

**AAIB Bulletin No:** 7/95                      **Ref:** EW/C95/5/1                      **Category:** 1.3

**Aircraft Type and Registration:** Denney Kitfox 4-1200 Speedster, G-UMST

**No & Type of Engines:** 1 Rotax 912-UL piston engine

**Year of Manufacture:** 1994

**Date & Time (UTC):** 5 May 1995 at about 1435 hrs

**Location:** Newmill Farm, Dolphinton, Lanarkshire

**Type of Flight:** Private

**Persons on Board:** Crew - 1                      Passengers - None

**Injuries:** Crew - Fatal                      Passengers - N/A

**Nature of Damage:** Aircraft destroyed

**Commander's Licence:** Private Pilot's Licence with IMC and Night Ratings

**Commander's Age:** 22 years

**Commander's Flying Experience:** 217 hours (of which 126 were on type)  
Last 90 days - 28 hours  
Last 28 days - 7 hours

**Information Source:** AAIB Field Investigation

### **History of the flight**

The aircraft, which was based at Portmoak Airfield, Kinross, was flown to Newmill Farm, Lanarkshire. The purpose of the flight was to assess the feasibility of using a particular field as an airstrip; it landed at about 1300 hrs. Two further flights of about ten minutes duration were made from the field, each time with a passenger. The pilot then planned to return to Portmoak to pick up a passenger and fly to the island of Mull, off the west coast of Scotland.

There were two witnesses to the aircraft's departure; they stood about halfway along the field's western boundary fence, about 400 metres from the start of the take-off roll. One was the pilot's grandfather who had played the major part in the aircraft's construction. The other was a family friend who had been a passenger on one of the two previous flights.

At about 1435 hrs, the aircraft took off in a southwesterly direction and was flown level as it passed the two witnesses; they estimated that it was at a height of about 20 feet agl and its speed was about 90 kt. Shortly afterwards it entered a steep climb to about 300 feet agl. The left wing was then seen to "slice" down and the aircraft appeared to enter a left-hand spin or tight spiral; the witnesses said that the engine noise "stopped" at or shortly after the apex of the climb. The aircraft struck the ground after about 1½ turns and caught fire almost immediately.

### **Impact parameters**

The aircraft struck the ground with a high rate of descent and negligible forward speed, rotating in yaw counterclockwise (viewed from above) consistent with the aircraft having been in a developed spin to the left. The pitch attitude at impact was of the order of 40 degrees nose down, and the resulting impact forces had caused extensive disruption of the nose and cabin sections of the fuselage. The ground at the impact point comprised a very hard soil, and no impact depressions of significance were produced.

Post-impact fire had destroyed much of the wreckage; particularly the forward fuselage, engine bay, and the fuel tank locations in the inboard wings. Each of the propeller blades had been totally destroyed in the ground fire, only small fragments remaining inside the hubs, and the engine was partially destroyed by fire.

### **Build quality**

The aircraft had been built to a very high standard, and was extensively equipped.

### **Airframe and flying controls**

Detailed examination of the wreckage at the accident site established that the aircraft was structurally complete and intact at the time of impact. All flying control surface hinge fittings were intact at impact, and the hinges were free-moving. Numerous failures were evident in the flying control linkage system; however, with the exception of the left rudder cable which had become detached from the rudder pedal due to post-impact burning of the swaged fitting, each of these failures was caused by overload consistent with the forces imparted to the system by the impact. The impact positions of the flying controls could not be determined because of disturbance of the control system linkages in and around the cockpit area during the initial stages of the impact. However, the electrically actuated pitch trim tab was set to an approximately neutral position.

## **Fuel system and powerplant**

The absence of any significant ground impact marks and the destruction of the propeller blades precluded any assessment of engine power at impact.

The main fuel selector valve was at the ON position. The fuel valves at the outlet of each wing tank were destroyed by the fire and their pre-impact positions could not be ascertained. Most of the aluminium and rubber hose fuel tubing connecting the wing tanks to the collector tank, and between the collector tank and the engine, had been destroyed by the fire. The extent of the fire and its distribution indicated the presence of a significant quantity of fuel in both main tanks at the time of impact. The collector tank survived the impact and suffered only superficial fire damage, raising the question of a possible lack of fuel in the collector. However, the fuselage tubes to which the tank was attached were deformed in a manner consistent with significant inertial loading at impact, implying the presence of a significant mass of fuel in the collector tank at impact, this fuel subsequently draining out through damaged fuel lines in the engine bay area, thereby feeding the engine fire whilst limiting fire damage to the tank itself.

The throttle control in the cockpit was at the fully forward (full throttle) position, but the knob had been struck forwards heavily during the impact, sufficient to bend the shaft through 90 degrees, rendering its post-impact position unreliable. The remaining elements of the throttle linkage system exhibited conflicting indications of throttle position, and it was not possible to establish a pre-impact throttle setting. The induction air, hot air control cable, however, appeared to have been set to the cold position at impact.

Fire had destroyed both carburettors and the ignition systems, and had caused extensive damage to the engine casing and cylinders. The engine was subject to a bulk strip examination at AAIB Farnborough and was found to be mechanically sound, with no evidence of any pre-impact abnormality. The starter free-wheel clutch unit was torque checked for possible slip in the drive sense. Post-accident heating in the ground fire prevented any positive conclusions from being reached regarding the pre-impact performance of the clutch, but no tendency to slip was evident during the tests.

The propeller fitted to this aircraft was a three bladed unit with composite blades mounted in a metal hub assembly; the pitch of which could be adjusted on the ground. Insufficient blade material survived to allow the pitch setting to be determined, but the pitch setting had reportedly been optimised for cruise performance.

## **Pilot's flying experience**

The pilot's flying experience was initially on gliders and he achieved Silver Badge standard. In July 1992 he started PPL training on the Piper PA-28; this was completed, after 35:40 hours flying, in February 1993. After 4:20 hours experience in a Kitfox IV, he first flew G-UMST on 13 August 1994. This initial Kitfox flying was under the guidance of a pilot with considerable experience on the aircraft type. He first flew the aircraft solo on 21 August 1994 after 9 hours experience. He was considered to have been a good pilot whose gliding experience had contributed to his ability to fly the Kitfox accurately to its limits.

In the United States of America, in January and February 1995, he added an IMC and night rating to his licence. It was his intention to complete the necessary training to obtain a Commercial Pilot's Licence and a start was made on this in March 1995.

## **Medical and Pathology**

There was no evidence of any pre-existing medical condition which would have contributed to the accident. Post-mortem examination indicated that the pilot died instantly from injuries commensurate with the impact; there was no evidence of smoke inhalation.