

Transport Category (Passenger). It was sponsored by an international company and was being used on the day of the accident to provide pleasure flights for the prize winners and runners up in two national competitions, one of which was organised by the sponsors. The helicopter was maintained by a CAA approved helicopter charter company, holders of an Air Operator's Certificate. The pilot of the accident aircraft was employed by the helicopter charter company and they had agreed to make his services available to the owners of the helicopter on the day of the accident.

At 0930 hours the first of a series of four pleasure flights was flown within the Silverstone circuit/airfield perimeter in accordance with the briefing given by the circuit management. Eye witnesses state that the flight path generally followed the car racing circuit in a clockwise direction. Passengers on these flights state that the aircraft climbed, banked and dived steeply during the five minute flight. In the early afternoon the pilot flew as a passenger in a Pitt Special bi-plane from Silverstone to Cranfield where the Pitt's was refuelled. He returned to Silverstone at about 1330 hours and some aerobatic manoeuvres were performed before the Pitt Special landed and was parked on runway 24. Shortly afterwards the helicopter pilot and five passengers, who had assembled in the sponsoring company's hospitality suite, boarded the helicopter. The take-off weight was 15 kilogrammes less than the maximum permissible, and the centre of gravity was located 9 centimeters aft of the forward limit. It was not the normal practice to use passenger headsets and they remained in their stowed positions. At about 1450 hours the helicopter took off from its parking stand south of the hospitality suite car park. It flew low along runway 24 towards Stowe Corner before following the race circuit back to the north.

One of the rear seat passengers was taking photographs during the flight. An analysis of the sequence of shots indicates a steeply banked turn to the right just north of the Club Corner followed by a dive towards Abbey Curve. The aircraft then levelled out and flew in a right hand turn behind the Grandstand Pits complex. Witnesses next saw the aircraft flying in a south easterly direction parallel to the Club straight. Positioned south east of the Chapel Curve it reversed its course through 180° and headed back towards the centre of the circuit at an estimated height of 50 feet. The aircraft then pitched down as if to make a low pass across the airfield in a north westerly direction.

Passengers in the helicopter state that they felt that recovery from the dive was unlikely and at the last moment the pilot banked the helicopter steeply to the right. The aircraft struck the ground just inside the Armco safety barrier. The tail rotor tips contacted the top of the barrier and the aircraft crashed through several strands of galvanised wire fencing which had been erected some 2 metres inside the Armco barrier. Evidence from the impact marks indicates that the helicopter was banked at 45 degrees to the right, in a steep nose up attitude and with a ground speed of approximately 125 knots.

Officials at Silverstone circuit, including a doctor, were at the scene within three minutes together with the incident vehicle and a fire tender. They quickly controlled the assembling crowd and organised the rescue. There was no fire but fumes and hot gases were seen in the area of the engine. During the roll along the ground the pilot was thrown from the cockpit, his lap strap having severed at an adjustment buckle. He sustained head injuries and a broken back. The other front seat passenger was restrained by her harness and escaped with badly bruised ankles and some cuts. The passenger sitting on the left rear seat was found kneeling beside the wreckage having suffered severe head and chest injuries. The passenger who was sitting on his right was able to crawl from the wreckage with cuts and a chipped tooth. The passenger who was sitting third from the left was suspended upside down by his lap strap. His head was trapped between the front seats. His injuries included a fractured neck vertebra and broken ankles. He was also saturated by turbine fuel from the dislodged fuel tank in the centre of the helicopter. The passenger from the right hand rear seat was found beside the wreckage with cuts and a fractured left wrist. One of his lap strap attachment points was found to be separated from the structure as a result of localised impact damage.

The pilot cannot remember anything about the flight.

Examination of the aircraft

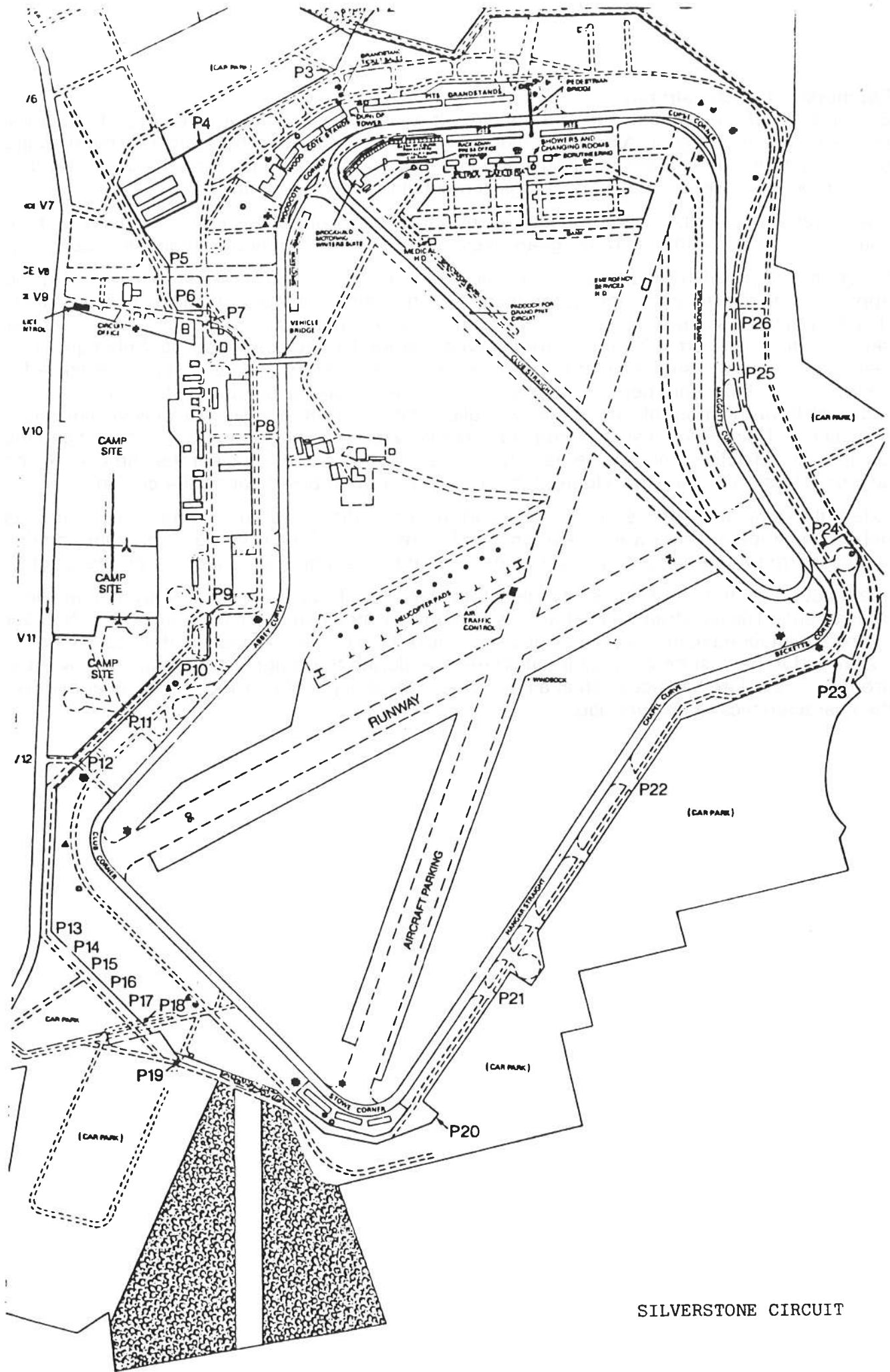
Examination of the accident site and the aircraft wreckage, showed no evidence of structural failure before the impact. All major failures were consistent with the effects of overloading occurring during the impact or the subsequent passage of the aircraft along the ground and all the components were found lying at logical points in the wreckage trail.

There was no evidence of pre-impact failure of the flying control system, rotor head or drive shafts. The main and tail rotor gearboxes were found to operate freely and correctly.

Functional testing of the hydraulic system and actuators was carried out using an external rig and applying inputs manually after disconnection of the damaged input mechanism. These tests revealed that the system was free from leakage, the individual accumulators on the main rotor servos functioned correctly, and all four servos operated in the correct sense. Subsequent rig testing of the servos showed that they operated in a satisfactory way i.e. just outside limits for newly overhauled components but typical of components having their particular time in service. Although it was not possible to test the hydraulic pump there was no reason to believe that failure had occurred, since under such circumstances a very loud claxon sounds in the cockpit and the cyclic and collective controls remain fully effective for some considerable time until the accumulators are exhausted. None of the occupants remembers hearing the claxon.

External examination of the engine revealed evidence that it was operating at, or moments before, the impact. There was no evidence of failure of any of the rotating assemblies and this was confirmed during a strip examination of the gas generator section of the engine.

Examination of the front seats revealed that they had both broken away from their floor attachments. The lap straps of the harness systems are attached to the floor whilst the shoulder straps are attached to inertia reels on the seat backs. One of the lap straps of the pilot's harness was found to have suffered a failure at some time during the progress of the aircraft over the ground. This failure had occurred at a point where the belt passes through its adjuster and had the characteristics of an overload.



SILVERSTONE CIRCUIT