No: 12/83 Ref: EW/C839

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| **Aircraft type and registration:** | British Aerospace/DH Dove G–AMYP (light twin-engine fixed wing aircraft) |
| **Year of manufacture:** | 1953 |
| **Date and time (GMT):** | 9 July 1983 at 1005 hrs |
| **Location:** | Shoreham Airport |
| **Type of flight:** | Private |
| **Persons on board:** | Crew – 1 Passengers – Nil |
| **Injuries:** | Crew – 1 fatal Passengers – – |
| **Nature of damage:** | Aircraft destroyed by impact and fire |
| **Commander's Licence:** | Private Pilot's Licence |
| **Commander's Age:** | 50 years |
| **Commander's total flying experience:** | 602 hours (of which 13 hours 30 minutes were on type) |

Shortly before the accident the aircraft was fitted with a replacement right engine. This engine, a Bristol Siddeley Gipsy Queen 70 Mk II, had not been used for a number of years and had been inhibited and kept in store over this period. A considerable amount of work was undertaken at the time of installation to ensure that the engine had not deteriorated, and extensive ground running was subsequently carried out without apparent defect.

The owner decided to undertake the first flight with the replacement engine himself. During the start-up sequence another pilot reported fire in the left engine, but when the Airport Fire Service attended they found no evidence of fire. The problem was attributed to over-priming resulting in a fire in the exhaust system. After re-starting the engines the aircraft taxied to the holding point where the pilot took a considerable time over his run-up and pre-take off procedures.

The aircraft took off in good weather, and eye-witnesses considered that the take-off and initial climb were normal except that intermittent puffs of dark smoke were seen coming from the right engine. At about 600 ft above ground level the aircraft was seen to roll to the right then turn on to its back and spin to the ground. After a short pause the aircraft burst into flames and was largely consumed by an intense fire.

Examination of the wreckage revealed that the aircraft impacted with the sloping side of the west flood bank of the River Adur. At impact the aircraft was 60° nose down, rolled to the right, and was yawing to the right. Both engines were rotating, with the left engine developing more power than the right. Detailed wreckage examination at the AIB engineering facility at Farnborough showed that the rudder was approximately fully left and the elevator fully up. Engine strip examination yielded no evidence of any pre-crash defect in the left engine, but severe corrosion was found in the fuel control boost capsule (Part No CH 90274) of the right engine. Tests were carried out on an engine test bed to examine the effects of boost capsule perforation. It was found that such a fault would induce power fluctuations, and that the engine could experience a rich cut when the throttle was retarded. Research into previous incidents on the same type of aircraft revealed two occasions during which fluctuating boost and rpm had been experienced shortly after take-off and later attributed to boost capsule perforation.

An eye-witness photograph of the Dove shortly after take-off revealed no defect. The landing gear had retracted, the flaps were set at 20° and both engines appeared to be operating normally. A second photograph showing the aircraft in a steep nose-down attidue at approximately 100 ft above the ground indicated that a small amount of rudder and left aileron were being applied at this point. Elevator angle could not be established. The flaps were still at the 20° take-off setting.

Pathological evidence revealed no medical condition in the pilot that could have caused incapacitation in flight.

The corroded boost capsule from the right engine fuel control unit was fabricated from soldered nickel coated steel. Following corrosion problems experienced with this type of capsule in service with the Gipsy Queen engine, including an accident in 1963 attributed to this cause, a modification first issued in 1967 replaced the nickel coated steel capsule with a copper/berryllium type with improved corrosion resistance. This modification is not mandatory, but is recommended at the next convenient opportunity; normally at engine overhaul. Since its last overhaul in 1965 the replacement right engine of G—AMYP had not accrued sufficient hours to require further overhaul. The AIB has recommended to the CAA that old type steel capsules should be subject to either mandatory periodic inspection, calender life limitation, or replacement with an improved capsule type.