ACCIDENT

Aircraft Type and Registration:	Piel CP301B Emeraude, G-AZGY	
No & Type of Engines:	1 Continental Motors Corp O-200-A piston engine	
Year of Manufacture:	1968 (Serial no: 122)	
Date & Time (UTC):	16 April 2016 at 1300 hrs	
Location:	RAF Henlow, Bedfordshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Left landing gear, wing skin and propeller	
Commander's Licence:	Light Aircraft Pilot's Licence	
Commander's Age:	56 years	
Commander's Flying Experience:	971 hours (of which 497 were on type) Last 90 days - 2 hours Last 28 days - 2 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further inquiries by the AAIB	

Synopsis

The left landing gear collapsed while the aircraft was taxiing on a grass taxiway. Subsequent examination revealed that the landing gear leg had failed as a result of a thread failure on one of the landing gear attachment bolts. The pilot considered that the poor construction of the bolt was the primary cause of the failure.

History of the flight

While taxiing from the hangar at RAF Henlow, shortly after the aircraft moved from the paved surface onto the grass taxiway, the pilot described hearing a "loud pop". On preparing to stop the aircraft he heard another loud pop and the left wing slowly sank to the ground, as the left landing gear leg folded forwards under the wing. The pilot was uninjured and exited the aircraft without assistance. The aircraft was subsequently recovered to the hangar for further examination.

Background information

The main landing gear leg is of tubular steel construction and is attached to the respective wing main spar by means of two steel plates, secured by three long bolts. Two of the bolts are installed forward of the spar, and one aft of the spar.

The pilot commented that it had been his practice to check the tightness of the nuts on the landing gear attachment bolts approximately every six months. He stated that access to

the area was limited, but that he had been able to get a spanner onto the nuts to tighten them, although the access was not sufficient to use a torque wrench. The pilot further commented that the CP301B Emeraude normally has access panels on the wings to facilitate inspection of the landing gear attachments, but that was not the case on this aircraft. He suspected that the wings may have been re-skinned at some point prior to his ownership, covering the original access holes, although there was no record of such activity in the aircraft log books.

The pilot recalled a landing on grass runway a number of months previously, where the last few metres of the runway were particularly rutted. This was approximately 12 landings prior to the accident.

Examination of the aircraft

The pilot reported that the threads on the inboard forward attachment bolt appeared to have been stripped and the nut had been pulled off the end (Figure 1). In this condition the landing gear was not adequately restrained. This caused the lower attachment plate to bend, allowing the landing gear leg to twist outboard until it failed just above the lower attachment plate (Figure 2).

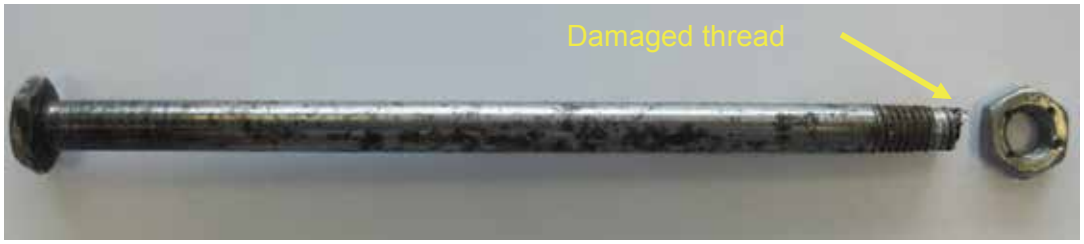

Figure 1

Failed landing gear attachment bolt

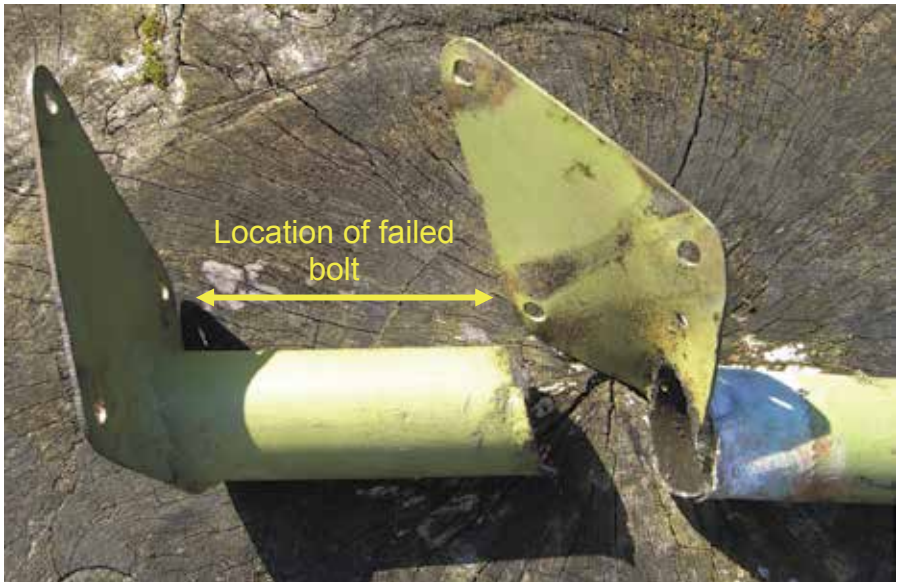

Figure 2

Damage to landing gear leg and attachment plates

The pilot reported that the failed bolt appeared to have been homemade. He commented that it seemed to have been poorly manufactured and with a poorly cut thread, that occupied only a small portion of its length. The nut was a half-thickness nut, offering limited thread engagement with the bolt. The nut did not offer a good fit with the threads of the bolt and appeared to have been locked by staking the nut/bolt thread interface with a number of centre punch strikes. No washers were installed. All the landing gear attachment bolts were of a similar construction.

The left wing skin was damaged near the landing gear attachment point and one of the wooden propeller blades broke at the tip as it contacted the ground. The pilot considered that a large compression spring, which forms part of the landing gear, allowed the wing to fall slowly to the ground when the landing gear collapsed, minimising damage to the aircraft.

Discussion

The pilot commented that the landing gear attachment bolts, which had been fitted at some time prior to him acquiring the aircraft, appeared to have been poorly manufactured, with insufficient nut depth to assure good locking. He was not aware until after the accident of the locking technique that had been used, and commented that this locking technique precludes subsequent torque tightening without compromising the locking method. His attempts to tighten the nuts may therefore have been ineffective. The pilot has since replaced all the landing gear attachment bolts with newly manufactured homemade studs and added 'Nyloc' lock nuts and washers. He has also restored what he believed to be original access panels in each wing to facilitate future inspection access.

The pilot considered that poor construction of the landing gear attachment bolts was the primary cause of the bolt failure. He also considered that the previous landing on a rutted runway may have served to accelerate the failure of the bolt, but it was unlikely to have to have been causal.