

## Accident

<b>Aircraft Type and Registration:</b>	Piper PA-28-161, G-SACS	
<b>No &amp; Type of Engines:</b>	1 Lycoming O-320-D3G piston engine	
<b>Year of Manufacture:</b>	1988 (Serial no: 2841047)	
<b>Date &amp; Time (UTC):</b>	22 June 2024 at 1645 hrs	
<b>Location:</b>	Sherburn-in-Elmet Airfield, Yorkshire	
<b>Type of Flight:</b>	Training	
<b>Persons on Board:</b>	Crew - 1	Passengers - 1
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Significant damage to wing, fuselage and landing gear	
<b>Commander's Licence:</b>	Commercial Pilot's Licence	
<b>Commander's Age:</b>	27 years	
<b>Commander's Flying Experience:</b>	356 hours (of which 245 were on type) Last 90 days - 18 hours Last 28 days - 7 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

## Synopsis

On takeoff, the right main gear oleo and wheel assembly fell free from the landing gear cylinder, but remained attached to the aircraft by the brake hose. The cause was failure of both torque link attachment lugs due to fatigue cracking. A Service Bulletin issued by the manufacturer exists to inspect the lugs, but it is not mandated in the UK and the failure occurred outside of the inspection interval. Following previous occurrences, the Civil Aviation Authority (CAA) issued Safety Notice SN-2024/002 to raise awareness to owners and operators of affected aircraft, and it continues to monitor instances of cracking in the lugs.

## History of the flight

A student pilot and instructor were conducting a practice forced landing (PFL) lesson, which also included two touch-and-go landings. No issues were identified by the instructor or student, but immediately after taking off after the second touch-and-go the ground crew in a rescue vehicle radioed the aircraft to inform that the right main wheel had become detached and was hanging by a hose. The instructor took control and flew along the runway where the ground crew and the pilot of another aircraft visually confirmed the issue. She then flew several further circuits to burn fuel, and allow time for emergency services to arrive, before landing on grass Runway 28. Upon landing the aircraft veered to the right by approximately 90° and came to a stop with the right wheel detached from the hose. Both instructor and student exited the aircraft unharmed (Figure 1).



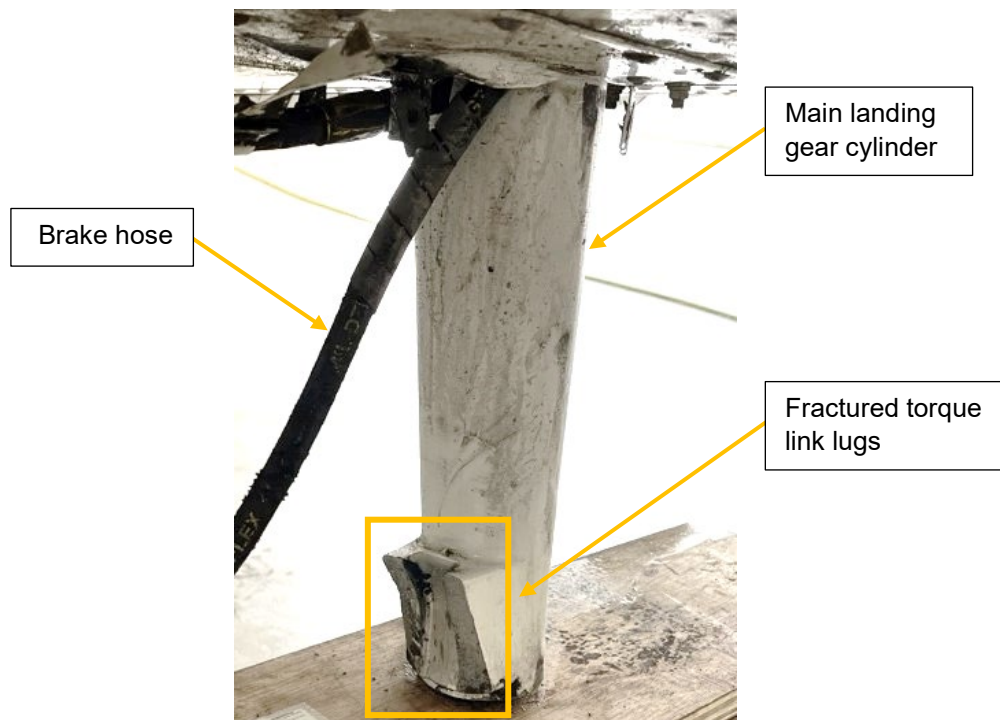
**Figure 1**  
G-SACS after landing

### **Aircraft information**

The PA-28 is a low wing, four seat aircraft with a fixed tricycle landing gear. G-SACS is a Piper PA-28-161, manufactured in 1988, and had a valid ARC. It had 18,607 flying hours at the time of the accident and has been owned and operated by a flight training school since 1989.

### **Aircraft examination**

The torque link attachment lugs on the main landing gear cylinder had fractured, allowing the oleo and wheel assembly to fall free of the cylinder but remain attached to the aircraft by the brake hose.



**Figure 2**

Fractured torque link attachment lugs

### Previous Occurrences and Safety Documentation

Failure of the torque link attachment lugs due to fatigue is a known issue with the cast main landing gear cylinders fitted to PA-28 and PA-32 aircraft manufactured between 1961 and 1977. The cylinders were also fitted to PA-28-161 variants up to 1994, including G-SACS. The cast cylinders were superseded by forged cylinders which are not as susceptible to fatigue cracking of the lugs.

Piper Service Bulletin SB1131A specifies inspection of the cast cylinder torque link attachment lugs at 100 hour intervals, but is not mandated in the UK. It specifies visual inspection followed by dye penetrant if cracks are not detected by 10x visual magnification. The SB had been applied to G-SACS at its last annual inspection at 18,268 hours, followed by visual inspection only of the lugs at each subsequent 100 hour interval.

Two recent occurrences have been investigated by the AAIB<sup>1</sup> and Safety Recommendation 2024-001 was made to the UK CAA to assess whether an unsafe condition exists to mandate SB1131A. The CAA analysis concluded that the failure rate did not meet the threshold for an Airworthiness Directive. As cracking events were still occurring, the CAA issued Safety Notice SN-2024/002<sup>2</sup> on 3 June 2024 to owners and operators of affected aircraft to bring

#### Footnote

<sup>1</sup> G-BRBA 4 September 2021: <https://www.gov.uk/aaib-reports/aaib-investigation-to-piper-pa-28-161-g-brba> and G-AXSG 7 April 2023: <https://www.gov.uk/aaib-reports/aaib-investigation-to-piper-pa-28-180-g-axsg> both [accessed 19 May 2025].

<sup>2</sup> <https://www.caa.co.uk/our-work/publications/documents/content/sn-2024002-version-2/> [accessed 19 May 2025].

the issue to their attention and to notify any occurrences of cracks to the CAA for monitoring. This Safety Notice notes that consideration should also be given for inspecting the area by applying a liquid penetrant dye to detect any signs of cracking.

Following this accident, the operator re-applied SB1131A including using dye penetrant to the six aircraft in their fleet and found two further aircraft with cracked torque link lugs. All the operator's aircraft are used for flight training. The operator has since noticed that within the Piper Airplane Parts Catalogue 761-538 for PA-28-151/161 Warrior aircraft, against the main landing gear cylinder, it states:

*"Forged assemblies recommended for aircraft used in training operations per Piper Service Bulletin 1131 – Latest Revision"*

SB1131A does not refer to the recommended use of forged assemblies for aircraft used in training operations, nor does it account for the number of landings in addition to flying hours. The statement does not appear in the parts catalogues for other applicable aircraft models listed within SB1131A, including the catalogue for G-SACS.

## Analysis

The torque link attachment lugs failed due to fatigue at 339 hours after the last dye penetrant inspection, that was made in accordance with Piper SB1131A, and outside of the 100 hour inspection interval. The two further cracked lugs found by the operator on other aircraft highlights the importance of using dye penetrant as cracks are not always visible solely under magnification.

Training aircraft typically see a high number of landing cycles which can accelerate fatigue failure once cracks have developed; both recent investigations by AAIB involved aircraft that had been used by flight schools. CAA SN-2024/002 provides additional detail and reporting of cracks so that the situation can be monitored to avoid an unsafe condition developing.

After reviewing the parts catalogues and maintenance manuals for affected aircraft types listed in SB1131A, the aircraft manufacturer is taking the following Safety Action:

## Safety Action

At the next revision, Piper will revise all applicable parts catalogues and maintenance manuals to include the following statement that is present in the parts catalogue for the PA-28-161/181, Piper part number 761-538:

*'Used if [cast] MLG Cylinder has not been replaced per Piper Service Bulletin 1131. For Service only. Forged assemblies recommended for aircraft used in training operations per Piper Service Bulletin 1131 - Latest Revision.'*

## Conclusion

The right main landing gear torque link attachment lugs failed due to fatigue cracking, causing the wheel assembly and oleo to fall free of the landing gear cylinder during flight. The cracks were not identified by visual inspection. The CAA continues to monitor the occurrences of lug cracking on the PA-28 and PA-32 fleets.