No: 4/90 **Ref: EW/C1137** **Category:1c**

Aircraft Type and Registration:	Pitts S-2A, G-PITT	
No & Type of Engines:	Avco Lycoming AE10-360-A1E piston engine	
Year of Manufacture:	1981	
Date and Time (UTC):	2 December 1989 at 1346 hrs	
Location:	Insch airfield, Gordon District, Scotland	
Type of Flight:	Private (pleasure)	
Persons on Board:	Crew - 1	Passengers -None
Injuries:	Crew - 1 (fatal)	Passengers - N/A
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	FAA Commercial Pilot (A/H) and Airline Transport Pilot's Licence (H)	
Commander's Age:	38 years	
Commander's Total Flying Experience:	8800 hours (of which 1385 were fixed wing and 36 were on type)	
Information Source:	AAIB Field Investigation	

Before flying the aircraft, the pilot had successfully completed a course in the United States, comprising 26 hours of aerobatics in another Pitts S-2A. The subject aircraft had then been imported from the United States, re-assembled by specialists in Dundee and flown by the owner for the first time in September 1989.

On the day before the accident occurred, the pilot had informed a colleague that it was his intention to fly to Insch airfield the next day and, weather permitting, carry out some aerobatics. This was also planned as the last flight in his new aeroplane before taking up an overseas posting. As a consequence, a group of friends and colleagues were at Insch when he arrived at about 1345 hrs the next day.

The aircraft first flew a low pass along the grass strip (runway) 13. Towards the end of the strip, the aircraft initiated a left climbing turn to a height which is variously reported as between 200 and 800 feet agl, and rolled out on a south westerly heading diagonally across the strip towards the small group of spectators. Again, there is differing opinion as to whether the aircraft then descended slightly, but it was seen to perform a half roll pause and then, with a positive and rapid pitch attitude change, pull into what appeared to the witnesses ahead of the aircraft to be a vertical dive into the ground. However, one witness, standing in a position to the west of the manoeuvre, was able to see the aircraft roll and turn during the dive such that it presented him a view of the underside of the fuselage before impacting with

the ground, erect and on a south easterly heading. During the entire manoeuvre the engine note was not heard to change until it ceased at impact.

Although there was a strong smell of fuel around the wreckage, and fuel was seen dripping from the airframe, there was no fire. As it was clear that the pilot had not survived, the witnesses who had rushed to the wreckage did not disturb it except to turn off the magnetoes. When the fire service arrived, they disconnected the battery and removed the pilot by cutting the fuselage in half.

Post-mortem examination of the pilot did not reveal any evidence which would suggest that medical factors contributed to the accident.

Examination of wreckage

It was apparent that the aircraft had struck the ground in an erect, wings level attitude, with the nose pitched down approximately 30° to the horizontal and on a heading of 165° magnetic. The aircraft had come to an immediate halt, with some minor fragments of wreckage being thrown a few yards forward. The propeller had come to a halt in less than one complete revolution in the heavy earth, with chord-wise scoring on one of the blades indicating that it was under power at impact.

The airspeed indicator in the rear cockpit had stuck with the needle at 155 mph. When the needle was displaced to a higher value, it returned under the spring pressure in the mechanism to the 155 mph position, it being prevented from moving further back by the presence of glass slivers at the edge of the dial. Once these slivers were removed the needle returned to zero. It is considered that this provided a reasonably reliable indication that the impact speed was 155 mph or above, the needle becoming trapped as a result of disruption to the instrument panel during the impact. The throttle was found at the fully forward position and distortion at the end of the slot in which the lever moved suggests that the pilot's hand may have been on the throttle at impact. Also, the propeller control was at its fully forward, or high rpm setting, and the fuel mixture was set fully rich, both these being the expected positions for a low level, aerobatic flight.

Following an on-site examination, the wreckage was recovered to a hangar at Aberdeen airport, where it was subjected to a more detailed examination.

During the recovery it was observed that the aerodynamic balance plate, or "spade" from the aileron on the right hand lower mainplane was missing, although the horn to which it had been attached by means of four bolts, was present. The function of the spades was to provide aerodynamic assistance in deflecting the ailerons, thereby lightening the roll control forces experienced by the pilot. The missing spade was never found despite an extensive search of the site and the area under the flight path prior to ground impact. There was no evidence to show that it had become detached in flight as the nature of the distortion of the horn provided tentative evidence that it had been attached at the time of impact. In any event the aircraft was capable of being flown without the spades. It was therefore concluded that although the spade could not be accounted for, it had no relevance to the accident.The aircraft was

otherwise complete and there was no evidence of a pre-impact structural failure.

An examination of the flying controls revealed no evidence of a pre-impact failure or disconnect. Part of the elevator control tube on this aircraft is located within the aileron torque tube. The position in which it had become trapped during the ground impact indicated a degree of aft stick had been applied, consistent with the pilot attempting to raise the nose of the aircraft. A stall warning indicator was fitted to the aircraft which consisted of an audio tone plus a warning light, both activated by a vane on the right hand lower mainplane. Examination of the bulb filament revealed some evidence of stretching, which suggested that the bulb was probably illuminated at impact. Again, such an indication is consistent with the pilot pitching the aircraft to a high angle of attack as he attempted to recover from the dive.

The aircraft had received a three year Certificate of Airworthiness in the Transport Category (Passenger), issued on 4 September 1989. The last maintenance inspection was a 62 day check on 4 November 1989.