SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-57

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10356						
Classification	Accident	**Date**	02 August 2023		**Time**	1115Z	
Type of Operation	Private (Part 94)						
Location							
Place of Departure	Ceres Airfield (FACE), Western Cape Province	Place of Intended Landing	Robertson Airfield (FARS), Western Cape Province.				
Place of Occurrence	On Runway 28 at Robertson Airfield, Western Cape Province						
GPS Co-ordinates	Latitude	33º48.65' S	Longitude	019º54.60' E	Elevation	640 ft	
Aircraft Information							
Registration	ZU-ELZ						
Make; Model; S/N	Flight Design GMBH, CTSW (Serial number: 07-01-12)						
Damage to Aircraft	Substantial		Total Aircraft Hours	858			
Pilot-in-command							
Licence Type	National Pilot Licence (NPL)		Gender	Male	Age	62	
Licence Valid	Yes	Total Hours	1 380	Total Hours on Type	1 380		
Total Hours 30 Days	1.2	Total Flying on Type Past 90 Days	39				
People On-board	1+0	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0

What Happened

On Wednesday, 2 August 2023, a pilot on-board a Flight Design CTSW light aircraft with registration ZU-ELZ took off on a private flight from Ceres (FACE) Aerodrome to Robertson (FARS) Aerodrome, both in the Western Cape province. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot reported that he conducted a pre-flight check on the aircraft and no anomalies were noted. The flight from FACE to FARS was uneventful, however, during the landing roll on Runway (RWY) 28, the right main landing gear strut failed. The aircraft veered off to the right of the runway before it stopped in a bushy terrain. The aircraft sustained damage to the right main landing gear and the right-wing tip. The pilot disembarked from the aircraft without having sustained injuries.

Post-accident inspection of the aircraft by the approved person (AP) on 10 August 2023 uncovered the following:

The right main gear strut revealed a severe subsurface crack which propagated undetected on the one side of the strut with signs of discolouration on the two metal halves at the lower bolt attachment area. The crack went undetected during the periodic inspections, consequently causing the right main gear strut to break off during the landing roll due to overloading.

Figure 1: The ZU-ELZ aircraft at the accident site. (Source: Operator)

Figure 2: The two halves of the main landing gear connect at the lower attachment.

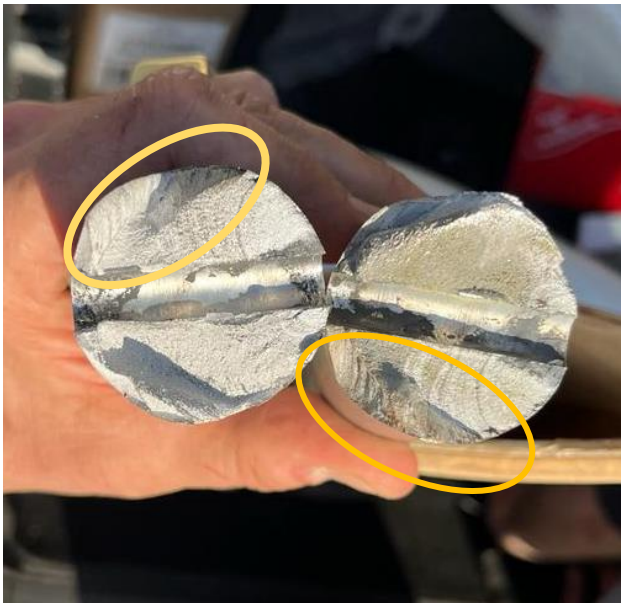
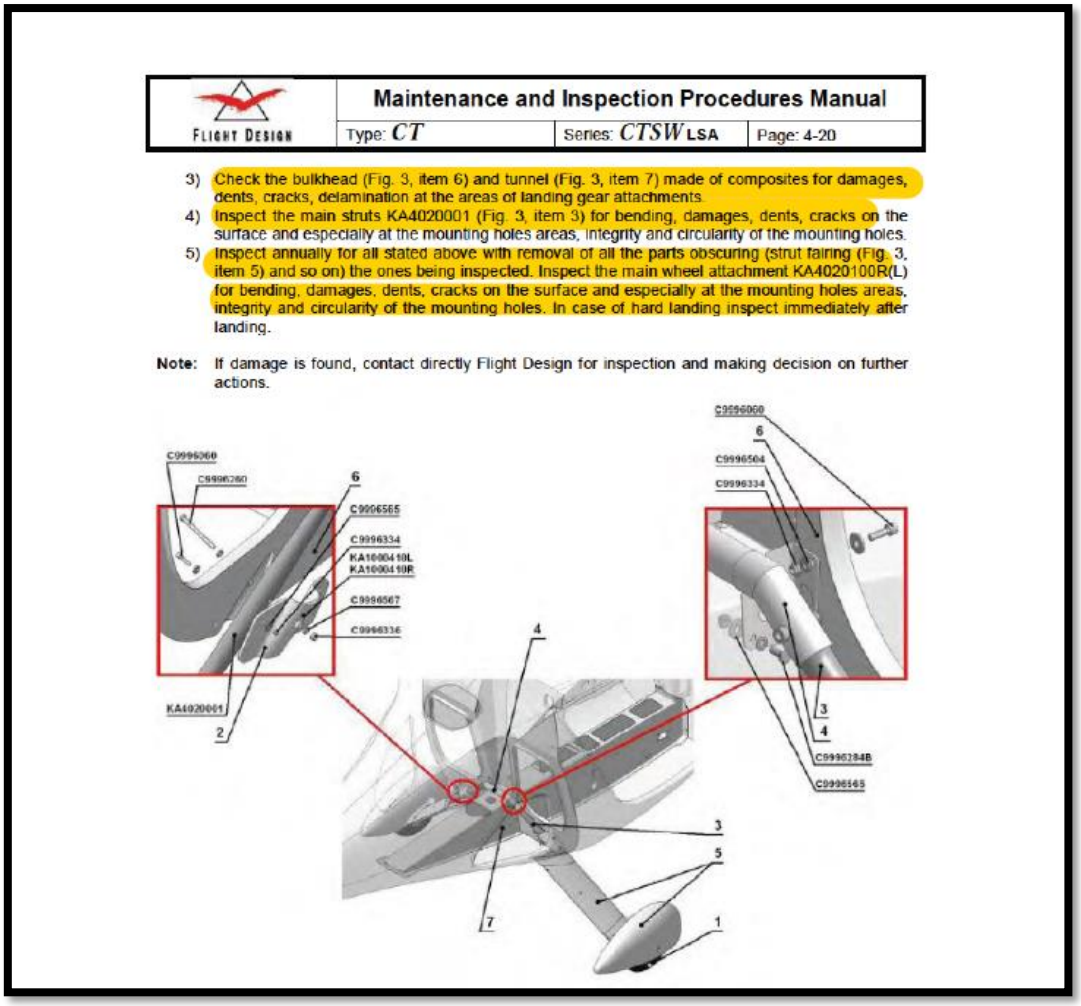


Figure 3: The right main landing strut that broke off during the landing roll. **Figure 4:** The yellow circles indicate a fatigue surface area which was not detected during maintenance. (Source: Operator)



FLIGHT DESIGN | Maintenance and Inspection Procedures Manual | Type: CT | Series: CTSW LSA | Page: 4-20

3) Check the bulkhead (Fig. 3, item 6) and tunnel (Fig. 3, item 7) made of composites for damages, dents, cracks, delamination at the areas of landing gear attachments.
4) Inspect the main struts KA4020001 (Fig. 3, item 3) for bending, damages, dents, cracks on the surface and especially at the mounting holes areas, integrity and circularity of the mounting holes.
5) Inspect annually for all stated above with removal of all the parts obscuring (strut fairing (Fig. 3, item 5) and so on) the ones being inspected. Inspect the main wheel attachment KA4020100R(L) for bending, damages, dents, cracks on the surface and especially at the mounting holes areas, integrity and circularity of the mounting holes. In case of hard landing inspect immediately after landing.

Note: If damage is found, contact directly Flight Design for inspection and making decision on further actions.

Figure 5: Schematic layout of the main landing gear. (Source: Operator)

3.9 Cabin and Baggage Compartment

CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
and general condition.			
Reinstall instrument panels. Check security of attachment and condition.			Owner/Pilot
Rudder pedals. Inspect for security, cracks, and play. Lubricate pedals PVC supports.			RLSA-M
Parking brake valve. Inspect for security of mounting and signs of leakage.			RLSA-M
Main Bulkhead. Inspect for cracks, dents, and debonding from the fuselage.			RLSA-M
Main landing gear attachment. Inspect for cracks, debonding and security of hardware.			RLSA-M

Figure 6: Inspection procedure. (Source: Operator)

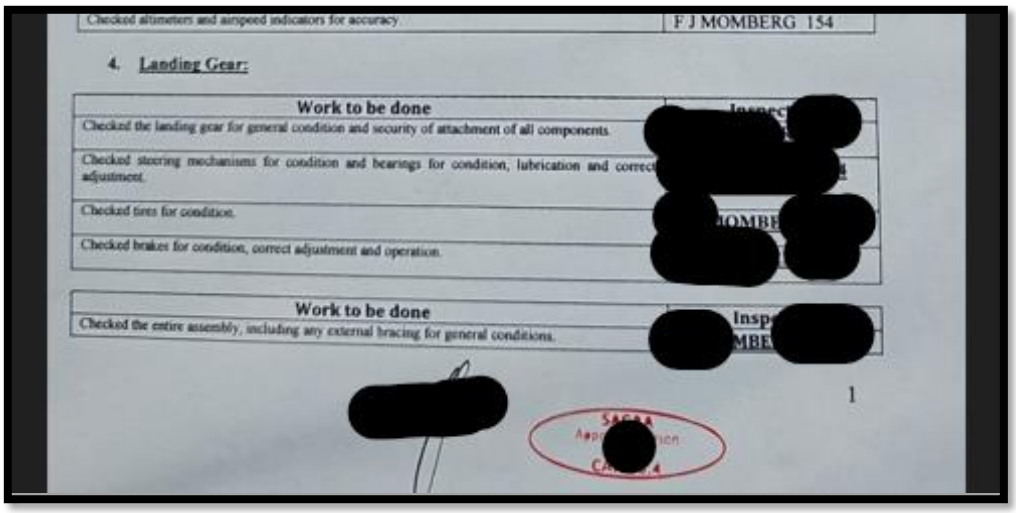
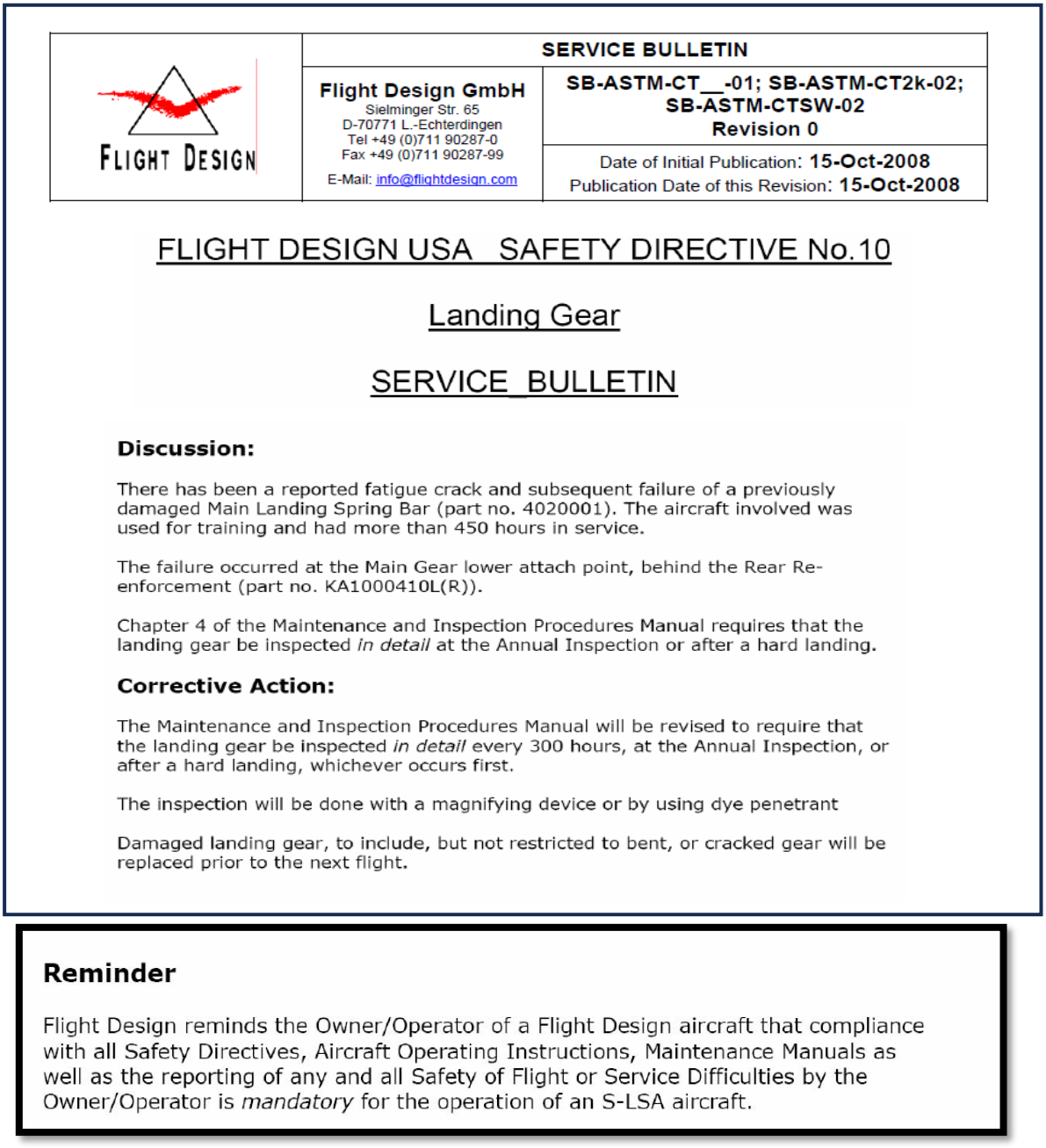


Figure 7: Maintenance requirements as per the manufacturer's checklist and in accordance with SA-CATS 44.01.06 & 44.01.16 (Source: Operator)



	SERVICE BULLETIN	
FLIGHT DESIGN	**Flight Design GmbH** Sielminger Str. 65 D-70771 L.-Echterdingen Tel +49 (0)711 90287-0 Fax +49 (0)711 90287-99 E-Mail: info@flightdesign.com	**SB-ASTM-CT__-01; SB-ASTM-CT2k-02; SB-ASTM-CTSW-02** **Revision 0** Date of Initial Publication: **15-Oct-2008** Publication Date of this Revision: **15-Oct-2008**

FLIGHT DESIGN USA SAFETY DIRECTIVE No.10

Landing Gear

SERVICE BULLETIN

Discussion:

There has been a reported fatigue crack and subsequent failure of a previously damaged Main Landing Spring Bar (part no. 4020001). The aircraft involved was used for training and had more than 450 hours in service.

The failure occurred at the Main Gear lower attach point, behind the Rear Re-enforcement (part no. KA1000410L(R)).

Chapter 4 of the Maintenance and Inspection Procedures Manual requires that the landing gear be inspected *in detail* at the Annual Inspection or after a hard landing.

Corrective Action:

The Maintenance and Inspection Procedures Manual will be revised to require that the landing gear be inspected *in detail* every 300 hours, at the Annual Inspection, or after a hard landing, whichever occurs first.

The inspection will be done with a magnifying device or by using dye penetrant

Damaged landing gear, to include, but not restricted to bent, or cracked gear will be replaced prior to the next flight.

Reminder

Flight Design reminds the Owner/Operator of a Flight Design aircraft that compliance with all Safety Directives, Aircraft Operating Instructions, Maintenance Manuals as well as the reporting of any and all Safety of Flight or Service Difficulties by the Owner/Operator is *mandatory* for the operation of an S-LSA aircraft.

Figure 8: The Service Bulletin issued by the operator on 15 October 2008.

Periodic and other inspections (Source: SA Civil Aviation Technical Standards)

44.01.7

(1) In addition to the annual inspection, referred to in regulation 44.01.6, the Director or the organisation designated for the purpose in terms of part 149, as the case may be, may prescribe additional periodic inspections for non-type certificated aircraft depending on the type of aircraft and its intended use.

(2) A schedule, reflecting the periodic inspections prescribed in sub regulation (1) shall be incorporated in the accepted maintenance schedule, referred to in regulation 44.02.1 or regulation 44.03.1, as applicable.

(3) In addition to the periodic inspections, referred to in sub regulation (1), the Director or the organisation designated for the purpose in terms of part 149, as the case may be, may prescribe, by way of a Mandatory Airworthiness Notice, any additional inspection of a non-type certificated aircraft if considered necessary in the interest of safety.

44.01.2

LOGBOOKS

(1)

The approved logbook makes provision for the recording of:

(e) compliance with airworthiness directives or safety directives, as applicable.

(f) compliance with service bulletins, service letters and similar documents, as applicable.

Findings

1. The pilot was initially issued a National Pilot Licence (NPL) on 29 July 2014. The licence was reissued on 24 January 2022 with an expiry date of 23 January 2024.

2. The pilot's Class 2 medical certificate was issued on 11 January 2023 with an expiry date of 11 January 2024 with a restriction to wear suitable corrective lenses.

3. The aircraft's last annual inspection was conducted on 30 June 2023 at 845.4 airframe hours, after which a Certificate of Release to Service (CRS) was issued with an expiry date of 1 June 2024 or at 880.0 hours, whichever comes first. No hard landings were recorded on the flight folio pages 807/808 or last page 809. These pages are dated from 9 October 2021 to 2 August 2023.

4. The Aircraft's Authority to Fly certificate was originally issued on 15 June 2019. It was renewed on 6 June 2023 with an expiry date of 30 June 2024.

5. The Certificate of Registration (C of R) was issued to the present owner on 4 April 2007.

6. Figure 6 indicated that the landing gear strut should be inspected for cracks, signs of delamination/debonding and security hardware.

7. Figure 7 indicated that the AP followed the manufacturer's maintenance requirements as outlined on Figure 6, but not the Service Bulletin that was issued on 15 October 2008 which dictated that the bracelet be removed to allow proper inspection on the area where the fatigue crack originated. This was not in line with South African Civil Aviation Technical Standards (SA-CATS) Part 44.01.2 (1 e and f) requirements. There were no records found that the dye penetrant inspection was conducted during the annual inspection.

8. It is required that the Service Bulletin be complied with at every 300 hours. The aircraft had accumulated 858 airframe hours. During that period, it should have been inspected twice had the SB been complied with.

9. The weather did not have a bearing to this accident: FACT 021100Z VRB01KT CAVOK 20/05 Q1026 NOSIG=

Probable Cause(s)

The right main landing gear failed during the landing roll due to a fatigue crack that may have been caused by galvanic corrosion at the main landing gear lower attachment point, which caused the aircraft to veer off to the right of the runway.

Contributing Factor(s)

- The AP failed to adhere to the Service Bulletin which resulted in the failure of the landing gear during the landing roll.
- The absence of a detail in landing gear inspection at 100-hour maintenance procedure manual.

Safety Action(s)

None.

Safety Message

In the interest of safety, AP and owners of aircraft are urged to always adhere and follow approved maintenance schedule as stipulated in the technical standards and maintain constant monitoring of published SB and ADs to ensure safe maintenance practises.

The AP responsible for the maintenance had released the aircraft with SB-ASTM-CTSW-02 not being complied with. The SACAA inspection team renewed the Authority to Fly as prescribed by SA CAR and SA-CATS 44.01.2 without proof of compliance. It is recommended to the Director of Civil Aviation (DCA) to consider reviewing their internal processes of verifying and validating the aircraft airworthiness prior to the issuance of the renewed Authority to Fly.

About this Report

The decision to conduct a limited investigation is based on factors including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation and that will determine the scope of an investigation. For this occurrence, a limited investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this limited report. The report has been compiled using information supplied in the initial notification, as well as from follow-up desk top enquiries to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar occurrence.

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

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and not to apportion blame or liability.

Disclaimer
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This report is issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa