SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-57

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10383						
Classification	Accident	**Date**	28 October 2023	**Time**	0830Z		
Type of Operation	Private (Part 91)						
Location							
Place of Departure	Wonderboom Airport, (FAWB) Gauteng Province	Place of Intended Landing	Wonderboom Airport (FAWB), Gauteng Province				
Place of Occurrence	Private farm in Bela-Bela, Limpopo						
GPS Co-ordinates	Latitude	24° 56' 31.4" S	Longitude	028° 16' 32.3" E	Elevation	4100ft	
Aircraft Information							
Registration	ZS-MKY						
Make; Model; S/N	Piper; PA28-180 Cherokee (Serial Number: 28-1171)						
Damage to Aircraft	Substantial	Total Aircraft Hours	3705.16				
Pilot-in-command							
Licence Type	Private Pilot Licence	Gender	Male	Age	23		
Licence Valid	Yes	Total Hours	77.4	Total Hours on Type	77.4		
Total Hours 30 Days	8.3	Total Flying on Type Past 90 Days	8.3				
People On-board	1+2	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0

What Happened

On Saturday, 28 October 2023 at 0830Z, a Piper PA28-180 Cherokee aircraft with registration ZS-MKY was involved in an accident during a forced landing on a private farm in Limpopo province. The flight was operated on a hire-and-fly basis. On-board the aircraft were the pilot and two passengers. Visual meteorological conditions (VMC) by day prevailed at the time of the flight which was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot and the passengers intended to conduct a private cross-country flight for hour building from Wonderboom Airport (FAWB), routing to Rustenburg Airport (FARB), Pilanesberg (FAPN), Bela-Bela Airfield (FAWA) and back to FAWB. The pilot had a Private Pilot Licence (PPL) and was rated on the aircraft type. According to the pilot, a pre-flight inspection was conducted with no anomalies noted, the aircraft was refuelled to capacity. Also, the pilot was informed about the left-side fuel gauge that was inoperative, and was not deferred in the logbook. The passenger (who also had a PPL) and seated on the right-side seat, was not part of the aircraft operation during this flight. Take-off from FAWB was uneventful; the aircraft routed to FARB and FAPN, flying overhead both aerodromes, whereafter it headed to FAWA. The pilot had planned to conduct a touch-and-go landing at FAWA. Whilst at approximately 5 nautical miles (nm), the aircraft began a descent from 7500 feet (ft) above mean sea level to 5700 ft.

According to the pilot, during this transition the aircraft's power was reduced from 2300 to 1500 revolutions per minutes (RPM). The pilot also selected the carburettor heat but closed it halfway through descent. During descent and prior to reaching 5700 ft above ground level, the pilot increased

power to maintain the desired 5700 ft; however, he noticed that the engine was not responding and the RPM remained at 1500. The pilot then commenced with the engine power loss procedure by opening the carburettor heat and switching the fuel tank from the right to the left feed with no change in power. The pilot deduced that the aircraft will not reach FAWA as it was losing height. At approximately 2nm from the airfield, the pilot surveyed the area and noticed an open field on the right side of the aircraft's path. The pilot then steered the aircraft to the right, aiming for the open field on which to conduct a forced landing.

When the nose gear touched the ground, the pilot applied brakes to reduce speed. However, the aircraft veered off to the left whereafter it impacted an irrigation machine with its right wing before it stopped. During impact, the aircraft abruptly shifted to the left and the nose landing gear broke, which caused the propeller to impact the ground. One of the propeller blades caused the engine to stop.

The aircraft sustained damage to the right-wing tip, the nose landing gear, engine cowlings and the propeller blade. No injuries were reported during this accident. All occupants disembarked from the aircraft unassisted.

Figure 1: The damaged aircraft after the accident. (Source: Operator)

Figure 2: The aircraft's resting position post-accident. (Source: Operator)

Figure 3: Damaged caused to the irrigation machine.

About the aircraft

The information below is an extract from the Pilot's Operating Handbook

The Piper PA-28-180 Cherokee is a family of two-seat or four-seat light aircraft built by Piper Aircraft and designed for flight training, air taxi and personal use. The PA-28-180 family of aircraft comprises all-metal, unpressurised, single piston-engine airplanes with low-mounted wings and tricycle fixed landing gear.

Engine Power Loss:

The most common of engine power loss is mismanagement of the fuel. Therefore, the first step to take after engine power loss is to move the fuel selector valve to the tank not being used. This will often keep the engine running even if there is no apparent reason for the engine to stop on the tank being used. If changing to another tank does not restore the engine:

1. *Check fuel pressure and turn on electrical fuel pump if OFF.*
2. *Push mixture control to full "RICH".*
3. *Check ignition switch. Turn to best operating magnetos left, right or both.*

Post-accident inspection

An on-site investigation by the AMO revealed that there was sufficient fuel on-board the aircraft for the flight. The aircraft was found in an upright position, and with the nose section and two main landing gears on the ground. One of the propeller blades was damaged. No further damage was noted on the aircraft except on the right-wing tip, the nose landing gear and the propeller blade. The aircraft and the engine were inspected on site and the aircraft was placed on a support stand to achieve a level position. The throttle was found set on full power, the fuel mixture control lever was set on lean position, and the left-side fuel gauge was inoperative when the cockpit was inspected. The throttle moved without any restriction when tested. After a careful review, a decision was made to test run the engine on-site; it successfully started and it reached 2700 rpm, which was satisfactory. This test also proved that there was nothing in the fuel system that could have restricted fuel flow during the flight, and which could have led to the engine power loss.

Aircraft Performance

During transition from 7500 ft to 5700 ft AGL, the pilot stated that prior to reaching 5700 ft, he conducted all the required checks and increased power without adjusting the fuel air mixture to compensate for the power required to maintain the desired flight level. The fuel mixture was set at lean position (as it was not adjusted at descent).

Post-accident, the pilot stated that during flight, the fuel mixture was on constant setting which resulted in satisfactory revolutions per minute whilst flying overhead both FARB and FAPN. During approach for FAWA, the pilot intended to conduct a touch-and-go landing before flying back to FAWB; hence, the descent from 7500 ft to 5700 ft. Although the pilot conducted other checks, including the carburettor heat for icing control, upon reaching the desired flight level when he configured the aircraft to maintain the flight level, he did not configure the fuel air mixture control to boost engine power. The engine power setting remained at 1500 RPM as set during descent, and thus, the pilot noticed the loss of power. Moreover, during an attempt to recover engine power, the pilot increased the carburettor heat which aggravated the existing low engine power; thereafter, the pilot opted to land the aircraft on an open field.

Findings

1. The pilot, who was also the owner of the aircraft, had a Private Pilot Licence (PPL) which was initially issued by the Regulator (SACAA) on 2 October 2020. The licence renewal was issued on 17 August 2022 with an expiry date of 30 August 2025.

2. His Class 2 aviation medical certificate was issued on 22 July 2022 with an expiry date of 31 July 2027. The pilot's training was conducted on the aircraft type which was endorsed on his licence. The pilot had accumulated a total of 77.4 hours.

3. The aircraft had a Certificate of Airworthiness (C of A) that was issued by the Regulator on 28 August 2023 with an expiry date of 31 August 2024. Post-maintenance, the Certificate of Release to Service (CRS) was issued on 28 July 2023 at 3 682.17 airframe hours with an expiry date of 27 July 2024 or at 7782.17, whichever comes first.

4. The AMO that maintained the aircraft had a valid AMO certificate that was issued by the Regulator on 17 August 2022 with an expiry date of 31 August 2023.

5. The aircraft's left-side fuel gauge was inoperative and was not deferred in the logbook. There was, however, sufficient fuel on-board the aircraft for the intended flight. Fine weather conditions prevailed at the time of the flight.

6. Following a descent from 7500 ft to 5700 ft, the pilot did not configure the fuel control mixture to compensate for the required engine power to maintain the desired flight level during approach for a touch-and-go landing at FAWA. The engine power remained at 1500 ft whereafter he opted to execute a forced landing on an open field after deducing that the aircraft will not reach the airfield due to the rapid loss of height.

7. The aircraft touched down uneventfully, however, during the landing roll when the pilot attempted to bring the aircraft to a stop by applying brakes, it veered off to the left and impacted the pivoted irrigation structure. The right-wing tip was damaged, as well as the nose landing gear and the propeller blade.

8. After the accident, the aircraft was inspected by the AMO whereafter, a decision was taken to test-run the engine on site. The engine ran satisfactorily in accordance with the required perimeters.

Probable Cause(s)

The pilot omitted to adjust the fuel mixture and added power, as well as misread the set 1500 RPM to indicate power loss. This resulted in the pilot conducting a forced landing which was unsuccessful.

Contributing Factor(s)

None.

Safety Action(s)

Pilots should not be complacent when flying aircraft.

Safety Message

To avoid injury and damage to property, pilots should be vigilant at critical phases of flight such as take-offs and landings.

About this Report

The decision to conduct a limited investigation is based on factors including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation and that will determine the scope of an investigation. For this occurrence, a limited investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this limited report. The report has been compiled using information supplied in the initial notification, as well as from follow-up desk top enquiries to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar occurrence.

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

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, 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

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