ACCIDENT

Aircraft Type and Registration:	Piper PA-28-181 Cherokee Archer III, G-LKTB
No & Type of Engines:	1 Lycoming O-360-A4M piston engine
Year of Manufacture:	2001
Date & Time (UTC):	19 July 2007 at 1115 hrs
Location:	Otherton Airfield, Staffordshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Nosewheel collapse
Commander's Licence:	Private Pilot's Licence
Commander's Age:	39 years
Commander's Flying Experience:	108 hours (of which 107 were on type) Last 90 days - 2 hours Last 28 days - 2 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and AAIB enquiries

Synopsis

Following a loss of electrical power and an apparent loss of engine power, the pilot made a precautionary landing at Otherton Airfield. The aircraft ran off the end of the runway and into a recently ploughed field where the nose landing gear collapsed.

History of the flight

The pilot reported that he planned to fly from Manchester International Airport to Halfpenny Green, via Congleton. The aircraft was equipped with a GPS receiver, two VHF radios and a transponder all fitted with digital displays. Approximately 5 nm south of Stoke-on-Trent, and 30 to 35 minutes into the flight, the radio and GPS displays started to flicker and eventually failed. The pilot was still able to communicate with Shawbury Radar, who were providing him with a Flight Information Service, and he advised them of his position and informed them that he was experiencing radio problems. He then lost contact with Shawbury Radio but his subsequent radio calls were "unexpectedly" answered by London Information. Shortly after he passed his details to London Information the radio failed completely. In order to verify his position the pilot started to orbit, set the carburettor heat to HOT and also descended to his last reported height of 2,800 feet. As the aircraft reached 2,800 feet he opened the engine throttle to maintain height and speed, but the engine did not immediately respond and sounded, and felt, as if it was running rough. The pilot believed

that he had both an electrical and an engine fault and, as he was near Otherton Airfield, he decided to make a precautionary landing.

The aircraft arrived in the overhead at approximately 2,000 feet and the pilot selected Runway 25 as the longest and best option to land on. He said he was conscious that the grass runway might not be long enough to stop on, but he could see a suitable field at the end of the runway which he could run into. He made a normal powered approach and configured the aircraft for a short field landing. However, on base leg the engine again appeared to be slow to respond to the throttle being opened. The pilot said that the aircraft touched down at the threshold, but halfway along the runway he realised that he was landing downhill and would not be able to stop on the runway. He said that he considered going around, but with the M6 motorway approximately 1 nm directly ahead, and the poor engine acceleration, decided to continue with the landing. The aircraft travelled approximately 20 to 30 feet into the recently ploughed field at the end of the runway when the nose leg collapsed and the aircraft came to a halt.

Description of the electrical system

The aircraft was equipped with a 28 volt direct current electrical system. A 75 amp alternator and a 24 volt battery were connected to a busbar which provided power to all the electrical equipment with the exception of the starter motor. The battery and alternator were controlled by the Battery Master and Alternator switches, which were rocker type switches mounted on the overhead panel. Alternator and Low Voltage warning lights were contained in the annunciation panel, positioned in front of the pilot near the top of the instrument panel. The Alternator light illuminates when there is no electrical current from the alternator and the Low Voltage light illuminates when the alternator output is lost and the electrical system is drawing power from the battery alone. A digital ammeter, mounted on the instrument panel, also provides a visual indication of the current produced by the alternator.

Engineering investigation

Following the repair of the aircraft, the maintenance organisation carried out engine ground runs and tests of the electrical generation system with the same engine and electrical components that had been fitted to the aircraft during the accident flight. The engine, electrical and warning systems all performed satisfactorily.

Comment

The pilot gave a very honest account of the accident and, even though he could not recall the warning lights being illuminated, he felt that during the pre-start checks he might not have selected the alternator switch to ON. The consequence of such an action is that the aircraft electrical equipment would run directly from the battery, which would become discharged after approximately 30 minutes. Such a scenario is consistent with the loss of the GPS and radio after 30 to 35 minutes into the flight. The unexpected response from London Information may have been because the radio was pre-set to 124.75 MHz, the frequency for London Information. It is likely that with the battery voltage decreasing there was insufficient power to operate all the electrical equipment and the radio therefore stopped working. However as other electrical equipment shut down it is possible that the battery power was then sufficient to power up the radio again, which then defaulted to the pre-set frequency.

The pilot commented that after the accident he remembered that the engine was slow to respond when the throttle was moved quickly during stall recovery exercises. Carburettor heat set at HOT enriches the fuel/air mixture, causes a reduction in engine power and

can adversely affect the acceleration of the engine as the pilot advances the throttle. This negative effect would be compounded if the pilot were to rapidly advance the throttle such that the accelerator pump in the carburettor provides even more fuel to an already over-rich mixture. The result would be an engine that would be slow to accelerate and might also run roughly.