AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

			Reference:			CA18/2/3/10030	
Aircraft Registration	ZS-CKP	**Date of Accident**	23 August 2021			**Time of Accident**	1035Z
Type of Aircraft	Piper PA-18A-150 Super Cub		**Type of Operation**			Part 43	
Pilot-in-command Licence Type	Commercial Pilot Licence (CPL)		**Age**	68		**Licence Valid**	Yes
Pilot-in-command Flying Experience	**Total Flying Hours**		4174.6			**Hours on Type**	26.9
Last Point of Departure	Port Alfred Aerodrome (FAPA), Eastern Cape Province						
Next Point of Intended Landing	Port Alfred Aerodrome (FAPA), Eastern Cape Province						
Damage to Aircraft	Substantial						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Port Alfred Aerodrome (FAPA) on the left-side of RWY10L (GPS 33°33'14.72'' S 026°52'24.60 E) at an elevation of 324 feet							
Meteorological Information	Wind: 030° at 4kt; Temperature: 20°C; Dew Point: 10°C; Visibility: ≥10000m; Cloud: CAVOK; QNH: 1016 hPa						
Number of People On-board	1 + 0	**Number of People Injured**	0	**Number of People Killed**	0	**Other (On Ground)**	0

Synopsis

On Monday, 23 August 2021, a pilot on-board a Piper Super Cub PA-18-150A with registration mark ZS-CKP took off from Runway (RWY) 28L at Port Alfred Aerodrome (FAPA) with the intention to conduct a post-maintenance test flight. The flight was conducted under visual flight rules (VFR) by day and under the provisions of Part 43 of the Civil Aviation Regulations (CAR) 2011 as amended.

Shortly after take-off at approximately 600 feet (ft) above ground level (AGL), the engine stopped. The pilot then switched fuel feed from the left tank to the right tank, and the engine restarted momentarily but stopped again. The pilot opted to conduct a teardrop turn and execute a forced landing on Runway 10L; however, the pilot could not complete the teardrop turn as the aircraft was rapidly losing height. The aircraft impacted the ground hard on the left-side of Runway 10L, damaging the engine cradle, propeller, fuselage and engine cowling. The pilot was not injured during the accident sequence.

After the accident, the engine was inspected and no anomalies were found. The engine was removed from the aircraft and bench-tested for 20 minutes. Again, no anomalies were observed during the bench test as the engine performed as per the manufacturer's specifications in the Lycoming Operators Manual Part No: 60297-30 Revision: October 2006, Section 3.

Probable Cause

The engine stopped during climb, resulting in an unsuccessful forced landing. The cause of engine stoppage could not be determined.

SRP Date	8 March 2022	Publication Date	14 March 2022

INTRODUCTION

Reference Number	**:** CA18/2/3/10030
Name of Owner/Operator	**:** Simon Bennett
Manufacturer	**:** Piper Aircraft Company
Model	**:** PA-18A-150 (Super Cub)
Nationality	**:** South African
Registration Marks	**:** ZS-CKP
Place	**:** Port Alfred (FAPA), Eastern Cape Province
Date	**:** 23 August 2021
Time	**:** 1035Z

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 was notified to the Accident and Incident Investigations Division (AIID) on 23 August 2021 at about 1050Z. The investigator did not dispatch to the accident site but conducted an off-site investigation. The investigator co-ordinated with all authorities on site by initiating the accident investigation process according to CAR Part 12 and investigation procedures. The AIID is leading the investigation as the Republic of South Africa is the State of Occurrence.

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

- *Accident — this investigated accident*
- *Aircraft — the PA-18A-150 (Super Cub) 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:

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ABBREVIATION	DESCRIPTION
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
AMSL	Above Mean Sea Level
ATC	Air Traffic Control
ATPL	Airline Transport Pilot Licence
˚C	Degrees Celsius
CAR	Civil Aviation Regulations
CPL	Commercial Pilot Licence
CVR	Cockpit Voice Recorder
FAPA	Port Alfred Aerodrome
FAPE	Port Elizabeth Airport
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
L	Litres
m	Metre
METAR	Meteorological Routine Aerodrome Report
MHz	Megahertz
MPI	Mandatory Periodic Inspection
NPL	National Pilot Licence
PIC	Pilot-in-command
POH	Pilot's Operating Handbook
QNH	Query Nautical Height (Barometric Pressure Adjusted to Sea Level)
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
TBO	Time Between Overhaul
UTC	United Time Coordinated
VFR	Visual Flight Rules
VHF	Very High Frequency
Z	Zulu (Term for Universal Coordinated Time –Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1 On Monday, 23 August 2021 at 1035Z, a pilot flying solo on-board a PA-18A-150 aircraft with registration ZS-CKP took off from Port Alfred Aerodrome (FAPA) with the intention to conduct a post-maintenance test flight following a mandatory periodic inspection (MPI). Before the flight, the aircraft was taxied to the fuel bay and 100 litres of Avgas fuel was uplifted; the aircraft had a total of 110 litres after refuelling.

1.1.2 The pilot stated that the aircraft was then taxied to the run-up bay for pre-flight checks; and all checks were within the specified limits. Thereafter, the pilot took off from Runway (RWY) 28L at FAPA for a visual flight rules (VFR) post-maintenance test flight. The test flight was conducted under the provisions of Part 43 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.3 The pilot reported that the take-off roll was without incident; however, after rotation and during climb at approximately 600 feet (ft) above ground level (AGL), the engine stopped. The pilot then switched the fuel feeder tank from the left to the right tank and restarted the engine. The engine ran momentarily but stopped again.

1.1.4 The pilot then decided to execute a teardrop turn to conduct a forced landing on RWY 10L. However, the pilot could not complete the teardrop turn as the aircraft was rapidly losing height. The aircraft impacted the ground hard on the left-side of RWY 10L, damaging the engine cradle, propeller, fuselage and engine cowling. The pilot was not injured during the accident sequence.

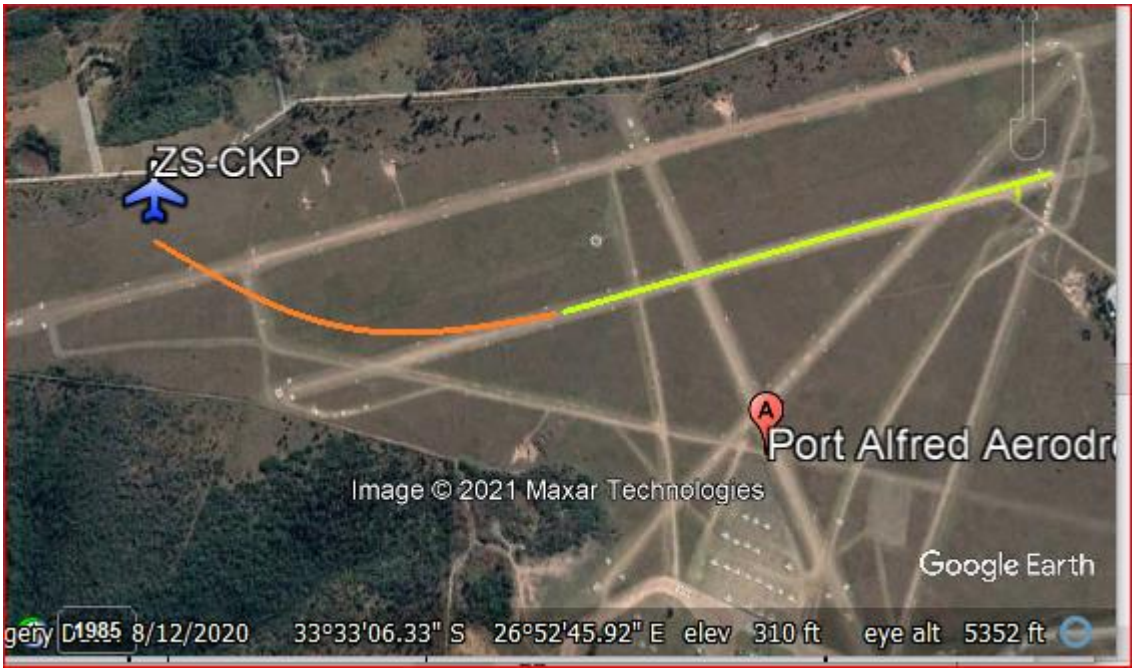

Figure 1: The aircraft path after take-off. (Source: Google Earth)

1.1.5 The accident occurred during day light at Global Positioning System (GPS) coordinates determined to be 33°33'14.72'' S 026°52'24.60 at an elevation of 324 feet (ft).

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 ground.

1.3. Damage to Aircraft

1.3.1 The aircraft sustained substantial damage during the accident sequence.

Figure 3: The aircraft at the accident site. (Source: Pilot)

1.4. Other Damage

1.4.1 None.

1.5. Personnel Information

Nationality	South African	Gender	Male	Age	68
Licence Number	*********	Licence Type	Commercial Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument, Test Pilot				
Medical Expiry Date	31 August 2021				
Restrictions	Corrective Lenses				
Previous Accidents	None				

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

1.5.1 The pilot was initially issued a Commercial Pilot Licence (CPL) on 16 August 1993; he did a competency evaluation on 10 February 2021 and the CPL licence was reissued on the same day with an expiry date of 28 February 2022. The pilot is also a licensed Aircraft Maintenance Engineer (AME).

1.5.2 The pilot had a Class I medical certificate issued on 1 February 2021 with an expiry date of 31 August 2021, with corrective lenses restriction.

Flying Experience:

Total Hours	4174.6
Total Past 24 Hours	1.5
Total Past 7 Days	8.2
Total Past 90 Days	26.9
Total on Type Past 90 Days	26.9
Total on Type	26.9

Aircraft Maintenance Engineer (AME) Experience:

Nationality	South African	Gender	Male	Age	68
Licence Number	*********	Aircraft Maintenance Engineer			
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	P & W PT6A Series				
Restrictions	None				
Previous Accidents	None				

1.6. Aircraft Information: *(Source: Pilot Operating Handbook (POH)*

1.6.1 *The Piper PA-18A-150 Super Cub is a development of a PA-11 which is rooted from military J-3. It is a two-seat in tandem high-wing monoplane. It is made of steel tube frame and cloth covering construction. The aircraft is powered by a 160-180 horsepower Lycoming O-360 powerplant. The aircraft, with its high-lift wing, is popular with bush and glider towing usually configured as a tail-dragger landing gear.*

Airframe:

Manufacturer/Model	Piper Aircraft Company/ PA-18-150A	
Serial Number	18-6711	
Year of Manufacture	1990	
Total Airframe Hours (At Time of Accident)	8035.12	
Last MPI (Date & Hours)	20 August 2021	8035.10
Hours Since Last MPI	0.02	
C of A (Issue Date)	8 April 2013	
C of A Expiry Date	30 April 2022	
C of R (Issue Date) (Present Owner)	8 August 2000	
Operating Categories	Standard Normal Category (Part 91)	
Type of Fuel Used in the Aircraft	Avgas100LL	
Previous Accidents	None	

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

1.6.2 The aircraft had a valid Certificate of Airworthiness (CoA) issued by the Regulator (SACAA) on 8 April 2013 with an expiry date of 30 April 2022. The aircraft was issued a Certificate of Registration on 8 August 2000.

1.6.3 The aircraft was issued a Certificate of Release to Service on 20 August 2021 at 8035.10 airframe hours with an expiry date of 22 August 2022 or at 8135.10 airframe hours, whichever comes first.

Engine:

Manufacturer/Model	Lycoming O-320-A2B
Serial Number	L-47296-27A
Hours Since New	5220.06
Hours Since Overhaul	474.06

1.6.4 The aircraft was fitted with a four-cylinder Lycoming O-320-A2B engine and maintained by an approved aircraft maintenance organisation (AMO). The engine had operated for 5220.06 hours since new. It was overhauled on 30 June 2000 at 4746 hours and was further operated for 474.06 hours since the last overhaul. According to the aircraft logbooks, all applicable Airworthiness Directives (AD), Service Bulletins (SB) and Service Letters (SL) were signed out.

Propeller:

Manufacturer/Model	Sensenich M74DM-0-54
Serial Number	A53384
Hours Since New	1262.88
Hours Since Overhaul	474

1.7. Meteorological Information

1.7.1 The meteorological information was sourced from the South African Weather Service on 23 August 2021 at Port Elizabeth Aerodrome (FAPE) weather station at 1030Z.

Wind Direction	030°	Wind Speed	04 kt	Visibility	≥10000m
Temperature	20° C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	10° 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 for the aircraft type. There was no record indicating that the navigation system was unserviceable prior to the accident.

1.9. Communication

1.9.1 The aircraft was equipped with standard communication equipment as approved by the Regulator for the aircraft type. There was no record indicating that the communication system was unserviceable prior to the accident. The pilot was in contact with FAPA flight information on frequency 122.0-Megahertz (MHz).

1.10. Aerodrome Information

1.10.1 The aircraft took off from RWY28L at FAPA and impacted the ground hard on the left-side of RWY10L.

Aerodrome Location	Port Alfred (FAPA), Eastern Cape
Aerodrome Status	Registered
Aerodrome Co-ordinates	S 33°33.62' E 026°52.68'
Aerodrome Altitude	315 feet MSL
Runway Headings	10L/28R 10R/28L 18/36 07/25
Runway Dimensions	1236.77m X 29m
Runway Used	RWY 28L
Runway Surface	Grass
Approach Facilities	None
Radio Frequency	122.0 MHz

1.11. Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), and neither was required by regulation to be fitted on this aircraft.

1.12 Wreckage and Impact Information

1.12.1 The aircraft took off from RWY 28L and, after rotating whilst climbing at 600ft AGL, the engine stopped. The pilot attempted to execute a teardrop turn to do a forced landing on Runway 10L. However, he could not complete the teardrop turn as the aircraft was rapidly losing height. The aircraft impacted the ground hard on the left-side of Runway 10L, damaging the engine cradle, propeller, fuselage and engine cowling.

Figure 4: The aircraft as it came to rest on the left-side of RWY10L.

1.13 Medical and Pathological Information

1.13.1 Not applicable.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The accident was considered survivable as there was no damage to the cockpit or cabin area that would have caused injuries to the pilot. Moreover, the pilot had made use of the safety harness.

1.16 Tests and Research

1.16.1 The fuel (Avgas) was visually examined for contaminants and nothing untoward was found. Moreover, the fuel system was examined for any faults, and no anomalies were observed.

1.16.2 The aircraft was fitted with a Lycoming O-320-A2B engine with Serial number: L-47296-27A. The AMO received the engine on 2 September 2021 to be bench-tested. The AMO reported that visual inspection of the engine was carried out and no abnormalities or damages were detected or found. The engine was placed on a test bench "as it was removed" from the aircraft with all the components intact except for the exhaust (as the exhaust was damaged during the accident). The engine was tested in accordance with Lycoming Operators Manual Part No: 60297-30 Revision: October 2006, Section 3. The engine was bench-tested for 20 minutes and it performed as per the manufacturer's specifications.

1.17 Organisational and Management Information

1.17.1 The aircraft was operated privately under the provisions of Part 43 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.17.2 The aircraft was maintained by the approved AMO that was in possession of an authorised AMO certificate issued by the Regulator on 28 October 2020 with an expiry of 31 October 2021.

1.18 Additional Information

1.18.1 **PA 18-150A SUPER CUB PILOT FLIGHT MANUAL (FM) Section 1V (EMERGENCY PROCEDURES)**

ENGINE POWER LOSS DURING TAKEOFF

The proper action to be taken if loss of power occurs during takeoff will depend on circumstances.

1. If sufficient runway remains for a normal landing, land straight ahead.
2. If insufficient runway remains, maintain a safe airspeed and make only a shallow turn if necessary to avoid obstructions. Use of flaps depends on circumstances. Normally, flaps should be fully extended for touchdown.
3. If you have gained sufficient altitude to attempt a restart, proceed as follows:

a. MAINTAIN SAFE AIRSPEED
b. FUEL SELECTOR - SWITCH TO ANOTHER TANK CONTAINING FUEL.
c. MIXTURE - CHECK RICH
d. CARBURETOR HEAT - ON

NOTE

If engine failure was caused by fuel exhaustion, power will not be regained after tanks are switched until empty fuel lines are filled, which may require up to ten seconds.

If power is not regained, proceed with the POWER OFF LANDING procedures.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1. General

From available evidence, the following analysis was made with respect to this accident. This shall not be read as apportioning blame or liability to any particular organisation or individual.

2.2. Analysis

2.2.1 The pilot was initially issued a Commercial Pilot Licence on 16 August 1993; he did a competency evaluation on 10 February 2021 with an expiry date of 28 February 2022. The pilot had a Class I medical certificate issued on 1 February 2021 with an expiry date of 31 August 2021, with a restriction to wear corrective lenses. The pilot was properly licensed to conduct the test flight.

2.2.2 The aircraft was issued a Certificate of Registration on 8 August 2000. The aircraft was also issued a Certificate of Airworthiness on 8 April 2013 with an expiry date of 30 April 2022. The last MPI on the aircraft was carried out on 20 August 2021 at 8035.10 airframe hours, 5220.06 engine hours and 1262.88 propeller hours. The accident occurred 0.02 hours after

the last 50-hour MPI. No anomalies were observed during the last MPI which may have contributed to the accident.

2.2.3 The aircraft had 110 litres of fuel when it took off. Post-accident examination indicated that there were no contaminants in the fuel; also, the fuel system was checked and no abnormalities were found which could have contributed to the engine stoppage.

2.2.4 After the accident, the engine was visually inspected and no anomalies were found. The engine was then bench-tested for 20 minutes, and no anomalies were observed as the engine performed as per the manufacturer's specifications. Therefore, the cause of engine power loss and stoppage could not be determined as the engine ran normally after being bench-tested.

3. CONCLUSION

3.1. General

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

To serve the objective of this investigation, the following sections are included in the conclusion 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.
- **Causes —** are actions, omissions, events, conditions or a combination thereof, which led to this accident.
- **Contributing factors —** are actions, omissions, events, conditions or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident occurring, or would have mitigated the severity of the consequences of the accident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability.

3.2. Findings

3.2.1 The pilot was initially issued a Commercial Pilot Licence on 16 August 1993; he did a competency evaluation on 10 February 2021 and was reissued the licence on the same date with an expiry date of 28 February 2022.

3.2.2 The pilot had a valid Class I medical certificate issued on 1 February 2021 with an expiry date of 31 August 2021, and with a restriction to wear corrective lenses.

3.2.3 The aircraft was issued a Certificate of Registration on 8 August 2000. The aircraft was also issued a Certificate of Airworthiness on 8 April 2013 with an expiry date of 30 April 2022.

3.2.4 The flight was conducted in VFR by day and under the provisions of Part 43 of the CAR 2011.

3.2.5 The aircraft was maintained by an AMO with a certificate issued on 28 October 2020 and with an expiry date of 31 October 2021.

3.2.6 The last MPI was carried out on 20 August 2021 at 8035.10 airframe hours, 5220.06 engine hours and 1262.88 propeller hours. The accident occurred 0.02 hours after the last 50-hour MPI.

3.2.7 The pilot reported that the aircraft had 110 litres of fuel when he took off; the engine failed at about 600 feet AGL. The pilot switched fuel tanks from the left to the right tank and the engine restarted momentarily but stopped again. The engine bench test could not establish any anomalies with the fuel system and the engine; therefore, no anomalies which could have contributed to the engine stoppage were identified.

3.2.8 The aircraft failed shortly after take-off and the pilot attempted to execute a forced landing on RWY 10L, resulting in the aircraft impacting the ground hard.

3.2.9 The aircraft was unsuccessfully forced landed after the aircraft experienced engine power loss which was followed by engine stoppage during the climb phase.

3.2.10 Following the accident, the engine was inspected and no anomalies were found. The engine was also bench-tested for 20 minutes and no anomalies were observed as the engine performed as per the manufacturer's specifications.

3.3. Probable Cause/s

3.3.1 Engine power loss and stoppage in-flight, resulting in an unsuccessful forced landing. The cause of engine stoppage could not be determined.

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 Engine test run report.

This report is issued by:

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

Appendix 1: Engine Test Run Report

43 AIR SCHOOL
NEXT GENERATION TRAINING

7 October 2021

ZS-CKP.

Engine test run report:
Engine make: Lycoming O-320-A2B.
Serial number: L-47296-27A.

The engine was received 02 September 2021 to be tested on our engine test bench as requested by SA-Mooney and Mr A Buchan the insurance assessor.

The engine was installed on our test bench "as it was removed" from the aircraft with all the components intact except for the exhaust, as the exhaust was damaged during the incident.
The engine was tested in accordance with, Lycoming Operators Manual part nr: 60297-30 revision: October 2006, Section 3.

The engine was tested for twenty minutes, and the engine performed as per the manufacturer's specification in the said Manual.

I hereby confirm that the above information is true and accurate
Should you require more information or further clarity on this matter, please do not hesitate to contact the Apprentice Department.
Kind regards