LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10186										
Classification	Accident			**Date**	9 July 2022			**Time**	0900Z		
Type of Operation	Training (Part 141)										
Location											
Place of Departure	Worcester Aerodrome (FAWC), Western Cape Province			Place of Intended Landing	Worcester Aerodrome (FAWC), Western Cape Province						
Place of Occurrence	Extended centreline on Runway 15, Worcester Aerodrome										
GPS Co-ordinates	Latitude	33°40'10.31" S		Longitude	019°25'35.73" E		Elevation	672 feet (ft)			
Aircraft Information											
Registration	ZS-FMO										
Make; Model; S/N	Piper Aircraft Company, Piper PA-28-180 Cherokee (Serial number: 28-4895)										
Damage to Aircraft	Destroyed			Total Aircraft Hours	9 971.0						
Pilot-in-command											
Licence Type	Commercial Pilot Licence			Gender	Male		Age	45			
Licence Valid	Yes	Total Hours	352.9	Total Hours on Type	21.6						
Total Hours 90 Days	20.4			Total Flying Hours on Type Past 90 Days	6.7						
People On-board	1 + 1	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0				

What Happened

On Saturday morning, 9 July 2022, a flight instructor and a passenger on-board a Piper PA-28-180 Cherokee aircraft with registration ZS-FMO took off on an introductory flight from Worcester Aerodrome (FAWC) extended centreline of Runway 15 in the Western Cape Province, with the intention to land back at the same aerodrome. The flight was conducted under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

According to the flight instructor, fine weather conditions prevailed before take-off. After take-off, the pair flew to the general flying area (GFA) where the flight instructor performed a few turns and explained the basic aerodynamics of flight. According to the passenger, fine weather conditions prevailed at the time of the flight to the GFA. Whilst flying at GFA, a frontal system formed from the north-west, which resulted in a sudden considerable increase in wind speed as well as a change in wind direction. The passenger stated that on their return flight to FAWC, he observed that the flying conditions had changed substantially; however, the pilot elected to land on Runway 15. *Note: The pilot had already committed to land on Runway 15 at this point*. The chief flight instructor (CFI) was standing in front of the clubhouse watching the approach. According to his statement, the aircraft was still at a height of approximately 20 to 30 feet (ft) above the runway surface (which was over the second asphalt section). He then ran into the clubhouse where a very high frequency (VHF) radio of

the aerodrome is kept. He radioed on frequency 124.80-Megahertz (MHz), advising the pilot of the ZS-FMO aircraft to perform a *"go-around"* (he repeated the advice three times).

The pilot did not opt for a go-around. (Later, during the interview with the investigator, he stated that all he wanted to do was to get the aircraft on the ground because he had already committed to land on Runway 15.) He landed deep, approximately 300m from the threshold of Runway 33, which meant that he had overflown approximately 1 300m of the runway surface. The pilot was unable to bring the aircraft to a stop after touchdown, hence, a runway excursion followed. It should be noted that the pilot was seated on the right-side where there were no toe breaks. The aircraft careered through three fences, of which the first two were barbed wired (typical farm fences) before the aircraft came to rest on its left-side, about 510m past the threshold of Runway 33. There was a person at the scene who arrived soon after the aircraft came to a stop and assisted both occupants out of the wreckage by pulling them out through the shattered windscreen.

Smoke was observed shortly after the aircraft came to rest. The pilot went back to the wreckage to retrieve a portable fire extinguisher, which he handed to the person who had been assisting them to douse the fire. However, he was unable to put it out. The fire consumed the entire wreckage except for the right wing, which had separated from the fuselage. This separation was due to the right wing impacting the fence made up of cement pillars. The local fire service responded swiftly to the scene and extinguished the fire which was fuelled by the strong wind. Both occupants were attended to at the scene by emergency medical personnel who had responded to the accident scene. Apart from the pilot who sustained scratches to his left knee, no other injuries were reported.

The CFI and another witness got into a vehicle and drove along the route the aircraft careered through to the scene, which was a grass-covered wetland. Also, the parents of the passenger who were waiting at the clubhouse rushed to the accident scene via the aerodrome access road.

The accident occurred during daylight on the extended centreline of Runway 15 at FAWC at Global Positioning System (GPS) co-ordinates determined to be: 33°40'10.31" South 019°25'35.73" East, at an elevation of 672 feet (ft).

Figure 1: The accident site is indicated by the yellow pin ZS-FMO. (Source: Google Earth)

Figure 2: The file picture of the Piper PA-28-180 aircraft, ZS-FMO. (Source: Worcester Flying Club)

Figure 3: The first of the three fences that the aircraft careered through.

Figure 4: The wheel markings of the aircraft on the swamp vegetation.
This was before the aircraft collided with the third fence.

Figure 5: The wreckage was consumed by post-impact fire.

Figure 6: The front view of the charred wreckage.

Figure 7: The left main gear with the barbed wire wrapped around it.

Figure 8: The right wing which was ripped off from the fuselage.

Findings

The Pilot

According to the pilot's logbook, the pilot started to fly on 17 January 2007. On 2 May 2007, he obtained his Private Pilot Licence (PPL). During this period, he had flown 77.5 hours. On 26 February 2010, he obtained his Commercial Pilot Licence (CPL). He continued to fly until 23 October 2013 when he stopped.

According to his logbook, he renewed his instrument flight (IF) rating over the period 28 and 29 July 2016 and had flown 4.0 hours. Using the simulator (instead of an aircraft), he again renewed his IF rating over the period 11 to 16 June 2018 and logged 5.8 hours. The IF rating was once again renewed using the simulator over the period 2 May 2019 and 25 July 2019 where he logged 6.1 hours. He then flew again from 20 March 2020 until 6 October 2020. During this period, he logged 14.0 hours, which included the revalidation of his Grade III flight instructor rating. Once more, he flew from 22 January 2021 until 18 December 2021. During this period, he logged 10.5 hours, which included the renewal of his IF rating as well as his flight instructor rating. From 31 January 2022 until the day of the accident (9 July 2022), the pilot had flown 22.6 hours. Most of these hours were flown as a flight instructor. At the time of the accident, the pilot had accumulated 352.9 hours of which 21.6 were on the aircraft type.

The Aircraft

The aircraft, a Piper PA-28-180 Cherokee with serial number 28-4895 was manufactured in 1969. The last maintenance inspection prior to the accident flight was certified on 27 May 2022 at 9 963.0 airframe hours. A further 8.8 hours were flown with the aircraft since the maintenance inspection. The initial Certificate of Airworthiness (C of A) was issued on 18 July 2005; the current C of A had an expiry date of 31 July 2023. The Certificate of Registration was issued to the current owner on 9 June 2005. The Certificate of Release to Service (CRS) was issued on 22 May 2022 with an expiry date of 26 May 2023 or at 10 063.0 airframe hours, whichever occurs first.

Weather Information

An official weather report was obtained from the South African Weather Service (SAWS). The closest weather station to the accident site is Cape Town International Airport (FACT), located approximately 45 nautical miles (nm) (84 kilometres) south-west of FAWC. The weather information entered in the table below was captured at 0900Z at FACT.

Wind Direction	110°	Wind Speed	3 knots	Visibility	10 000m
Temperature	14.5°C	Cloud Cover	-	Cloud Base	-
Dew Point	10.3°C	QNH	1011hPa		

Satellite image

The Day Natural Colour RGB satellite imagery of the Meteosat Second Generation (MSG) was taken at 0915Z, which was approximately the time of the accident. The satellite imagery indicates a cold front just off the West Coast of the country, advected by the moist air ahead (of it) over the western parts of the country which resulted in cloud formation as depicted on the satellite imagery. The satellite imagery also shows the presence of mountain and gravity waves.

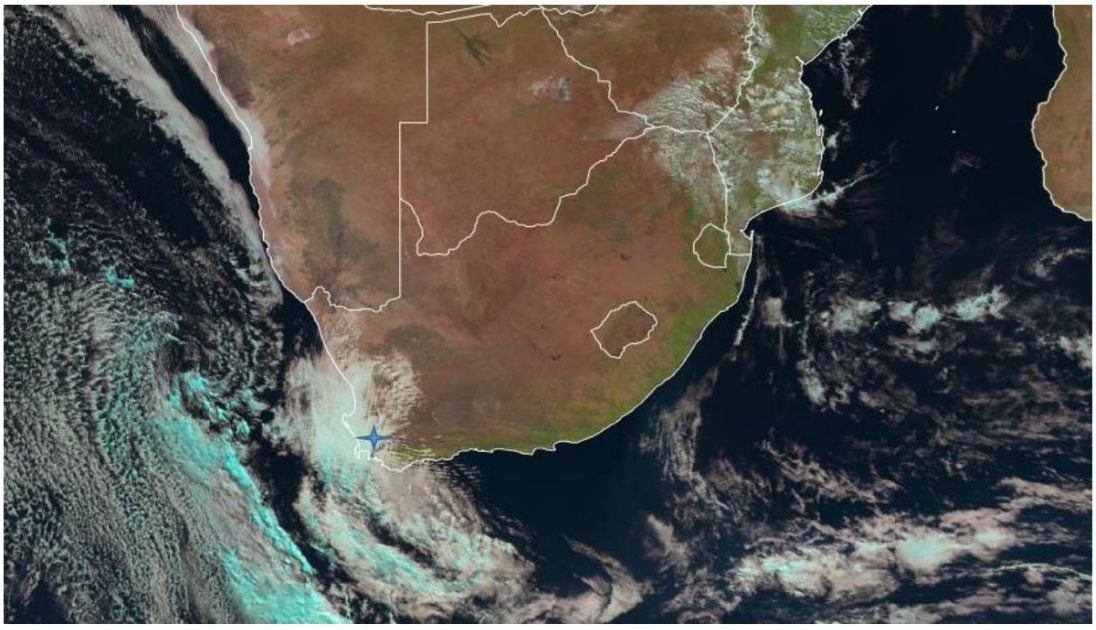

Figure 9: The Day Natural Light RGB satellite imagery at 0915Z on 9 July 2022. (Source: SAWS)

Warnings issued

There were four warnings issued that were valid during the accident period, as well as in the area where the accident occurred. This includes three Significant Meteorological Information (SIGMET), valid from 0600Z to 1000Z for severe mountain waves, severe turbulence from surface to 6 500ft and from 30 000ft to 34 000ft. An Airman's Meteorological Information (AIRMET) was also issued for moderate turbulence from surface to 10 000ft for the area and the time at which the accident occurred. Significant weather conditions that could lead to possible aviation hazards were forecasted and warnings were issued by the SAWS.

Sigmet FACA (Cape Town) FIR

FACA SIGMET B02 VALID 090600/091000 FAOR- FACA CAPE TOWN FIR SEV MTW FCST WI

S3030 E01743 - S3030 E02116 - S3119 E02345 - S3103 E02537 - S3329 E02651 - S3426

E02007 - S3400 E01837 - S3102 E01801=

Sigmet FACA (Cape Town) FIR

FACA SIGMET E01 VALID 090600/091000 FAOR- FACA CAPE TOWN FIR SEV TURB FCST WI

S3030 E01827 - S3030 E02116 - S3119 E02345 - S3117 E02402 - S3205 E02421 - S3256

E02521 - S3356 E02532 - S3400 E02334 - S3413 E01922 - S3301 E01914 - S3155 E01846

SFC/FL065=

Sigmet FACA (Cape Town) FIR

FACA SIGMET C02 VALID 090600/091000 FAOR- FACA CAPE TOWN FIR SEV TURB FCST WI

S3141 E02638 - S3406 E03014 - S3459 E02831 - S3549 E02612 - S3522 E02606 - S3401

E02501 FL300/340=

Airmet FACA (Cape Town) FIR

FACA AIRMET A01 VALID 090610/091000 FAOR- FACA CAPE TOWN FIR MOD TURB FCST WI

S3030 E01512 - S3030 E02116 - S3119 E02345 - S3057 E02619 - S3052 E02712 - S3120

E02730 - S3258 E02802 - S3509 E02412 - S3537 E01621 - S3248 E01506 SFC/FL100=

Figure 10: Weather warnings issued between 0600Z to 1000Z on the day of the accident. (Source: SAWS)

Weather station at FAWC

The Worcester Flying Club has a weather station that provides local aviators with the weather conditions at the aerodrome. The photograph below was taken by one of the club members approximately 20 minutes after the accident occurred. From the information, the prevailing wind was from the north-west at 22.2 knots. The 2-minute average wind speed was 27.5 knots and the 10-minute average wind speed was 26 knots. The 2-minute wind gust was captured at 34.8 knots and the 10-minute wind gust was captured at 39.1 knots. It should be noted that this was the actual weather condition at the time even though the year stamp on the display indicates 2002 instead of 2022. This error was pointed out to the CFI.

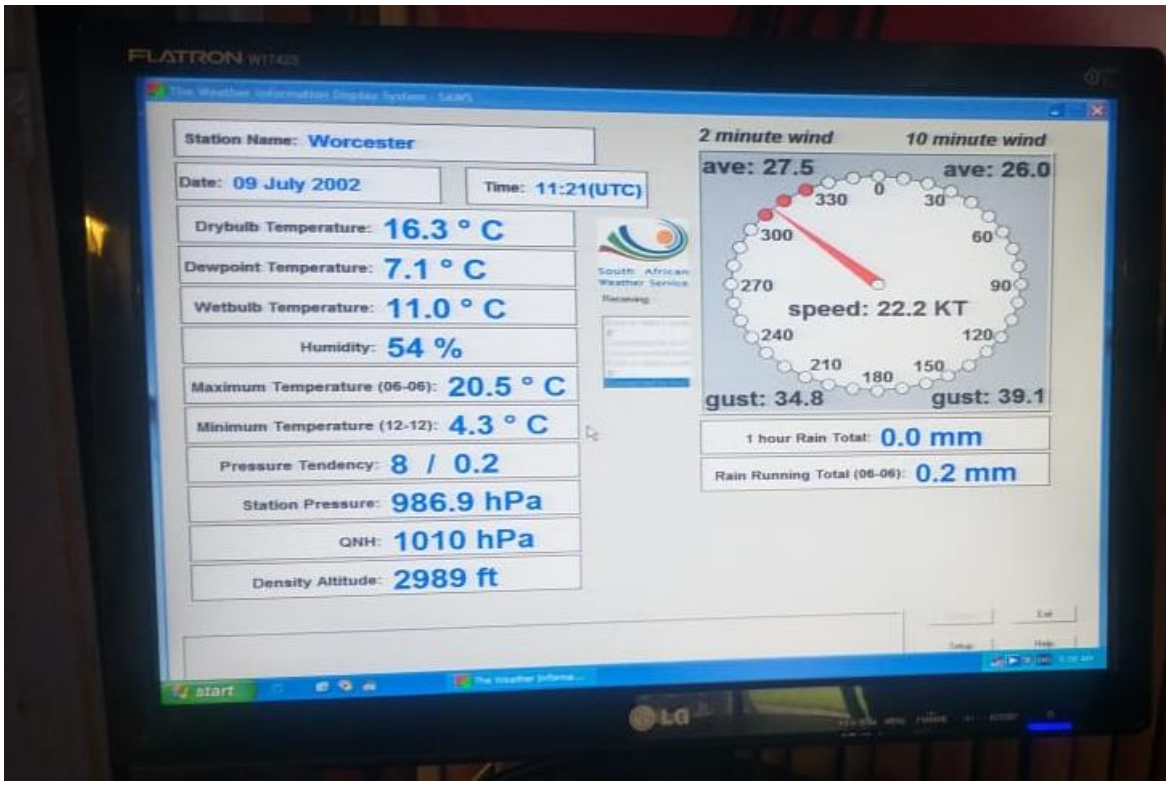

Figure 11: The photograph of the weather station at FAWC taken at 0921Z on 9 July 2022. (Source: Club member)

Aerodrome Information

According to available information, Worcester Aerodrome (FAWC) is licensed by the Regulator (SACAA).

The aerodrome has two runways: Runway 15 was used for take-off on the day; the runway is 1 600m long and 25m wide. The initial runway surface is asphalt for approximately 500m and then it becomes a gravel surface for approximately 600m, and asphalt again in the last 500m.

During the on-site investigation, only one windsock was observed. There was a second windsock pole towards the threshold of Runway 15, but the windsock was in a dilapidated state. The investigating team was informed that there used to be a third windsock near the threshold of Runway 33, but the windsock pole was stolen.

Aerodrome Location	2nm south-west of Worcester	
Aerodrome Status	Licensed	
Aerodrome GPS coordinates	33°40’00.00” South 019°25’00.00” East	
Aerodrome Elevation	653ft	
Runway Designations	12/30 (Gravel)	15/33
Runway Dimensions	1 000m x 25m	1 600m x 25m

Runway Used	15
Surface of Runway Used	Asphalt then gravel and then asphalt again
Approach Facilities	None
Radio Frequency	124.80MHz

Figure 12: The dilapidated windsock (left side), and the primary windsock (right side). These photographs were taken during the on-site investigation.

Figure 13: Photograph was taken at the threshold of Runway 15

Figure 14: The end of the first asphalt section and the start of the gravel surface.

Figure 15: View of the runway looking towards the threshold of Runway 15.

Figure 16: End of the gravel runway surface and the beginning of the last section of the asphalt surface.

(i) The pilot was issued a Commercial Pilot Licence (CPL). According to his logbook, he had flown a total of 352.9 hours, of which 21.6 hours were on the aircraft type.

(ii) The pilot was issued a valid Class 1 aviation medical certificate on 12 November 2021 with an expiry date of 30 November 2022.

(iii) The pilot had conducted his type conversion onto the aircraft over the period 30 June to 2 July 2021. During this period, he flew 3.4 hours dual with a flight instructor.

(iv) The initial Certificate of Airworthiness (C of A) was issued on 18 July 2005. The current C of A had an expiry date of 31 July 2023.

(v) The aircraft was issued a Certificate of Registration on 9 June 2005.

(vi) The last maintenance inspection carried out on the aircraft prior to the accident flight was certified on 27 May 2022 at 9 963.0 airframe hours. The aircraft had accumulated a further 8.8 airframe hours since the said inspection.

(vii) A Certificate of Release to Service (CRS) was issued on 27 May 2022 with an expiry date of 26 May 2023 or at 10 063.0 hours of flight time, whichever occurs first.

(viii) The Approved Training Organisation (ATO) was in possession of a valid certificate that was issued by the Regulator (SACAA) on 29 March 2022 with an expiry date of 28 March 2027.

(ix) The flight was accordingly authorised in the flight authorisation sheet.

(x) FAWC is a licensed aerodrome. Only the primary windsock was found to be in good condition to provide the prevailing wind conditions at the aerodrome. Parts of the gravel runway surface of Runway 15 were waterlogged, which was regarded as unsafe for aircraft making use of the runway.

(xi) According to the weather information, several warnings of a cold front that was moving in over the Western Cape were issued. The weather station at FAWC recorded strong winds from the north-west when the accident occurred.

(xii) The pilot was flying the aircraft from the right front seat. There is no toe brake on the right side. The pilot indicated that he used the emergency brake handle located on the floor of the aircraft between the two seats to slow down the aircraft.

(xiii) The pilot failed to assess the wind conditions at the aerodrome on their return flight prior to landing; he continued with a downwind landing in strong wind conditions.

(xiv) The aircraft touched down on the second asphalt section of Runway 15, approximately 250m from the end of the runway. The touchdown point on the runway was pointed out by the pilot to the investigating team during an interview.

(xv) The CFI of the flying school informed the pilot via a radio to perform a go-around, but he was committed to landing the aircraft.

(xvi) The two occupants were assisted out of the cockpit by a person who was at the scene soon after the accident occurred.

(xvii) The two occupants were medically assessed on site by the emergency medical personnel who responded to the accident scene.

Probable Cause

Failure to make a proper assessment of the prevailing wind conditions upon return from the general flying area. A committed downwind landing resulted in the aircraft touching down approximately 1 350m (250m from the end of the runway) beyond the threshold of Runway 15 and the aircraft could not be brought to a safe stop, which led to a runway excursion. The aircraft careered for approximately 518m after leaving the asphalt runway surface before it came to rest with both wings ripped off from the fuselage.

Contributing Factors

A cold front that was moving in over the Western Cape province.

The north-westerly winds encountered during the return flight from the general flying area could, therefore, be associated with the unexpected weather condition (frontal system) at FAWC. The pilot became aware once committed to the landing that the frontal system had moved in as it was common weather condition during the winter season in the Western Cape.

A proper assessment of the weather conditions was not made during the return flight to FAWC and a committed landing on Runway 15 was executed.

An option to perform a go-around was not considered as (the pilot) indicated post-accident that he wanted to get the aircraft on the ground.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

- With FAWC being a licensed aerodrome, it is recommended that the facility be maintained in accordance with the guidelines for Category 1 aerodromes. It is essential that pilots making use of a licensed aerodrome ensure that they will have the necessary infrastructure to facilitate a safe landing at all times.
- The seating of instructors during introductory flights should always be on the side with the toe brakes.
- Pilots should take extra care in observing weather conditions thoroughly before undertaking a flight.

About this Report

The decision to conduct 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 desktop 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

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