



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8349	
Aircraft Registration	ZU-ANG	Date of Accident	11 August 2007		Time of Accident	1400Z
Type of Aircraft	Piper PA-22-150 (Fixed Wing)		Type of Operation		Training	
Pilot-in-command Licence Type		Student Pilot	Age	35	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	150.0		Hours on Type	72.15
Last point of departure		Petit unlicensed Aerodrome.				
Next point of intended landing		Petit Aerodrome.				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
On Runway 03 at Petit Aerodrome.						
Meteorological Information		Wind direction: north westerly, Wind speed: 8 kts, Visibility: Good, Temperature: 18°C.				
Number of people on board	1 + 0	No. of people injured	0	No. of people killed	0	
Synopsis						
<p>The Student Pilot flew the aircraft on a training flight, under Visual Flight Rules (VFR) by day at Petit Aerodrome. He started with the first session of the solo training at approximately 0800Z, doing circuits and landing exercises. The training exercises lasted for an hour, before the pilot landed and parked the aircraft to have a few minutes' break. There were no problems that were experienced with the aircraft operation until that time. The pilot started the second session of training at approximately 1000Z, continuing with touch-and-go exercises. After nearly an hour of flying, the pilot landed the aircraft on Runway 03 and during touch down felt that the aircraft was turning to the right side of the runway. The pilot couldn't get the aircraft to go straight by applying left brake, but the aircraft rolled into uneven ground off the runway and ground looped. The aircraft was extensively damaged. The Student Pilot did not sustain any injury in the accident.</p> <p>The evidence found in the investigation shows that the student pilot experienced a loss in directional control after landing, which resulted in the aircraft veering off to the right side of the runway and entering in a ground loop on the uneven ground off the runway. It is possible that the student pilot may have experienced a loss in concentration during the landing, thus he could not manage to control the situation immediately and effectively.</p>						
Probable Cause						
The pilot experienced a loss of directional control during landing, causing the aircraft to ground loop.						
IARC Date				Release Date		



AIRCRAFT ACCIDENT REPORT

Name of Owner : Erasmus J J
Manufacturer : Piper Aircraft Corporation
Model : Piper PA-22-150
Nationality : South African
Registration Marks : ZU-ANG
Place : Petit Aerodrome
Date : 11 August 2007
Time : 1400Z

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 Student Pilot flew the aircraft on a training flight, under Visual Flight Rules (VFR) by day at Petit Aerodrome. He started with the first session of the solo flight training at approximately 0800Z, doing circuits and landing exercises. The training exercises lasted for an hour, before the pilot landed and parked the aircraft to have a few minutes' break. There were no problems that were experienced with the aircraft operation at the time.
- 1.1.2 The student pilot started the second session of training at approximately 1000Z, continuing with touch-and-go exercises. After nearly an hour of flying, the pilot landed the aircraft on Runway 03 and during touch down felt that the aircraft was turning to the right side of the runway. The pilot attempted to correct the situation by applying left brake, but the aircraft rolled into uneven ground off the runway and ground looped.
- 1.1.3 The aircraft was extensively damaged. The student pilot did not sustain any injury in the accident.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft was extensively damaged in the accident.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	35
Licence Number	N/A	Licence Type	Student Pilot		
Licence valid	Yes	Type Endorsed	No		
Ratings	None				
Medical Expiry Date	31 July 2008				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	150.0
Total Past 90 Days	19.0
Total on Type Past 90 Days	19.0
Total on Type	72.15

Microlight

1.5.1 The pilot submitted an application form dated 19 March 2001 to the CAA, applying for the issuance of Student Microlight Pilot's Licence. The CAA received, approved and issued the licence, having endorsed on it a Quiksilver MXII aircraft type rating. When completing the required training on the aircraft type, the pilot submitted another application form dated 09 September 2001 to the CAA for issuance of Microlight Pilot's Licence. To comply with requirements, the pilot submitted evidence of 34.5 hours flying experience.

Student Pilot's Licence

- 1.5.2 The pilot submitted an application form dated 05 August 2007 to the CAA, applying for the issuance of Student Pilot's Licence. The CAA received, approved and issued the Student Pilot's Licence, having endorsed on it a Piper PA-20 Pacer type of aircraft. The pilot then commenced with flying training under the authority of Aviation Training Organisation – CAA/0252. On 11 August 2007, approximately 6 days after being issued with the Student Pilot's Licence, the pilot was involved in the accident.

1.6 Aircraft Information

Airframe:

Type	Piper PA-22-150	
Serial Number	22-1972	
Manufacturer	Piper Aircraft Corporation	
Date of Manufacture	1954	
Total Airframe Hours (At time of Accident)	3521.25	
Last Annual Inspection(Date & Hours)	16 June 2007	3508.45
Hours since Last Annual Inspection	12.80	
Authority to Fly (Issue Date)	20 June 2007	
C of R (Issue Date) (Present owner)	23 June 2006	
Operating Categories	Private Operation Authority to Fly	

- 1.6.1 The aircraft was registered under the following manufacturer's designation: PA-22-150 (Veteran). The implication was that the owner requested and CAA approved it to be operated in the Non-Type Certificated Category.
- 1.6.2 No maintenance-related defects were found, as experienced by the pilot with the aircraft during the training flights.

Engine:

Type	Lycoming O-320
Serial Number	L-5150-27
Hours since New	268.0
Hours since Overhaul	TBO not reached.

Propeller:

Type	Sensenich
Serial Number	M74 OM-O-60
Hours since New	72.15
Hours since Overhaul	Midlife not reached.

1.7 Meteorological Information

Wind direction	North-Westerly	Wind speed	8 kts	Visibility	Good
Temperature	18°C	Cloud cover	unknown	Cloud base	unknown
Dew point	unknown				

1.7.1 The above identified weather information was submitted by the student pilot to the SACAA, in a Pilots Accident/Incident Questionnaire dated 15 August 2007.

1.8 Aids to Navigation

1.8.1 The aircraft had standard navigation equipment fitted in it, as approved by its manufacture. All other navigation aids installed were approved by the CAA and included in its equipment list. There was no evidence found to show that the pilot experienced any problems with the navigation equipment.

1.9 Communications.

1.9.1 The accident took place at an unlicensed aerodrome. There were no communication facilities available at the aerodrome.

1.10 Aerodrome Information

Aerodrome Location	Petit Aerodrome	
Aerodrome Co-ordinates	S26°04'53.5" E028°23'26.0"	
Aerodrome Elevation	5450 feet	
Runway Designations	03/21	
Runway Dimensions	1300m x 30m	
Runway Used	03	
Runway Surface	Grass	
Approach Facilities	None	

1.10.1 The accident took place at an aerodrome which was not licensed.

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 was intact, but was extensively damaged. Damage was caused to the wings and fuselage. When the aircraft ground looped, the wingtips made contact

with the ground.

1.13 Medical and Pathological Information

1.13.1 Not applicable.

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 took place at an unlicensed aerodrome. There was no assistance by emergency services. The Student Pilot evacuated the aircraft safely, without being assisted by external helpers.

1.16 Tests and Research

1.16.1 To fully understand the principle of “Ground Loop” and “Directional Control” the investigator searched on the internet. The information extracted is discussed in the paragraphs below:

Ground Loop

1.16.2 In a tail dragger aircraft, the centre of mass is located behind the front landing gear. If the pilot is not able to keep the longitudinal axis of the aircraft aligned with the runway, then the centre of mass of the aircraft will rotate around the landing gear (highest point of drag, or friction while on the ground) until the centre of mass is in front of the highest point of drag. This results in an abrupt turn known as a ground loop.

1.16.3 In order to fully understand the concept, “Ground Loop” refers to the rapid rotation of a fixed-wing aircraft in the horizontal plane whilst on the ground. There are aerodynamic and centrifugal forces which may cause one wing of the aircraft to rise, and the other wingtip to touch the ground. In severe cases (particularly if the ground surface is soft), the wingtip can dig in, causing the aircraft to swung violently or even cartwheel.

1.16.4 Further too, if the aircraft heading is slightly different from the aircraft’s direction of motion, a side force is exerted on the wheels. If the force is in front of the centre of gravity (CoG), the resulting momentum rotates the aircraft’s heading even further from its direction of motion. This then increases the force and the process reinforces itself. To avoid a ground loop, the pilot must respond to any turning tendency quickly, while sufficient control authority is available to counteract it. Once the aircraft rotates beyond this point, there is nothing the pilot can do to stop it from rotating further.

1.16.5 The evidence found shows that ground loops occur when the aircraft is moving on the ground, either taxiing, landing, or during takeoff. Damage caused is normally to the undercarriage and wingtips of an aircraft. Ground loops may also occur when landing on muddy ground, wet pavement, or frozen surfaces, especially if there are puddles or patches. They may occur when an aircraft departs a paved surface: for example, after an engine failure on takeoff roll in a multi-engine aircraft. Another common cause is failure of a tire or wheel brake, causing a loss of directional control.

Directional Control

1.16.6 Once the aircraft has landed and wheels made contact on the runway surface, it becomes the responsibility of the pilot to effectively control the aircraft during the landing roll until it stops. It is for this purpose that the pilot needs to make use of the aircraft flight control surface (rudder) in put and wheel brakes for directional control and steering of the aircraft. If the pilot does not manage the steering of the aircraft properly, it is possible that he/she may experience a loss of directional control after landing.

1.17 Organisational and Management Information

1.17.1 The Student Pilot was engaged in a training flight when the accident happened. The Aviation Training Organisation responsible for scheduling the training had a valid approval issued by the SACAA.

1.17.2 The aircraft was maintained by an appropriately rated Approved Person.

1.18 Additional Information

1.18.1 The pilot stated that after landing, the aircraft started veering to the right.

Aircraft Landing Gear

1.18.2 The aircraft has a conventional tail-wheel gear configuration undercarriage, consisting of two main weight-bearing wheels forward of the aircraft centre of gravity (CoG), and tail wheel that supports the remaining weight. The tail wheel aircraft may land in two distinct styles. The one referred to as a “three pointer”, refers to all three wheels contacting the ground at the same time. Another is a “wheeler” or “wheel landing”, where the aircraft is flown onto the main wheels in a more level attitude, until the airspeed bleeds off and tail stops flying.

1.18.3 The pilot landed the aircraft and veered off the runway to the right. When attempting to control the turning, the aircraft veered off the runway and ground looped. There was no evidence found of defective brakes and/or steering devices of the aircraft. All other landings that were performed by the pilot on the day prior to the accident were performed successfully.

1.19 Useful or Effective Investigation Techniques

1.19.1 No useful or effective investigation techniques were used.

2. ANALYSIS

- 2.1 The student pilot flew the aircraft on a solo training flight, circuits and landing exercises, from Runway 03 at Petit Aerodrome. During landing, when the aircraft touched down, the pilot experienced a loss in directional control. The aircraft veered off the runway to the right side and entered into a ground loop.
- 2.2 The student pilot was supposed to be effectively controlling the aircraft during the landing roll prior to the next intended take off. In order to do so, he was required to make use of the flight control surface (rudder) in put and wheel brakes for directional control and steering of the aircraft. It is possible that he experienced a loss of concentration during the landing, as a result not managing the steering of the aircraft. Thus he experienced a loss in directional control after landing, causing the aircraft to veer off to the right. The aircraft then entered in a ground loop and sustained substantial damage.

3. CONCLUSION

3.1 Findings

- 3.1.1 There was no evidence of mechanical defects identified or reported by the student pilot, which may have contributed to the accident.
- 3.1.2 The student pilot experienced a loss in directional control after landing.
- 3.1.3 The aircraft ground looped, causing damage to the airframe.
- 3.1.4 The student pilot did not sustain any injuries in the accident.

3.2 Probable Cause/s

- 3.2.1 The student pilot experienced a loss of directional control during landing, thus resulting in the aircraft going into a ground loop.

4. SAFETY RECOMMENDATIONS

- 4.1 The SACAA to refer report to RAASA to note.

5. APPENDICES

5.1 None.

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Report reviewed and amended by Advisory Safety Panel

27 January 2009