AAIB Bulletin No: 2/93 **Ref: EW/C92/11/2** **Category: 1c**

Aircraft Type and Registration:	Pitts Special S-2A, G-LIAM
No & Type of Engines:	1 Lycoming piston engine
Year of Manufacture:	1980
Date & Time (UTC):	17 November 1992 at 1408 hrs
Location:	Near Chesham, Buckinghamshire
Type of Flight:	Private
Persons on Board:	Crew - 2 Passengers - Nil
Injuries:	Crew - 1 Fatal, 1 Serious Passengers - N/A
Nature of Damage:	Aircraft Destroyed
Commander's Licence:	Commercial Pilot's Licence with Assistant Flying Instructor Rating endorsed for aerobatic instruction
Commander's Age:	29 years
Commander's Flying Experience:	351 hours (of which 109 were on type)
Information Source:	AAIB Field Investigation

History of the flight

On the day of the accident the instructor, who was also the owner of the aircraft, had flown four short trips. The weather was good and the aircraft was fully serviceable. After refuelling his aircraft at Leavesden, the pilot met two acquaintances who were building a Steen Skybolt and wanted experience of flying a similar type aircraft; the Pitts Special is not unlike a Steen Skybolt. It was agreed that one of them, a Private Pilot's Licence holder with approximately 150 hours flying experience and no known aerobatic experience, would have a familiarisation sortie including some basic aerobatics.

After take-off, with the student occupying the front seat, the aircraft was flown towards the Chesham area, some 5 nm west of Leavesden. At about 1400 hrs witnesses observed G-LIAM ('AM') performing aerobatics. In this location the aircraft was under the London Terminal Control Area which restricted its altitude to 2,500 feet amsl; the highest ground in the area is approximately 500 feet amsl. After completing several manoeuvres in both the looping and rolling planes, the aircraft was seen to enter a vertical climb. It is unclear what manoeuvre was executed at the top of the climb, but once the

nose had fallen below the horizontal, 'AM' was seen to descend steeply while rotating clockwise in an erect attitude. The latter part of the descent, from about 130 feet agl to impact, was observed by only one witness who stated that the aircraft was not rotating but descending steeply in a level attitude and oscillating slightly in pitch and roll. The aircraft then impacted the ground on the soft muddy bank of a waterway with the left lower wing in the water and the right wings on the bank itself. The student was fatally injured on impact and the instructor suffered serious injuries to his face and ankles.

Examination of Wreckage

The aircraft had struck the ground with wings level and a 30° nose down pitch attitude. The absence of characteristic ground marks suggested that it had not been rotating at impact but the deformation of the undercarriage structure showed that there had been considerable sideslip to the right. The rate of descent had been high, but there appeared little evidence of forward speed.

Whilst the cockpit areas remained basically intact and the pilots' seat belts and attachments had not failed, both occupants' heads had struck the instrument panels or coaming . However, the fatal injury had been caused by the high vertical deceleration forces. It was noted that there was significantly more structural deformation as a result of these forces present in the rear cockpit area than the front, which is surrounded by stronger and stiffer structure associated with the wing and undercarriage attachments, and hence it may have absorbed more energy and contributed to the survival of the rear occupant.

Examination of the propeller indicated that the engine had been running but was not producing significant power. This was consistent with the 'as found' position of the throttle levers in the closed selection. There were no signs of any major mechanical pre-impact defects in the engine.

Since the airframe was still largely intact, it was possible to perform flying control continuity checks which showed that both control columns were still capable of moving the primary flying control surfaces albeit with restricted movement due to impact structural deformation. No evidence was observed of any foreign object which could have been responsible for pre-impact control restriction.

Pilot's recollection of events

Immediately following the accident, the instructor was unable to recall the events prior to the crash. Subsequently he remembered some aspects but his recollection was fragmented and incomplete although he recalled that:

a. He had handed over control to his pupil on more than one occasion.

b. He could not remember if the front seat occupant flew any aerobatics but he had intended to let him if he wanted to.

c. He had performed barrel rolls, left and right, aileron rolls left and right, at least one Cuban Eight and stall turn.

d. He had tried unsuccessfully to push the control stick forward against a force. The stick was not solid but could be moved to some extent with the use of both hands.

e. He had shouted "I have control" and pushed the control stick forward with both hands from a position full aft and fully right.

f. He had closed the throttle at some stage but could not remember re-opening it.

g. He may have blacked out at some stage of the flight.

h. He believed that the aircraft was in a flat spin to the left.