

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Alpi Pioneer 300, G-IPKA	
<b>No &amp; Type of Engines:</b>	1 Rotax 912ULS piston engine	
<b>Year of Manufacture:</b>	2005 (Serial no: PFA 330-14355)	
<b>Date &amp; Time (UTC):</b>	20 August 2022 at 1600 hrs	
<b>Location:</b>	Fenland Airfield, Lincolnshire	
<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 landing gear failure and damage to left wing	
<b>Commander's Licence:</b>	National Private Pilot's Licence	
<b>Commander's Age:</b>	76 years	
<b>Commander's Flying Experience:</b>	2,840 hours (of which 877 were on type) Last 90 days - 17 hours Last 28 days - 6 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and AAIB visual examination of the landing gear	

## Synopsis

Whilst taxiing after landing the left main landing gear collapsed due to the failure of the swinging leg. The leg had fractured in overload initiating close to the weld between the swinging leg and its pivot tube. As a result of this investigation the Light Aircraft Association (LAA) are reviewing design and manufacturing aspects of the type's landing gear, including whether on-going maintenance action is required.

## History of the flight

The aircraft landed on Runway 26 at Fenland Airfield. As the aircraft taxied, its left main gear collapsed causing the left wing to contact the ground (Figure 1).

## Aircraft information

The Alpi Pioneer 300 is a small two-seat, low-wing aircraft, of mainly wooden construction. The aircraft is fitted with electrical retracting tricycle landing gear.

The main landing gear leg consists of an upper strut which pivots around an axial trunnion when the landing gear is raised or lowered. The 'swinging leg', also referred to as the drag strut, is hinged off the bottom of the upper strut. A damper, which provides the landing gear suspension, is fitted above the swinging leg (Figure 2).



**Figure 1**  
G-IPKA once it had come to rest



**Figure 2**  
Alpi Pioneer left main landing gear

G-IPKA's annual inspection for its Permit to Fly revalidation was completed on 31 July 2022, approximately 5.5 flight hours and 9 landings prior to the accident. The owner reported that during the inspection particular attention was paid to the landing gear, as he had identified a crack in the nose gear leg assembly earlier that year.

All three landing gear legs had been replaced by the owner in 2012 and had flown 725 hours and 837 landings since installation.

The owner reported that the aircraft had not suffered any heavy landings during this time but had mainly been operated from grass strips, some of which 'can be rough in places'.

### Landing gear examination

The swinging arm and damper were removed from the aircraft for further examination (Figure 3).



**Figure 3**

G-IPKA left main swinging arm and damper

The swinging leg had failed around its full circumference, the crack initiating adjacent to the weld between the swinging leg tube and the upper pivot tube (Figure 4).

The fracture in the wall of the tube was indicative of overload, suggesting that the fracture had occurred rapidly. The inside of the tube, which is uncoated and had evidence of overspray on some of the inner surfaces, was lightly corroded.

The condition of the interface between the swinging leg tube and the pivot tube suggested the weld had not fully penetrated the parent material and is a possible factor in the initiation of the crack.





**Figure 4**  
Swinging tube upper end

In August 2019 the LAA wrote a letter to all registered Alpi Pioneer 300 owners informing them of a similar failure of a Pioneer 300's landing gear. A crack had initiated close to the welded pivot tube and corrosion was present on the internal surfaces of the tube. It highlighted that corrosion may have been a factor in the failure and that this hinge is subjected to high stresses, especially in any crosswind landings. It suggested inspection for cracking around the hinge and that owners complete a landing gear retraction check every 25 hours which would include a check of the legs whilst in the 'relaxed' or unloaded state. Additionally, it suggested more regular checks if the aircraft 'is being operated from a bumpy runway' and identified that it is essential that the landing gear is thoroughly checked after heavy landings, especially following a touchdown made with any sideways drift.

### **Analysis**

The crack initiated from the interface of pivot tube to swinging leg tube. Poor weld quality between two components can act as a stress raiser at the interface and could serve to locate a crack. If the landing gear was subjected to a heavy landing or an element of lateral loading during a crosswind landing, this could increase the stress at the interface between the swinging tube and the pivot tube and cause a crack to initiate and propagate rapidly.

The pilot did not recall any particularly heavy landings, however, did say that the aircraft often flew from grass airfields where the surface condition can be rougher and may have been sufficient to initiate a crack.

Although the owner had inspected the landing gear components recently it would be difficult to inspect as the downtube of the main landing gear strut partially covers the location of the crack initiation.

**Safety action**

As a result of this investigation the LAA are reviewing the design and manufacturing aspects of the Alpi Pioneer 300 landing gear, including whether on-going maintenance action is required.