DHC-1 Chipmunk 22, G-BBWN, 25 February 1996

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Aircraft Type and Registration:DHC-1 Chipmunk 22, G-BBWN

No & Type of Engines:1 De Havilland Gipsy Major 10 Mk 2 piston engine

Year of Manufacture:1952

Date & Time (UTC):25 February 1996 at 1630 hrs

Location: Near Netherthorpe Airfield, Nottinghamshire

Type of Flight: Private

Persons on Board: Crew - 1 Passengers - 1

Injuries: Crew - Minor Passengers - Minor

Nature of Damage: Aircraft Destroyed

Commander's Licence: Private Pilot's Licence with IMC Rating

Commander's Age:62 years

Commander's Flying Experience:1,159 hours (of which 847 were on type)

Last 90 days - 10 hours

Last 28 days - 3 hours

Information Source: Aircraft Accident Report Form submitted by the pilot

The pilot reported that the aircraft was refuelled to approximatelyfull tanks before taking-off for a flight from Netherthorpe toNorth Coates (approximately 50 nm), followed by a return flightto Netherthorpe. Both legs were uneventful, although carburettorwarm air was used in the cruise on both occasions. The aircraftwas then left in the open for approximately 45 minutes, afterwhich the pilot decided to carry out a further flight. The oillevel was checked and confirmed to be adequate and the enginestarted without requiring priming. Normal taxiing and pre-take-offchecks were carried out with the carburettor air selected to warmuntil the aircraft turned onto the runway. The take off was entirelynormal, the pilot recalling seeing 2,100 RPM indicated duringthe ground roll. During the climb-out, however, the engine suddenlymisfired for 2-3 seconds before becoming silent. There was noresponse to throttle pumping. The pilot attempted to glide tothe only suitable firm ground within range but was unable to positionthe aircraft adequately. This left him with no option but to"bellyflop" the aircraft in a three-point attitudeonto a hedge. Unfortunately, the hedge contained a low stonewall which effectively destroyed the aircraft, the fuselage comingto rest on its

left hand side in an almost inverted position,although with only minor damage to the cockpit and engine areas.

A video recording of the whole flight was reviewed. This showeda trail of smoke coming from the aircraft at about the time itapparently ceased to climb. Observers confirmed that this trailappeared at about the time misfiring was heard.

The aircraft wreckage was examined and no defect was found inany part of the fuel-system. Some traces of water were foundin the pipework and the main filter bowl, although these are thoughtto have resulted from snow (which fell after the accident) enteringthe outer end of the right fuel tank, which was seriously disruptedin the accident and became the highest point on the wreckage. (It is also thought that the local fire brigade, who were onsite soon after the accident, projected some water into the exposedend of the tank).

The engine was removed under AAIB supervision from the airframe,no defects being identified during this process. It was transportedto an engine overhaul agency approved for work on this enginetype. The engine was then further examined in the presence ofAAIB and prepared for running on a test-bed. During preparation,more water was found in the sediment bowls alongside both fuelpumps. It was noted that these were at the lowest point of thefuel-system as the aircraft came to rest and the wreckage wasstored in this attitude for a lengthy period after the accident(as was the engine after its removal and during transit). Oncethe water had been removed from the fuel system, a full enginetest schedule run was carried out using a test club to absorbpower. The engine performed correctly throughout the RPM range.

An analysis of the met office aftercast for the area of the accidentat approximately the time of the event showed that the temperatureand humidity conditions were conducive to icing at all enginepower settings. Other pilots flying at the time informed thepilot of G-BBWN subsequently that they believed they had beensuffering some degree of carburettor icing. Although other aircraftre-fuelled from the same supply as the Chipmunk both before andafter it refuelled, none suffered fuel related problems. Thetrail of smoke reported by observers and evident on the videowas consistent with over rich operation before complete powerloss.

The carburettor warm air system on Chipmunks operates in conjunctionwith the engine cooling by admitting air through the port sideof the forward face of the engine cowling and allowing it to passalong that side of the cylinders. The ducting prevents it fromexiting on the port side but permits it to pass around the cylindersso that it can exit only on the starboard side at the rear ofthe cowling. With the carburettor air control selected to thecold position, air is drawn through a scoop directly from theoutside airflow, whilst when warm air is selected, air is drawnfrom a point high up in the starboard side of the cowling, thisbeing a region of air which has already flowed over the cylinders.

The majority of light training aircraft in current use have acarburettor heat system which draws air through a duct fittingclosely around the exhaust pipe system. This is known to producea greater temperature rise than that in the Chipmunk arrangement. The largest user of Chipmunks, the Royal Air Force, used thisaircraft type for over 40 years. During most of this period theiraircraft had the carburettor warm air selector wired permanentlyin the WARM position. Their aircraft normally operated from largeairfields where available runway length was not a limiting factorin the operation. Netherthorpe, in contrast, is understood tohave the shortest licensed runway in the United Kingdom.