

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Piper PA-28R-180 Cherokee Arrow, G-AVWO	
<b>No &amp; Type of Engines:</b>	1 Lycoming IO-360-B1E piston engine	
<b>Year of Manufacture:</b>	1967	
<b>Date &amp; Time (UTC):</b>	10 August 2011 at 1750 hrs	
<b>Location:</b>	Biggin Hill Airport, Kent	
<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>	Left wing, flap and aileron damaged	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	56 years	
<b>Commander's Flying Experience:</b>	249 hours (of which 100 were on type) Last 90 days - 15 hours Last 28 days - 6 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and subsequent enquires	

## Synopsis

During approach the pilot observed that the three landing gear green 'DOWN AND LOCKED' lights were illuminated. On touchdown the left main landing gear collapsed and the 'IN TRANSIT' light illuminated. Subsequent investigation revealed that wear on the left main landing gear actuator piston prevented the complete engagement of the downlock hook on the lock-pin. However, the partial engagement had actuated the limit switch that illuminated the 'DOWN AND LOCKED' light.

## History of the flight

After joining the circuit the pilot extended the landing gear on the downwind leg and observed three green lights on the landing gear position indicator panel, indicating

that all three landing gears were 'DOWN AND LOCKED'. During his pre-landing checks the pilot confirmed that the three green landing gear indication lights remained illuminated. Immediately after touchdown, the left wing of the aircraft began to drop and the pilot observed that the landing gear 'IN TRANSIT' light on the instrument panel had now illuminated. With the aircraft's speed decaying rapidly, the pilot raised the left wing using aileron inputs whilst shutting down the engine and electrical systems. As the speed decayed the left wing made contact with the ground and the aircraft came to a halt on the runway. The pilot was uninjured and was able to leave the aircraft through the normal exit.

**Investigation**

The PA-28R-180 is fitted with three hydraulically actuated retractable landing gears. Each gear is fitted with a mechanical downlock. These consist of a pivoting hook attached to the upper drag link which rotates, as the landing gear extends, to engage on a lock-pin on the lower drag link. When the downlock hook begins to engage the lock-pin, it actuates a limit switch mounted on the lower drag link. Actuation of the limit switch illuminates the green 'DOWN AND LOCKED' light and when all three landing gear limit switches are made the landing gear 'IN TRANSIT' light is extinguished and the hydraulic pump stops.

Examination of the main landing gear limit switches confirmed that they were correctly rigged. A test of the landing gear extension and retraction system confirmed that it appeared to operate normally, with all three landing gear downlocks being engaged when the landing gear was extended. A detailed examination of the left main landing gear actuator identified a small hydraulic leak from between the actuator piston and the seal when the piston was in the extended position. The position of the leak corresponded to an area of wear on the chrome plating of the actuator piston.

Further tests revealed that when the left main landing gear was extended against a load, it would extend sufficiently to allow the downlock hook to actuate the landing gear limit switch but the downlock hook would not fully engage on the downlock pin. Examination of the approved maintenance programme for the aircraft confirmed that there is no requirement for the routine removal of the landing gear actuator for overhaul. The aircraft records showed no evidence that the main landing gear actuators had been removed for overhaul.

**Conclusion**

The wear on the left main landing gear actuator piston prevented the left main landing gear from extending fully against flight loads. The downlock hook did not fully engage the downlock pin, despite providing an indication to the pilot that the gear had extended normally. On landing, the forces on the left landing gear caused the partially engaged downlock hook to disengage from the downlock pin, allowing the left main landing gear to collapse.