

Piper PA-30, G-BAWU

AAIB Bulletin No: 6/99 Ref: EW/G99/02/03 Category: 1.3

Aircraft Type and Registration: Piper PA-30, G-BAWU

No & Type of Engines: 2 Lycoming IO-320-C1A piston engines

Year of Manufacture: 1967

Date & Time (UTC): 2 February 1999 at 1956 hrs

Location: Exeter Airport

Type of Flight: Private

Persons on Board: Crew - 2 - Passengers - 2

Injuries: Crew - None - Passengers - None

Nature of Damage: Damage to propellers and fuselage underside

Commander's Licence: Private Pilot's Licence with IMC and Night Rating

Commander's Age: 70 years

Commander's Flying Experience: 3,568 hours (of which 550 were on type)
Last 90 days - 24 hours
Last 28 days - 8 hours

Information Source: Aircraft Accident Report Form submitted by the pilot

The aircraft had departed from Exeter Airport for the purpose of a night flight in the local area. Having established a positive rate of climb, the landing gear selector lever was moved to the UP position whereupon the electrical system immediately failed, with loss of the cockpit illumination and power to the radio transmitter/receivers. The pilot therefore decided to terminate the flight, and to attempt emergency manual extension of the landing gear, in the absence of electrical power.

It was necessary to use torches in the darkness within the cockpit, and both crewmembers co-operated in actioning the appropriate Checklist for the emergency extension of the landing gear. This procedure required removal of the emergency gear extension panel from the floor between the seats and lifting/moving forwards a release lever which slides an outer sleeve forward on the worm drive output shaft of the landing gear motor, in order to allow release of the output shaft from engagement with the landing gear torque tube. The sleeve and shaft should then be lifted out of engagement with the torque tube, thus disconnecting the landing gear electric motor drive from the torque tube. This should allow the landing gear to 'free fall' part of the way towards extension. An emergency extension lever tube is then inserted into one of the two sockets (ie left or right) mounted on the torque tube and then pushed forward, thereby rotating the tube to fully extend and

lock down the respective landing gear. The lever is then removed from the first socket and inserted into the other socket to complete extension and locking down of the other landing gear. After apparently completing this procedure, the crew reported having heard and felt a 'clunk', which indicated to them that the landing gear was down and locked.

By this stage electrical power had partially returned, providing intermittent radio contact with Exeter Tower, however no landing gear 'down-and-locked' indication was apparent. A low flypast was then conducted over the control tower so that a visual inspection of the landing gear could be attempted. The tower controller reported that his assessment was difficult due to the dark conditions, but that the nose landing gear appeared to be extended. This gave the crew confidence that the landing gear was down and locked, and so they carried out a normal approach. However on touchdown the landing gear appeared to them to collapse immediately, and the aircraft then slid to a halt at the side of the runway. The emergency services arrived promptly and the aircraft was evacuated without injury.

The maintenance organisation responsible for the aircraft subsequently conducted an inspection and came to the view that since the main landing gear doors had not been damaged, the landing gear had probably not been extended. Further examination revealed that although the landing gear motor release lever had been raised, the hooked sleeve had not slid forward to release the linkage to the torque tube. This would have prevented the required rotation of the torque tube using the emergency extension lever, although the fact that severe distortion of the motor linkage was found suggested that some rotation must have occurred with the output shaft still engaged on the torque tube. The commander of the aircraft disagreed with this assessment, and maintained that full lever travel had been obtained. However it was noted during subsequent tests on the landing gear, which were conducted in daylight, that the release lever required to be pushed forwards beyond a resistance point and then 'rocked' from side to side in order to effect release of the hooked sleeve and shaft from the torque tube. This aspect of the emergency procedure was not mentioned in the Flight Manual.

The aircraft was equipped with DC generators, as opposed to alternators, and thus the engines had to be operated at approximately 1600 RPM, with all services running, in order to maintain battery charge. It was the opinion of the maintenance organisation that the battery had probably become discharged due to the cumulative effects of the pre-flight inspection, which was conducted with the electrical power switched on, the subsequent starting of the engines and extended taxiing prior to take off. It was further considered that when the landing gear had been selected UP, the additional current drain imposed by the motor had caused the battery relay to open, with consequent loss of electrical power to the aircraft systems. After the motor had stopped running, it was considered that the battery had then recovered sufficiently for the relay to close, restoring electrical power. This view appeared consistent with a subsequent inspection which found no problems associated with the electrical system, and a battery check which indicated 90% capacity.