

PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10378



Figure 1: File picture of ZS-JKE aircraft before it was re-painted in blue stripes. (Source: Safety Pilot)

Description:

On Saturday, 21 October 2023 at 0715Z, a pilot and a safety pilot on-board a Beechcraft Sundowner C23 aircraft with registration ZS-JKE took off on a navigation (cross-country) flight from Bram Fischer International Airport (FABL) in the Free State province, with Wonderboom Airport (FAWB) in Gauteng province as the final destination.

The aircraft took off from Runway 02 and routed north. Whilst on a climb at approximately 350 feet (ft) above ground level (AGL), the engine revolutions per minute (RPM) decreased which caused the engine to run rough. The safety pilot took control of the aircraft from the pilot to execute a forced landing on an open field, but the aircraft lost height rapidly and crashed before it burst into flames. The safety pilot was able to exit the aircraft and was assisted by an eyewitness to a safe distance. However, the eyewitness was unable to rescue the pilot who was still trapped in the aircraft due to the intense post-impact fire.

The pilot was fatally injured, and the safety pilot was seriously injured during the accident. The aircraft was destroyed by post-impact fire.

Occurrence Details

Reference Number : CA18/2/3/10378
Occurrence Category : Category 1
Type of Operation : Private (Part 91)
Name of Operator : 4 AVIATORS
Aircraft Registration : ZS-JKE
Aircraft Make and Model : Beechcraft Sundowner C23
Nationality : South African
Place : 1 kilometre east of Runway 20 threshold at FABL, Free State Province
Date and Time : 21 October 2023 at 0722Z
Injuries : One fatal; one seriously injured
Damage : Destroyed

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.

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.

Investigation Process

The Accident and Incident Investigations Division (AIID) of the South African Civil Aviation Authority (SACAA) was notified of the occurrence involving a Beechcraft C23 aircraft which occurred at Bram Fischer International Airport (FABL) in the Free State province on 21 October 2023 at 0722Z. The occurrence was classified as an accident according to the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) Standards (STD) Annex 13 definitions.

The AIID appointed an investigator-in-charge and a second-in-charge investigator who dispatched to the accident site to conduct a full investigation. The AIID will lead the investigation and issue the final report of this accident in accordance with the CAR 2011 Part 12 and ICAO Annex 13.

The information contained in this preliminary report is derived from the information gathered during the on-going investigation into the occurrence. Later, an interim or final report may contain altered information in case new evidence is found during the on-going investigation that requires changes to the information depicted in this report.

The AIID reports are made available to the public at:

<http://www.caa.co.za/Pages/Accidents%20and%20Incidents/Aircraft-accident-reports.aspx>

Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*

Accident — this investigated accident

Aircraft— the Beechcraft C23 involved in this accident

Investigation — the investigation into the circumstances of this accident

Pilot — the pilot-in-command involved in this accident

Report — this accident report

2. *Photos and figures used in this report were taken from different sources and may have been adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows, or lines.*

Disclaimer

This report is produced without prejudice to the rights of the SACAA, which are reserved.

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Abbreviation	Description
AIID	Accident and Incident Investigations Division
AGL	Above ground level
AMO	Aircraft Maintenance Organisation
ARCC	Airport Rescue and Fire Fighting
ATC	Air Traffic Control
ATO	Aviation Training Organisation
°C	Degrees Celsius
CAR	Civil Aviation Regulations
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
EMS	Emergency Medical Service
FABL	Bram Fischer International Airport
FABW	Karoo Gateway Airport
FACT	Cape Town International Airport
FAEO	Ermelo Aerodrome
FASX	Swellendam Airport
FAWB	Wonderboom Airport
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
kt	Knots
km	Kilometres
m	Metres
METAR	Meteorological Aerodrome Report
MHz	Megahertz
PPL	Private Pilot Licence
RPM	Revolutions per Minute
QNH	Barometric pressure adjusted to sea level
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
UTC	Co-ordinated Universal Time
VMC	Visual Meteorological Conditions
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

- 1.1.1 A safety pilot (with a Commercial Pilot Licence) stated that on Saturday morning, 21 October 2023 at 0605Z, the air traffic control (ATC) tower was not yet manned at Bram Fischer International Airport (FABL) in the Free State province. Together with the pilot, the safety pilot boarded the aircraft, a Beechcraft C23 registered ZS-JKE. The pilot completed the pre-take-off checks and then taxied the aircraft to line up for take-off on Runway 02. During the take-off run, the engine power degraded, and the pair aborted the take-off. They then taxied the aircraft back to the apron and telephoned the technician about their problem. The technician advised them to check the magnetos. Thereafter, the crew contacted ATC on frequency 114.10-Megahertz (MHz) and requested clearance to depart. The ATC officer informed the crew that the tower was still closed and that they could proceed with the unmanned procedure. At approximately 0709Z, the ATC advised the crew to be on the lookout for an inspection vehicle FV2 which was conducting inspections on the airfield grounds.
- 1.1.2 The crew taxied the aircraft to the runway again to perform the pre-take-off run-up checks, and when all parameters were in the green arch, the aircraft was ready for take-off. At 0715Z, the pair took off on a navigation (cross-country) flight from Bram Fischer International Airport (FABL), intending to route to Brandfort Airfield, both in the Free State province, and then proceed to Ermelo Airfield in Mpumalanga province before routing to Wonderboom Airport in Gauteng province. The flight plan was filed for this flight which was to be conducted in visual flight rules (VFR) and under visual meteorological conditions (VMC) by day. The provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended were to be followed.
- 1.1.3 Whilst at a height of 350 feet (ft) above ground level (AGL), the engine ran rough and the revolutions per minute (RPM) decreased to 2 400; thereafter, the aircraft lost height. The safety pilot then took over the control of the aircraft. As there was a developed area ahead of the aircraft's flight path, the safety pilot decided to steer the aircraft to the right to perform a forced landing on the identified open field. The aircraft impacted the ground hard and spun 180° before the post-impact fire ensued on the right side of the aircraft. The fire also ignited the grass around the aircraft, which started a veld fire.
- 1.1.4 According to the eyewitness who was on the gravel road nearby, he saw the left wing drop before the aircraft descended and impacted the ground, followed by the fire that ensued. He stated that the aircraft was approximately 120 metres from his position when it crashed. He ran to help and was able to assist the safety pilot who had managed to crawl out of the aircraft; he found him kneeling on the ground. As the fire was approaching fast towards them, he decided to move him to a safe distance. When he was about to go back for the pilot, the fire had already intensified and, thus, was unable to assist him. Moments later, the Airport Rescue and Fire Fighting (ARFF) personnel arrived at the scene and sprayed foam to extinguish the fire. Upon arrival, the Emergency Medical Service (EMS) personnel attended to the injured occupant. The safety pilot was seriously injured and was transported to a nearby hospital; the pilot was declared deceased on site by the EMS.
- 1.1.5 The aircraft was destroyed by post-impact fire.
- 1.1.6 The accident occurred during daylight on an open field at Bram Fischer International Airport (FABL) at Global Positioning System (GPS) co-ordinates determined to be 29°04'47.98" South 026°18'46.83" East, at an elevation of 4 409 feet (ft).



Figure 2: Aerial view and elevation profile of the crash site. (Source: Google Earth)

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	1	-	-	1	-
Serious	-	1	-	1	-
Minor	-	-	-	-	-
None	-	-	-	-	-
Total	1	1	-	2	-

Note: Other means people on the ground.

1.3. Damage to Aircraft

1.3.1. The aircraft was destroyed by post-impact fire.



Figure 3: The wreckage post-accident.

1.4. Other Damage

1.4.1. None.

1.5. Personnel Information

1.5.1 Pilot-in-Command (PIC)

Nationality	South African	Gender	Male	Age	21
Licence Type	Private Pilot Licence (PPL)				
Licence Valid	Yes	Type Endorsed	No		
Ratings	Night rating				
Medical Expiry Date	31 December 2025				
Restrictions	None				
Previous Accidents	None				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

Flying Experience:

Total Hours	±111.7
Total Past 24 Hours	6.9
Total Past 7 Days	Unknown
Total Past 90 Days	Unknown
Total on Type Past 90 Days	Unknown
Total on Type	±19.3

1.5.1.1 The pilot was initially issued a Private Pilot Licence (PPL) on 14 October 2021 under the provisions of Part 61 of the CAR 2011. The licence was revalidated on 18 September 2023 with an expiry date of 30 September 2025.

1.5.1.2 The pilot was issued a Class 2 medical certificate on 4 December 2020 with an expiry date of 31 December 2025.

1.5.1.3 The hours on the table above are as per the pilot's logbook which the Aviation Training Organisation (ATO) chief flight safety officer made available to the investigators. The logbook was last updated on 23 September 2023.

1.5.2 Safety Pilot

Nationality	South African	Gender	Male	Age	24
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night Rating, Instrument Rating, and Instructor Grade 2				
Medical Expiry Date	30 April 2024				
Restrictions	None				
Previous Accidents	None				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

Flying Experience:

Total Hours	±838
Total Past 24 Hours	6.9
Total Past 7 Days	TBA
Total Past 90 Days	TBA
Total on Type Past 90 Days	TBA
Total on Type	±16.3

1.5.2.1 The safety pilot was initially issued a Commercial Pilot Licence (CPL) on 15 June 2021 under the provisions of Part 61 of the CAR 2011. The licence was revalidated on 29 August 2023 with an expiry date of 31 August 2024.

1.5.2.2 The safety pilot was issued a Class 1 medical certificate on 21 April 2023 with an expiry date of 30 April 2024.

1.5.2.3 The hours in the table above are as per the safety pilot's logbook which the ATO chief flight safety officer made available to the investigators. The logbook was last updated on 18 October 2023. The safety pilot was still in hospital at the time of completion of this report. His flying experience (hours) will be included in the final report.

1.6 Aircraft Information

1.6.1 Beechcraft C23

(Source: <https://www.aopa.org/go-fly/aircraft-and-ownership/aircraft-fact-sheets/beechnraft-sundowner>)

The airplane is a four-place, low wing, single engine airplane equipped with fixed tricycle landing gear. This airplane is certified in the normal category, utility category and aerobatic category. In the normal category, all aerobatic manoeuvres including spins are prohibited. See the aircraft's P.O.H for approved manoeuvres when in the utility or aerobatic categories. The airplane is approved for day and night VFR/IFR operations when equipped in accordance with F.A.R. 91 or F.A.R 135.

The aircraft is powered by a Lycoming O-360-A2G and is rated at 180 horsepower. It is a four cylinder, normally aspirated, direct drive, air cooled, horizontally opposed, carburettor equipped engine. Fuel tanks located in each wing's leading edge have a capacity of 30 gallons for a total capacity of 60 gallons when full. A visual measuring tab below the filler neck of each tank allows the tank to be filled to a 15- or 20-gallon capacity. Fuel is fed from the desired tank to a fuel selector valve in the centre floorboard and then through a strainer to the engine-driven fuel pump. The electrical system is powered by an alternator and a 12-Volt, 25 Amp-hour battery.

Airframe:

Manufacturer/Model	Beech Aircraft Corporation C23	
Serial Number	M-1708	
Year of Manufacture	1975	
Total Airframe Hours (At Time of Accident)	2982.3(Tach)	
Last Inspection (Hours & Date)	2904.6	29 March 2023
Hours Since Last Inspection	77.7	
CRS Issue Date	29 March 2023	
C of A (Issue Date & Expiry Date)	8 May 2023	7 May 2024
C of R (Issue Date) (Present Owner)	23 May 2023	
Type of Fuel Used	Avgas 100LL	
Operating Category	Private Operations (Part 91)	
Previous Accidents	<p>(1) The aircraft had a landing accident at Karoo Gateway Airport (FABW) in Beaufort West on 28 June 2004. During approach for landing on a gravel runway in gusty wind conditions, the pilot had difficulty controlling the aircraft. The aircraft landed hard which caused the nose wheel to collapse.</p> <p>(2) The aircraft had a landing accident in Swellendam Airport (FASX) in the Western Cape which resulted in the collapse of the nose gear and the</p>	

	propeller struck the ground. This accident occurred on 3 December 2021 and was not reported to the AIID. There are no records of this occurrence in any of AIID's database.
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Note: Previous accidents refer to past accidents the aircraft was involved in, when relevant to this accident.

1.6.2 According to available information, the aircraft was first registered to the present owner on 23 May 2023. The Certificate of Release to Service (CRS) was reissued on 29 March 2023 with an expiry date of 28 March 2024 or at 3004 Tachometer hours, whichever occurs first. After the 3 December 2021 accident, the aircraft was grounded for approximately nine (9) months. A special permit was then issued for the aircraft; the permit had an expiry date of 29 September 2022. The aircraft was flown from Swellendam Airport (FASX) to FAWB on 28 September 2022. It was then repaired, and the test flight was conducted on 30 March 2023.

Engine:

Manufacturer/Model	Textron Lycoming
Serial Number	L-20195-36A
Part Number	O-360-A4K
Hours Since New	2973.3
Hours Since Overhaul	1242.3

Propeller:

Manufacturer/Model	Sensenich
Serial Number	103965K
Part number	76EM8S5-0-60
Hours Since New	439.0
Hours Since Overhaul	8.3

1.6.3 After the accident on 3 December 2021, a shock load inspection was conducted on the engine and, thereafter, the engine was re-fitted to the aircraft.

1.7 Meteorological Information

1.7.1 The weather information entered in the table below was obtained from the South African Weather Service (SAWS) report for FABL on 21 October 2023 at 0730Z.

Wind Direction	320°	Wind Speed	20kts	Visibility	10km
Temperature	27°C	Cloud Cover	None	Cloud Base	None
Dew Point	06°C	QNH	1016 hPa		

1.8 Aids to Navigation

- 1.8.1 The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA). There were no records indicating that the navigational equipment was unserviceable prior to the flight.

1.9 Communication

- 1.9.1 The aircraft was equipped with a standard communication system as approved by the Regulator. There were no recorded defects with the communication system prior to the flight. The ZS-JKE crew had contacted ATC on frequency 114.10 MHz to request clearance prior to the flight. The ATC personnel had informed the crew that the tower was still closed and that they could proceed with the unmanned procedure. At approximately 0715Z, the ATC personnel advised the crew to be on the lookout for the inspection vehicle FV2 which was on the airfield grounds.

1.10 Aerodrome Information

1.10.1

Airport Location	Bloemfontein, Free State Province
Airport Status	Licensed
Airport GPS coordinates	29°05'38"S 26°18'14"E
Airport Elevation	4 457 feet
Runway Headings	02/20 and 12/30
Dimensions of Runway Used	2 559 x 46 m
Heading of Runway Used	02
Surface of Runway Used	Asphalt
Approach Facilities	Runway lights, PAPI, NDB
Radio Frequency	114.10 MHz

1.11 Flight Recorders

- 1.11.1 The aircraft was neither equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required by regulation.

1.12 Wreckage and Impact Information

- 1.12.1 The aircraft impacted the ground hard, which caused the right main landing gear to break off. The aircraft then spun 180° clockwise to face the direction from which it had approached. The left main landing gear and the right flap also broke off whilst the aircraft was spinning. The aircraft burst into flames, which consumed the right side of the aircraft, wing section and horizontal and vertical stabilisers. The control surfaces and the wiring were all accounted for at the accident site.



Figures 4 and 5: The right main landing gear assembly (left); and the left main landing gear assembly with rear view of the main wreckage in the background (right).

1.12.2 The left aileron, flap and part of the left wing were damaged by post-impact fire; they were still attached to the aircraft.



Figures 6 and 7: The damaged outboard (left) and inboard (right) of the left wing.

1.12.3 The engine and the propeller sustained impact damage; the spinner was burnt. The instrument panel, both control columns and the electrical wires behind the instrument panel also sustained damage during the accident sequence.



Figures 8 and 9: The damaged engine (left) and instrument panel (right).

1.12.4 The left door had detached during impact and was not burnt.



Figure 10: Left door.

1.13 Medical and Pathological Information

1.13.1 To be discussed in the final report.

1.14 Fire

1.14.1 A post-impact fire ensued and destroyed the aircraft.

1.15 Survival Aspects

1.15.1 The accident was considered not survivable because of the intense post-impact fire, as well as the impact forces that destroyed the aircraft's cabin.

1.16 Tests and Research

1.16.1 To be discussed in the final report.

1.17 Organisational and Management Information

1.17.1 The flight was conducted in accordance with the provisions of Part 91 (General Aviation and Operating Flight Rules) of the CAR 2011 as amended.

1.17.2 The aircraft maintenance organisation (AMO) which conducted the last maintenance inspection prior to the accident flight had an approved AMO Certificate that was issued by the Regulator on 9 November 2022 with an expiry date of 30 November 2023.

1.18 Additional Information

1.18.1 None.

1.19 Useful or Effective Investigation Techniques

1.19.1 To be discussed final report.

2 FINDINGS

2.1 General

From the available evidence, the following preliminary findings were made with respect to this accident. These shall not be read as apportioning blame or liability to any organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusions heading:

- **Findings** — are statements of all significant conditions, events, or circumstances in this accident. The findings are significant steps in this accident sequence, but they are not always causal or indicate deficiencies.

2.2 Findings

2.2.1 The pilot was initially issued a Private Pilot Licence (PPL) on 14 October 2021 under the provisions of Part 61 of the CAR 2011. The licence was revalidated on 18 September 2023 with an expiry date of 30 September 2025.

2.2.2 The pilot was issued a Class 2 medical certificate on 4 December 2020 with an expiry date of 31 December 2025.

2.2.3 The pilot's logbook was last updated on 23 September 2023.

- 2.2.4 The safety pilot was initially issued a Commercial Pilot Licence (CPL) on 15 June 2021 under the provisions of Part 67 of the CAR 2011. The licence was revalidated on 29 August 2023 with an expiry date of 31 August 2024.
- 2.2.5 The safety pilot was issued a Class 1 medical certificate on 21 April 2023 with an expiry date of 30 April 2024.
- 2.2.6 The safety pilot's logbook was last updated on 18 October 2023.
- 2.2.7 The AMO which conducted the last maintenance inspection prior to the accident flight had an approved AMO certificate that was issued by the Regulator on 9 November 2022 with an expiry date of 30 November 2023.
- 2.2.8 The last annual inspection on the aircraft was conducted on 29 March 2023 at 2904.6 Tachometer hours. The aircraft was issued a CRS on 29 March 2023 with an expiry date of 28 March 2024 or at 3004 Tachometer hours, whichever occurs first.
- 2.2.9 The aircraft impacted the ground hard and burst into flames following an engine failure after take-off. The aircraft came to rest in an upright position facing the direction from which it had taken off.
- 2.2.10 Clear weather conditions prevailed at the time on the flight.

3 ON-GOING INVESTIGATION

- 3.3.1 The AIID investigation is on-going and the investigators will be investigating other aspects of this accident which may or may not have safety implications.

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