

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/3/2/0836	
Aircraft Registration	ZS-SPZ	Date of Incident	16 March 2011		Time of Incident	1213Z
Type of Aircraft	Piper PA-34-200 Seneca		Type of Operation		Private	
Pilot-in-command Licence Type		Private	Age	26	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	262,5		Hours on Type	31,6
Last point of departure		Port Alfred Aerodrome (FAPA)				
Next point of intended landing		Port Alfred Aerodrome (FAPA)				
Location of the incident site with reference to easily defined geographical points (GPS readings if possible)						
Port Alfred Aerodrome on runway 10R						
Meteorological Information						
Number of people on board	1 + 1	No. of people injured	0	No. of people killed	0	
Synopsis						
<p>The instructor and student were conducting a commercial test flight at Port Alfred aerodrome. On approach for landing, the nose gear failed to extend. After several unsuccessful attempts to get the wheel down, it was decided to retract the main gear and land without wheels to minimise damage.</p> <p>The propellers were feathered as the aircraft crossed the threshold of runway 10R and the touchdown was smooth and gentle. Neither propeller was turning on touchdown and neither made contact with the ground. The aircraft came to a halt a few metres from the first touchdown and sustained damage to its lower surfaces.</p> <p>The investigation established that the previous repair to the fibreglass of the wheel bay had not been properly prepared, which resulted in a fracture. This caused the side of the wheel bay to press against the undercarriage mechanism, preventing the nose wheel from extending.</p>						
Probable Cause						
<p>A fracture in the fibreglass of the wheel bay caused the side of the wheel bay to press against the undercarriage mechanism, preventing the nose wheel from extending.</p> <p>Contributory: Poor maintenance</p>						
IARC Date				Release Date		

AIRCRAFT INCIDENT REPORT

Name of Owner/Operator : 43 Air School (Pty) Ltd
Manufacturer : Piper Aircraft Corporation
Model : PA-34-200
Nationality : South African
Registration Marks : ZS-SPZ
Place : Port Alfred Aerodrome
Date : 16 March 2011
Time : 1213Z

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 interest 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 instructor and student were conducting a commercial test flight at Port Alfred aerodrome. On approach for landing, the nose gear failed to extend.
- 1.1.2 Numerous attempts were made, with the assistance of senior instructors and senior aircraft maintenance engineers on the ground, to get the wheel down. When these had failed, it was decided to retract the main wheels and execute a belly landing to minimise damage.
- 1.1.3 The propellers were feathered as the aircraft crossed the threshold of runway 10R and the touchdown was smooth and gentle. Neither propeller was turning on touchdown and neither made contact with the ground. The aircraft came to a halt a few metres from the first touchdown and sustained damage to its lower surfaces.
- 1.1.4 Neither occupant was injured. The student was sent to hospital for medical examination.

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-

None	1	1	-	-
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1.3 Damage to Aircraft

1.3.1 The lower surfaces of the aircraft were substantially damaged.



Figure 1. The aircraft after the wheels-up landing.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Instructor

Nationality	South African	Gender	Male	Age	46
Licence Number	*****	Licence Type	ATPL		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instructor grade 1; Test pilot class 2; Instrument rating (A); Flight test on piston multi- and single-engines; Radio telephony certificate; co-pilot restricted 747SP and 747-300				
Medical Expiry Date	23 September 2011				
Restrictions	Corrective lenses				
Previous Accidents	None				

Flying Experience

Total Hours	14 500
Total Past 90 Days	150
Total on Type Past 90 Days	10
Total on Type	300

Student

Nationality	Rwandan	Gender	Male	Age	26
Licence Number	*****	Licence Type	Private		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Night flight				
Medical Expiry Date	31 May 2012				
Restrictions	None				
Previous Accidents	None				

Flying Experience

Total Hours	262,5
Total Past 90 Days	78,8
Total on Type Past 90 Days	31,6
Total on Type	31,6

1.6 Aircraft Information

Airframe

Type	Piper PA-34-200	
Serial No.	34-7250047	
Manufacturer	Piper Aircraft Corporation	
Date of Manufacture	1972	
Total Airframe Hours (at time of incident)	6 197	
Last MPI (Date & Hours)	14 March 2011	6 190
Hours since last MPI	7	
C of A (Issue Date)	19 November 2010	
C of R (Issue Date) (Present Owner)	7 October 2010	
Operating Categories	Standard Part 91	

Engine 1

Type	Lycoming IO-360-C1E6
Serial No.	L-10696-51A
Hours since New	9 424
Hours since Overhaul	292
Date of Overhaul	13 October 2010

Engine 2

Type	Lycoming IO-360-C1E6
Serial No.	L-930-67A
Hours since New	Unknown
Hours since Overhaul	292
Date of Overhaul	13 October 2010

Propeller 1

Type	Hartzell HCC2YK-2CEUF
Serial No.	AU13765B
Hours since New	292
Date Newly Installed	15 October 2010

Propeller 2

Type	Hartzell HCC2YK-2CEUF
Serial No.	AU13873B
Hours since New	292
Date Newly Installed	15 October 2010

1.7 Meteorological Information

- 1.7.1 The student pilot reported fine weather conditions at the time of the accident but did not provide a full weather report.

1.8 Aids to Navigation

- 1.8.1 The aircraft was fitted with standard navigational equipment as approved by the regulator for this type. No abnormalities were reported prior to the accident

1.9 Communications

- 1.9.1 The aircraft was fitted with standard communication equipment as approved by the regulator for this type. No abnormalities were reported prior to the accident.

1.10 Aerodrome Information

Aerodrome Location	Port Alfred Aerodrome	
Aerodrome Co-ordinates	S33°35'00.0" E026°53'00.0"	
Aerodrome Elevation	275 ft	
Runway Designations	10L/28R	10R/28L
Runway Dimensions	1 828 m x 30 m	1 200 m x 30 m
Runway Used	10R	
Runway Surface	Grass	
Approach Facilities	None	

1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder or cockpit voice recorder. Neither was required by regulation to be fitted to this aircraft type.

1.12 Wreckage and Impact Information

1.1.5 After several unsuccessful attempts to lower the nose gear, the main undercarriage was retracted. The propellers were then feathered and a smooth wheels-up landing performed. Neither propeller made contact with the ground. The aircraft slid to a halt a short distance from the first touchdown and sustained damage to its bottom surfaces.



Figure 2. Front view of the aircraft after the wheels-up landing.

1.13 Medical and Pathological Information

1.13.1 None

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The pilot and student were wearing their safety harnesses, and at no stage during the landing were subjected to any excessive forces.

1.16 Tests and Research

1.16.1 The aircraft was recovered to an approved aircraft maintenance organisation

(AMO), who was also the operator of the aircraft, to establish the cause of the nose wheel extension failure. The AMO was unable to replicate the failure on ZS-SPZ when the aircraft was on jacks in the hangar. On disassembling the nose wheel, the engineers uncovered previous damage and repair work on the nose wheel bay. The quality of the repair was poor, the work having been carried out without proper preparation of the fibreglass material.



Figure 3. Tear in the fibreglass and scuffing on the lower surfaces.



Figure 4. The discolouration indicates an earlier repair. A fibreglass spar which runs the length of this section of the nose cone is designed to provide some rigidity to the structure. This spar was fractured, enabling the entire nose to twist under the aerodynamic forces of the ram air entering the wheel bay when the doors were open. This twisting was sufficient to cause the side of the wheel bay to press against the undercarriage mechanism, thus preventing the nose wheel from extending.

1.17 Organisational and Management Information

1.17.1 This was a training flight.

1.17.2 The AMO was in possession of a valid AMO approval issued on 1 September 2010 and due to expire on 31 August 2011. The last audit of the AMO was performed on 7 and 8 July 2010. According to SACAA records, six findings and four observations were made and an acceptable action plan was received by the Regulator from the operator. The findings were closed. The last maintenance inspection performed on the aircraft prior to the accident was certified by the AMO on 12 March 2011.

1.17.3 The aviation training organisation was in possession of a valid approval certificate issued on 25 November 2010. The last audit had been carried out on 28 October 2010. There were no findings.

1.18 Additional Information

1.18.1 None.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1 The instructor and student were conducting a commercial test flight at Port Alfred aerodrome. On the approach for landing, the nose gear failed to extend. After unsuccessful attempts to lower it, the main landing gear was retracted and the aircraft was landed without wheels to minimise damage.

2.2 The landing was smooth and gentle. Both propellers were feathered and neither touched the ground. The aircraft came to a halt a few metres from the first touchdown and sustained damage to its lower surfaces.

2.3 On disassembling the nose wheel, AMO engineers uncovered previous damage and unsatisfactory repairs, the work having been carried out without proper preparation of the fibreglass material. As a result, the fibreglass had fractured, causing the side of the wheel bay to press against the undercarriage mechanism and prevent the nose wheel from extending.

3. CONCLUSION

3.1 Findings

3.1.1 The aircraft had a valid certificate of registration and a valid certificate of airworthiness.

3.1.2 The maintenance records indicated that the aircraft had been maintained in accordance with existing regulations and approved procedures.

3.1.3 The aircraft was serviceable when dispatched for the flight.

3.1.4 No anomalies on the engine or airframe were identified during the investigations.

3.1.5 The pilot was properly licensed and medically fit for the flight in accordance with existing regulations.

3.1.6 The pilot executed a wheels-up landing due to the nose wheel failing to extend during approach for landing.

- 3.1.7 The failure of the nose wheel was found to be due to a fracture of the fibreglass material on the wheel bay, which caused the side of the wheel bay to press against the undercarriage mechanism.
- 3.1.8 The accident occurred on a prepared runway.
- 3.1.9 The pilot reported fine weather conditions at the time.

3.2 Probable Cause/s

- 3.2.1 The nose wheel failed to extend due to a fracture of the fibreglass material, which caused the side of the wheel bay to press against the undercarriage mechanism.
- 3.2.2 Contributory: Poor maintenance.

4. SAFETY RECOMMENDATIONS

- 4.1 None.

5. APPENDICES

- 5.1 Report from the AMO.

Compiled by: Maitsiedi Frank Masoga

Date: 26 May 2011

For: Director of Civil Aviation

Investigator-in-charge:

Date:

Co-Investigator:

Date:

Appendix 1

PROBABLE CAUSE OF THE ZS-SPZ WHEELS-UP OCCURRENCE

The AMO were unable to replicate the nose wheel extension failure on ZS-SPZ when the aircraft was on jacks in the hangar. This implied that either the damage caused had resulted in the obstruction being removed or that the cause was dynamic – that it had to do with the pressures of the airflow in flight that caused the snagging of the wheel in the wheel bay. On disassembling the nose of the aircraft, previous damage and repair were uncovered. The previous repair was not good, having been carried out without proper preparation of the fibreglass material.



The tear in the fibreglass indicated by the arrow shows discolouration when examined with the naked eye; it is indicative of an earlier repair.



This discolouration is more visible in the second photograph. What is important is that there is a fibreglass spar which runs the length of this section of the nose cone which is supposed to provide some rigidity to the structure. This spar was also fractured; this enabled the entire nose to twist under the aerodynamic forces of the ram air entering the wheel bay when the doors are open. This twisting is sufficient to cause the side of the wheel bay to press against the undercarriage mechanism, thus preventing the wheel from extending.

The entire nose was replaced with a repairable item from the rebuild hangar and further tests were then conducted and the aircraft was certified serviceable.