AIRCRAFT INCIDENT SHORT REPORT

CA18/3/2/1207: ZU-WCG, Nose landing gear collapse on touchdown runway 08 at Port Elizabeth Airport

Date and time	:	4 May 2018 at 1327Z
Occurrence type	:	Serious incident
Aircraft registration	:	ZU-WCG
Aircraft manufacturer and model	:	Airplane Factory Sling 2
Last point of departure	:	FAPE
Next point of intended landing	:	FAPE
Location of incident site with reference to easily defined geographical points (GPS readings if possible)		Runway 08 at FAPE (33° 59' 28" South 025° 36' 37" East)
Meteorological information	:	FAPE 041330Z 08014KT CAVOK 19/10 Q1020 NOSIG=
Type of operation	:	Private, None-type certified aircraft (Part 94)
Persons on board	:	1 + 1
Injuries	:	None
Damage to aircraft	:	Nose gear, propeller and lower engine cowling

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (2011) this report was compiled in the interests of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and ***not to establish blame or liability****.*

Disclaimer:

1. SYNOPSIS

1.1 On Friday 4 May 2018, a pilot accompanied by a passenger, departed FAPE on a scenic flight along the coast towards Jeffreys Bay and back to FAPE. The departure, en-route and arrival phases of the flight were uneventful. The aircraft was cleared by air traffic control (ATC) to land on runway 08. The prevailing wind according to the 1330Z METAR was 080° at 14 knots.

1.2 Shortly after touchdown, the nose landing gear strut assembly collapsed and the aircraft came to rest in a nose down attitude on the runway surface. The aircraft sustained damage to the nose gear, engine cowling and the propeller. Neither occupant sustained any injuries.

1.3 The investigation revealed that due to weakening of the nose gear strut over time, a possible excessive force applied to the gear on touch down caused the nose gear strut to bend backward and collapsed

2. HISTORY OF FLIGHT

2.1 The pilot, who was the holder of a private pilot license (PPL), hired the aircraft from a local aviation training organisation (ATO) at FAPE. Accompanied by a passenger they departed from FAPE at 1220Z on a scenic flight to Jeffreys Bay and back to FAPE. The flight was conducted under visual meteorological conditions (VMC) during daylight hours.

2.2 The departure, en-route and arrival phases of the flight were uneventful. On returning back to FAPE, the pilot was cleared by ATC for a full stop landing runway 08, which was the active runway at the time with the prevailing wind according to the pilot's statement was 110° at 13 knots. The pilot stated that he selected 30° of flaps for landing. On touch down as the nose wheel made contact with the runway surface the nose landing gear strut assembly collapsed and the aircraft came to rest in a nose down attitude on the runway.

2.3 The pilot shut down the engine and advised ATC of the incident. The crash alarm was activated and the aerodrome rescue and fire-fighting (ARFF) personnel responded to the scene. Both occupants vacated the aircraft with no injuries.

2.4 The incident occurred at FAPE, which was a licenced aerodrome and had two runways, which crossed one another. Runway 08, which was the active runway at the time, was 1 980 m long and 46 m wide and had a downward slope of -0,61%.

2.5 The extract below was obtained from the aircraft maintenance manual which stipulates what landing gear items need to be inspected during a 100-hour inspection.

LANDING GEAR GROUP

1. Inspect all parts for poor condition and insecurity of attachment.
2. Inspect shock absorbing devices (spring on nose gear) for damage.
3. Inspect members for undue or excessive wear, fatigue and distortion.
4. Inspect hydraulic lines for leakage.
5. Inspect wheels for cracks, defects and condition of bearings.
6. Inspect tyres for wear, cuts and slippage.
7. Inspect brakes for improper adjustment.

(Source: Sling 2 Maintenance Manual)

2.6 The pilot held a private pilot's licence (PPL) and the aircraft type was endorsed on his licence.

2.7 The pilot was in possession of a valid aviation medical certificate that was issued by a designated medical examiner.

2.8 The aircraft had a valid Authority to Fly and had been maintained in accordance with the prescribed standards.

2.9 The aircraft was a Sling 2 with serial number 94 and was manufactured in 2012. This aircraft was equipped with a single piston engine and was registered as a non-type certified aircraft (NTCA). The last maintenance inspection that was carried out on the aircraft prior to the flight in question was an Annual Inspection which was certified on 6 April 2018 at 1 383.5 airframe hours.

2.10 Fine weather conditions prevailed at the time of the incident.

3. FINDINGS

3.1 Pilot

3.1.1 The pilot had completed his PPL test on the 29th of November 2016. The pilot is allowed to exercise the privileges of the license for a period of two years from the day of the test provided that the following is adhered to:

- The pilot's medical is valid
- Annual currency fees have been paid
- Relevant recency requirements are satisfied

3.1.2 The pilot was the holder of a class one medical certificate which had expired on the 31st of December 2017. Due to the pilot being a holder of a PPL, a class one medical can be downgraded to a class two medical and the expiry date will be increased by another year. Therefore, the medical was deemed to be valid at the time of the incident. (See appendix A)

3.1.3 Although the actual expiry date of the PPL was the 30th of November 2018, the pilot had failed to pay his annual currency fees to the South African Civil Aviation Authority. The pilot

was therefore not allowed to exercise the privileges of the license.

3.2 Aircraft

3.2.1 The aircraft had flown 34 hours since the last inspection. The aircraft was in possession of a valid certificate of Release to Service and Authority to Fly.

3.2.2 The nose gear collapsed backward. (See Appendix C and D). The paint on the strut showed signs of peeling. This process had happened over time as corrosion had become evident on the strut.

3.2.3 The wind direction was a head wind of 14 knots. No wind gusts were reported on the day. Therefore, the weather may not have played a factor in the incident.

3.2.4 The Sling 2 aircraft type has had in excess of 12 nose gear collapses in the past 5 years (See appendix E for photos of previous incidents)

Figure 1: A view of the collapsed nose gear (source: C Coetzee)

Figure 2: The aircraft as it came to rest on the runway (source: C Coetzee)

4. PROBABLE CAUSE

Due to weakening of the nose gear strut over time, a possible excessive force applied to the gear on touch down caused the nose gear strut to bend backward and collapse.

5. REFERENCES USED ON THE REPORT

5.1 South African Civil Aviation Regulations, 2011

5.2 Sling 2 Maintenance Manual

5.3 Sling 2 Pilot's Operating Handbook

6. SAFETY RECOMMENDATION

Safety message: It is recommended that operators of the Sling 2 aircraft carry out more frequent inspections on the nose landing gear strut for signs of distortion or damage. This is more pertinent to operators especially in the training environment who carry out a large amount of cycles between maintenance inspections.

7. ORGANISATION

None

8. TYPE OF SAFETY ACTION

None

9. SAFETY MESSAGE

None

10. APPENDICES

10.1 Appendix A (SA Civil Aviation Regulations extract for expired medical certificates)
10.2 Appendix B (SA Civil Aviation Regulations extract for payment of currency fees)
10.3 Appendix C (Sling AMM Nose gear breakdown)
10.4 Appendix D (ZU-WCG nose gear strut damage)
10.5 Appendix E (Other Sling two aircraft nose gear collapses)

(3) An air traffic service personnel member who holds a valid Class 3 medical certificate shall be deemed to hold a valid Class 4 medical certificate.

(4) Upon expiry of a Class 1 medical certificate, such medical certificate shall be deemed to be valid for the remainder of the period for which it would have been valid as a Class 2 medical certificate and a Class 4 medical certificate as specified in regulation 67.00.6.

(5) Upon expiry of a Class 3 medical certificate such medical certificate shall be deemed to be valid for the remainder of the period for which it would have been valid as a Class 4 medical certificate as specified in regulation 67.00.6.

(6) The medical requirements and standards to be complied with by an applicant for, or the holder of, a Class 1, 2, 3 or 4 medical certificate are as prescribed in Document SA-CATS 67.

Functions of Director regarding medical examinations

67.00.3 (1) The Director must –

(a) exercise control over medical examinations or tests and over aviation medical examiners performing such examinations or tests;
(b) determine standards for such examinations or tests and for the training of such aviation medical examiners;
(c) issue or amend medical certificates and keep all books or documents regarding such examinations or tests;
(d) apply basic safety management principles to the medical assessment process of licence holders by *inter alia*:

(i) routinely collecting and analysing medical findings during medical assessments to identify areas of increased medical risk;
(ii) continuously re-evaluating the medical assessment process to concentrate on identified areas of increased medical risk;
(iii) routinely collecting and analysing incapacitation in-flight and on active duty; and
(iv) ensuring that accredited medical conclusions are reached.

(2) The Director may designate a body or institution to –

(a) exercise control over medical examinations or tests and over aviation medical examiners performing such examinations or tests;
(b) determine standards for such examinations or tests and for the training of such aviation medical examiners;
(c) issue or amend medical certificates and keep all books or documents regarding such examinations or tests; and
(d) subject to the provisions of regulation 67.00.9, advise the Director on any matter connected with such examinations, tests or aviation medical examiners and on the training of flight crew and cabin crew in first aid.

(3) The designation referred to in sub-regulation (2) shall be made in writing and shall be published in the Gazette within 30 days from the date of such designation.

(2) The register must contain the following particulars, which must be recorded immediately upon issuing the licence or rating or validation –

(a) the full name of the holder of the licence;
(b) date of birth;
(c) the postal and residential address of the holder of the licence;
(d) the date on which the licence was issued or validated;
(e) particulars of the ratings held by the holder of the licence; and
(f) the nationality of the holder of the licence.

(3) A licence holder must notify the Director within 14 days of any change of the particulars referred to in sub-regulation (2).

(4) Any person may obtain a copy of the register upon payment of the fee as prescribed in Part 187: Provided that postal and residential addresses may not be divulged to third parties, except if otherwise directed by the court of law.

Training for acquiring licence, rating or validation

61.01.15 (1) Training for the purpose of acquiring a licence, rating or validation as required by this Part, may only be provided by the holder of an ATO approval issued in terms of Part 141 and under the provisions set out in Document SA-CATS 61.

(2) For training towards the issue of a pilot licence to be recognised as integrated training, such training must be conducted in accordance with an approved training course, meeting the conditions, requirements, rules, procedures and standards as prescribed in Appendix 3.0 to Document SA-CATS 61–CPL/IR(A)/ATPL(A) Integrated Course.

Payment of currency fee

61.01.16 (1) (a) The holder of a pilot licence must pay the annual currency fee as prescribed in Part 187 on or before the anniversary date of the licence.

(b) The privileges of the licence may not be exercised in the succeeding year unless all outstanding fees are paid in full.

(2) The payment must, where applicable, be accompanied by the annual summary as prescribed by regulation 61.01.5(9).

Approval of flight simulation training devices

61.01.17 (1) The approvals for FSTD must be issued based on the criteria set out in Document SA-CATS 61.

(2) The Director must issue a registration designator for each approved FSTD.

the AIRPLANE factory

4.4.2 NOSE GEAR

Refer to Figure 38. Refer to paragraph 1.7.

The nose gear strut is attached to the engine mount (1) with two guide brackets (2). A circular spring (3) provides suspension. The steel strut attaches to a conventional U-shaped fork (4) supporting an axle bolt (5). The front wheel (6) is not fitted with a braking mechanism. Steering motion is transmitted from the rudder pedal control horns through two adjustable pushrods attached to the nose gear strut by means of two control horns. Ease of steering movement (both on the ground and in the air) is ensured through the use of three needle roller bearings on the weight bearing surfaces of the strut.

A wheel fairing (7) rounds off the nose gear assembly.

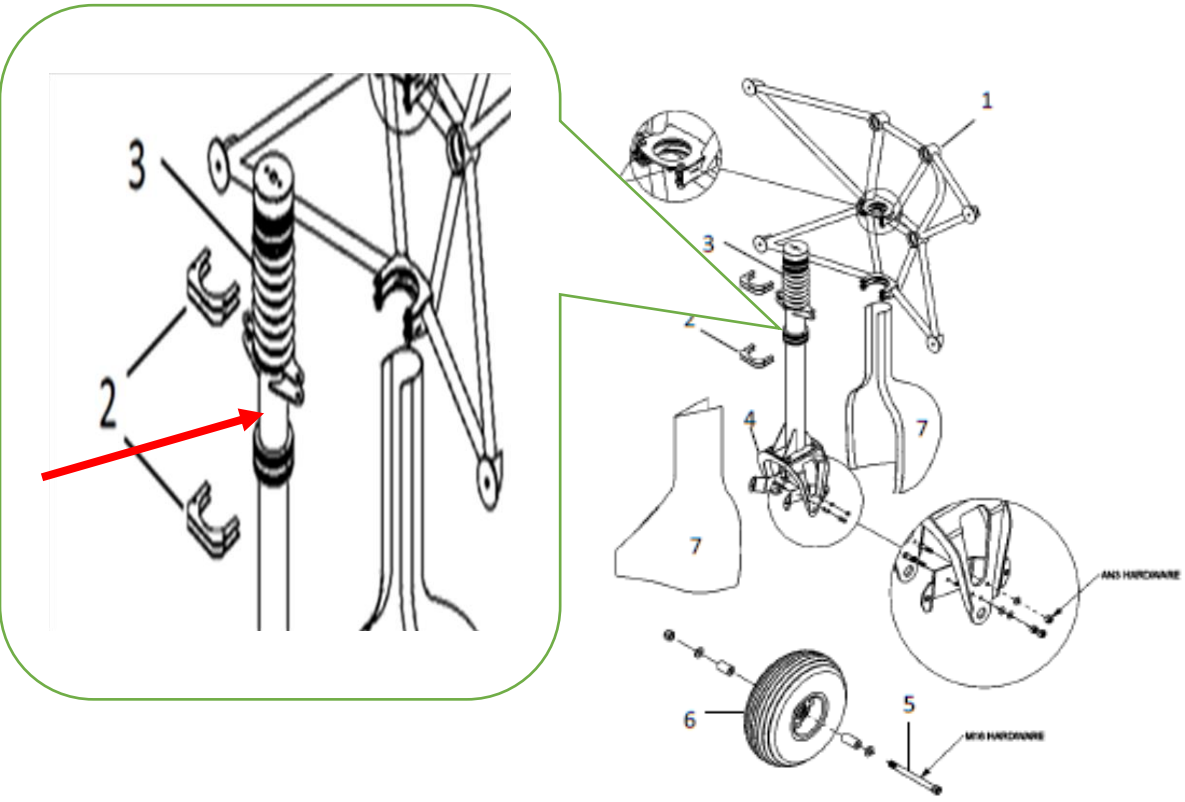
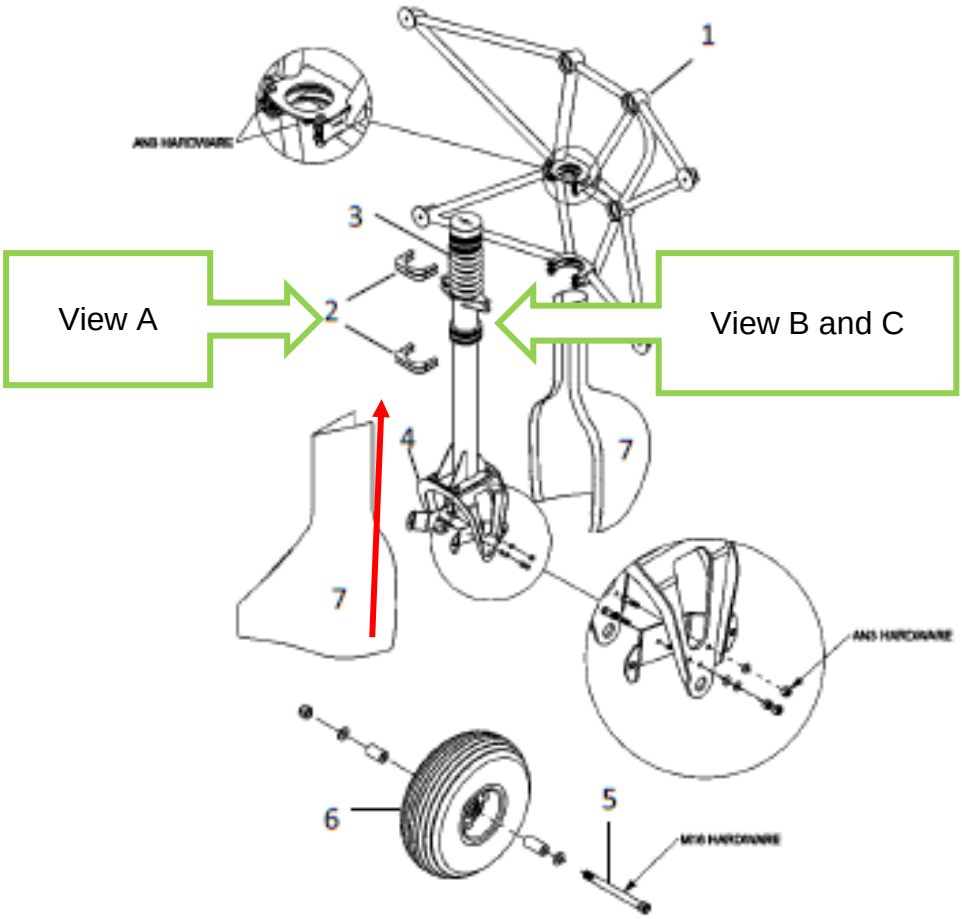


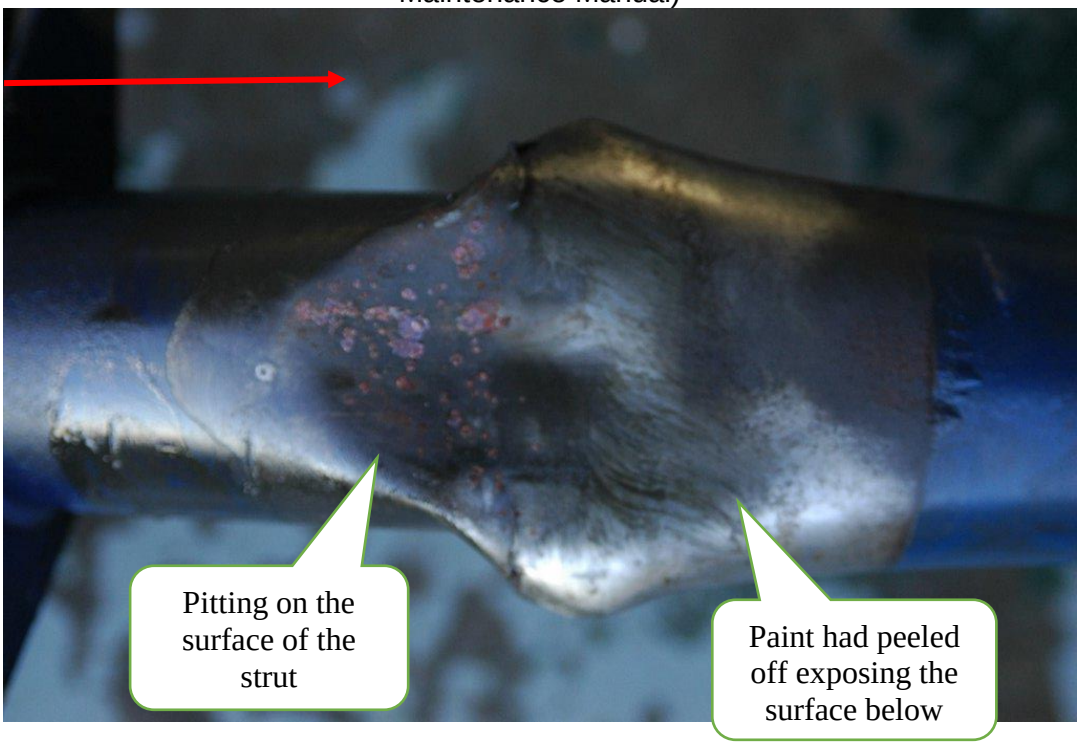
Figure 38: Nose gear.

(The red arrow depicts the approximate position of the nose gear damage) (Source: Sling 2 Maintenance Manual)

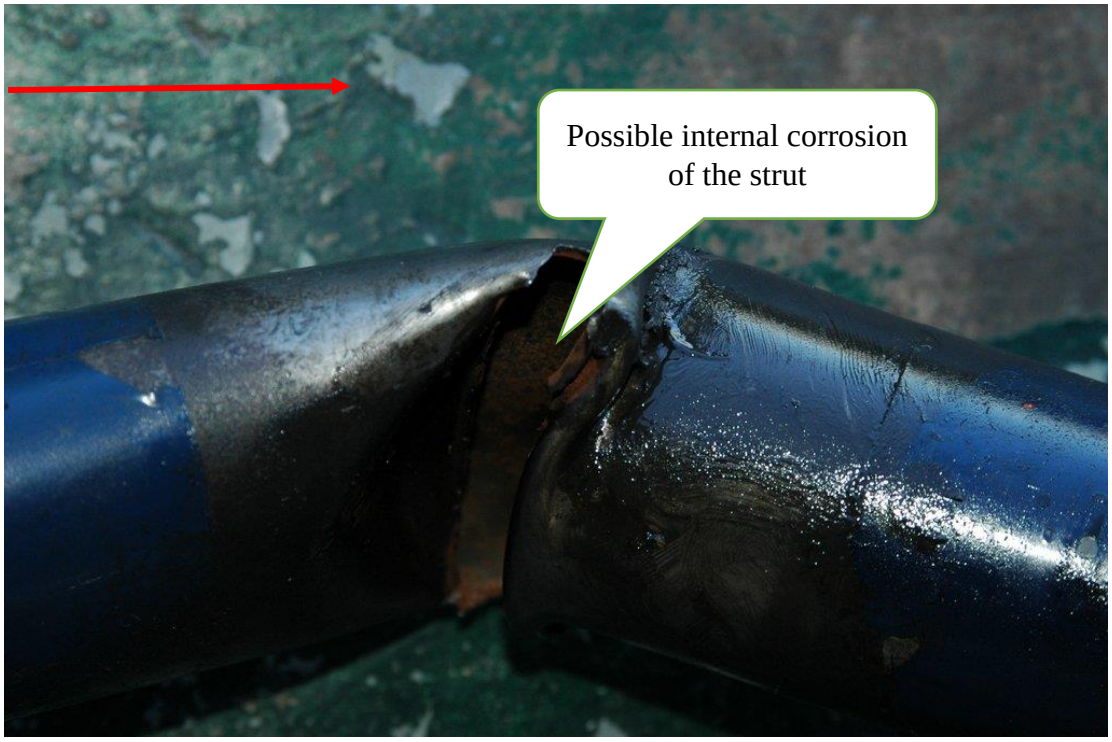
APPENDIX D



The direction of the images below, the red arrow points from bottom to top (Source: Sling 2 Maintenance Manual)



View A (Source: T Meyer)



View B (before the strut was straightened) (Source: T Meyer)

View C (After the strut was straightened) (Source: T Meyer)

Appendix E: Sling two aircraft that have experienced a nose gear collapse

Registration: ZU-FZF

Registration: ZU-WMM

Registration: ZU-IAE

Registration: ZU-FUS

Registration: ZU-FVW

Registration: ZU-FYR

Registration: ZU-FYP

Registration: ZU-FUS

Registration: ZU-IAE