 m.

There is no VOR beacon located at Blackpool Airport, the nearest being WAL (114.10 MHz), some 22 nm to the south, and POL (112.1 MHz), 56 nm to the east. An NDB (420 KHz), BPL, is located on the Airport; Runway 28 is equipped with an ILS system.

There are a number of significant obstacles along the coastline at Blackpool in the area to the north of the airport, notably Blackpool Tower at 533 ft amsl and an amusement park ride at 242 ft amsl. There is an extensive wind farm offshore in the area.

There are several other airports in the local area, for example Woodvale and Warton, some of which are operational only during weekdays.

**Recorded information**

Recordings of the ATC communications with the aircraft were available for the investigation. Information from these recordings has been used in the history of flight.

Primary radar information from the radar head located at Blackpool Airport is not recorded although primary and secondary radar information from St Annes radar is recorded. Blackpool Airport ATC screens display both the Blackpool primary and St Annes secondary radar information. St Annes primary radar is available on the ATC screens, if selected, but this source of primary data is not approved for directing aircraft.

Recorded data from St Annes radar, identified as belonging to the accident aircraft, started at 1638 hrs with the aircraft near Mold, North Wales, when it was tracking to the North. Figure 2 shows this track just as G-BBBK approached Blackpool, and ends when radar contact was finally lost at 1713:18 hrs. Radar contact, however, was briefly lost at 1711:01 hrs (the end of the red track) in Figures 2 and 3, before being re-established 1 minute 39 seconds later (the start of the green track) for a further 38 seconds.



**Figure 2**  
Radar track of G-BBBK positioning to land at Blackpool Airport

A radar track for the SAR helicopter was also available. Primary returns from this were evident down to an altitude of around 100 ft. The gap in the radar track of the aircraft suggests that the aircraft was most likely flying below this altitude between 1711:01 hrs and 1712:40 hrs, and after 1713:18 hrs.

### Wreckage examination

An initial examination of the aircraft wreckage was carried out after the aircraft had been recovered from the sea by the emergency services and transported to Blackpool

Airport. The rear fuselage and cockpit roof structure had been removed during the recovery operation. The engine and propeller remained attached to the forward fuselage, the engine having been pushed upwards by impact forces. The propeller blades had suffered from some bending but were relatively undamaged. The left wing had remained attached to the centre section of the fuselage; however, the right wing had separated from the aircraft during the impact sequence, the fuel pipe having been pinched closed where the wing had detached from the fuselage. The damage to the wing leading edges and the separation of the right wing indicated that the aircraft had struck the sea with a small amount of right roll, in a relatively level pitch attitude. Examination of the aircraft's control circuits indicated that there was no evidence of a pre-impact failure or restriction. All the damage identified was assessed as being the result of the impact with the sea or occasioned during the recovery operation. Due to the disruption of the airframe, no



**Figure 3**

Detail of last section of Radar track of G-BBBK.  
Lack of data between 1711:01 hrs and 1712:40 hrs suggests that the aircraft was below 100 ft amsl between these times

estimation of the pre-impact position of the engine controls could be made. The key had been snapped off in the ignition switch in the 'BOTH' magneto position.

Examination of the cockpit revealed that the fuel selector had been positioned to feed from the right tank. The barometric setting on the altimeter subscale was 1046 hPa, the VHF radio was set at 119.95 MHz (Blackpool Approach), the VOR receiver at 114.10 MHz (WAL) and the ADF unit to the 190/440 KHz range, with the tuning dial on 330 KHz.

A more detailed examination of the aircraft was carried out after the wreckage was recovered to the AAIB. Disassembly of the engine indicated that the engine had not suffered any pre-impact mechanical failure, but damage to the carburettor prevented it from being tested; a strip examination revealed no pre-accident defects. Functional testing of the engine ignition system showed



it to have been serviceable and the engine-driven vacuum pump showed evidence of rotation at impact.

The right wing fuel tank contained 3.3 Imp gal of fluid, whilst the left wing tank was found to be full of water. Analysis of the fluid samples recovered from the tanks confirmed that the contents of the left tank were predominantly sea water; the right tank was found to contain approximately 2.4 Imp gal of fuel together with 0.9 Imp gal of salt water.

X-ray images of the altimeter confirmed that the subscale adjustment gear train was intact and remained engaged. Movement of the subscale from its setting of 1046 mb to the pressure setting for Blackpool at the time of the accident, 1039 mb, was found to require approximately one and a half turns of the adjustment knob.

#### **Aircraft records**

From June 2003, the aircraft had been maintained in Blackpool by a maintenance/engineering organisation based at Bagby, Yorkshire. The airframe and engine log books indicated that the aircraft had been maintained in accordance with the CAA approved Light Aircraft Maintenance Schedule (LAMS). Certification stamps within the log books that made reference to file numbers, were confirmed by the maintenance organisation to relate to work cards provided and retained by the operator. The FTO, which had operated the aircraft, was in the process of changing ownership at the time of the accident and the new owners had not 'taken on' G-BBBK; this was to continue in operation with the outgoing CFI. No records could be found, either at the FTO or with the outgoing CFI, to support the certification stamps in the log books, as they were reported as having been mislaid during the transfer of ownership. However, the maintenance organisation had retained a copy of the aircraft's last Certificate of Airworthiness (CoA) renewal documentation, which was

completed in March 2005. This indicated that the aircraft was compliant with the requirements at that time. The CoA was valid until 28 March 2008 and the aircraft had been certificated in the Private category.

#### **Maintenance documentation requirements**

The Air Navigation Order (ANO) 2000 states:

##### ***'Aircraft, engine and propeller log books***

- (4) *Any document which is incorporated by reference in a log book shall be deemed, for the purposes of this Order, to be part of the log book.*
- (5) *It shall be the duty of the operator of every aircraft in respect of which log books are required to be kept to keep them or cause them to be kept in accordance with the foregoing provisions of this article.*
- (6) *Subject to article 91 every log book shall be preserved by the operator of the aircraft for a period of at least 2 years after the aircraft, the engine or the variable pitch propeller, as the case may be, has been destroyed or has been permanently withdrawn from use.'*

#### **Analysis**

##### *Aircraft serviceability*

No evidence was found to indicate that the aircraft had suffered from a structural failure or technical malfunction prior to the impact with the sea. Although the damage observed on the propeller was slight, the damage to the engine-driven vacuum pump confirmed that the engine had been rotating at impact. Given the position of the ignition switch, the successful test of the ignition system and the engine noise heard during the final radio transmission, it is highly likely that the engine

was operating at the time of impact, although no reliable estimation of the engine power setting could be made.

Whilst no technical defect was determined as being a causal factor in this accident, the absence of technical records referred to in the aircraft's log book meant that the aircraft operator had not complied with the requirements of the ANO. However, the available documentation indicated that the aircraft had been maintained in accordance with the requirements.

#### *Pilot-in-command*

The relatively inexperienced pilot was paying for the fuel for the two flights, the purpose of which was for him to build up his flight hours. He was seated in the left seat and he was almost certainly handling the controls throughout the accident flight. Thus, he should be considered the pilot-in-command even though he may have called upon the experienced accompanying pilot for help and advice. Nevertheless, it is the responsibility of the pilot-in-command to assure himself that a flight is conducted within the aircraft's operating limits, within his own capability and in accordance with the privileges of his licence.

#### *Flight from Blackpool to Exeter*

The weather for the takeoff and first part of the flight to Exeter did not meet the specified minima for visual flight. The pilot had not flown within the previous 90 days and, therefore, was not entitled to carry passengers. The aircraft was over its MTOW by some 67 kg. Moreover, neither pilot was qualified to fly in the prevailing weather conditions. Additionally, the aircraft was not equipped for flight in Instrument Meteorological Conditions (IMC).

Why the pilot decided to set out on a flight in weather conditions that were not suitable for his experience and qualifications, and with the aircraft overweight, is not

known but a possible explanation may be found by looking at the circumstances which led up to the flight.

The flight had been proposed by the 'de facto' CFI at the FTO. The fact that a person in a position of 'authority' made such a proposal may have led the pilot, who was relatively inexperienced, to think that there were no reasons why the flight should not take place. He had also been told that he would be accompanied by an 'experienced pilot'. Although he would be pilot-in-command, he may have thought that, as the accompanying pilot was more experienced than himself, or possibly that he was an instructor, he could 'take over' if necessary. If this was the case, it is considered unlikely, when he met the accompanying pilot, that he would have questioned his experience or qualifications. In addition, both the passengers were qualified pilots, one of whom had previously held an instructors rating.

By the time the pilot arrived at the airport, much of the planning and preparation for the flights had already been carried out. The accompanying pilot decided how much fuel to put on the aircraft, carried out the refuelling and also checked the weather. Therefore, most of the preparation and decision making for the flight had already taken place. The pilot had, therefore, effectively delegated some of the responsibility for the flight to the accompanying pilot. Whether either pilot gave any consideration to the loading of the aircraft is not known, but this is unlikely as the aircraft was determined to have been some 67 kg overweight at departure.

When the pilot arrived at the airport the passengers were ready and waiting. If the flight did not depart promptly it would not have been possible to return before dark. The pilot did not have a night rating. Thus, there was a time pressure and the pressure of the presence of waiting passengers to depart without delay.

The weather conditions at Blackpool on departure were such that LVPs were in force (as broadcast on the ATIS) and the aircraft entered cloud almost immediately after takeoff. It is not known whether the pilot had checked the weather and was aware this would occur, but he was not licensed or qualified to fly in cloud. It is not known if the pilot listened to the ATIS before departure but, on requesting taxi clearance, it would be expected for him to have advised ATC that he had received the current ATIS information.

The aircraft departed from Runway 25, which is one of the shorter runways available, entered the low cloud layer shortly after takeoff, then climbed and flew above cloud until south of Liverpool. This was not permitted under the privileges of the pilot's (private) licence, as all the flight was required to be conducted 'in sight of the surface'. However, once the aircraft was south of Liverpool, the flight conditions were good and a successful landing was made at Exeter.

#### *Flight from Exeter to Blackpool*

The weather forecast at Blackpool seen by at least the accompanying pilot before the flight, indicated that there would be an improvement in visibility to 6,000 m in the afternoon, with a 40% probability of CAVOK later. In reality, the improvement did not occur and the visibility remained poor with low cloud throughout the day. A correction was made to the forecast at 1216 hrs but, by this time, the pilot and his passengers were probably already with the aircraft and not aware of the change. Had the pilot checked the Blackpool weather while he was on the ground at Exeter, the continued poor conditions would have been apparent. It is unlikely that such an update was obtained but the pilot did speak to a friend on the telephone before departing and was told it was still misty.

The photograph at Figure 1 shows that, at 1620 hrs, the weather conditions were good in the Welshpool area and that the surface was 'in sight'. However, the sun was to set 37 minutes later and approximately 50 minutes of flight time remained before the flight was due to arrive at Blackpool.

As the aircraft approached the Liverpool area, the ground below would have become obscured by cloud. The pilot still had the opportunity to turn around and land elsewhere but the deteriorating weather did not act as a trigger for him to divert.

The weather conditions at Blackpool, at the time the aircraft was attempting to land, were not suitable for VFR flight. The cloud ceiling was between 100 ft and 200 ft aal and daylight was fading, conditions that would have made it nearly impossible for a pilot, flying an aircraft without serviceable navigation equipment and without instrument flying training and experience, to locate and land at the airport. There were few options open to the pilot. He was unable to make a safe approach and landing at Blackpool, the aircraft did not have enough fuel to fly to an alternate airport and the onset of darkness would have made it unlikely that a suitable field could be found for a precautionary landing beyond the area covered by cloud. In the event, it seems that he decided to descend through the cloud cover over the sea, in the hope of being able to find the airport from beneath the cloud.

#### *Navigation*

It was not possible for the pilots to navigate by visual references as they approached Blackpool as they stated that they had no visual contact with the ground. This had probably been the case for some time as the area of the overcast extended well to the south of Blackpool. The accompanying pilot's reply to ATC to the effect that

there was no navigational equipment available, indicated that either the ADF and/or VOR were not serviceable, or that without a VOR beacon on or close to the Airport, the VOR would have been of limited use. However, as several position reports were given by the aircraft, these were most likely derived from the GPS receiver carried by the accompanying pilot. Although he had asked for DF bearings on several occasions, there was no evidence that the pilot attempted to use either these or GPS information for an approach.

The altimeter subscale was found to be on an incorrect setting after the accident at 1046 mb; the QNH at the time was 1039 mb. It is highly unlikely that the adjustment mechanism could have altered the setting significantly in the accident, as it would have required 1½ turns of the knob. Therefore, if the pre-accident calibration of the altimeter was within normal limits, it is possible that the altimeter had been inadvertently set incorrectly. Such a mis-setting would have put the aircraft some 200 ft lower than indicated to the pilot so that, when they reported to ATC at 1712 hrs that they were at 200 ft, they could actually have been very close to the surface of the sea. This situation is supported by the radar data. The time and distance between the end of the red track and the start of the green track in Figure 3, would indicate that the aircraft did not fly a direct line between these points and that, at around 17:12 hrs, it was probably lower than 100 ft amsl, below radar cover.

Given the prevailing conditions of twilight, a very low and probably indistinct cloudbase, poor visibility and, most likely, a fairly featureless surface, it is highly likely that even when below 100 ft amsl, the pilot would not have been able to see the sea surface, or the coastline, before entering the water.

#### *Aircraft fuel state*

When the aircraft arrived in the vicinity of Blackpool Airport, there was insufficient fuel on-board to divert to another airfield. The nearest alternative offered by ATC was Leeds, an airport known to have good weather but some 40 minutes flying time away. Given that the aircraft's fuel tanks were full on departure from Blackpool, and considering the elapsed flight time, there should have been around 7.6 Imp gal of fuel (3.6 of which were useable) on-board at the time of the accident. Although only 2.4 Imp gal of fuel found was found in the right wing after the accident, it is possible that some had leaked away as a result of the accident. Also, as the engine could clearly be heard to be running in the background of the last radio transmission from the aircraft, it is unlikely that the aircraft ran out of fuel.

#### *Supervision of the flights*

Although the flight departed from the premises of a FTO, and was arranged at the suggestion of the 'de facto' CFI of that organisation, the agreement made for the use of the aircraft was apparently on a private basis. Therefore, the flight would not be required to be 'authorised' by the FTO.

The presence of a 'more experienced' or 'safety' pilot on board, (a fairly common arrangement in private flying) in addition to the two pilot-qualified passengers, did not alter the fact that the pilot was the pilot-in-command of the aircraft. As such, he was responsible for the decisions made concerning the flight and for its safe conduct, as required by the ANO.

#### **Safety action**

The circumstances of this accident are such that many of the rules governing the VFR private flight were not adhered to. As there is no doubt that sufficient information

is available through responsible training organisations, in CAA publications (including the ANO, Safety Sense Leaflets, GASIL, etc) in aviation magazines and via the internet, for private pilots to be reminded of, or make

themselves aware of, the manner in which flights are to be conducted within the privileges of their licences, no Safety Recommendations are considered appropriate as a result of this investigation.