

PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10522



Figure 1: The file picture of ZU-IBE aircraft. (Source: Flight Zone Aviation Photography)

Description:

On Friday evening, 1 November 2024, a flight instructor and a pilot (with a Private Pilot Licence [PPL]) on-board a Jabiru J170 aircraft with registration ZU-IBE took off on a training flight from Rhino Park Aerodrome in Gauteng province with the intention to conduct aerial work, before proceeding to Witbank Aerodrome (FAWI) in Mpumalanga province and to Wonderboom Aerodrome (FAWB) in Gauteng province where the crew intended to conduct a full-stop landing.

The flight was conducted under visual meteorological conditions (VMC) by night. The pilot was training towards achieving his PPL night rating. Whilst inbound FAWB, the engine ran rough, and the pilot contacted air traffic control (ATC) and declared a MAYDAY. The crew was cleared to land on Runway 29 at FAWB and the emergency services were alerted. However, the crew was unable to reach FAWB and, during an attempt to perform a forced landing in a game reserve, the aircraft

impacted high-tension powerlines and burst into flames. It crashed on a rocky terrain and was consumed by post-impact fuel-fed fire. The two occupants on-board were fatally injured.

Occurrence Details

Reference Number	: CA18/2/3/10522
Occurrence Category	: Accident (Category 1)
Type of Operation	: Training (Part 141)
Name of Operator	: Legend Sky
Aircraft Registration	: ZU-IBE
Aircraft Make and Model	: Jabiru J170
Nationality	: South African
Place	: Carlsruhe Private Game Reserve
Date and Time	: 1 November 2024 at 1747Z
Injuries	: Two fatalities
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 an accident involving a Jabiru J170 which occurred in a private game reserve near Cullinan in Gauteng province on 1 November 2024 at 1747Z. The occurrence was classified as an accident according to the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) Standard (STD) Annex 13 definitions.

The AIID has appointed an investigator-in-charge who dispatched to the accident site to initiate the investigation. The AIID will lead the investigation and issue the final report of this accident in accordance with the CAR 2011 Part 12 and the ICAO Annex 13. The information contained in this preliminary report is derived from the information gathered during the ongoing investigation into the occurrence. Later, an interim or final report may contain altered information in case new evidence is found during the ongoing investigation that requires changes to the information depicted in this report.

The AIID reports are made available to the public at:

<https://www.caa.co.za/industry-information/accidents-and-incidents/>

Notes:

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

Accident — this investigated of accident

Aircraft — the Jabiru J170 involved in this accident

Investigation — the investigation into the circumstances of this accident

Pilots — the pilots 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 the clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; enhancement of colour, brightness, and contrast; or addition of text boxes, arrows, or lines.*

Disclaimer

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Abbreviation	Description
°	Degrees
°C	Degrees Celsius
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
ARCC	Aeronautical Rescue Coordination Centre
ARFF	Aerodrome Rescue and Firefighting
ATC	Air Traffic Control
ATF	Authority-to-Fly
ATO	Approved Training Organisation
CAR	Civil Aviation Regulations
C of R	Certificate of Registration
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
EFIS	Electronic Flight Information System
FAWB	Wonderboom Aerodrome
FAWI	Witbank Aerodrome
ft	feet
GPS	Global Positioning System
hPa	hectopascal
kt	knots
m	metres
METAR	Meteorological Aerodrome Report
MTOW	Maximum Take-off Weight
PPL	Private Pilot Licence
QNH	Barometric Pressure Adjusted to Sea Level
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
TBO	Time Between Overhaul
UTC	Coordinated Universal Time
VDF	VHF Direction-finding Station
VHF	Very High Frequency
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VOR	Very High Omnidirectional Range
Z	Zulu (Term for Universal Co-ordinated Time – Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1 History of Flight

- 1.1.1 On Friday evening, 1 November 2024 at 1631Z, a flight instructor and a pilot on-board a Jabiru J170 aircraft with registration ZU-IBE took off on a training flight from Rhino Park Aerodrome in Gauteng province to conduct aerial work before proceeding to Witbank Aerodrome (FAWI) and, thereafter, Wonderboom Aerodrome (FAWB) for a full-stop landing. The flight was conducted under visual meteorological conditions (VMC) by night and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.
- 1.1.2 The pilot had a Private Pilot Licence (PPL) and was training towards his PPL night rating. After take-off, the pair flew north-east of Rhino Park Aerodrome (see Figure 2) where they conducted upper aerial work. Thereafter, they flew to Witbank Aerodrome (FAWI) to intercept the very high frequency (VHF) omnidirectional range (VOR) [*VOR is a ground-based radio navigation system that provides aircraft with accurate directional information*]. The pair then flew westerly along the N4 highway. At 1728Z, one of the approved training organisation's (ATO's) flight instructors who was at home at the time received a WhatsApp message on his cellular phone from the pilot who stated: *"We are experiencing an engine abnormality, think we had a magneto failure [sic]"*. Shortly after this message was sent, the aircraft flew north-westerly. The flight instructor then tracked the aircraft on the Flightradar24 application he had installed on his cellular phone. At 1747Z, he received two short WhatsApp messages stating the following: *"MAYDAY"* and *"Engine died."* There was no further communication from the pilot.
- 1.1.3 According to gathered information, during radio contact with air traffic control (ATC) at FAWB, the pilot stated that they were coming up to the south of Mamelodi at 5 500 feet (ft): *"We have a rough running engine, hopefully, we can pass the ridge and get ... you can assist us in getting us in on Runway 29, please?"* The ATC stated: *ZU-IBE copied the engine; you can continue for a straight-in approach for Runway 29.* This was from the recordings post-accident. The pilot's reply was not audible; it could also be heard on this radio communication that the ATC had activated the crash alarm during their conversation. Also audible was the sound of the engine, which was erratic; this was consistent with a rough-running engine.
- 1.1.4 The following communication was recorded between the pilot and the ATC:
Pilot: Wonderboom tower, this is India Bravo Echo (IBE) we are declaring an emergency, Mayday Mayday Mayday, we are at 5 000 feet (ft) heading 320, we are trying to get to your field at this stage, but it is going to be close, we will see. The time was 1741Z.
ATC: Copied IBE, emergency services are on standby, looks like you are to the south-east of the airfield.

Pilot: Do you got me visual Mam, or not?

ATC: Negative, I do not have you in sight, but I can see that the VDF (VHF direction-finding station - is a ground-based radio aid that consists of a directional antenna system and a VHF radio receiver, tuned to the operating frequency of an air traffic services unit) is pointing that you are routing from the south-east of Mamelodi side.

ATC: India Bravo Echo Wonderboom?

ATC: Zulu Uniform India Bravo Echo?

At 1747Z, the ATC officer lost communication with the aircraft.

There was no further communication between the ATC and the aircraft.

ATC: Foxtrot Tango One [Aerodrome Rescue and Firefighting team call sign] and company I do not think that the aircraft made it to the airfield.

ATC then declared a distress phase (DETRESFA – *which is a situation wherein there is a reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger and require immediate assistance*) with the Aeronautical Rescue Coordination Centre (ARCC) who then initiated the search and rescue operation.

- 1.1.5 The game reserve owner on whose property the aircraft had crashed stated that him and his family were sitting outside having a barbeque that evening at about 1745Z. They then heard an aircraft flying low over their house and, seconds later, they heard a loud bang which was followed by a white flash. Thereafter, the electricity cut off in the area. They immediately got into a vehicle and drove to the site where they found the aircraft engulfed in flames; they were unable to extinguish the fire. They recovered two cellular phones and an iPad, which was undamaged. Shortly thereafter, one of the cellular phones rang. The person on the other end was advised about the accident (it was later found out that the person who called was the flight instructor who had communicated with the pilot earlier that evening via WhatsApp). All relevant authorities were informed about the accident. The accident occurred 14 nautical miles (nm) or 25 kilometres east south-east of the threshold of Runway 29 at FAWB.
- 1.1.6 The accident occurred at nighttime at Global Positioning System (GPS) co-ordinates determined to be 25°40'50.70" South 028°29'21.05" East, at an elevation of 4 734 ft.

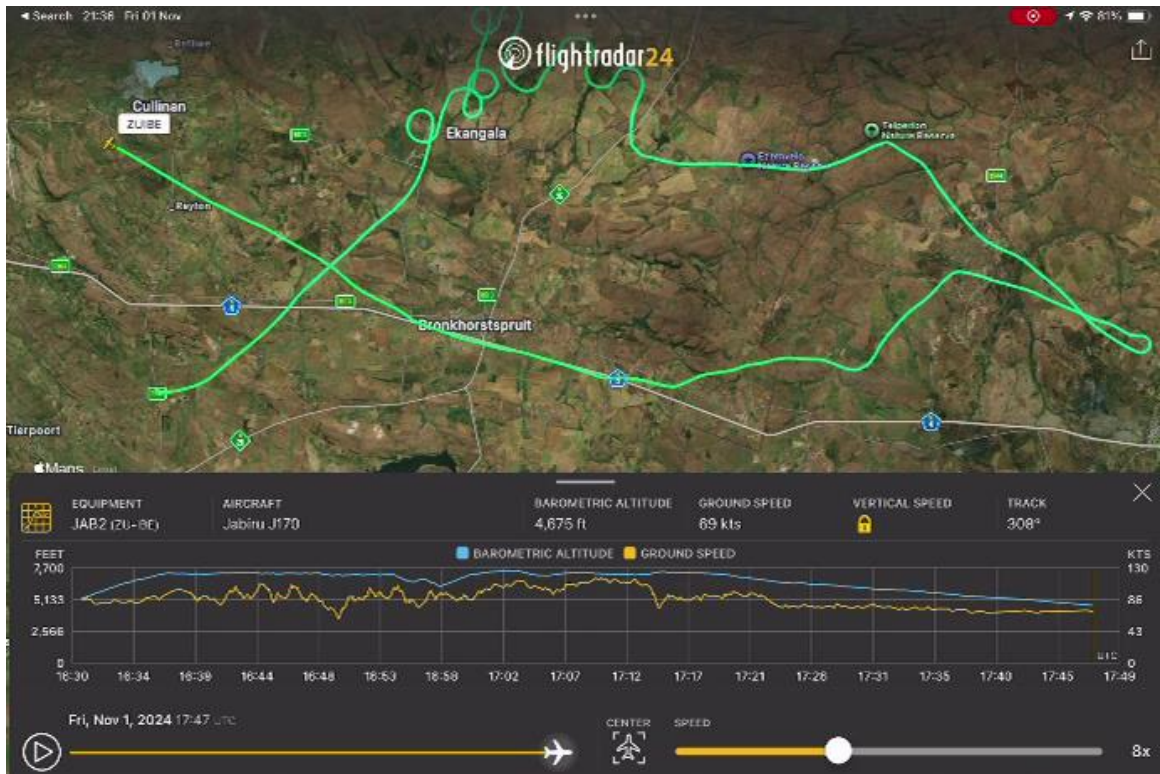


Figure 2: The green line shows the route flown by ZU-IBE. (Source: Flightradar24.com)

1.2 Injuries to Persons

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

Note: Other means people on the ground.

1.3 Damage to Aircraft

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



Figure 3: The wreckage post-accident.

1.4 Other Damage

- 1.4.1 Several Eskom powerline pylons and conductors were damaged after impact with the aircraft. There was power failure in some parts of Cullinan after the accident.
- 1.4.2 The local fire services responded to the scene and doused the post-impact fire that erupted.



Figure 4: One of the high-tension cables that snapped from the pylon during the accident.

1.5 Personnel Information

1.5.1 Pilot-in-Command (PIC) – Flight Instructor

Nationality	South African	Gender	Male	Age	49
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument, Instructor Grade 3				
Medical Expiry Date	30 September 2025 (Class 1)				
Restrictions	VNL: Valid only with correction for defective near vision				
Previous Accidents	None				

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

Flying Experience:

Total Hours	437.9
Total Past 90 Days	28.7
Total on Type Past 90 Days	22.8
Total on Type	119.4

*NOTE: The flying hours entered in the table above were obtained from the pilot's second logbook which he started in 2015; his first logbook could not be located. The recorded flying hours were also obtained from the ATO where he conducted his flight instructions.

1.5.2 Pilot (PPL)

Nationality	South African	Gender	Male	Age	27
Licence Type	Private Pilot Licence (PPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	31 January 2028 (Class 2)				
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	70.7
Total Past 90 Days	13.0
Total on Type Past 90 Days	4.4
Total on Type	4.4

*NOTE: The flying hours entered in the table above were obtained from the pilot's logbook and the ATO at which he was training for his night rating.

1.6 Aircraft Information

1.6.1 Jabiru J170 (Source: www.jabiru.co.za)

The J170 is a high-winged, strut-braced monoplane with wing flaps, mass-balanced elevators and in-flight adjustable trim. The ergonomically designed cockpit has side-by-side seating, centre controls and panel-mounted throttles plus the option of adjustable rudder pedals. It is fitted with two large doors to provide easy entry and exit and, in South Africa, there is the added advantage of a luggage door at the back for easy access and stowing of luggage in the back compartment. Low cowls and large, blue-tinted windows provide excellent visibility, and the snap vents provide good interior ventilation. The aircraft has a tricycle undercarriage, steering nose wheel, and hand-operated hydraulic disc brakes.

Airframe:

Manufacturer/Model	Shadow Lite CC / Jabiru J170	
Serial Number	358	
Year of Manufacture	2014	
Total Airframe Hours (at the time of the accident)	3 563.4	
Last Inspection (Hours & Date)	3 533.1	10 October 2024
Hours Since Last Inspection	30.3	
MTOW	600kg	
CRS Issue Date	10 October 2024	

ATF (Issue Date & Expiry Date)	15 July 2016	10 December 2024
C of R (Issue Date) (Present Owner)	9 October 2023	
Type of Fuel Used	Avgas	
Operating Category	Production Built	
Previous Accidents	<p>On 13 April 2016, the left wing of the aircraft struck an object when it veered off the runway. The wing and fuselage carry through beams were replaced; and the engine was subjected to a teardown inspection. (Aircraft logbook entry)</p> <p>On 9 October 2022, the aircraft was involved in a landing accident at Kitty Hawk Aerodrome in which the nose gear broke off. The AIID reference number is CA18/2/3/10082.</p>	

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

Engine:

Manufacturer/Model	Jabiru A3300
Serial Number	33A2114
Hours Since New	3 563.4
Hours Since Overhaul	665.4

Propeller:

Manufacturer/Model	Peter de Necker
Serial Number	N4197
Hours Since New	665.4
Hours Since Overhaul	TBO not yet reached

1.7 Meteorological Information

1.7.1 The weather information below was obtained from the meteorological aerodrome report (METAR) that was issued by the South African Weather Service (SAWS), recorded at Wonderboom Aerodrome (FAWB) on 1 November 2024 at 1900Z and 2000Z. FAWB is located 14nm from the accident site.

FAWB 011900Z AUTO 03005KT //// // ///// 26/06 Q1019=

Wind Direction	030°	Wind Speed	5kt	Visibility	9999m
Temperature	26°C	Cloud Cover	CAVOK	Cloud Base	Nil
Dew Point	6°C	QNH	1019hPa		

FAWB 012000Z AUTO 00000KT /// // ///// 21/08 Q1020=

Wind Direction	No wind	Wind Speed	Nil	Visibility	9999m
Temperature	21°C	Cloud Cover	CAVOK	Cloud Base	Nil
Dew Point	8°C	QNH	1020hPa		

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 before 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 before the flight.

1.9.2 There was radio communication between the pilot and the ATC officer at FAWB on tower frequency 118.35 Megahertz (MHz). The pilot declared a MAYDAY at 1741Z and informed ATC that the aircraft had a rough-running engine.

1.9.3 The ATC had activated the crash alarm, and the ARFF personnel responded by taking up positions next to Runway 29 and awaited the arrival of the aircraft.

1.10 Aerodrome Information

1.10.1 The accident did not occur at or close to an aerodrome.

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 to be fitted to the aircraft type.

1.12 Wreckage and Impact Information

1.12.1 The aircraft impacted high-tension powerlines whilst flying in a north north-westerly direction. The wreckage distribution covered an approximately 30m radius and the fuselage was consumed by post-impact fire that erupted. Aircraft parts that were not destroyed displayed evidence of being scorched.



Figure 5: The accident site.



Figure 6: The fuselage of the aircraft.



Figure 7: A section of the left outer wing.



Figure 8: The horizontal plane with the vertical fin ripped off.



Figure 9: The vertical fin with the rudder still attached.

1.13 Medical and Pathological Information

1.13.1 To be discussed in the final report.

1.14 Fire

1.14.1 The aircraft impacted high-tension wires and fire erupted due to impact; fuel exacerbated the fire.

1.15 Survival Aspects

1.15.1 The accident was not considered survivable as the aircraft was consumed by post-impact fuel-fed fire. The accident site is a game reserve; therefore, specialised vehicles were required to reach the accident site.

1.16 Tests and Research

1.16.1 To be discussed in the final report.

1.17 Organisational and Management Information

1.17.1 This was a training flight conducted under the provisions of Part 141 of the CAR 2011 as amended. The ATO had a valid ATO Certificate that was issued by the Regulator (SACAA) on 15 July 2021 with an expiry date of 30 April 2026.

1.17.2 The last maintenance inspection of the aircraft was conducted and certified on 10 October 2024 at 3 533.1 hours. The aircraft maintenance organisation (AMO) that maintained the aircraft had a valid AMO Certificate that was issued by the Regulator on 31 August 2024 with an expiry date of 31 August 2025.

1.18 Additional Information

1.18.1 To be discussed in the final report.

1.19 Useful or Effective Investigation Techniques

1.19.1 To be discussed in the 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

The Crew

2.2.1 The flight instructor had a Commercial Pilot Licence (CPL) that was issued by the Regulator on 22 February 2021 with an expiry date of 30 April 2025. The flight instructor had flown a total of 437.9 hours of which 119.4 hours were on the aircraft type.

- 2.2.2 The flight instructor was issued a Class 1 aviation medical certificate on 5 September 2024 with an expiry date of 30 September 2025 with a restriction to wear corrective lenses when flying an aircraft.
- 2.2.3 The pilot (under training) had a Private Pilot Licence (PPL) that was issued by the Regulator on 25 October 2024 with an expiry date of 31 October 2025. The pilot had flown a total of 70.7 hours of which 4.4 hours were on the aircraft type.
- 2.2.4 The pilot was issued a Class 2 aviation medical certificate on 7 February 2023 with an expiry date of 31 January 2028 with no restrictions.
- 2.2.5 The pilot sent a WhatsApp message at 1728Z to one of the ATO's flight instructors who was at home at the time to inform him that they were experiencing engine abnormality. At 1747Z, he received two WhatsApp messages stating the following: "MAYDAY" and "Engine died."

The Aircraft

- 2.2.6 The last maintenance inspection of the aircraft was certified on 10 October 2024 at 3 533.1 airframe hours. The aircraft accrued 28.7 hours since the said inspection.
- 2.2.7 The aircraft had a valid Authority-to-Fly (ATF) that was initially issued on 16 May 2015. The latest ATF had an expiry date of 31 May 2025.
- 2.2.8 The aircraft's Certificate of Registration (C of R) was issued to the present owner on 26 April 2021.
- 2.2.9 The aircraft was issued a Certificate of Release to Service (CRS) on 10 October 2024 with an expiry date of 9 October 2025 or at 3 633.1 airframe hours, whichever occurs first.

Meteorological Information

- 2.2.10 According to the METAR data for FAWB, fine weather conditions prevailed at the time of the flight. The weather had no bearing on this accident.
- 2.2.11 It was new moon at the time of the flight (during a new moon, the lunar disk is not visible to the naked eye).

Approved Training Organisation (ATO) Certificate

2.2.12 The ATO was issued an Approved Training Organisation (ATO) Certificate by the Regulator (SACAA) on 15 July 2021 with an expiry date of 30 April 2026.

2.2.13 The flight was authorised as per the flight authorisation sheet No. 2024110009.

Air Traffic Control

2.2.14 FAWB is licensed with a manned control tower and an ARFF response team that was on duty at the time of the accident. The pilot had declared a MAYDAY with the ATC officer who activated the crash alarm. The ARFF team responded and took up their positions next to Runway 29 and awaited the arrival of the aircraft.

3. On-going Investigation

3.1 The AIID investigation is on-going and the investigator will look into other aspects of this occurrence which may or may not have safety implications.

4. Safety Recommendation(s)

4.1 None.

5. Appendices

5.1 None.

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