

Piper PA-28-140, G-OHOG

AAIB Bulletin No: 1/97 Ref: EW/G96/07/18 Category: 1.3

Aircraft Type and Registration:	Piper PA-28-140, G-OHOG
No & Type of Engines:	1 Lycoming O-320-E2A, piston engine
Year of Manufacture:	1967
Date & Time (UTC):	21 July 1996 at 1150 hrs
Location:	Sandown, Isle of Wight
Type of Flight:	Private
Persons on Board:	Crew -2 - Passengers - 2
Injuries:	Crew - 2 (Minor) - Passengers - 2 (Minor)
Nature of Damage:	Extensive
Commander's Licence:	Basic Commercial Pilot's Licence with IMC and FI Rating
Commander's Age:	34 years
Commander's Flying Experience:	5,280 hours (of which over 1,000 were on type) Last 90 days - 210 hours Last 28 days - 79 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by AAIB Operations Inspector

The aircraft departed from Bournemouth International Airport at 1034 hrs for a flight to Sandown Airfield, Isle of Wight. The trial lesson flight had been booked as a birthday present for the occupant in the left hand seat (the student). Accompanying him were an instructor and two members of the student's family. The outbound flight proceeded normally and the aircraft landed at Sandown at 1058 hrs. After taking refreshments at the airfield, the four occupants reboarded the aircraft for the return flight to Bournemouth. According to the passengers, the pilot commented that *"he would be happier when we clear the trees beyond the runway"* as they prepared to board the aircraft.

The aircraft taxied out for a departure from the grass Runway 23, as other aircrafts were using this runway despite the presence of a slight tailwind component. The instructor reportedly briefed the passengers that because of the wind direction and high temperature, the climb out after take off would be very poor. The instructor was handling the aircraft from the right hand seat and indicated in his report that he flew the aircraft so as to gain speed rather than height initially. He

commented that he shallow-climbed the aircraft to clear the rising ground and wooded area on top of a small hill, which was successful until the aircraft entered an area of disturbed air, about 30 feet to 40 feet above a wooded copse. The aircraft began to sink towards the trees and it became apparent that a collision would occur, so the instructor closed the throttle and raised the nose in order to reduce the severity of the impact. The aircraft hit the trees some 800 metres from the end of the runway, coming to rest with the nose vertically downwards and suspended in a tree some 15 feet above the ground. The airfield elevation is 60 feet amsl and the location of the accident site was about 130 feet amsl.

All of the occupants' harnesses held during the impact. The instructor switched off the fuel and electrics and the door was found to be jammed closed. The instructor then cleared debris from the front windscreen, climbed out of the aircraft and down the tree to the ground. The student then left the aircraft by the same means. One of the rear seat occupants slipped and fell to the ground while being next to effect egress. The fourth occupant remained in situ until a ladder was suitably positioned by the emergency services. Fuel was leaking from the damaged wings but there was no fire. The emergency services had been alerted to the accident by the airfield air/ground radio operator. Early reports suggested that 14 gallons of fuel were aboard the aircraft at the time of the accident.

One of the rear seat occupants was filming with a video camera during the final take off. This indicated that the take off was made with some flap selected, the aircraft becoming airborne about half way along the 884 metre runway. When approaching a beam the light aircraft parking area, the stall warning light was illuminated on the instrument panel. The aircraft had gained some height by the time it crossed the road by the south western boundary of the airfield. An analysis of the sound track was carried out by AAIB and a final engine speed of 2,400 RPM was derived. A similar analysis of the take off from Bournemouth indicated that the engine speed just after take off was 2,472 RPM. The passengers commented that the stall warning light seemed to be illuminated prior to the impact with the trees. The instructor commented that the flaps had not been retracted by the time the impact occurred.

The aircraft's latest flight test report indicated that during a test flight on 5 July 1995, the aircraft achieved 2,500 RPM during the performance climb test at an airspeed of 83 mph. On that occasion, the observed rate of climb was found to be 59 feet per minute below the scheduled rate of climb. The flaps up, power off stalling speed was 58 mph (one kt above the scheduled figure), with the stall warning light illuminating 10 kt above this speed, for an operating weight of about 2,100 lb.

An aftercast from the Met Office indicated that at the time of the accident there was a high pressure region over the south of England with light and variable surface winds, being from 120°/3 to 7 kt at Sandown. The visibility was 10 km to 15 km with a few cumulus clouds at 3,500 feet. The temperature was +20°C and the dew point +14°C. The mean sea level pressure was 1021 mb.

The instructor supplied a weight and balance calculation for this investigation. This indicated that the final fuel quantity onboard at the time of the accident was 8 gall imp. He estimated the total front seat occupant weights to be 305 lb, and that of the rear seat occupants as 288 lb, giving a total occupant weight of 593 lb. Using these figures, the instructor calculated that the total weight of the aircraft at the time of the accident was 1,971 lb. The maximum allowable weight for this aircraft was 2,150 lb.

Enquiries by AAIB indicated that the actual total occupant weight was about 725 lb, some 132 lb in excess of the instructor's calculation. The aircraft's movements during the week prior to the

accident were compiled from official records, along with details of each refuelling. Based on a total of 1,043 minutes airborne time during the period studied and a total fuel uplift of 701 litres, an average fuel consumption of 40.3 litres (8.87 gall imp) per flight hour was derived. Based on this consumption rate and given details of the refuelling which occurred at Bournemouth that morning, with no further refuelling having taken place at Sandown, it is estimated that about 15 gall imp of fuel was on board the aircraft at the time of the accident. Using this figure, along with the revised occupant weight, the actual operating weight was about 2,150 lb, the maximum allowable weight for the aircraft. The calculated centre of gravity was in the mid range of the allowable envelope.

Data extracted from the aircraft's Flight Manual indicates that the calculated operating weight with the flaps retracted, in the ambient conditions, the aircraft's gross pressure rate of climb after take off should have been around 650 feet per minute. There was no data in the Flight Manual for climb performance with flap selected.