SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED ACCIDENT INVESTIGATION REPORT

Reference Number	CA18/3/2/10127								
Classification	Accident	**Date**	26 February 2022	**Time**	1530Z				
Type of Operation	Private (Part 94)								
Location									
Place of Departure	New Tempe Aerodrome (FATP), Free State Province	Place of Intended Landing	New Tempe Aerodrome (FATP), Free State Province						
Place of Accident	FATP Runway 01								
GPS Co-ordinates	Latitude	S 29°2'44.81"	Longitude	E 26°9'36.90"	Altitude	4441.6 feet (ft)			
Aircraft Information									
Registration	ZU-FAS (Serial Number: CH029)								
Model/Make	Cheetah, Rainbow Aircraft (Pty) Ltd								
Damage to Aircraft	Substantial	Total Aircraft Hours	812.2						
Pilot-in-command									
Licence Type	National Pilot Licence (NPL)	Gender	Male	Age	67				
Licence Valid									
Total Hours on Type	200.6	Total Flying Hours	200.6						
People On-board	1 + 1	Injuries	0	Fatalities	0	Other (on ground)	0		
What Happened									

On 26 February 2022 at 1530Z, a pilot and a passenger on-board a Cheetah aircraft with registration mark ZU-FAS were planning to take-off on a sightseeing flight from New Tempe Aerodrome (FATP) with the intention to land back at the same aerodrome. The flight was planned to be 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 stated that after completing the pre-flight inspections, he back-tracked the aircraft on Runway 01 to perform the run-up checks before departure. The pilot indicated that all the engine indications were normal. He then taxied the aircraft to the holding point where he stopped to prepare for departure. As soon as the pilot applied power to initiate the take-off roll, the nose gear broke off at the fork (Figure 2) and the aircraft's nose pitched down, resulting in the propeller blades striking the ground.

The aircraft sustained substantial damage, however, both occupants were not injured.

What was found:

- According to the approved person (AP), the inspection of the nose gear strut and fork was conducted on 19 April 2021 during an application for an Authority to Fly (ATF). The aircraft had 782.2 airframe hours during the last annual inspection. It was then flown for a further 30 hours after the last inspection (before the accident flight).
- The nose wheel spat or fairing makes it difficult to visually inspect or monitor the metal condition (of the nose gear) during pre-flight inspections.
- The Service Bulletin (Figure 2, bullet point 6) states that "*a visual inspection must be done every 50 normal landings";* and (bullet point number 7) further states that "*an inspection must be done in cases where a hard landing was experienced"*. The pilot admitted to not counting the landings he made on the aircraft, however, he approximated that he did one landing per hour.
- The pilot did not keep a proper record of the landings he made, therefore, this made it hard to determine how many landings had he completed in the last 30 hours before the accident.

Figure 1: The aircraft's nose wheel fork broke off just before the take-off roll.
Inset: The wheel spat/fairing. (Source: Pilot)

1d) Compliance

Immediate compliance:

OLD STYLE front fork

1) Remove the front fork Spat (if installed)
2) Clean the affected area in order to better the inspection
3) Utilising a bright light, inspect the indicated area **see figure 2**
4) If no cracks were found assemble the removed parts
5) Continue further operation
6) Inspect every 50 normal landings (with Spats)
7) Inspect every time with hard landings (with Spats)
8) Include this inspection in your pre-flight if no spats are fitted. This is normally the case with aircraft being utilized as per point 1b

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Figure 2: Cheetah SB 004-08-2011 compliance. (Source: fly-skyreach.com)

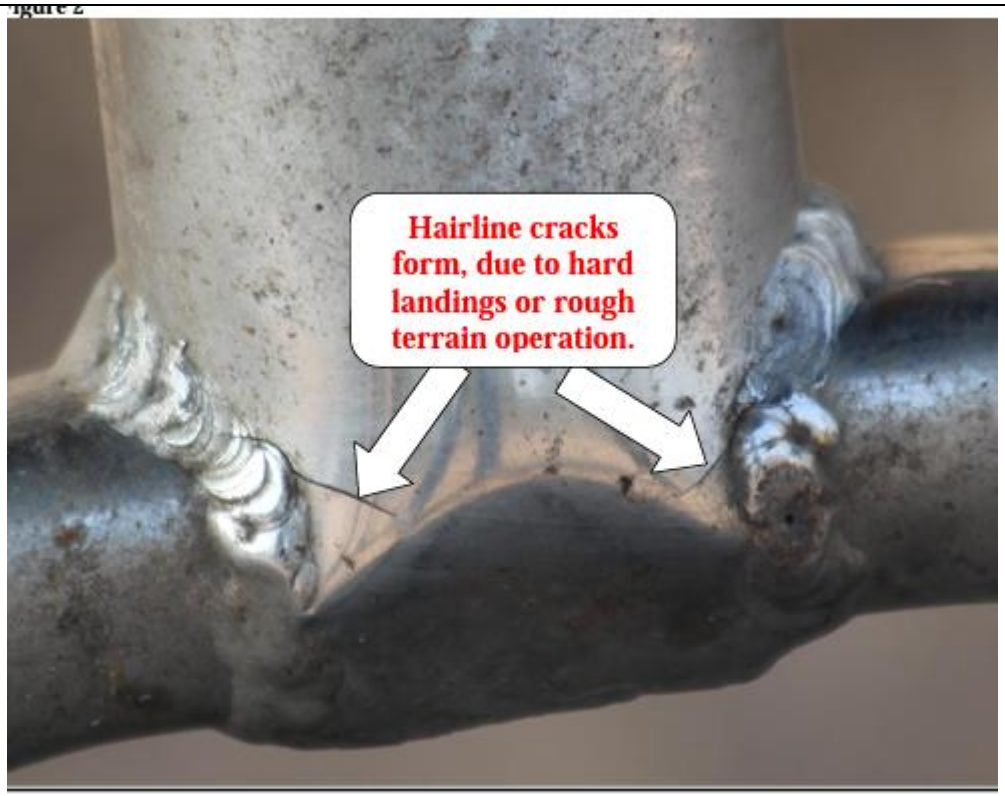

Figure 3: Chetaah SB 004-08-2011 showing hairline cracks. (Source: fly-skyreach.com)

Figure 4: The damage on the nose wheel gear fork. (Source: Owner)

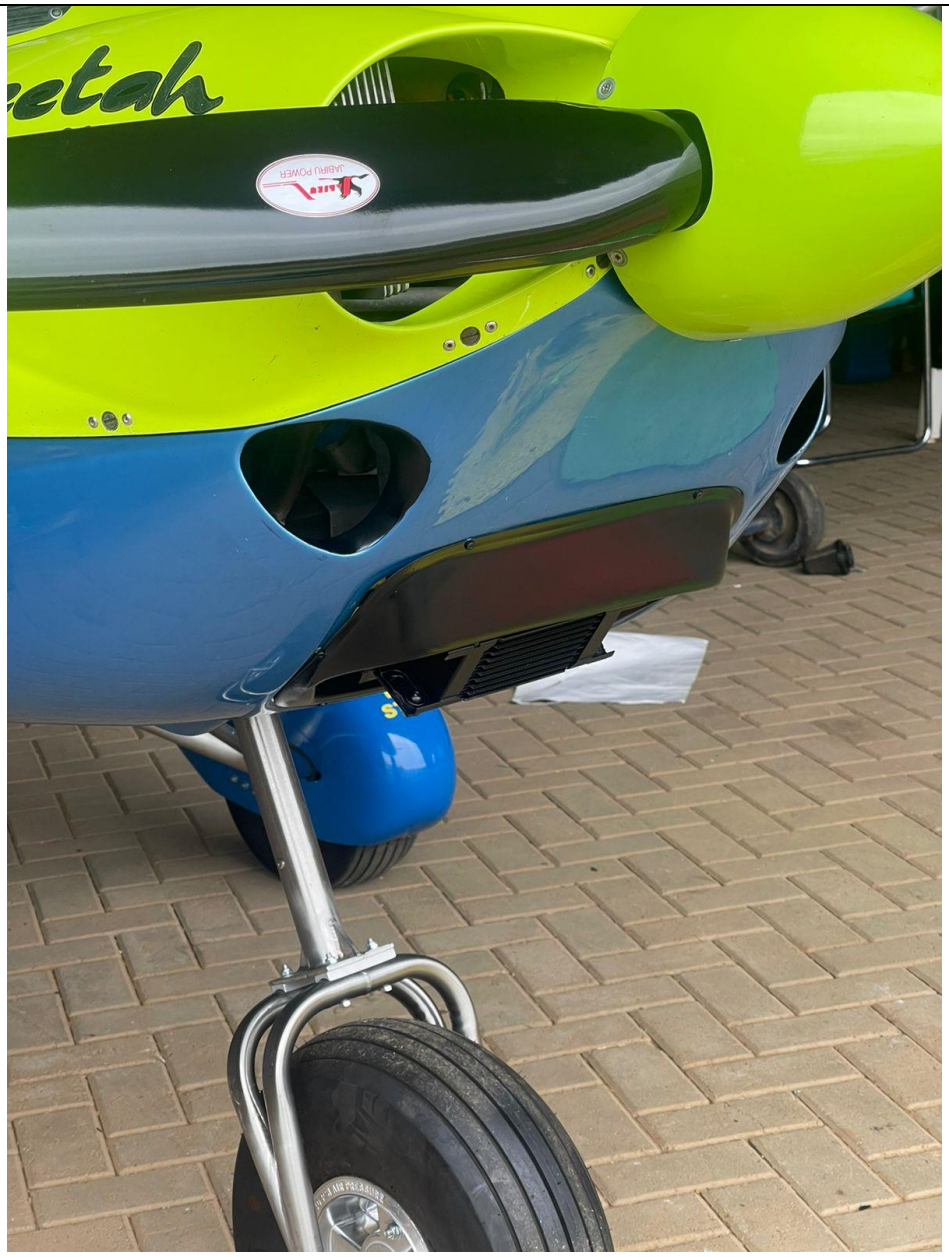

Figure 5: The new nose wheel fork that was installed. (Source: Pilot)

Extract from the Civil Aviation Regulations (CAR) 2011:

24.01.2 Airworthiness

(1) A non-type certificated aircraft, other than an aircraft classified in regulation 24.01.1 (2) (h) to (l), may only be considered to be airworthy if that aircraft has—

(a) been issued with an authority to fly or a proving flight authority or special flight permit, as the case may be in terms of this Part;

(b) been maintained in accordance with the provisions of Part 44;

(c) no known condition which could make it unsafe for flight; and

(d) on board, and in working order, the relevant communication and navigation equipment prescribed

in Parts 94 and 96 as applicable for an operation of a particular type of aircraft.

(2) In the case of—

(a) amateur built aircraft, only those aircraft, of which the build standard has been submitted to the Director, may be built or imported and flown within the Republic: Provided that—

(i) before any person commences with the construction of an aircraft, which is intended to be put on the South African Civil Aircraft Register, such person shall apply for a build number.

*[**Editorial note**: See AIC 60.15 for information regarding application for a building number.]*

(ii) the application shall be made to the Director or the organisation designated for the purpose in terms of the Act, as the case may be, in the format prescribed in Document SA-CATS 24 and shall be accompanied by a copy of the design criteria of the aircraft, as prescribed in Document SA-CATS 24.

(iii) the Director or the organisation designated for the purpose in terms of the Act, as the case may be, shall on receipt of the prescribed documentation issue the build number to the applicant.

(iv) the Director or the organisation designated for the purpose in terms of the Act, as the case may be, must retain a register of build numbers issued and make relevant information available to any authorised officer, inspector or authorised person who needs such information for the purpose of oversight and inspection.

(v) the applicant, on being issued with the build number, shall enter a record of the build number in the aircrafts logbook or any other document associated with the construction of the aircraft.

(b) production built aircraft, only those aircraft, of which the type design, the local or foreign manufacturing organisation and facility, the local assembling organisation and facility or agent/distributor, and the build standard has been approved by the Director may be built or imported and flown within the Republic.

(3) For the purposes of sub-regulation (2), the Director or the organisation designated for the purpose in terms of Part 149, as the case may be, may consider a foreign manufacturing organisation as being approved if that facility was approved by an appropriate authority.

(4) The design criteria and the build standard for an amateur- or production-built aircraft must—

(a) comply with the appropriate design criteria as prescribed in Document SA-CATS 24;

(b) comply with any special conditions prescribed in regulation 24.02.4 or by the Director or the organisation designated for the purpose in terms of Part 149, as the case may be; and

(c) incorporate no feature or characteristic that makes the aircraft type unsafe for its intended use.

(5) In the case of—

(i) amateur built aircraft, static tests, as required, are to be carried out on the aircraft prior to its first flight or after a structural modification, according to Document SA-CATS 24;

(ii) production built aircraft, in the absence of static test documentation from an appropriate authority acceptable to the Director, static tests, as required, are to be carried out on the aircraft prior to its first flight or after a structural modification, according to Document SA-CATS 24.

(6) The airworthiness of the aircraft, classified in subparagraphs (h) to (l) in regulation 24.01.1 (2), shall be the sole responsibility of the owner or operator in accordance with generally accepted practices for such aircraft or as laid down by the organisation, approved for the purpose in terms of Part 149.

(7) An operator of a model aircraft referred to in regulation 21.01.1 shall ensure that such aircraft meets

the general characteristics for model aircraft as prescribed in Document SA-CATS 24 unless otherwise approved by the Director.

44.01.6 Annual inspections

(1) A non-type certificated aircraft, specified in regulation 24.01.1 (1) and classified in paragraphs (a) to (g) of regulation 24.01.1 (2) shall undergo an annual inspection no later than 365 days since the previous annual inspection, or an inspection equivalent to an annual inspection, was carried out.

(2) The items to be inspected as part of an annual inspection are those listed in Document SA-CATS 44 for the particular type of aircraft, and shall be incorporated in the accepted maintenance schedule.

(3) The annual inspection shall be recorded in the aircraft logbook and certified by the organisation or person by whom, or under whose prescribed supervision, the annual inspection was carried out.

(4) Within 30 days from the day that the annual inspection is completed, the annual inspection form, as prescribed in Document SA-CATS 44, shall be completed and forwarded to the Director or the organisation designated for the purpose in terms of part 149, as the case may be, together with the currency fee prescribed in regulation 24.02.8.

(5) The inspection, prior to the issue of a proving flight authority and the inspection prior to the issue or reissuing of an authority to fly of an amateur-built or production-built aircraft, referred to in regulation 24.02.2 (5) (d), shall be carried out by an appropriately rated approved person who may not be the owner of the aircraft, even if the owner is also an appropriately rated approved person.

44.01.7 Periodic and other inspections

(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.

44.01.8 Mandatory maintenance and inspections

All special inspections and modifications prescribed by the Director or the organisation designated for the purpose in terms of part 149, as the case may be, to detect and correct an unsafe condition of a non-type certificated aircraft shall be considered mandatory.

Probable cause:

The nose gear fork failed due to an undetected crack during the last inspection.

Contributing factors:

1. Non-recording of landings by the pilot/s and/or operator.
2. Lack of proper maintenance inspection as per the manufacturer's SB.
3. Non-adherence to the 50 landings maintenance inspection as per the manufacturer's SB.

Safety Action

The owner of the aircraft has since fitted a new nose wheel fork from the aircraft's manufacturer (see Figure 5).

Safety Message and Safety Recommendations

Safety message:

- Pilots and operators must always adhere to the maintenance requirements by the manufacturer, as well as abide by the regulations.

Safety recommendations:

- It is recommended that the nose wheel spat on these aircraft be permanently removed; this would enable pilots to conduct proper pre-flight inspections in the nose wheel strut/fork assembly area, which is known to be susceptible to cracks and possible failure.
- It is recommended that the manufacturer considers redesigning the nose wheel strut/fork assembly by making use of durable material as the current strut/fork assembly material appears to be weak for the type of operation.

Purpose of the Investigation

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, 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****.*

About this Report

Decisions regarding whether to investigate, and the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, no 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 brief report. The report has been compiled using information supplied in the initial notification, as well as follow-up information 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 accident.

This report provides an opportunity to share safety message/s in the absence of an investigation.

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.

Disclaimer

This report is issued by:

Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa