AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/7997		
Aircraft Registration	**ZU-DRS**	**Date of Accident**	29 July 2005		**Time of Accident**	1350Z	
Type of Aircraft	Sonex		**Type of Operation**		Private		
Pilot-in-command Licence Type	PPL		**Age**	67	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		232.9		Hours on Type	Unknown	
Last point of departure	Rand Aerodrome (FAGM)						
Next point of intended landing	Rand Aerodrome (FAGM)						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Rand Aerodrome dumping area. GPS position: S 26°14. 606′ E 028°08.394′							
Meteorological Information	The weather was fine.						
Number of people on board	1 + 1	**No. of people injured**	0	**No. of people killed**	1 + 1		

Synopsis

The pilot, accompanied by a passenger (also a pilot), took off from runway 29 at Rand Aerodrome (FAGM) with the intention of practising circuits and landings. During the second touch-and-go, as they became airborne, the engine stopped and the aircraft crashed next to the threshold of runway 11.

The aircraft was substantially damaged in the accident, and both occupants were fatally injured.

An examination of the aircraft fuel system revealed that a polytetrafluoroethylene (PTFE) thread seal tape found in the carburettor fuel inlet port and also in the fuel metering valve had restricted the fuel flow to the carburettor. It is clear that this had led to fuel starvation, which resulted in the engine stoppage.

Probable Cause

Loss of positive climb-rate after rotation due to engine stoppage as a result of fuel starvation, caused by a restriction in the carburettor metering valve by PTFE thread tape.

Contributing factor:

Non-adherence to Standard Practices (SP) during maintenance.

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : E Paladin
Manufacturer : Sonex Ltd
Model : Sonex
Nationality : South African
Registration Marks : ZU-DRS
Place : Rand Aerodrome
Date : 29 July 2005
Time : 1350Z

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 On 29 July 2005, at approximately 1340Z, the pilot, accompanied by a passenger (also a pilot), took off from runway 29 at Rand Aerodrome (FAGM) with the intention of practising circuits and landings. During the second touch-and-go, as they became airborne, the aircraft experienced an engine stoppage and crashed next to the threshold of runway 11.

1.1.2 According to statements from eye-witnesses working in a nearby hangar where the aircraft was parked, the pilot and passenger were seen doing repair work on the engine prior to the accident flight. At one point, the aeroplane was seen taxiing towards the runway for takeoff, but had to return to the hangar for repairs because the engine had stopped. The nature of these repairs could not be ascertained, as they were not recorded in any documentation.

1.1.3 The accident occurred in daylight at approximately 1350Z, adjacent to runway 11 at Rand Aerodrome, at an elevation of 5 483 ft and at the GPS position S 26°14.606′ E 028°08.394′.

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 substantially damaged.

Figure 1. Side view of the wreckage.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	67
Licence Number	**********	Licence Type	Private		
Licence valid	Yes	Type Endorsed	No		
Ratings	Night Rating				
Medical Expiry Date	31 March 2009				
Restrictions	Corrective lenses				
Previous Accidents	None				

Flying Experience

Total Hours	232.9
Total Past 90 Days	Unknown
Total on Type Past 90 Days	Unknown
Total on Type	Unknown

NOTE : The pilot's hours were extracted from his flying logbook, which had last been updated on 11 May 2004. Thus his flying experience for the previous 90 days could not be determined.

1.6 Aircraft Information

Airframe

Type	Sonex	
Serial Number	0660	
Manufacturer	Sonex Ltd	
Year of Manufacture	2005	
Total Airframe Hours (At time of Accident)	12.1 Hobbs	
Last Annual Inspection (Date & Hours)	New	New
Hours since Last Annual Inspection	New	
Authority To Fly (Issue Date)	14 March 2005	
C of R (Issue Date) (Present Owner)	26 January 2005	
Operating Categories	Standard	

Engine

Type	Sonex Aero Vee 2002
Serial Number	0161
Hours since New	12.1 Hobbs
Hours since Overhaul	TBO not yet reached

Propeller

Type	Sensenich
Serial Number	None
Hours since New	12.1 Hobbs
Hours since Overhaul	TBO not yet reached

1.6 Meteorological Information

1.6.1 An official weather report was not requested at the time of the accident. According to witnesses, the weather was fine and clear with light winds.

Wind direction	250°	Wind speed	6 kts	Visibility	CAVOK
Temperature	Unknown	Cloud cover	None	Cloud base	None
Dew point	None				

1.8 Aids to Navigation

1.8.1 The aircraft had standard navigational instruments and none was reported unserviceable prior to or during the flight.

1.9 Communications

1.9.1 The aircraft was fitted with a VHF radio. Apart from routine communication with air traffic control just before and after takeoff, the pilot made no calls indicating that he had any sort of problem.

1.9.2 A crash alarm was activated by the ATC following the accident. The pilot never made an emergency call.

1.10 Aerodrome Information

1.10.1 The accident occurred adjacent to runway 11 at Rand Aerodrome at an elevation of 5 483 ft and at the GPS coordinates S 26°14.606′ E 028°08.394′.

Aerodrome Location	Rand Aerodrome (FAGM)	
Aerodrome Co-ordinates	S 26°14.31′ E 028°09.05′	
Aerodrome Elevation	5 483 ft	
Runway Designations	11/29	35/17
Runway Dimensions	1 660 m x 15 m	1 463 m x 15 m
Runway Used	29	
Runway Surface	Asphalt	
Approach Facilities	NDB/VOR/DME/PAPIs/Landing Lights	

1.11 Flight Recorders

1.11.1 The aircraft was not fitted with a cockpit voice recorder (CVR) or a flight data recorder (FDR). Neither was required by regulations to be fitted to this type of aircraft.

1.12 Wreckage and Impact Information

1.12.1 The accident site was a level rocky surface adjacent to the threshold of runway 11 at Rand Aerodrome. The aircraft took off from runway 29. After rotation, following the second touch-and-go, the engine stopped and the aircraft was unable to climb, resulting in an impact with the ground at high speed and in a slightly nose-down and right wing-low attitude. The wreckage was contained within a small impact area.

1.12.2 The impact largely destroyed the engine compartment and cockpit. The fuselage aft of the pilot's seat remained relatively intact. The wings and tail section were still attached to the fuselage. Pre-impact integrity of the flight controls was positively established.

1.12.3 Evidence from the wreckage position indicated that the aircraft had a very high rate of descent at the time of impact.

Figure 2. Front view of the wreckage.

1.13 Medical and Pathological Information

1.13.1 The pilot and passenger were fatally injured. The respective post mortem reports concluded that the cause of death was multiple injuries sustained during the impact.

1.13.2 The toxicology report was not available at the time of compiling this report. Should any of the results, once received, have a bearing on the performance of the pilot, these will be considered as new evidence and the investigation will be re-opened.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 Due to the severe impact forces and the destruction of the cockpit, this was regarded as a non-survivable accident.

1.16 Tests and Research

1.16.1 On-site wreckage examination

(i) This revealed that all of the structural damages were consistent with the impact, and nothing was found to suggest that there had been any pre-impact failure of the primary structure. Approximately 9 litres of fuel were drained from the fuel tank.

1.16.2 Aircraft systems and engine examination

(i) The wreckage and engine were recovered and taken to an approved aircraft test/inspection facility. A complete fuel system analysis and engine teardown was carried out in the presence of CAA representatives.

(ii) During examination of the fuel system, it was discovered that the fuel supply line leading to the carburettor was loose on the side of the carburettor. On further examination, pieces of white PTFE thread seal tape, typically used for plumbing applications in water and gas systems, were found in the carburettor fuel inlet port, and another piece was found in the carburettor fuel metering and shut-off valve. It was apparent that these pieces had restricted fuel flow to the carburettor.

(iii) Sparkplug examination revealed that the engine had been running on a very lean mixture.

(iv) Examination of the engine did not reveal any evidence of mechanical failure, and the damage to the engine was entirely the result of impact forces.

1.17 Organisational and Management Information

1.17.1 The aircraft was privately owned and operated.

1.18 Additional Information

1.18.1 None.

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

2.1.1 The pilot, accompanied by a passenger (also a pilot), took off from runway 29 at Rand Aerodrome (FAGM) with the intention of practising circuits and landings. During the second touch-and-go, as they became airborne, the aircraft experienced an engine stoppage and could not maintain a positive rate of climb, resulting in the aeroplane crashing next to the threshold of runway 11.

2.1.2 An examination of the aircraft fuel system revealed that PTFE thread seal tape found in the carburettor fuel inlet port and also in the fuel metering valve had restricted the fuel flow from the carburettor to the combustion chambers. It is clear that this had led to fuel starvation, which had resulted in the engine stoppage.

2.1.3 The white PTFE thread seal tape found in the fuel supply line is for water and gas pipes only. Its application to the fuel pipe was non-adherence to Standard Practices (SP) during maintenance.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot was a holder of a valid private pilot's licence (aeroplane). However, after an evaluation of his records, it emerged that he was not rated on the aircraft type.

3.1.2 The aircraft had a valid Proving Flight Authority to Fly certificate.

3.1.3 Weather conditions were reported to be fine, with the prevailing wind being 250° at 6 kts. It was not a factor in this accident.

3.1.4 The accident occurred in daylight.

3.1.5 Post-accident strip examination of the engine found that pieces of PTFE thread seal tape had restricted fuel flow to the carburettor and from the carburettor to the engine combustion chambers.

3.1.6 The engine stopped shortly after the touch-and-go as a result of fuel starvation.

3.1.7 Following the engine stoppage, the aircraft could not maintain a positive rate of climb, resulting in the crash.

3.1.8 The engine stopped in a situation that left the pilot with little chance of executing a safe forced landing.

3.2 Probable Cause/s

3.2.1 Loss of a positive climb rate after rotation due to engine stoppage as a result of a fuel starvation, caused by a restriction in the carburettor metering valve by PTFE thread tape.

Contributory factor

3.2.2 Non-adherence to Standard Practices (SP) during maintenance

4. SAFETY RECOMMENDATIONS

4.1 None.

5. APPENDICES

5.1 None.

Report reviewed and amended by the Advisory Safety Panel on 16 February 2010

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