



MINISTÉRIO DA ECONOMIA E DO EMPREGO

GABINETE DE PREVENÇÃO E INVESTIGAÇÃO DE ACIDENTES COM AERONAVES
GPIAA

AIRCRAFT INCIDENTE REPORT

Notes: The Investigation of this incident was initiated by an Investigator who ceased his collaboration with the GPIAA. . This report was written based on information collected by this Investigator.

This report is a process conducted for the purpose of accident prevention which includes the collection and analysis of information, the determination of causes and, when appropriate, the making of safety recommendations, in accordance with Annex 13 to the Convention on International Civil Aviation, with Regulation (EU) N° 996/2010 of the European Parliament and of the Council, October 20, 2010, and with paragraph 3 of art. 11 of Dec.-Law No. 318/99 of 11 August. . It is not the purpose of any such accident investigation and the associated investigation report to apportion blame or liability.

Date/time: 26/05/ 2009 @ 08:56 UTC ¹		Proc. N° 15 /INCID/2009
Operator: AERO VIP	Type of incid.: Collapse of the left main landing gear during take-off	
Aircraft: Cessna 180K, D-EGSW		
Local: Portimão Aerodrome (LPPM)		
Flight Type: Transport of Parachutists	Phase of flight/ Take off	
Persons on board: 5	Pax: 4	Injuries: NIL
Damage to aircraft: Propeller blades, left main landing gear and left wing tip.		

1. FACTUAL INFORMATION

1.1 History of flight

On May 26, 2009, about 08:56, Lisbon daylight time, a Cessna 180k airplane, registered D-ELSW, sustained substantial damage when the left main landing gear separated from the airplane during take-off at Portimão aerodrome. The aircraft was being operated as a visual flight rules flight in a local flight transport of parachutists. The pilot and passengers didn't suffer injuries. Visual meteorological conditions prevailed, and a flight plan was filed.

The aircraft had travelled around 110 metres when swerved suddenly to the left. The pilot felt that something unusual was happening with the left main landing gear and has tried to keep the aircraft on runway, correcting to the right.

The aircraft turned 180 degrees on the runway and continued moving on previous direction until stopped toward at 280°. The left main landing gear separated from the airplane, resulting in damage to the left wing and propeller.

¹ The times referred to in this report are UTC = Coordinated Universal time.
On the date, in Continental Portugal, the legal time = UTC + 1:0

1.2 Personnel Information

The pilot had Portuguese nationality and the flight experience described in the following table:

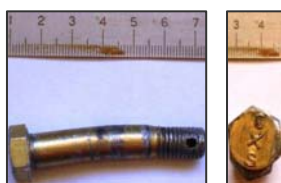
Identification		Flight experience		Medical Certificate	
Sex:	Male	Total flying hours:	4351:00	Class:	1
Age:	58 years old	Total hours on type:	23:00	Date:	12- 01-2004
Nationality:	Portuguese	Hours in last 90 days:	59:10	Expire date:	N/D
Licence Type:	CPL (A)	Hours in last 30 days:	27:00	Limitations:	N/D
Issued by:	INAC	Hours in last 7 days:	08:40		
Expire date:	03-2 -2013	Hours in last 24 hours:	00:00		

1.3 Aircraft Information

The aircraft was a single engine airplane with a maximum take-off mass of 1270 kg and the following characteristics:

Features	Cell	Engine	Propeller
Manufacture:	CESSNA	TELEDYNE C.	MC CAULEY
Brand:	CESSNA	T.C.M.	Mc Caulley
Model:	180K	O-470-U	C2A34C204-C/90DCB-8
Serial N°:	180-52975	813342R	040859
Manufacturing year:	1978		
TSN ²	3602:40		
TSO ³		846:40	39:40
Last inspection:	29/03/1998	26/03/1998	21/06/2006

1.4 Tests and Research



The inspection to the aircraft revealed that the retaining nut on the left main landing gear attaching bolt was missing. The bolt was bent and the threads were damaged.

Fig. 1 - bolt and nut

The Cessna parts illustrated catalogue shows that the bolt AN7-20A and the nut AN365-720 c are the indicated ones. The nut AN365-720C is built of steel and is self-locking. The AN365 series steel nuts, with exception of the AN365-720C, have been superseded by MS20365 steel nuts, that incorporate some leagues in its design, such as aluminium and copper, but which are considered, essentially, steel parts.

² Flight time since new.

³ Flight time since overhaul.

It was not possible to identify the serial numbers of the bolt and nut installed in the aircraft but it was found that did not have the same characteristics indicated in the catalogue of the Cessna.

The original bolt (AN7 20A) does not have any hole; on the contrary, the bolt installed on the aircraft had a hole. The AN365-720C is an all steel self-locking nut; the nut of the aircraft featured a golden colour, lighter, and it was not a self-locking nut.

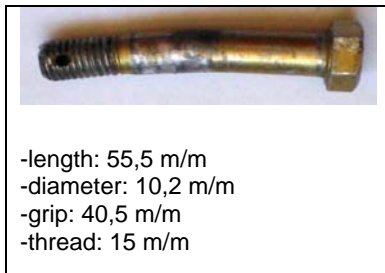
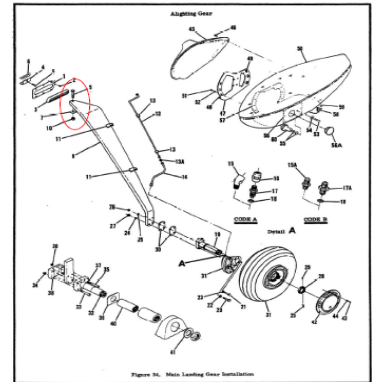
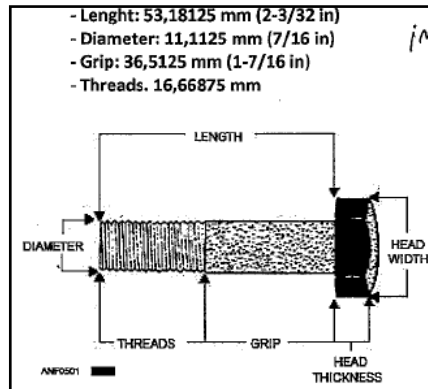


Fig. 2 – Bolt



Bolts characteristics m/m				
Bolt:	Length	Threads	Grip	Diameter
AN7-20A:	53,18125	16,66875	36,5125	11,1125
Installed:	55,5	15,0	40,5	10,2
Difference:	+2,31875	-1,66875	+3,9875	-0,9125

2. ANALYSIS

The bending deformation of the bolt indicates that a side load was present during the failure. This side load could have resulted from a hard landing with the airplane moving sideways. We have to note that the incorrect installation of the landing gear can also allow the introduction of lateral loads during normal landings.

3. CONCLUSIONS

3.1 Findings

- The left main landing gear leg separated from the aircraft, during take-off, which resulted in substantial damage to the aircraft.
- The left main landing gear leg separated from the aircraft because the bolt has ceased to fulfil its function.
- The bending of the bolt indicates that was subjected to a lateral load.
- It was not possible to identify the serial numbers of the bolt and nut that were holding the left main landing gear leg.
- For the purpose of to attach the landing gear leg to the aircraft, Cessna indicates the AN7 bolt and the AN365-20A-720C nut.
- The bolt and nut installed on the left main landing gear leg of the aircraft had some important differences in relation to the originals.

3.2 Cause of Incident

The collapse of the left main landing gear leg was due to the failure of its attaching bolt.

Lisbon 8th August 2011

The investigator in charge



Fernando Lourenço