SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

Reference:	CA18/2/3/9828

Aircraft Registration	**ZS-EEZ**	**Date of Accident**	6 October 2019	**Time of Accident**	1555Z
Type of Aircraft	Piper PA-28-140	**Type of Operation**		Private (Part 91)	
Pilot-in-command Licence Type	Commercial Pilot Licence	**Age**	30	**Licence Valid**	Yes
Pilot-in-command Flying Experience	Total Flying Hours	255.4		Hours on Type	21.5
Last Point of Departure	Vryburg Aerodrome (FAVB): North West Province				
Next Point of Intended Landing	Klerksdorp Aerodrome (FAKD): North West Province				

Location of the accident site with reference to easily defined geographical points (GPS readings if possible)

Huhudi township, near Vryburg (GPS S 26° 58’ 35.4” E 024°44’6.66”), elevation 3945 feet

Meteorological Information	Surface wind: 300°/14kts gusting at 25kts; temperature: 33°C; dew point: 7°C; QNH: 1017hPa; Visibility: CAVOK				
Number of People on-board	1+1	**No. of People Injured**	1	**No. of People Killed**	1

Synopsis

The pilot and a passenger on-board a Piper PA-28-140 aircraft took off on a private flight from Vryburg Aerodrome (FAVB) to Wonderboom Aerodrome (FAWB) with the intention to make a stop for fuel uplift at Klerksdorp Aerodrome (FAKD). The passenger stated that during take-off from Runway 36, the aircraft made an early right turn approximately 12 metres (m) above ground level (AGL) and at the height of the power lines. Thereafter, the pilot had to manoeuvre the aircraft to avoid colliding with electric lines on its path; which he narrowly cleared. The aircraft continued with the right turn and, thereafter, began to lose height until it impacted the road and, later, two trees about 0.9km east of FAVB. The aircraft continued to skid for approximately 15m before hitting and damaging a property perimeter fence, as well as its concrete pillar on the veranda, the windowpane, a garage wall, a garage door, a car parked in the garage and a tap before it came to a stop.

The paramedics, who were alerted by one of the community members, administered first aid to the passenger who was seriously injured before taking him to hospital for further treatment. The pilot had succumbed to his injuries at the accident site. The aircraft was destroyed during the accident sequence.

The investigation revealed that the aircraft made an early right turn before reaching the required take-off height of 500 feet AGL, which put the aircraft in a tail wind condition, increasing its forward speed, thus, reaching the power lines sooner than expected. This resulted in the pilot making a manoeuvre to avoid hitting the power lines, which he narrowly missed. Thereafter, the pilot lost control of the aircraft, which continued on a right turn until it crashed.

SRP Date	1 December 2020	Publication Date	3 December 2020

ABBREVIATION	DESCRIPTION
AGL	Above Ground Level
AMO	Aircraft Maintenance Organisation
AMSL	Above Mean Sea Level
CAR	Civil Aviation Regulations
C of A	Certificate of Airworthiness
C of R	Certificate of registration
CPL	Commercial Pilot Licence
CVR	Cockpit Voice Recorder
FAA	Federal Aviation Administration
FAKD	Klerksdorp Aerodrome
FAVB	Vryburg Aerodrome
FAWB	Wonderboom Aerodrome
FDR	Flight Data Recorder
ft	feet
gal	gallons
GPS	Global Positioning System
hPa	hectopascals
km	kilometres
Kts	Knots
LH	Left-hand
m	metre
MPI	Mandatory Periodic Inspection
nm	Nautical miles
P92E	Tecnam Echo Super
QNH	Query: Nautical Height
RH	Right-hand
SAPS	South African Police Service
SAWS	South African Weather Service
TBO	Time Between Overhaul
VFR	Visual Flight Rules

Reference Number	**:** CA18/2/3/9828
Name of Owner/Operator	**:** Voertuie vir almal (PTY) LTD
Manufacturer	**:** Piper Aircraft Corporation
Model	**:** Piper PA-28-140
Nationality	**:** South African
Registration Marks	**:** ZS-EEZ
Place	**:** Huhudi near Vryburg, North West Province
Date	**:** 6 October 2019
Time	**:** 1555Z

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 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****.*

Investigations process:

The accident was notified to the Accident and Incident Investigations Division (AIID) on 6 October 2019 at approximately 1630Z. The investigators dispatched to Huhudi on 7 October 2019. The investigators co-ordinated with all authorities on site by initiating the accident investigation process according to CAR Part 12 and investigation procedures. The AIID of the South African Civil Aviation Authority (SACAA) is leading the investigation as the Republic of South Africa (RSA) 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 Piper PA-28-140 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 be adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report are limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows or lines.

Disclaimer:

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1 On 6 October 2019, the pilot and a passenger on-board a Piper PA-28-140 aircraft, with registration ZS-EEZ, took off on a private flight under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended. The aircraft departed Wonderboom Aerodrome (FAWB) at 1115Z and landed safely at Vryburg Aerodrome (FAVB) at approximately 1315Z. The flight from FAWB to FAVB was uneventful and was conducted under visual flight rules (VFR) by day.

1.1.2 During an interview (post-accident), the passenger stated that they had visited friends and family in Colridge, near Vryburg. The house that they had visited is located approximately 4.6 kilometres (km) north-west of FAVB. The passenger further stated that during their visit, they had bought beers to take along because the liquor stores would have been closed by the time they reached FAWB. The passenger had drunk some beers earlier in the day. He also stated that he had not seen the pilot drinking any beer on the day of the accident.

1.1.3 In the afternoon at approximately 1550Z, the pilot and the passenger took off from FAVB to FAWB. Their plan was to fly via Klerksdorp Aerodrome (FAKD) where they would uplift fuel, and then continue to FAWB. FAKD is 187 kilometres (km) north-east of FAVB. The planned routing included a right-hand turn after take-off.

1.1.4 According to the passenger, they took off from Runway 36 at FAVB. All went well until the aircraft made a sudden right turn at the height (approximately 12m) of electric wires which ran parallel to the runway, and the pilot narrowly cleared them. The passenger recalled seeing the pilot making a lot of different inputs on the controls. However, the passenger could not confirm if there was anything wrong with the aircraft. The passenger further stated that he had asked the pilot if all was fine; however, the pilot did not respond but remained calm. The pilot had, then, added power and pulled back the flaps (flaps up position).

1.1.5 The aircraft continued with a right turn whilst losing height and impacted the road and, later, two trees in a right-wing low attitude about 0.9km from FAVB. The aircraft skidded for approximately 15 metres (m) before colliding with a property, damaging its parameter fence, a concrete pillar on the veranda, a windowpane, a garage wall, a garage door, a car parked in the garage and a tap before coming to a stop. No person was injured on the ground.

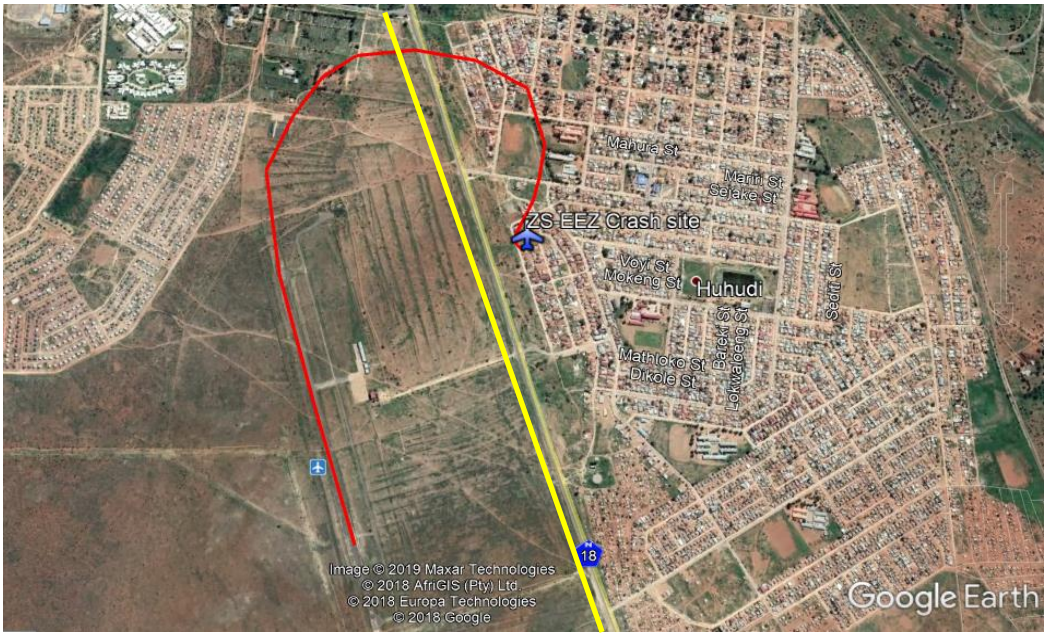

Figure 1: The flight path indicated by the red line; and the power lines indicated by the yellow line.

1.1.6 An eyewitness, who resides in the house next to the one that was damaged, stated that she heard a noise and saw the aircraft flying low; the aircraft veered from left to right on its path in a south-easterly direction over the houses. The aircraft flew over two 15m tall trees then impacted the road in a right-wing low attitude and, thereafter, impacted two smaller trees in front of the (damaged) house with its right wing.

1.1.7 The owner of the damaged house reported that he came out of his house after the accident and found the passenger seating under a tree at his neighbour's house. He also stated that fuel was spilling from the aircraft and there was water coming from the tap that was uprooted by the aircraft during impact. One of the residents called an ambulance and the South African Police Service (SAPS). On arrival, the paramedics administered first aid to the passenger who was seriously injured, however, the pilot had succumbed to his injuries at the accident site. The passenger was taken to hospital for further treatment. The aircraft was destroyed during the accident sequence.

1.1.8 The accident occurred during daylight at Huhudi township near Vryburg at Global Positioning System (GPS) determined to be: S 26° 58' 35.4" E 024°44' 6.66" and at an elevation of 3945 feet (ft) above mean sea level (AMSL).

1.2. Injuries to Persons

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

1.3. Damage to Aircraft

1.3.1 The aircraft was destroyed during the accident sequence.

Figure 2: The wreckage as found at the accident site.

1.4. Other Damage

1.4.1 The house, window, garage door, vehicle taillight, a tap and a fence were also damaged.

Figures 3 and 4: Damage caused to the window of the house, the garage door and the parameter wall. The vehicle which was parked in the garage (not visible in the picture) was also damaged.

1.5. Personnel Information

Nationality	South African	Gender	Male	Age	30
Licence Number	0272331299	Licence Type	Commercial Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night, Instrument and Grade III instructor				
Medical Expiry Date	31 August 2020				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	255.4
Total Past 90 Days	16.7
Total on Type Past 90 Days	2.7
Total on Type	21.5

1.5.1 The pilot was initially issued a Commercial Pilot Licence (CPL) on 24 October 2013 and the aircraft type was endorsed on his licence. His last validation was on 30 May 2019 and his licence was reissued with an expiry date of 20 May 2020. The pilot held a Class 1 aviation medical certificate issued on 2 August 2019 with an expiry date of 31 August 2020, with no restrictions. He obtained his grade 3 instructor rating on 28 July 2019. The pilot's logbook was last updated on 14 September 2019. According to the flight authorisation sheet at the aviation training school, he last flew on 4 October 2019 for 1.7 hours in a Tecnam Echo Super (P92E). During the accident flight, the pilot was flying an aircraft hired from another training school.

1.6 Aircraft Information

1.6.1 Source: Piper Website

The Piper PA-28 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 family of aircraft comprises all-metal, unpressurized, single-engine, piston-powered airplanes with low-mounted wings and tricycle landing gear. They have a single door on the right side, which is entered by stepping on the wing.

Figure 5: A file photo of the aircraft type. (Source://www.jetphotos.com/photo/9309654)

Airframe:

Type	Piper PA-28-140	
Serial Number	28-20575	
Manufacturer	Piper Aircraft Corporation	
Date of Manufacture	1964	
Total Airframe Hours (At time of Accident)	4693.38	
Last MPI (Date & Hours)	4643.60	19 July 2019
Hours Since Last MPI	49.78	
Certificate of Airworthiness (Issue Date)	25 July 2014	
Certificate of Airworthiness (Expiry Date)	31 July 2020	
C of R (Issue Date) (Present owner)	18 April 2013	
Operating Categories	Private (Part 91)	
Recommended Fuel Used	Avgas LL100	

Engine:

Type	Lycoming O-320-E2A
Serial Number	L-14724-27A
Hours Since New	9414.1
Hours Since Overhaul	343.0

Propeller:

Type	Sensenich 74 DM6-0-58
Serial Number	A60596
Hours Since New	862.8
Hours Since Overhaul	TBO not yet reached

1.6.2 The aircraft maintenance records such as logbooks, Mandatory Periodic Inspection (MPI) records and flight folio records were reviewed and no anomalies were found. The aircraft has two 25-gallon fuel tanks with a total fuel capacity of 50 gallons. The aircraft has a total useable fuel capacity of 48 gallons, with 24 gallons of usable fuel per tank. It consumes 8.4 gallons per hour when cruising at 100 knots (kts) and has an endurance of 5.7 hours. The aircraft was last refuelled with 17 gal of Avgas LL 100 on 4 October 2019, which filled both tanks to capacity. According to the flight folio, the aircraft was flown for 0.4 hours in the morning of 6 October 2019. During take-off from FAWB, the aircraft had approximately 5.3 hours endurance. The flight from FAWB to FAVB was approximately 2 hours (202 nautical miles). Before take-off from FAVB, the aircraft had a total of 3.3 hours endurance, and the accident flight was approximately 0.04 hours. The aircraft flew a total of 2.44 hours since refuelling on 4 October 2019 and had 2.85 hours endurance left (23.9 gallons).

1.6.3 According to the aircraft logbook, the last 100-hour MPI was conducted on 19 July 2019 at 4693.60 hours by a Regulator-approved AMO. The aircraft had flown 49 hours since its last MPI. The aircraft was issued a Certificate of Release to Service (CRS) on 19 July 2019 at 4693.6 hours with an expiry date of 18 July 2020 or at 4743.6 hours, whichever occurs first.

1.6.4 *Piper Cherokee Pilot's Operating Manual extract:*

The maximum crosswind component in which the aeroplane has been demonstrated to be safe for take-off and landing is 17 knots at a tower height of 33 feet.

1.7 Meteorological Information

1.7.1 The weather report was obtained from the South African Weather Service (SAWS) for the aviation weather station at FAVB on 6 October 2019 at 1545Z.

Wind direction	300°	Wind speed	14 G 25kts	Visibility	9999m
Temperature	33°C	Cloud cover	Nil	Cloud base	Nil
Dew point	7°C	QNH	1017hPa		

1.7.2 The aircraft took off from Runway 36 with the surface wind at 300°/14kts gusting 25kts. Therefore, the wind angle was 60° and the crosswind component was 12kts for the main wind speed of 14kts; the crosswind component was 22kts for the gusting wind speed of 25kts.

Crosswind component = wind speed x sin (wind angle)

= 14kts x sin60

= 12kts

Crosswind component = gusting wind speed x sin (wind angle)

= 25kts x sin60

= 22kts

With the above calculations, the wind gust crosswind component of 22kts was in excess by 5kts compared to the maximum safe (demonstrated) take-off crosswind component of 17kts. This could make the aircraft difficult to control.

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA) for the aircraft type. No defects that could render the navigation system unserviceable were recorded before the flight.

1.9 Communication

1.9.1 The aircraft was equipped with standard communication equipment as approved by the Regulator. There were no recorded defects with the communication equipment prior to the flight.

1.10 Aerodrome Information

1.10.1 The accident occurred during daylight at Huhudi residential area, which is 800m east of Vryburg Aerodrome, North West province, at GPS co-ordinates determined to be 26° 58' 35.4" South, 024° 44' 6.66" East, at an elevation of 3945ft AMSL.

Aerodrome Location	Republic of South Africa – Vryburg Airfield
Aerodrome Coordinates	GPS S 26° 58’ 50.38” E 024°43’7.58”
Aerodrome Elevation	3945 feet (AMSL)
Runway Designations	18/36
Runway Dimensions	1200m x 20m
Runway Used	36
Runway Surface	Asphalt
Approach Facilities	None

1.10.2 According to the Aeronautical Information Publication (AIP), the circuit altitude at FAVB is 5000ft AMSL.

1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder (FDR) or cockpit voice recorder (CVR), nor were these required to be fitted on this aircraft type.

1.12 Wreckage and Impact Information

1.12.1 According to the eyewitness who saw the aircraft seconds before impact, the aircraft flew in a south easterly direction in a right-wing low attitude. It flew over two tall trees approximately 15m high (see Figure 6).

Figure 6: The location of the trees in relation to where the wreckage was found.

The aircraft first impacted the street pavement with its right-wing tip and the right-hand (RH) main landing gear wheel. This was indicated by blue and white paint marks on the street's surface and the black tyre marks towards the left-hand (LH) side of the street pavement.

1.12.2 The aircraft's right-wing in-board leading edge collided with the first tree and then the outer right-wing leading edge collided with the second tree. The aircraft began to veer off to the right (see figure 7). Both trees were lining the street on the left side of the house.

Figure 7: The ground scars on the road.

1.12.3 The left wing-tip collided with a building pillar on the patio of the house and then the wall. The LH main landing gear impacted the ground and broke off. The LH wing stroke the windowpane, breaking it, and impacted the garage wall and door. The aircraft's engine compartment impacted the garage's outer wall and demolished it, and the cockpit panel bent (turned) towards the right. The fuselage was torn into two parts from the middle, with the LH side (where the pilot was seated) folded backwards.

Figures 8 and 9: Scratch marks of the left-wing tip on the pillar and the damaged window.

Figure 10: The impact points show the initial direction (southerly) of the aircraft before impacting the house. After impact, the aircraft turned left and came to a stop, facing north east.

Figure 11: Damages on the right-wing leading edge and wing-tip.

1.12.4 After impact, the LH wing main spar broke off and the rest of the wing was destroyed. The engine compartment was found resting on the propeller hub (see Figure 12) and the propeller blades had dug into the ground and both had bent forward (see Figure 13), indicating that the engine had power until the point of impact. The nose landing gear wheel had broken off from the mounting fork, which was also bent.

Figures 12 and 13 The aircraft and the propeller blade with the blade tips curled forward, indicative of a high-power setting.

1.12.5 The cockpit was destroyed during the accident sequence and the LH front seat had broken off (see Figure 14). The LH rear seat was found on the RH side of the wreckage. The front LH seat harness was cut by the first responders to release the pilot. Both the RH side (front and rear) seats were still intact in their mounting positions (see Figures 14 and 15) and the passenger's safety harness was still intact. All flight control cables were still intact, and the continuity was established. The cables were cut during recovery. All flight control surfaces were accounted for.

Figures 14 and 15: The damaged pilot seat (left) and the passenger seat (right).

1.12.6 The fuel selector was found on the left-side of the wreckage (see Figure 16) and the LH fuel tank was destroyed by impact forces. The RH fuel tank was damaged during impact. The investigators had dipped a stick in the tank and found some fuel remaining in the tank. The damaged RH wing and the low volume of fuel made it difficult to drain the fuel to determine how many gallons were left in the tank. The owner of the house stated that there was fuel spillage after the accident and there was a large quantity of water from the

tap that was uprooted by the aircraft during impact (see Figure 16). There was also a strong smell of fuel at the accident site the day after the accident.

Figure 16: The wreckage and fuel and water spillage after the accident. (source: SAPS)

1.12.7 The instrument panel was found destroyed; the airspeed indicator and the artificial horizon were found on the ground. The rest of the instruments were found still intact on the instrument panel. The tail section was found buckled, and the horizontal stabiliser was found damaged. The vertical fin was found intact.

1.12.8 Broken beer bottles, which were in a cooler bag, were found in the wreckage. Broken bottles were found all over the cabin. The investigation team could not determine how many were there or whether they were empty before impact. The passenger stated that they had bought beers in one of the local bottle stores in Vryburg as they were anticipating finding bottle stores closed in Pretoria when they got to FAWB.

1.13 Medical and Pathological Information

1.13.1 The pilot was fatally injured during the accident. The post-mortem and toxicology reports were still outstanding at the time of compiling this report. Should any of the results have a bearing on the circumstances leading to this accident, it will be treated as new evidence that will necessitate the reopening of this investigation.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The accident was considered non-survivable because the cabin structure was destroyed during the accident sequence. The pilot's body was trapped in the wreckage. The safety harness was cut off by the first responders. Both the pilot and the passenger had used safety harnesses. The passenger sustained serious injuries and the pilot was fatally injured.

1.16 Tests and Research

1.16.1 The propeller blade tips had curled forward, indicative of a high-power engine setting. On 8 October 2019, the aircraft was recovered to a hangar at FAWB by an aircraft maintenance organisation (AMO) which inspected the engine for any possible failures prior to the accident. The AMO reported that all damages found were associated with impact during the accident.

1.17 Organisational and Management Information

1.17.1 This was a private flight from FAVB with an intention to make a stop at FAKD to uplift fuel and then proceed to FAWB. The flight was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.17.2 The last MPI was conducted by an approved AMO. The AMO (0247) had an approval certificate issued by the Regulator on 26 November 2018 with an expiry date of 30 November 2019.

1.18 Additional Information

1.18.1 Source: Airplane Flying Handbook (FAA-H-8083-3B) Chapter 5 Initial Climb

Upon lift-off, the airplane should be flying at approximately the pitch attitude that allows it to accelerate to Vy (maximum rate of climb). This is the speed at which the airplane gains the most altitude in the shortest period of time. If the airplane has been properly trimmed, some back-elevator pressure may be required to hold this attitude until the proper climb speed is established. Relaxation of any back-elevator pressure before this time may result in the airplane settling, even to the extent that it contacts the runway. The airplane's speed will increase rapidly after it becomes airborne. Once a positive rate of climb is established, the pilot should retract the flaps and landing gear (if equipped). It is recommended that take-off power be maintained until reaching an altitude of at least 500 feet above the surrounding terrain or obstacles. The combination of Vy and take-off power assures the maximum altitude gained in a minimum amount of time. This gives the pilot more altitude

from which the airplane can be safely manoeuvred in case of an engine failure or other emergency. A pilot should also consider flying at Vy versus a lower pitch for a cruise climb requires much quicker pilot response in the event of a powerplant failure to preclude a stall.

1.18.2 *Source: Airplane Flying Handbook (FAA-H-8083-3B) Chapter 5* Crosswind Take-off

A crosswind affects the airplane during take-off much as it does during taxiing. With this in mind, the pilot should be aware that the technique used for crosswind correction during take-offs closely parallels the crosswind correction techniques used for taxiing. The technique used during the initial take-off roll in a crosswind is generally the same as the technique used in a normal take-off roll, except that the pilot must apply aileron pressure into the crosswind. This raises the aileron on the upwind wing, imposing a downward force on the wing to counteract the lifting force of the crosswind; and thus, preventing the wing from rising. The pilot must remember that since the ailerons and rudder are deflected, drag will increase; therefore, less initial take-off performance should be expected until the airplane is wings-level in coordinated flight in the climb. If a proper crosswind correction is applied, the aircraft will maintain alignment with the runway while accelerating to take-off speed and then maintain that alignment once airborne. As take-off acceleration occurs, the efficiency of the up aileron will increase with aircraft speed causing the upwind wing to produce greater downward force and, as a result, counteract the effect of the crosswind. The yoke, having been initially turned into the wind, can be relaxed to the extent necessary to keep the aircraft aligned with the runway. As the aircraft becomes flyable and airborne, the wing that is upwind will have a tendency to be lower relative the other wing requiring. Simultaneous rudder input to maintain runway alignment. This will initially result in the aircraft to sideslip. However, as the aircraft establishes its climb, the nose should be turned into the wind to offset the crosswind, wings brought to level, and rudder input adjusted to maintain runway alignment (crabbing). Firm and positive use of the rudder may be required to keep the airplane pointed down the runway or parallel to the centreline. Unlike landing, the runway alignment (staying over the runway and its extended centreline) is paramount to keeping the aircraft parallel to the centreline. The pilot must then apply rudder pressure firmly and aggressively to keep the airplane headed straight down the runway. However, because the force of a crosswind may vary markedly within a few hundred feet of the ground, the pilot should check the ground track frequently and adjust the wind correction angle, as necessary. The remainder of the climb technique is the same used for normal take-offs and climbs.

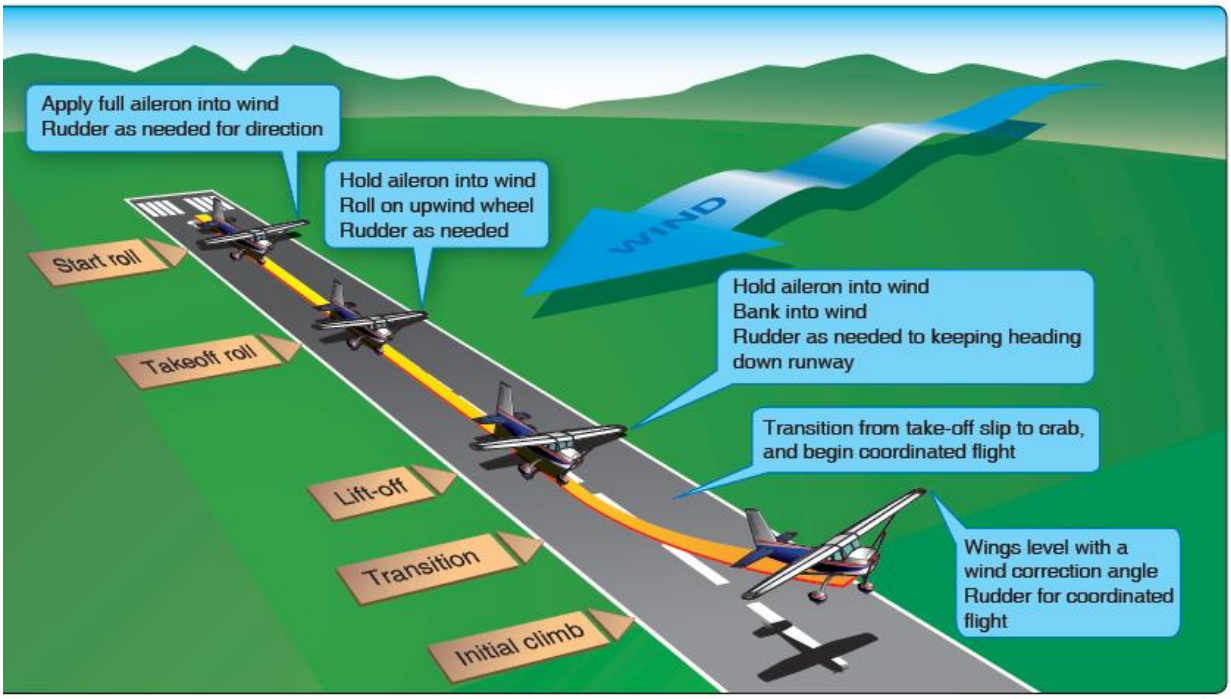

Figure 17: Illustration of crosswind roll and take-off climb. (Source: Airplane Flying Handbook)

1.18.3 It is recommended that after take-off, an aircraft should only turn left or right after passing 500ft or climb to circuit altitude, follow the circuit and break off from the circuit to route the destination. The aircraft turned at lower than 500ft AGL.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1. General

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

2.2 Analysis

2.2.1. The pilot had a Commercial Pilot Licence (CPL) issued on 24 October 2013. His last renewal was on 30 May 2019 with an expiry date of 31 May 2020. He had a Class 1 aviation medical certificate that was issued on 2 August 2019 with an expiry date of 31 August 2020, and with no restrictions.

2.2.2 After take-off with a crosswind from the left, the aircraft turned right before reaching a height of 500ft AGL as required by the Federal Aviation Administration (FAA) handbook, this resulted in a tailwind condition, which accelerated the aircraft, making it reach the power lines sooner than anticipated. The pilot took an evasive manoeuvre to avoid colliding with the power lines, however, this resulted in the pilot losing control of the aircraft and subsequently crashed.

2.2.3 The aircraft had 23.9 gallons of fuel on-board, which translated to approximately 2.85 hours endurance. This indicated that it had enough fuel for the flight to FAKD.

2.2.4 The aircraft was destroyed during impact, with the pilot fatally injured and the passenger seriously injured.

2.2.5 There were broken beer bottles found in the cabin. The investigating team could not determine how many bottles were there or whether they were empty. The passenger stated that they had bought beers as the liquor stores would have been closed by the time they reached FAWB.

2.2.6 At the time of release of this report, the post-mortem and toxicology reports were not available to the investigating team. Should the post-mortem and/or toxicology report reveal new evidence, it will necessitate the reopening of the investigation.

2.2.7 The propeller condition indicated that the engine had sufficient power on impact, given that the blade tips were curled forward. None of the engine or airframe systems had any reported deficiencies prior to the accident and all damages observed on the aircraft at the accident site were a result of the crash.

2.2.8 The investigation revealed that the aircraft made an early right turn before reaching the required take-off height of 500ft AGL, which put the aircraft in a tailwind condition, increasing its forward speed, thus, reaching the power lines sooner than expected. This resulted in the pilot making a manoeuvre to avoid hitting the power lines, which he narrowly missed. Thereafter, the pilot lost control of the aircraft, which continued on a right turn until it crashed.

3. CONCLUSION

3.1. General

From the evidence available, 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 or incident occurring, or mitigated the severity of the consequences of the accident or incident. 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 CPL with the type endorsed on it on 24 October 2013. His last validation was carried out on 30 May 2019 with an expiry date of 20 May 2020. The pilot was issued an aviation medical certificate (Class 1) on 2 August 2019 with an expiry date of 31 August 2020, and with no restrictions. The pilot last flew the aircraft type on 6 April 2019.

3.2.2 The flight was private, conducted under Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

3.2.3 The aircraft was issued a Certificate of Release to Service on 19 July 2019, which would have lapse at 4743.6 airframe hours or on 18 July 2020, whichever occurs first.

3.2.4 At the time of the accident flight, the aircraft had a Certificate of Registration (C of R), issued on 18 April 2013.

3.2.5 The aircraft was issued a valid Certificate of Airworthiness (C of A) on 13 August 2019 with an expiry date of 31 August 2020.

3.2.6 The logbooks and flight folio were reviewed after the accident and there were no defects recorded prior to the accident.

3.2.7 The AMO that performed the MPI on the aircraft held a valid AMO certificate (0247). The AMO that conducted the last maintenance inspection on the aircraft prior to the accident flight was in possession of an AMO-approval certificate, which was issued by the SACAA on 26 November 2018, with an expiry date of 30 November 2019.

3.2.8 After take-off with a crosswind from the left, the aircraft turned right before reaching a height of 500ft as required by the FAA manual, which put the aircraft in a tailwind condition.

The aircraft accelerated and reached the power lines sooner than anticipated. The pilot took an evasive manoeuvre to avoid colliding with power lines, resulting in the pilot losing control of the aircraft before it crashed.

3.2.9 The aircraft had 23.9 gallons of fuel on-board, which translated to approximately 2.85 hours endurance. This indicated that the aircraft had enough fuel for the flight to FAKD.

3.2.10 The aircraft was destroyed during impact, fatally injuring the pilot and seriously injuring the passenger.

3.2.11 The propeller condition indicated that the engine had sufficient power on impact, given that the blade tips were curled forward. None of the engine or airframe systems had any reported deficiencies prior to the accident and all damages observed on the aircraft at the accident site were a result of the crash.

3.2.12 The investigation revealed that the aircraft made an early right turn before reaching the required take-off height of 500ft AGL, which put the aircraft in a tailwind condition, increasing its forward speed, thus, reaching the power lines sooner than expected. This resulted in the pilot making a manoeuvre to avoid hitting the power lines, which he narrowly missed. Thereafter, the pilot lost control of the aircraft, which continued on a right turn until it crashed.

3.3. Probable Cause/s

3.3.1 The aircraft made an early right turn before reaching the required take-off height of 500ft AGL, which put the aircraft in a tailwind condition, increasing its forward speed, thus, reaching the power lines sooner than expected. This resulted in the pilot making a manoeuvre to avoid hitting the power lines, which he narrowly missed. Thereafter, the pilot lost control of the aircraft, which continued on a right turn until it crashed.

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