SOUTH AFRICAN CIVIL AVIATION AUTHORITY

*Section/division* **Accident and Incident Investigations Division** Form Number: CA 12-40

# AIRCRAFT ACCIDENT SHORT REPORT

**CA18/2/3/9864:** The left main landing gear axle failed and separated from the aircraft during the landing roll.

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| **Date and time** | : | 30 January 2020, 1500Z |
| **Aircraft registration** | : | ZU-BEA |
| **Aircraft manufacturer and model** | : | Kit Planes for Africa, Bush-Baby |
| **Last point of departure** | : | Plot 49 Klerksdorp, North West Province |
| **Next point of intended landing** | : | Plot 49 Klerksdorp, North West Province |
| **Location of incident site with reference to easily defined geographical points (GPS readings if possible)** | : | S26°49'31.21" E026°34'06.14", at an elevation of 4455 ft AMSL. |
| **Meteorological information** | : | Wind: 330°/03 kt, Temperature 23°C, CAVOK |
| **Type of operation** | : | Private (Part 94) |
| **Persons on-board** | : | 1 + 1 |
| **Injuries** | : | Minor |
| **Damage to aircraft** | : | Substantial |

*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 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:**

**SYNOPSIS**

1.1. On 30 January 2020 at approximately 1400Z, the pilot and the passenger on-board a Bush-Baby aircraft with registration mark ZU-BEA departed Plot 49 Airstrip in Klerksdorp on a private flight to show the passenger some animals on the farm, and thereafter, return to the same airstrip. The flight was conducted under the provisions of Part 94 of the South African Civil Aviation Regulations (CAR) 2011 as amended. The entire segment of the flight was uneventful, and the aircraft was routed back to the airstrip after an hour.

1.2. The pilot reported that after touch down during the landing roll, the left-hand main landing gear axle broke off inside the wheel bearing area. As a result, the gear strut dug into the ground and the aircraft nosed over, coming to rest in an inverted position.

1.3. The aircraft was substantially damaged, and the pilot and the passenger sustained minor injuries.

1.4. The investigation revealed that the left-hand main landing gear axle failed due to fatigue possibly caused by a pre-existing crack on the wheel assembly in-board bearing area.

1.5. The failure could be attributed to a possibility that over time, the main landing gear axle could have been exposed to hard landings, which may have resulted in the overstress fracture of the left-hand main landing gear axle and, hence, the subsequent separation of the left main landing gear axle.

## 2. FACTUAL INFORMATION

2.1. On 30 January 2020 at approximately 1400Z, the pilot and a passenger on-board the Bush-Baby aircraft with registration mark ZU-BEA departed Plot 49 Airstrip in Klerksdorp on a private flight with the intention to show the passenger animals on the farm. The intention was to return to the same airstrip. The flight was conducted in visual meteorological conditions (VMC) by day with fine weather conditions prevailing at the time. The flight was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended. The entire segment of the flight was uneventful, and the aircraft was routed back to the airstrip at approximately 1500Z.

2.2. The pilot reported that after touch down, during the landing roll on Runway 36, the left-hand main landing gear axle broke off on the in-board wheel bearing area. As a result, the left gear strut dug into the ground and the aircraft nosed over, coming to rest in an inverted position. The aircraft was substantially damaged, and the pilot and the passenger sustained minor injuries.

2.3. Post-accident inspection of the left gear showed a pre-crack condition on the in-board wheel bearing area where the failure had occurred (see Figure 2).

2.4. The aircraft's last inspection was a 50-hour inspection which was carried out on 6 August 2019 at 576.6 hours. The aircraft flew 5.9 hours since the last 50-hour inspection and had accumulated a total of 582.5 hours at the time of the accident. The aircraft was issued a Certificate of Release to Service (CRS) on 6 August 2019 at 576.6 hours with an expiry date of 6 August 2020 or at 626.6 hours, whichever occurs first.


**Figure 1**: The aircraft at the accident site post-accident. (Source: Pilot)

2.5. Figure 2 shows a pre-crack condition on the in-board wheel bearing area indicating that there was an existing crack which may have resulted from previous hard landings.

2.6. According to the approved person (AP) who maintains the aircraft, there was no non-destructive testing (NDT) carried out on the axles prior to the accident and none was recorded in the airframe logbook. According to the aircraft's maintenance plan, there was no NDT required as this aircraft was registered in the Experimental Aircraft Category in terms of Part 24 of the Civil Aviation Regulations (CAR) 2011 as amended, (Civil Aviation Technical Standard, as well as Part 96). According to the reviewed records, the axles were never replaced since new and the aircraft had flown a total of 582.5 airframe hours, including this accident.

2.7. According to the logbook, new brakes were installed on 10 August 2018. The AP stated that both wheels were removed to enable access to the brake callipers for pad replacement, one at a time. The axles could be removed from the landing gear fitment point for inspection. The axles were removed, cleaned and checked for any possible damage to the surface, cracks or possible bending, among others. No evidence of such anomalies was found during inspection and brake pad replacement process.

2.8. The axle pre-existing crack (Figure 2) could have occurred from previous hard landings. The pilot is responsible for reporting and recording hard landings so that the aircraft can be inspected for any possible damage. The AP reported that he was not aware of an existing crack.


**Figure 2:** Pre-crack condition on the in-board wheel bearing area. (Source: AP)

2.9. The manufacturer reported that they had researched the history of the aircraft and uncovered that it was supplied in 1997 as a kit for amateur assembly. There is no further information on the aircraft. According to the manufacturer, the individual aircraft builders could, previously,

install their own wheel and brake system and (the manufacturer) could not confirm whether the batch was a Kitplanes for Africa (KFA) product or an individually (home) built plan. The aircraft was not affected by any of the KFA Service Bulletins (SB) as outlined on the website http://kitplanesforafrica.co.za/Pages/Technical.asp

2.10. The accident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be S26°49'31.21" E026°34'06.14", at an elevation of 4455 feet above mean sea level (AMSL).

## 3. FINDINGS

3.1. The pilot was initially issued a National Pilot Licence (NPL) on 15 January 2007 and the aircraft type was endorsed on his licence. The pilot's skills test was carried out on 12 October 2019 and the licence was reissued on 17 October 2019 with an expiry date of 11 October 2021. The pilot had accumulated a total of 198.8 flying hours at the time of the accident, of which 10.4 hours were on the aircraft type.

3.2. The pilot was issued a Class 4 medical certificate on 21 July 2018 with an expiry date of 31 July 2020. The medical certificate was issued with a restriction to wear corrective lenses.

3.3. The aircraft was issued a certificate of release to service on 6 August 2019 with an expiry date of 6 August 2020 or at 626.6 hours, whichever occurs first. The last maintenance check carried out was a 50 hours inspection on 6 August 2019 at 576.6 hours. The aircraft had flown a further 5.9 hours since its last annual inspection and had accumulated a total of 582.5 hours including the accident flight.

3.4. The aircraft was issued an Authority to Fly (ATF) certificate on 8 August 2019 with an expiry date of 31 August 2020.

3.5. The aircraft was issued a Certificate of Registration to the current owner on 12 May 2017.

3.6. According to the aircraft logbooks, there was no NDT done on the axles prior to the accident and there was no requirement for it as per the regulations for experimental aircraft. According to the reviewed records, the axles were never replaced since new and the aircraft had flown a total of 582.5 airframe hours including the accident flight.

3.7. There were no faults recorded in the aircraft's flight folio prior to the flight. The manufacturer reported that they had researched the history of the aircraft and it was uncovered that the aircraft was supplied in 1997 as a kit for amateur assembly. There is no further information on the aircraft. According to the manufacturer, individual aircraft builders in the past could install their own wheel and brake system and (the manufacturer) could not confirm whether the batch was a Kitplanes for Africa (KFA) product or an individually built plan.

3.8 . The flight was conducted in visual meteorological conditions (VMC) by day.

3.9. The investigation revealed that the left-hand main landing gear axle failed due to fatigue possibly caused by a pre-existing crack on the wheel assembly in-board bearing area. The failure could be attributed to a possibility that over time, the main landing gear axle could have been exposed to hard landings which may have resulted in the overstress fracture of the left-hand main landing gear axle and, hence, the subsequent separation of the left main landing axle.

## 4. PROBABLE CAUSE

4.1. The investigation revealed that the left-hand landing gear failed due to fatigue possibly caused by a pre-existing crack on the wheel assembly in-board bearing area. The failure could be attributed to a possibility that over time, the main landing gear axle could have been exposed to hard landings which may have resulted in the overstress fracture of the left-hand main landing gear axle and, hence, the subsequent separation of the left main landing axle.

## 5. Contributing factor/s

5.1. None.

## 6. REFERENCES USED ON THE REPORT

6.1 None.

## 7. SAFETY RECOMMENDATION

7.1. It is recommended to the DCA that the airworthiness division and manufacturer consider investigating the possibility of incorporating non-destructive testing (NDT) on the aircraft axle inspection of experimental aircraft to prevent a similar accident from recurring.

## 8. ORGANISATION

8.1. The flight was operated under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

**This report is issued by:**

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