No: 6/83 Ref: EW/G83/03/13

Aircraft:	Cessna 172 N G-BGIC (Light single engined fixed wing aircraft)
Year of manufacture:	1976
Date and time (GMT):	22 March 1983 at 1600 hrs
Location:	50 miles NW of Glenrothes
Type of flight:	Commercial (Aerial Survey/Photography)
Persons on board:	Crew - 1 Passengers - Nil
Injuries:	Crew - Nil Passengers - N/A
Nature of damage:	Major damage to aircraft electrical system
Commander's Licence:	ATPL/SCP and instrument rating
Commander's Age:	38 years
Commander's total flying experience:	5460 hours (of which 380 hours were on type)

The aircraft was on a flight from Inverness to Glenrothes airfield when the pilot noticed a higher than normal charge rate being indicated by the ammeter. After attempting to determine the cause of this by selectively switching on and off different electrical services, the pilot turned off the master switch. At this point smoke issued from behind the panel, but as this did not become excessive and began to dissipate the pilot elected to continue his flight, albeit without any electrical power on the aircraft. At Glenrothes the aircraft was briefly examined, made safe, and then flown to Perth where repairs were to be effected.

Examination of the aircraft by the repair organisation revealed that all defects within the electrical system were symptomatic of a high overvoltage condition. Damage had occurred to the alternator windings, voltage regulator, battery and voltage sensitive circuits within the avionics. All light bulbs, including the overvoltage warning light, that were selected at the time of the incident had suffered filament failures. The source of the cabin smoke was identified as having come from the lighting circuit rheostat, but the wiring had not suffered significant damage.

The condition of the damaged voltage regulator, a semi solid state device on this aircraft, precluded determination of any fault that may have developed. The aircraft was equipped with an overvoltage sensor, which in the event of an excessive rise in voltage, should turn off the field current to the alternator and illuminate the overvoltage warning light. This apparently failed to operate. However, the sensor was subsequently declared serviceable by the repair organisation and returned to service.