

		CA18/2/3/7741			
		SOUTH AFRICAN CIVIL AVIATION AUTHORITY ACCIDENT REPORT – EXECUTIVE SUMMARY			
Aircraft Registration	ZS-DVF	Date of Accident	16 December 2003	Accident Time	0515Z
Type of Aircraft	PIPER PA 22-108		Type of Operation	Private	
Pilot-in-command Licence Type	Private	Age	81	Licence Valid	Yes
Pilot-in-command Flying Experience	Total Flying Hours	4 065.2		Hours on Type	49.2
Last point of departure	Krugersdorp Aerodrome (FAKR)				
Next point of intended landing	Krugersdorp Aerodrome (FAKR)				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)					
Farm Moedhou, Hartbeesfontein District (GPS: South 25° 51' 537" East 027° 37' 418", elevation ± 4 200ft)					
Meteorological Information	Surface wind; 020°/10 knots, Temperature; 20°C, Visibility; >10km				
Number of people on board	1 + 1	No. of people injured	0	No. of people killed	1 + 1
Synopsis	<p>The pilot, accompanied by a passenger, departed from Krugersdorp Aerodrome on the morning of 16 December 2003 on a private flight.</p> <p>According to an eyewitness, who was standing in the front yard of his house, he observed the aircraft flying at a height of approximately 100 metres (330 feet) above ground level (AGL) and it was orbiting/circling over a certain area several times. Fine weather conditions prevailed and the wind was reported to be from the northeast at about 10 knots. Prior to impact, the aircraft was observed flying downwind (tailwind component) it then executed a turn in a southeasterly direction and was flying towards the eyewitness at a straight and level attitude. According to the witness the engine was operating at a constant speed. When in close proximity to the eyewitness the aircraft turned left, into wind. The first 90° of the turn appeared to be uneventful, however, the bank angle then suddenly increased considerably. The next thing the witness observed was when the aircraft dived towards the ground and then impacted with terrain. He immediately notified the local emergency service as well as the local police of the accident and rushed to the scene in order to render the necessary assistance, but was unable to do so, as both occupants were fatally injured.</p>				
Probable Cause					
<p>The pilot most probably stalled the aircraft while executing a turn at low level and was unable to recover from such a condition prior to ground impact.</p>					



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Dr. T.R. Chamberlain
Manufacturer : Piper Aircraft Corporation
Model : PA 22-108
Nationality : South African
Registration Marks : ZS-DVF
Place : Farm Moedhou, Hartebeesfontein District
Date : 16 December 2003
Time : 0515Z

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 (1997) this report was compiled in the interests of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and **not to establish legal liability.***

Disclaimer:

This report is given without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of Flight:

1.1.1 The pilot, accompanied by a passenger, departed from Krugersdorp Aerodrome on a private flight on the morning of 16 December 2003.

1.1.2 They were observed flying in the Hartebeesfontein area at about 0510Z. According to an eyewitness who was standing at his house observing the aircraft, it was flying at a height of approximately 100 metres (330 feet) above ground level (AGL) and was orbiting/circling over a certain area. The wind

was from the northeast at the time. Prior to impact, the aircraft was observed to have flown downwind (wind from behind) on the other side of the river and then turned in a southeasterly direction, flying towards the eyewitness at a straight and level attitude. The engine was noted to be operating at a constant speed. When it got close to the eyewitness, the aircraft turned left, into the wind. The first 90° of the turn appeared to be normal, followed by a sudden increase in the bank angle and shortly thereafter the aircraft dived towards the ground and collided with terrain. The eyewitness immediately rushed to the scene. He also notified the emergency service as well as the local police of the accident.

- 1.1.4 The accident occurred during daylight conditions at a geographical position determined as South 25° 51' 537" East 027° 37' 418" at an elevation of approximately 4 200 feet above mean sea level (AMSL).

1.2 Injuries to Persons:

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

1.3 Damage to Aircraft:

- 1.3.1 The aircraft was destroyed by the impact forces.



Figure 1. A view of the wreckage, which crashed into a spinach field.

1.4 Other Damage:

- 1.4.1 Apart from a small portion of spinach crops being destroyed during the impact sequence, no other damage was caused.

1.5 Personnel Information:

Nationality		South African			
Licence No	0270010648	Gender	Male	Age	81
Licence valid		Yes	Type Endorsed	Yes	
Ratings		Night Rating, Safety Pilot Rating			
Medical Expiry Date		16 April 2005			
Restrictions		Must wear corrective lenses			
Previous Accidents		None			

Flying Experience:

Total Hours	4 065.2
Total Past 90 Days	18.3
Total on Type Past 90 Days	18.3
Total on Type	49.2

1.6 Aircraft Information

Airframe:

Type	Piper PA 22-108	
Manufacturer	Piper Aircraft Company	
Serial No.	22-9773	
Year of Manufacture	1968	
Total Airframe Hours (At time of Accident)	6 256.77	
Last MPI (Date & Hours)	6 187.94	4 March 2003
Hours since Last MPI	68.83	
C of A (Issue Date)	19 October 1973	
C of A (Currency Fee)	Expired on 18 October 2003	
C of R (Issue Date) (Present owner)	2 April 2003	
Operating Categories	Standard	
SBs and ADs Status	Complied	
Type acceptance in RSA	Yes	

According to available evidence (CAA aircraft file) the Certificate of Airworthiness Currency Fee had expired on 18 October 2003. On 23 November 2003 a pro-forma invoice was forwarded to the owner, reminding him that the currency fee had expired. No evidence could be found to indicate that such a fee was paid prior to the flight which ended in the accident. Applicable Civil Aviation Regulation Part 21.08.2(5) read together with Part 91.01.11(2) addresses the compliance with the currency fee. The holder of a standard, restricted or special category of certificate shall pay the annual currency fee as prescribed in Part 187 on the anniversary day of such certificate.

Engine:

Type	Lycoming O-290-D
Serial No.	1610-21
Hours since Overhaul	1 112.77

Propeller:

Type	Sensenich M76AM-2-56
Serial No.	5224
Hours since Overhaul	217.08

1.7 Meteorological Information:

1.7.1 An official weather report was obtained from the South African Weather Services (SAWS).

Weather Conditions at time of Accident (0600Z)

Surface Analysis:

A high-pressure system was over the north-eastern part of the country feeding moist air in over the eastern part, causing cloudy to partly cloudy conditions.

Upper Air Analysis:

A high-pressure system was present over the central interior.

Satellite Imagery:

The satellite imagery shows cloudy to partly cloudy conditions over the north-eastern part and cloudy over Hartebeesfontein.

Weather Conditions in the vicinity of the Accident

No official weather observations were available at the time and place of the accident. The most likely weather conditions at the place of the accident was cloudy with a cloud base of 2 000 feet.

Time	-	0515Z
Temperature	-	20.0°C
Dew point	-	17.0°C
Visibility	-	> 10km
Wind direction	-	020°
Wind speed	-	10 knots

1.8 Aids to Navigation:

1.8.1 The aircraft was equipped with standard navigational equipment.

1.9 Communications:

1.9.1 The aircraft was equipped with a VHF (Very High Frequency) radio. The pilot was in radio contact with a person on the ground that had a private/unlicensed landing strip on her property, in close proximity to where the accident occurred. They were having a casual conversation on the VHF frequency 125.80 MHz approximately 10 minutes prior to the accident when the pilot flew over her property.

1.10 Aerodrome Information:

1.10.1 The accident occurred on the farm Moedhou, in the Magaliesburg district. The aircraft crashed on a flat section of agricultural farmland that was planted with spinach crops.

1.11 Flight Recorders:

1.11.1 The aircraft was not fitted with a Cockpit Voice Recorder (CVR) or a Flight Data Recorder (FDR) and neither was required by regulations to be fitted to this type of aircraft.

1.12 Wreckage and Impact Information:

1.12.1 The aircraft impacted terrain in a substantial nose-down attitude on a heading of 326°M (magnetic). Following impact with the ground, the wreckage remained stationary in a semi-upright position with no lateral or longitudinal movement evident on the ground surface. The forward fuselage section, including the cockpit area, was severely disrupted following ground impact. Both wings displayed evidence of severe disruption. The empennage area displayed very little damage.

1.13 Medical and Pathological Information:

1.13.1 The pilot was a male aged 81 years, who held a valid Class II aviation medical certificate at the time of the accident. His last medical examination prior to the accident was conducted on 23 June 2002.

1.13.2 Medical History:

He had an Appendicectomy in 1954, Prescibus with Bilateral high Frequency Sensory Neural Loss, with 100% Speech Discrimination. He had a Prostactectomy in 2001; which was a secondary to Benign Prostatic Hypertrophy.

1.13.3 Blood Results:

Alcohol concentration was 0.00 grams per 100 millilitres.

Naproxen, an anti-inflammatory was detected in the following Concentration:

- 0.5 micrograms per gram of the stomach and contents
- 0.6 micrograms per gram of liver
- 1 microgram per gram of kidney
- 4 microgram per millilitre of blood.

Carboxyhaemoglobin detected was 16.1%, a range, which according to the pathologist, was not significant enough to have caused death in an adult.

1.13.4 Post-Mortem Report:

According to the Forensic Pathologist Report of the post-mortem that was performed on 18 December 2003, the cause of death was Multiple Blunt Force injuries.

1.13.5 The passenger was a male aged 61 years. According to the post-mortem report his cause of death was Multiple Blunt Force injuries.

1.14 Fire:

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

1.15 Survival Aspects:

1.15.1 The accident was not regarded as survivable, due to the severity of the impact

forces and the deformation of the cockpit/cabin area.

1.15.2 The passenger was flung from the aircraft on impact and was located approximately 3 metres in front of the main wreckage. The pilot's body was trapped inside the wreckage and the assistance of the emergency services was required. They had to make use of special rescue equipment to free the body of the pilot from the wreckage.

1.16 Tests and Research:

1.16 None considered necessary.

1.17 Organisational and Management Information:

1.17.1 This was a private flight.

1.17.2 The last maintenance inspection that was carried out on the aircraft prior the accident was certified by Aircraft Maintenance Organisation (AMO) No. 9. The AMO was in possession of a valid AMO Approval that was issued by the SACAA at the time.

1.18 Additional Information:

1.18.1 Engine Teardown Inspection:

The engine, a Lycoming Textron O-290-D, Serial No. 1610-21 was removed from the wreckage and was taken to an approved engine maintenance facility, where a teardown inspection of the engine was conducted on 22 December 2003.

The following observations were made:

- Substantial impact damage was noted on the front section of the engine, which include the propeller flange and No.1 & 2 cylinders as well as the bottom/lower section.
- The carburettor also sustained substantial impact damage. The unit was removed from the engine and was dismantled. No abnormalities were

noted, while the bowl and float unit still appeared to be in a good condition.

- All four cylinders were removed and a valve leak test was conducted on each cylinder. No's 1, 2 and 4 cylinders leaked from both the inlet and exhaust valve.
No. 3 cylinder appeared to be in an overall better condition than the other three cylinders with a very slight leak rate noted on the inlet valve side.
- Each cylinder was measured with a cylinder gauge and all four cylinders were found to be within the acceptable limits.
- The push-rods were found to be of the aluminium type. Lycoming Service Bulletin 240S, dated 3 February 2003, required them to have been of the steel type. The rods nevertheless still appeared to be in a good overall condition.
- The oil pump was removed and was found to be in a good working condition.
- The crankcases were split and all the bearings inspected, which were still in an overall good condition.
- The connecting rods and pistons were also removed and appeared to be in a good condition, with the oil and compression rings on all four pistons found to be intact.
- Both magnetos were removed. They appeared to be intact although the ignition leads were severely disrupted. They were both rotated by hand at the shaft end and were being short-circuited at the spark ends. Both units delivered spark while this test was being conducted.
- The camshaft was inspected and appears to be in a good condition.
- The crankshaft was also inspected and appears in a good condition, although substantial damage was caused during impact to the propeller's coupling/flange.

Observation – Engine Logbook:

The last entry in the engine logbook dated 29 May 2003, stipulated that cylinders No. 1, 2 and 4 had been removed due to low “blow-by’s” (cylinder differential pressure test). The cylinders had been honed by an approved engine maintenance facility and had been reinstalled, using new piston rings, seals and gaskets.

The entry does not refer to any CRMA (Certificate Relating to Maintenance of an Aircraft) or Job Card and no records were available in the logbook that justify the new parts that they refer to have being used to certify this entry.

1.18.2 On-site investigation.

During the on-site investigation, it was essential for the investigating team to determine the integrity of the flight control system. Inspection of the wreckage revealed that all flight control surfaces were accounted for, as well as all associated control linkages associated with these systems.

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

- 2.1 The available information revealed that fine weather conditions prevailed in the area at the time of the flight and subsequent accident. The investigating team therefore did not consider prevailing weather conditions to have had any bearing on the accident.
- 2.2 The aircraft was properly maintained and according to available documentation did not reflect any defect or malfunction that could have contributed or have caused the accident. The post-crash inspection of the wreckage, including the engine, indicates that the aircraft was intact prior to ground impact and that the engine was operating normally.
- 2.3 The pilot has been flying for many years and was in possession of a valid private pilot’s licence as well as a valid aviation medical certificate at the time of the accident. He was appropriately rated to fly the aircraft. There was no indication that incapacitation or physiological factors had affected the pilot’s

performance at the time of the accident.

- 2.4 Taking the eyewitness observation into account, the pilot was flying at low-level and was observed to have executed several orbits/turns in the area without any problem. The turn prior to ground impact, according to his account, appeared initially uneventful, but then the bank angle increased suddenly and following this the aircraft was observed falling to the ground. It is the opinion of the writer that the pilot stalled the aircraft at this stage of the turn/flight and due to insufficient available height, was unable to recover from the condition prior to ground impact.

3. CONCLUSION

a) Findings

- (i) The pilot was the holder of a valid private pilot's licence and had the aircraft-type endorsed in his logbook.
- (ii) The pilot was the holder of a valid aviation medical certificate.
- (iii) There was no indication that incapacitation or physiological factors had affected the pilot's performance at the time of the accident.
- (iv) This was a private flight.
- (v) The aircraft had been maintained in accordance with the approved maintenance schedule.
- (vi) The aircraft held a valid Certificate of Airworthiness.
- (vii) The annual Certificate of Airworthiness' currency fee had lapsed on 18 October 2003.
- (viii) An aircraft examination revealed no evidence of pre-impact failures or malfunctions with the airframe or the engine.
- (ix) The aircraft was destroyed by the impact.
- (x) The AMO that certified the last Mandatory Periodic Inspection prior to the accident was in possession of a valid AMO Approval Certificate

from the CAA.

- (xi) Weather conditions at the time were not considered to have had a bearing on the accident.
- (xii) Both occupants (pilot and passenger) died as a result of Multiple Blunt Force injuries sustained during impact.

b) Probable Cause/s

- (i) The pilot most probably stalled the aircraft while executing a turn at low level and was unable to recover from such a condition prior to ground impact.

4. SAFETY RECOMMENDATIONS

4.1 None.

5. APPENDICES

5.1 There are no appendices attached to this report.

Report has been reviewed and amended by Advisory Safety Panel

27 January 2009