

PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10501



Figure 1: The file picture of ZS-BGN aircraft. (Source: <https://www.airhistory.net/photo/336975/ZS-BGN/2185>)

Description:

On Saturday morning, 28 September 2024, a pilot on-board a De Havilland aircraft with registration ZS-BGN took off on a private flight from Heidelberg Airfield (FAHG) in Gauteng province to Vereeniging Airfield (FAVV) in the same province. Approximately 15 minutes into the flight at 6 500 feet (ft), the engine's power reduced significantly. After checking and confirming if the fuel selector, magnetos and mixture were properly set, the pilot soon realised that recovery was not possible and looked for a site on which to conduct a forced landing. He identified a gravel road on a private farm, and, during landing, the main wheel rolled over a trench and the aircraft flipped over. The pilot was unharmed; he disembarked from the aircraft unassisted. The aircraft was substantially damaged.

Occurrence Details

Reference Number	: CA18/2/3/10501
Occurrence Category	: Accident Category 1
Type of Operation	: Private (Part 94)
Name of Operator	: JA Earle
Aircraft Registration	: ZS-BGN
Aircraft Make and Model	: De Havilland Aircraft Company, DH-82A
Nationality	: South Africa
Registration Marks	: ZS-BGN
Place	: Dirt road near R42 and R551
Date and Time	: 28 September 2024 at 0815Z
Injuries	: None
Damage	: Substantial

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) was notified of the occurrence involving a De Havilland aircraft on 28 September 2024 at 0815Z. The occurrence was classified as an accident according to the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) STD Annex 13 definitions. The AIID has appointed an investigator-in-charge to conduct an off-site investigation. Notification was sent to the State of Registry, Operator, Design and Manufacturer in accordance with the CAR 2011 Part 12 and the ICAO Annex 13 Chapter 4. The States did not appoint an accredited representative and/or advisor. 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 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:

<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 accident*
 - Aircraft — the De Havilland Aircraft involved in this accident*
 - Investigation — the investigation into the circumstances of this accident*
 - Pilot — the pilot 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
°	Degrees
°C	Degrees Celsius
ACCID	Accident
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
AP	Approved Person
ATF	Authority to Fly
CAR	Civil Aviation Regulations
CAVOK	Cloud and Visibility OK
C of R	Certificate of Registration
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
kt	Knots
m	Metres
METAR	Meteorological Aerodrome Report
nm	Nautical Miles
QNH	Query Nautical Height
RWY	Runway
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
VFR	Visual Flight Rules
VMC	Visual Meteorological Condition
W	West
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1. On Saturday morning, 28 September 2024, a pilot on-board a De Havilland aircraft with registration ZS-BGN took off on a private flight from Heidelberg Airfield (FAHG) in Gauteng province to Vereeniging Airfield (FAVV) in the same 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.

1.1.2. The pilot reported that approximately 15 minutes into the flight whilst cruising at 6 500 feet (ft), the aircraft's engine power reduced significantly. The pilot conducted cockpit checks to identify faults to recover the engine's functionality; he verified if the fuel selector valve and magnetos were set to the "ON" position, as well as confirmed whether the fuel mixture was correctly configured. However, the pilot soon realised that engine recovery was not likely, and he began to survey the surrounding area to identify a suitable site on which to conduct a forced landing. Initially, the pilot identified Regional Road 42 (R42) which intersected with R551 but had traffic at the time.

The pilot then spotted a gravel road on a private farm on the left of R42. Thereafter, he executed a right turn to position the aircraft to conduct a forced landing. During the landing roll, the aircraft's main wheel rolled over a trench and the aircraft flipped over. The pilot disembarked from the aircraft uninjured and unassisted. The aircraft sustained substantial damage to the right wing, rudder, fin, propeller (which was severed from the aircraft) and front engine mount (which bent).

1.1.3. The accident occurred on the dirt road near the intersection of R42 and R551 at Global Positioning System (GPS) co-ordinates determined to be 26°32'49" South 28°14' 18.1" East, at an elevation of 4 846 ft.



Figure 2: The accident site. (Source: Google Maps)

1.2. Injuries to Persons

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

Note: Other means people on the ground.

1.3. Damage to Aircraft

1.3.1. The aircraft's right wing, rudder, fin, propeller and the front engine mount were substantially damaged.



Figure 3: The aircraft post-accident. (Source: Pilot)

1.4. Other Damage

1.4.1. None.

1.5. Personnel Information

Nationality	South African	Gender	Male	Age	81
Licence Type	Private Pilot Licence (PPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Nil				
Medical Expiry Date	28 February 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	6 508
Total Past 24 Hours	0.45
Total Past 7 Days	0.45
Total Past 90 Days	8.6
Total on Type Past 90 Days	13.5
Total on Type	13.5

1.5.1. The pilot was initially issued a Private Pilot Licence (PPL) on 26 July 1974. The latest renewed licence was issued on 26 September 2023 with an expiry date of 30 September 2024. The aircraft type was endorsed on the pilot's licence.

1.5.2. The pilot was issued a Class 2 aviation medical certificate on 20 February 2024 with an expiry date of 28 February 2025 with no medical restrictions.

1.6. Aircraft Information

Aircraft Description: (Source: Pilot's Operating Handbook [POH])

1.6.1 *The De Havilland Tiger Moth-D.H.82C is a two-seat biplane. It is powered by the De Havilland Gypsy Major Series 1C Engine. The fuselage is constructed in two parts of steel tubing, covered on the sides and bottom with fabric and a topside of plywood. The front half with the two cockpits and firewall contains longerons and diagonals which are welded with the joints reinforced by gusset plates. Each side is separately jig-welded, drilled and then assembled with bolted cross members. The rear fuselage section is a rigid, jig-welded unit. The front and rear sections are assembled with eight bolts. A canopy of transparent plastic encloses the cockpit, consisting of front and rear sliding sections and a fixed windscreen. The sections can be locked in the open; partly sliding sections may jettisoned from either inside or outside the cockpits.*

Airframe:

Manufacturer/Model	De Havilland Aircraft Company	
Serial Number	84864	
Year of Manufacture	1941	
Total Airframe Hours (At Time of Accident)	1885	
Last Inspection (Date & Hours)	5 August 2024	1883.55
Hours Since Last Inspection	1.45	
CRS Issue Date	5 August 2024	
ATF (Issue Date & Expiry Date)	19 August 2024	31 August 2025
C of R (Issue Date) (Present Owner)	28 June 1993	
Type of Fuel Used	Avgas	
Operating Category	Private Part 94	
Previous Accidents	None	

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

Engine:

Manufacturer/Model	De Havilland, Gipsy Major 1C
Serial Number	8801
Part Number	Not Applicable
Hours Since New	Unknown
Hours Since Overhaul	380

Propeller:

Manufacturer/Model	Dunbar DC193-150 LDH 110
Serial Number	1286C
Part Number	Not Applicable
Hours Since New	Unknown
Hours Since Overhaul	380

1.6.2 The aircraft had a valid Authority to Fly (ATF) Certificate that was initially issued on 1 April 2019. The latest ATF was renewed on 19 August 2024 with an expiry date of 31 August 2025.

1.6.3 The aircraft's Certificate of Release to Service (CRS) was issued on 5 August 2024 at 1883.55 hours with an expiry date of 4 August 2025 or at 1983.55 hours, whichever comes first.

1.6.4 The pilot had refuelled the aircraft to full capacity prior to the flight.

1.7 Meteorological Information

1.7.1 The weather information below was obtained from the pilot's questionnaire.

Wind Direction	360	Wind Speed	5Kt	Visibility	CAVOK
Temperature	20°C	Cloud Cover	None	Cloud Base	None
Dew Point	TBD	QNH	TBD		

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.

1.10 Aerodrome Information

1.10.1 The accident occurred on the dirt road near the intersection of R42 and R551 in Gauteng province.

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



Figure 4: The aircraft in an inverted position post-accident. (Source: Pilot)

1.12.1 The accident occurred on a gravel road of a private farm near R42 and R551. The wreckage was fairly localised and was intact with no parts separation.

1.12.2 The aircraft was found in an inverted attitude; it faced the direction from which it had approached. The dirt road surface was uneven and unfavourable to perform a safe landing.

1.12.3 The bottom side of the nose section was damaged, consistent with impact with the ground (see Figure 2). The propeller was severed, and the engine mountings were bent. The right upper wing was also damaged during the accident sequence, indicative of impact with a solid surface. The tail fin and rudder were substantially damaged due to the hard impact with the ground as the aircraft had flipped over.

1.13 Medical and Pathological Information

1.13.1 None.

1.14 Fire

1.14.1 There was no pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 The accident was survivable as the pilot was properly restrained by the safety belt; the cabin structure was not damaged during the accident sequence.

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 private flight was conducted under the provisions of Part 94 of the CAR 2011 as amended.

1.18 Additional Information

1.18.1 The engine will be subjected to tests and the results will be included in the final report.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

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 26 July 1974. The licence was reissued on 26 September 2023 with an expiry date of 30 September 2024. The aircraft type was endorsed on the pilot's licence and logbook.

2.2.2 The pilot was issued a Class 2 aviation medical certificate on 20 February 2024 with an expiry date of 28 February 2025 with no medical restrictions.

2.2.3 The aircraft had a valid Authority to Fly (ATF) which was initially issued on 1 April 2019. The ATF was renewed on 19 August 2024 with an expiry date of 31 August 2025.

2.2.4 The aircraft flipped over during the landing roll after the main wheel had rolled over a trench on an uneven dirt road.

3 ON-GOING INVESTIGATION

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

4 SAFETY RECOMMENDATIONS

4.1 General

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report. The AIID expects that all safety issues identified by the investigation are addressed by the receiving States and organisations.

4.2 Safety Recommendation/s

- 4.2.1 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**