No: 11/91 **Ref: EW/G91/07/16** **Category: 1c**

Aircraft Type and Registration:	Druine D31 Turbulent, G-ARBZ
No & Type of Engines:	1 Ardem 4C02 Mk 1B piston engine
Year of Manufacture:	1960
Date & Time (UTC):	10 July 1991 at 1720 hrs
Location:	Netherthorpe Airfield, Yorkshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - Minor Passengers - N/A
Nature of Damage:	Damage to canopy, propeller, tail surfaces and landing gear
Commander's Licence:	Private Pilot's Licence
Commander's Age:	23 years
Commander's Flying Experience:	156 hours (of which 6 were on type)
Information Source:	Aircraft Accident Report Form submitted by the pilot and aircraft inspection by AAIB and PFA Inspector.

The pilot reports that the pre-take-off power checks were satisfactory but immediately after take-off, as the aircraft cleared the runway threshold, the engine suffered a power failure. The pilot landed the aircraft ahead into a field. The landing was heavy and due to retardation from the crop in the field the aircraft pitched forward and inverted. The pilot evacuated the aircraft through the smashed canopy and sustained only minor injuries.

The aircraft was examined some time later when it had been placed in a workshop for repair. The engine was free to rotate and its valve mechanism and accessory drive appeared to operate normally. The fuel pump was found to produce a flow to the carburettor with no sign of blockage in the line. The induction passage to the carburettor was clear but in the 'hot air' trunking some foil lining was loose.

When the engine was rotated both magnetos produced sparks at the plugs. However, the common earthing wire from the magneto switch to the right magneto body was found to be broken at its attachment to the magneto. The magneto switch wiring, which appeared to be domestic 3-core cable,

was interrupted at a terminal block at the engine bay bulkhead. The common earthing wire was again found to be broken at the terminal block. These defects, if present before the accident, would not have caused a power failure but would have kept the magnetos live permanently. The wires had not been supported by adequate sleeving at these attachments. The magneto switch was found to operate in the reverse of the conventional sense, i.e. DOWN was ON.

Before flight the pilot had added 2 gallons of AVGAS 100LL. During the aircraft examination a fuel sample was taken from the tank and this was found to conform to specification (except for the presence of a very small amount of sediment). However, of 80 mls of fluid recovered from the strainer bowl, 10 mls proved to be water. When the aircraft was being worked on later, during repair, it was found that the fuel tank was loose in its mountings and it had sagged towards the front left hand corner. It was estimated that, with the aircraft stationary on its landing gear, 1 litre of fluid in the tank would have been below the fuel outlet. This would have formed a water trap within the tank and one which was much larger than the built in water trap in the strainer bowl. The fuel strainer bowl was made of glass and so the contents could be viewed directly in a pre-flight check. However, water in the strainer would be most visible if there could be seen an interface between the water and fuel also present. If there were enough water in the system to fill the bowl then the fact that the fluid in the bowl was water and not fuel would not be so obvious. It was also noted that the strainer bowl was wire locked and so it would not be readily convenient to vent the strainer as a routine procedure before each flight.