AAIB Bulletin No: 4/93 **Ref: EW/G93/02/12** **Category: 4**

INCIDENT

Aircraft Type and Registration:	Cessna F172M Skyhawk, G-BDZD
No & Type of Engines:	1 Lycoming O-320-E2DL piston engine
Year of Manufacture:	1976
Date & Time (UTC):	24 February 1993 at 1333 hrs
Location:	Southampton Airport, Hampshire
Type of Flight:	Aerial Work
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to aircraft's electrical system and slight damage to No 4 cylinder head
Commander's Licence:	Basic Commercial Pilot's Licence with Instrument and Instructor ratings
Commander's Age:	31 years
Commander's Flying Experience:	1,170 hours (of which 305 were on type) Last 90 days - 70 hours Last 28 days - 26 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and telephone enquiries by the AAIB

The aircraft, with an instructor and student on board, was being flown on an IMC training detail. It had successfully completed the first of two radar vectored ILS approaches to runway 20, and was localiser established on the second approach, when the instructor reported that both the high and low volts warning lights illuminated at the same time as the ammeter indicated a significant discharge. After briefing his student to continue with the approach the instructor attempted to reset the alternator, but was unsuccessful, and so shed all non-essential electrical load and reported to the tower that they had an electrical problem. The instructor was given a non-standard missed approach clearance and requested a non-radio departure from controlled airspace. This was granted, following which the radio and transponder were turned off, leaving just the ILS/DME equipment functioning. At the missed approach point the student commenced the 'as cleared' overshoot but, as the aircraft passed through 1,300 feet, a loud 'report' emanated from the engine accompanied by severe vibration and loss of

power. Since there was no suitable landing area ahead, the instructor took control and adopted glide speed before turning back through 180°. He reselected the radio on and transmitted a MAYDAY call. This was acknowledged and clearance given to land on runway 02. The engine was shut down before a satisfactory landing was made, with touchdown approximately half way along the runway. There were no injuries and the occupants were able to vacate the aircraft unaided.

The aircraft was subsequently examined by the organisation normally responsible for its maintenance. It was reported that the vibration and loss of power had been caused by release of the No 4 cylinder upper spark plug. Close inspection revealed that a wire thread insert in that cylinder had pulled out, releasing the plug. However the insert was not recovered. Maintenance records for the aircraft revealed that the insert had been fitted some 1,160 hours before the incident, and that the plugs had been removed at a 50 hour check some 4 hours previously. A satisfactory repair was accomplished after the incident by tapping the spark plug hole .010 inches oversize and inserting an appropriately sized insert. This failure appeared to be unconnected with the preceding electrical problem experienced on the same flight. During the aircraft's recent history there had been several occasions on which the electrical system had developed faults, particularly associated with the voltage regulator, the most recent event having occurred some 9 flying hours previously. The maintenance organisation now believe that these electrical problems are most likely associated with a wiring fault and that the aircraft's power generation system may have to be rewired.