

Piper PA-23-160, G-ARTD

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Category: 1.3

Aircraft Type and Registration:	Piper PA-23-160, G-ARTD
No & Type of Engines:	2 Lycoming O-320-B2B piston engines
Year of Manufacture:	1958
Date & Time (UTC):	2 August 1999 at about 1326 hrs
Location:	Moel Hebog, North Wales
Type of Flight:	Post engineering test flight
Persons on Board:	Crew 1 - Passengers - None
Injuries:	Crew - 1 Fatal - Passengers - N/A
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Basic Commercial Pilots Licence
Commander's Age:	56 years
Commander's Flying Experience:	5,120 hours (of which 67 were on type) Last 90 days - 136 hours Last 28 days - 25 hours

Information Source: AAIB Field Investigation

History of flight

The main purpose of the flight was thought to be to an airborne test of the function of the right engine starter motor, which had been refitted after repair. The precise time of departure from Runway 26 at Caernarfon Airport was not determined, however, it was the usual practice to call Royal Air Force (RAF) Valley ATC shortly after take off. A transmission was recorded between 1314:50 hrs and 1315:36 hrs, a transcription of which is reproduced, in part, below:

Aircraft:	--- TWINAPACHE JUST AIRBORNE OUT OF CAERNARFON SQUAWKING 7000 IN THE CLIMB TO THE LLEYN PENINSULA AREA FOR AIRTEST REQUESTING FIS
ATC:	--- FISTHE HOLYHEAD 1007 SAY AGAIN HEIGHT
Aircraft:	1007 CLIMBING TO 4000 FEET WILL BE OPERATING IN THE BLOCK 4000 TO 2000 FEET

No further radio communication was reported between the aircraft and any ground station.

Radar data, recorded from both St Annes and Clee Hill Radars, was used to determine the aircraft's flight path. The first contact was at 1316:33 hrs, 1.4 nm northwest of the airfield; the aircraft's altitude was about 1,540 feet amsl. Subsequent contacts indicated that the aircraft was turning right and climbing. It passed the eastern edge of the airport, tracked southeast and had climbed to about 4,840 feet amsl by 1321:30 hrs. Almost immediately it started to descend and when, at 1324:01 hrs, it was 2.3 nm to the south west of Moel Hebog it started a left turn to track northerly towards the mountain. During the turn the

average rate of descent was about 2,400 fpm and the groundspeed was about 165 to 170 kt. Radar contact was lost at 1325:10 hrs when the aircraft was 1.7 nm south of Moel Hebog, at 3,040 feet amsl.

The lack of radar contact, below 1,500 feet amsl shortly after take off, and below 3,000 feet amsl just prior to the accident, was attributed to the intervening high ground between the aircraft and the radar heads.

Witnesses at the eastern end of Llyn Cwmystadrlllyn, the lake at the foot of Moel Hebog, saw the aircraft fly over them, in straight and level flight, into the side of the mountain. The engine sounded normal and there was no change in the engine noise up to the point of impact. One of these witnesses then went to a house at the other end of the lake, about 0.7 nm away, and telephoned the emergency services. The police logged this call at 1348:15 hrs.

Meteorology

The RAF Valley weather report for 1350 hrs was as follows:

Surface wind	190°/02 kt
2,000 foot wind	190°/10 kt
Visibility	15 Km
Weather	Nil
Cloud	4 Oktas base 10,000 feet 7 Oktas base 15,000 feet
QNH/QFE	1011 mb/1009.7 mb
Temp/Dew point	22°C/14°C

Witnesses in the local area confirmed that there was no low cloud, very little wind and that the visibility was good.

Pilots flying experience

The pilot started flying training at Peterborough (Sibson) in June 1982. He was, at the time serving as an Air Traffic Control Officer in the RAF. He was awarded a Private Pilots Licence (PPL) in September that year. He started the Assistant Flying Instructor (AFI) Course at Goodwood in April 1987 and was awarded an AFI rating in July 1988. He then started instructing at Goodwood where he remained until May 1989 when he obtained a Group B aircraft rating and moved to Elstree.

In April 1990 his PPL was converted to a Basic Commercial Pilots Licence under transitional arrangements then in force; the conversion involved no tests or examinations.

He was the Chief Flying Instructor (CFI) at Elstree until December 1995 when he moved to Denham, again as CFI. In August 1997 he was issued with an American Airline Transport Pilot Certificate.

He left the RAF in January 1998 and moved to Caernarfon to take up the post of Airport Director.

Medical and pathology

Post mortem examination of the pilot and his recent medical history revealed no pre-existing medical condition which could have contributed to the accident. Toxicology detected no sign of alcohol or common drugs. There was a 4% saturation of carbon monoxide in the haemoglobin but this is not considered significant.

Examination of the accident site

At the location where the aircraft had impacted, Moel Hebog sloped upwards generally at about 45° but localised rocky crags were nearly vertical. G-ARTD had struck one of these at an altitude of about 1,850 feet AMSL, the wreckage having then dropped two metres or so. The only readily identifiable (albeit badly damaged) part of the airframe was the extreme rear fuselage and the empennage which lay in an inverted attitude. The disrupted remains of the cockpit, principally tubular structure, control cables, piping and wiring were tangled together with the engines and nose landing gear. There was some sheet-metal scatter upwards and to the right of the main site, which generally turned out to be the remains of both wings and engine cowling panels. Both propellers had detached from the engines and bore characteristic leading edge and tip damage suggesting that roughly cruise power was present at impact.

It was just possible to discern an imprint of the aircraft where it had originally impacted the mountain face. It appeared to be banked about 5° to the right, roughly level in pitch, and had struck the face approximately at right angles. The degree of disruption to the airframe and engines suggested that the aircraft had been travelling at a speed in excess of 160 kt.

With some difficulty, the wreckage was recovered from Moel Hebog and brought to the AAIB facility at Farnborough for further examination.

Off-site examination and engineering discussion

As already noted the wreckage was extremely badly disrupted, rendering conclusive examination of items such as the flying control runs extremely difficult. Even most of the instrument faces proved difficult to examine or even identify. Within these limitations, it can be said that no anomalies were found with the flying controls, structure or engines. The aircraft had originally been fitted with a rudimentary autopilot but this had been removed some time ago and only the roll servo, forming part of the control column, remained from the original installation.

The aircraft was fitted with a Janitrol type heater and this was examined in detail to see whether there was any possibility that defects in this could have led to leakage of carbon monoxide into the cabin. Evidence was found that it was not in operation and it is considered unlikely that, given the temperature of the day, the pilot would have found it necessary to use the heater. The low carbon monoxide level detected in the pilot's body during post mortem examination reinforces the conclusion that this was not a factor in the accident.

Summary

In his radio transmissions shortly after take off, the pilot expressed his intention to climb to 4,000 feet amsl and to carry out an air test. The test of the starter motor would have involved the shutdown and restart of the right engine and the associated feathering/unfeathering of its propeller. It would be reasonable to expect the pilot to do this while in level flight probably at 4,000 feet amsl, the higher level mentioned in the radio transmission. Radar contact was continuous between 1316:33 hrs and 1325:10 hrs and showed that the aircraft climbed through the intended level and shortly afterwards, with no significant period of level flight, entered a continuous descent until contact was lost. This implies that the proposed air test was not carried out.

The deviation from what could be considered the expected flight regime occurred when the aircraft climbed through 4,000 feet amsl. The uninterrupted secondary radar return over this period, and for at least a further 4 minutes, confirms the presence of electrical power. It is reasonable to expect the pilot to have made a radio transmission if a technical problem existed which affected his control of the aircraft. The aircraft was well within radio range of RAF Valley but no such transmission was recorded.

The timing suggests that there was only a short period between the final radar contact and the point when the eyewitnesses to the impact first saw the aircraft. During this time it had descended from 3,040 feet amsl and was in level flight at about 2,000 feet amsl until it struck the mountain side. They neither saw any flight path deviation nor heard any change in engine note prior to impact.

Conceiving any possible technical causes why an aircraft of this type should fly, ostensibly straight and level and at cruise power and speed, into a steep mountain face in good visibility is extremely difficult. Disconnection or freezing of the flying controls would have to occur in all three axes for deviation from a set flight path to be impossible. This is considered extremely unlikely as it would have had to occur during the final seconds of the flight with the aircraft already trimmed straight and level and heading towards the mountain.

The engine noise was constant prior to impact and both engines appeared to have been producing a similar output, roughly cruise power, at impact. This implies that the pilot made no attempt to enter a climb or, if the

extremely unlikely disconnection or freezing of the flying controls in all three axes had occurred, to use asymmetric power to turn the aircraft.

In the absence of evidence of a technical defect, a human factor for the subsequent almost continuous descent into the mountainside in fine weather was considered. The Inquest was held at Caernarfon on 27 April. The Coroner said that there was insufficient evidence to support any of the findings available to him and therefore recorded an Open verdict.