

# Piper PA-28R-180 Cherokee Arrow, G-BAPW

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| <b>AAIB Bulletin No:</b> 3/2003        | <b>Ref:</b> EW/G2002/11/15                                | <b>Category:</b> 1.3 |
| <b>Aircraft Type and Registration:</b> | Piper PA-28R-180 Cherokee Arrow, G-BAPW                   |                      |
| <b>No &amp; Type of Engines:</b>       | 1 Lycoming IO-360-B1E piston engine                       |                      |
| <b>Year of Manufacture:</b>            | 1968  |                      |
| <b>Date &amp; Time (UTC):</b>          | 24 November 2002 at 0915 hrs                              |                      |
| <b>Location:</b>                       | Denham Aerodrome, Middx                                   |                      |
| <b>Type of Flight:</b>                 | Private   |                      |
| <b>Persons on Board:</b>               | Crew - 1  | Passengers - None    |
| <b>Injuries:</b>                       | Crew - None   | Passengers - N/A     |
| <b>Nature of Damage:</b>               | Damage to radio aerial and fuselage rear tie-down bracket |                      |
| <b>Commander's Licence:</b>            | Private Pilots Licence                                    |                      |
| <b>Commander's Age:</b>                | 56 years  |                      |
| <b>Commander's Flying Experience:</b>  | 881 hours (of which 750 were on type)                     |                      |
|  | Last 90 days - 15 hours                                   |                      |
|  | Last 28 days - 0 hours                                    |                      |
| <b>Information Source:</b>             | Aircraft Accident Report Form submitted by the pilot      |                      |

The purpose of the flight was to perform a single circuit to check out the aircraft following its Annual Inspection. The takeoff from Runway 24 was uneventful and the landing gear retracted normally when selected up. The landing gear was selected down on the downwind leg, but the three green gear down and locked lights failed to illuminate. The pilot tried cycling the landing gear lever but this had no effect. He then performed the emergency landing gear extension procedure, again without success. During a flypast of the control tower, he was advised that the landing gear appeared to be in the down position and so proceeded to land, using full flap on final approach. After touch down the right main landing gear partially collapsed. During the landing roll the pilot shut down the engine and turned off the fuel. The left gear then also partially collapsed, causing the aircraft to slew off the left side of the runway, but the nose gear remained extended. The aircraft came to rest about 40 metres from the edge of the runway and the pilot, who was uninjured, exited the aircraft without difficulty.

The landing gear on the PA-28R is operated hydraulically, via a pump, which is driven by a reversible electric motor and is held in the retracted position by hydraulic pressure. The landing gear may be lowered in an emergency by moving the gear override lever to the EMERGENCY DOWN position, which dissipates the hydraulic pressure and allows it to free fall under gravity.

On recovery of the aircraft to a hangar, it was observed that the circuit breaker for the landing gear had tripped. The aircraft was jacked up and, after resetting the circuit breaker, the landing gear was cycled up and down. On the third cycle, the electric motor ceased running part way through the gear extension cycle. Further investigation revealed that the down solenoid for the landing gear motor was operating intermittently. When the solenoid was tapped, the motor started to run again and the landing gear continued to extend and lock in the down position. It could not be established why the gear failed to lower in flight, using the emergency lowering function, as this was found to operate satisfactorily when tested in the hangar.

It was concluded that the faulty landing gear down solenoid had interrupted the electrical supply to the motor during gear extension in flight, preventing the gear from fully extending. The landing gear circuit breaker tripping is believed to be associated with the faulty solenoid, probably as a result of an intermittent internal short in the solenoid. Rectification action involved replacement of the landing gear down solenoid, since when the problem has not re-occurred. The up solenoid was also replaced as a precaution.