No: 5/87 **Ref: 1c**

Aircraft type and registration:	Piper PA38-112 Tomahawk G-BLKX	
No & Type of engines:	1 Lycoming 0-235-L2C piston engine	
Year of Manufacture:	1979	
Date and time (UTC):	13 December 1986 at 1015 hrs	
Location:	Walthamstow, London E17	
Type of flight:	Private (pleasure)	
Persons on board:	Crew — 1	Passengers — 1
Injuries:	Crew — 1 (serious)	Passengers — 1 (fatal)
Nature of damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	43 years	
Commander's Total Flying Experience:	68 hours (of which 66 were on type)	
Information Source:	AIB Field Investigation.	

The aircraft took-off, from Panshanger Aerodrome, at about 0957 hrs on Saturday 13 December 1986, and departed to the south. The pilot's intention was to fly down the Lee Valley to the Cheshunt Lakes then, if the weather was suitable, to continue to the Thames and to return to Panshanger by the same route. The weather was fine with a visibility in excess of 20 kilometres. The surface wind was about 10 knots from the south-west.

The aircraft was at 1400 feet, in the vicinity of Walthamstow, when it was decided to turn left and return to the Cheshunt Lakes area. The turn had just started when the passenger drew the pilot's attention to "a fire" in the cockpit. The pilot looked in and saw a significant amount of dark smoke coming from under the righthand instrument panel. The area to the left of the aircraft appeared to be open ground, so the turn was continued, a Mayday call was made and the Alternator and Battery Master switches were selected off. The content of the radio call was "smoke in the cabin, making emergency landing".

The pilot set the aircraft up for an approach to the chosen landing site and, to minimise the risk of fire, the engine was shut down and the fuel was switched off. As the aircraft approached the landing site, the pilot saw that it was a sports field and that there were people using the area. The approach was discontinued and the aircraft was turned to the left to look for a more suitable landing area. An attempt was made to restart the engine but it was unsuccessful.

The pilot does not recall subsequent events, but witnesses saw a light aircraft manoeuvring, at low level, in the vicinity of Chestnut Sports Ground, which adjoins the northern side of the Town Hall in the centre of Walthamstow. The Sports Ground is approximately 1000 feet long, in an east/west direction, about 300 feet wide, and it has a level grass surface. The grass was

short but wet from the previous night's heavy rain. It was to this field that the second approach was made.

The aircraft was seen making an approach to Chestnut Sports Ground, from the west, at about 1014 hrs. When it was about half way down the field, and to the left of the centreline, the right wingtip contacted the ground, followed shortly by the right mainwheel. Ground marks indicated that the wheel brake had been applied, but the aircraft became airborne again, flying just above the ground until, less than 100 feet from the eastern boundary fence, it climbed steeply and flew at roof top level over several houses, striking chimney pots, aerials and roof tiles. It crashed into a wall at the end of the garden of a house in Walthamstow, killing the passenger and seriously injuring the pilot.

Examination of the wreckage revealed that an electrical unit, mounted on the forward lower right-hand cabin wall behind the instrument panel, had overheated and burst, discharging smoke and acrid fumes into the cabin. This electrical unit was the "Alternator Inoperative Switch", part number 587863, manufactured by Lamar, number A-00258-1, in 1978. The function of this unit was to sense the output voltage of the alternator and to trigger the "Alternator Inoperative Warning Light" in the cockpit when the voltage dropped below a preset value. The unit was a solid state device, encapsulated in a form of epoxy resin and approximately the size of a matchbox. A report, by the Analytical and General Chemistry Section of the Royal Aircraft Establishment at Farnborough, indicated that several volatile chemical compounds were released from heated epoxy resin, and experiments have shown that these volatiles caused a loss of the righting reflex ie, intoxication. The aircraft's alternator, overvoltage relay and voltage regulator were taken to a test and overhaul organisation and tested as individual units and as a system. No fault was found except that the alternator's main output terminal was excessively loose but no electrical arcing was observed that would have suggested that there had been any degradation of the alternator's output. X-ray pictures of the "Alternator Inoperative Switch" indicated that the failure occurred in the area of the two resistors located adjacent to where the electrical wires enter the unit. Because of the damage to the unit no detailed examination could be undertaken. The 5 ampere in-line fuse between the alternator and the alternator inoperative switch was of the correct rating and had blown.

Detailed examination of the airframe, flying controls, fuel system and the engine with its systems did not reveal any contributary cause to the accident.