No: 3/86 **Ref: EW/C932**

Aircraft type and registration:	Pitts Special S-2E, G-BKTC (light single engined biplane)
Year of Manufacture:	1983
Date and time (GMT):	8 September 1985 at 1740 hrs
Location:	Wellesbourne-Mountford Airfield
Type of flight:	Private (business)
Persons on board:	Crew — 1 Passengers — 1
Injuries:	Crew — 1 (Fatal) Passengers — 1 (Fatal)
Nature of damage:	Aircraft destroyed by impact and fire
Commander's Licence:	Private Pilot's Licence
Commander's Age:	27 years
Commander's Total Flying Experience:	1300 hours (of which 76 were on type)
Information Source:	AIB Field Investigation.

On departure from Wellesbourne-Mountford the aircraft had two occupants. The occupant of the front seat had current flying licences, was experienced in aerobatic flying at competition level and was the regular pilot of this aircraft. The rear seat occupant had flown on a number of occasions in G-BKTC as passenger. He had allowed his Private Pilot's Licence to lapse some years previously but had recently taken advice from the Civil Aviation Authority on how to re-validate it.

The aircraft had dual controls. It had a full set of instruments in the rear cockpit with only a basic set in the front and was normally piloted from the rear cockpit.

On previous visits to Wellesbourne-Mountford the front seat pilot had, on departure, given a short low-level aerobatic display which appeared to follow a consistent routine. Following a query from Wellesbourne radio when the aircraft was ready for departure a message was received from it which indicated that it was the pilot's intention to give a short display. The voice was recognised as that of the pilot in the front seat.

The aircraft took-off and flew a circuit while another aircraft landed and cleared the runway. The Pitts Special then approached the airfield in a shallow dive parallel to the runway in use. Abeam the tower, from a height generally estimated at about 300 feet, the aircraft entered a vertical climb rolling through 360 degrees. At the top of the climb it performed a wing-over manoeuvre and descended, pulling level for a short distance before entering another steep climb or loop. At what was probably the apex of a half-loop, at about 700 feet, the aircraft began to roll to the right. The rate of roll was seen to accelerate and the aircraft entered a spin. It completed three turns before hitting the ground. After a brief interval it burst into flames.

The airfield's fire vehicle, which had been put on standby when it was known that the aircraft was going to perform aerobatics, was quickly on the scene but the aircraft had burned out. Both occupants had been killed instantly.

The aircraft had hit the ground in a steep nose down attitude with wings virtually level. There was no evidence of ground speed in the impact but the aircraft had rotated through 40° to the right after first hitting the ground. This evidence confirmed that the aircraft was in a spin to the right.

The airframe was burned out and most of the combustible materials had been consumed, but an examination of the wreckage showed that the aircraft and its controls had been intact prior to impact.

The cockpit area was examined, in particular for evidence of any obstructions to movement of the controls or any unsecured items but none was positively identified. The canopy had been in its fully forward, closed position. Both seat harnesses had been fully secure and had provided restraint in the crash.

From the damage to the propeller and the runway surface it was evident that the propeller was rotating under power at impact. Witnesses also had reported hearing engine noise continuously during the spin. Both ends of the throttle cable had been bent in the crash, trapping the cable at what was virtually the fully open throttle position. The flight manual for this aircraft states "Use power off for all spin recoveries". No evidence of position was found for any of the flying controls at the time of impact.

The bracket supporting a bellcrank in the starboard aileron control linkage on the aft face of the lower wing main spar was found to have failed. The failure was in a welded seam and it was evident that, at manufacture, the weld had not fully penetrated the butt joint. Examination showed that no cracking had developed in the weld before the crash but that the local weakness of the seam had been exploited in the impact. The Civil Aviation Authority and the Popular Flying Association were informed of this feature which appeared to be similar to a case cited in Issue 9/85 of the General Aviation Safety Information Leaflets (GASIL's), Item No 17.

When the aircraft was being dismantled and inspected at AIB Farnborough it was found that a fuel union at the inlet to the electric fuel pump was completely disconnected. Absence of sooting on the thread suggested that it had been engaged during the post-crash ground fire, but it could not be determined whether or not it had been fully secure before the crash. This type of fuel union has no provision for safetying or locking of the nut and looseness of a union could allow air into the system. However, none of the witnesses reported any unusual interruption or lack of power during the flight.

Although the information available did not allow precise estimates to be made of weight and balance it did indicate that the aircraft would have been within limits for aerobatic flight.

The medical certificate of the front seat pilot required him to wear spectacles to correct for distant vision and to carry a spare set. During the accident flight he was wearing contact lenses, only one of which was found to be in place after the accident. It could not be determined whether the lost lens had become dislodged before the crash. No medical factor was found in either occupant that could have had a bearing on the crash.