



SOUTH AFRICAN CIVIL AVIATION AUTHORITY

ACCIDENT REPORT – EXECUTIVE SUMMARY

Aircraft Registration	ZS-AMM	Date of Accident	20 April 2003	Time of Accident	1520Z
Type of Aircraft	PA23-250	Type of Operation	Charter		
Pilot-in-command Licence Type	Commercial	Age	52	Licence Valid	No
Pilot-in-command Flying Experience	Total Flying Hours At time of licence renewal as on 10 December 2001	969	Hours on Type	Unknown	
Last Point of Departure	Segodi Lodge, close to Ellisras				
Next Point of Intended Landing	FAGC				
Location of the Accident Site with Reference to Easily Defined Geographical Points (GPS readings if possible)					
Near Ellisras (GPS coordinates: S23°56'04,3" E027°17'38,6")					
Meteorological Information	According to the official weather report the most likely conditions at the place of the accident were: Surface wind 300/05KT, Visibility +10km, Scattered cloud, Temperature 30°C.				
Number of People on Board	1 + 4	No. of People Injured	0	No. of People Killed	1 + 4
Synopsis	<p>On 20 April 2003 at approximately 1520Z, the pilot, accompanied by four passengers, took off on a charter flight from a private aerodrome near Ellisras to FAGC. The flight was not conducted in terms of any existing Air Operator Certificate.</p> <p>According to an eyewitness, the right-hand nose baggage compartment opened during the take-off. It was reported that the aircraft climbed to approximately 200 ft above ground level (AGL), whereafter the pilot executed a left-hand turn. During the turn, the nose dropped and the aircraft crashed into dense bush and burst into flames. The aircraft was destroyed during the ensuing fire and all the occupants sustained fatal injuries during the accident sequence.</p>				
Probable Cause					
When the right-hand nose baggage compartment opened during the take-off, the pilot became distracted and failed to maintain flying speed during the turn, allowing the aircraft to stall and enter a spin from which he was not able to recover.					



AIRCRAFT ACCIDENT REPORT

Name of Owner : BISON COMPUTERS CC
Name of Operator : None
Manufacturer : Piper Aircraft Corporation
Model : P23-250
Nationality : South African
Registration Marks : ZS-AMM
Place : Segodi Lodge
Date : 20 April 2003
Time : 1520Z

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 two 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 On 20 April 2003 at approximately 1520Z, the pilot, accompanied by four passengers, took off on a charter flight from a private aerodrome near Ellisras to FAGC. The flight was not conducted in terms of any existing Air Operator Certificate.

1.1.2 According to eyewitnesses, the right-hand nose baggage compartment opened shortly after take-off, when turning out to the left at approximately 200 ft AGL. During the turn, the nose dropped and the aircraft crashed into dense bush and burst into flames.

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	1	-	4	-
Serious	-	-	-	-
Minor	-	-	-	-
None	-	-	-	-

1.3 Damage to Aircraft

1.3.1 During the ensuing fire, the aircraft was destroyed.



Figure 1: The wreckage, destroyed by the ensuing fire

1.4 Other Damage

1.4.1 Minor damage was caused to the surrounding vegetation by the ensuing fire that followed the accident.

1.5 Personnel Information

1.5.1 Pilot-in-command:

Nationality		South African			
Licence #	*****	Gender	Male	Age	52
Licence Valid		No (medical certificate expired)	Type Endorsed	Yes	
Ratings		Night rating and instrument rating valid from			

	10 December 2001 to 9 December 2002
Medical Expiry Date	31 October 2002
Restrictions	Corrective lenses
Previous Accidents	None

1.5.2 Pilot-in-command Flying Experience:

The pilot's personal logbook could not be located. According to information obtained from the South African Civil Aviation Authority (SACAA) pilot file, his experience comprised the following as on 10 December 2001 when he renewed his licence:

Total Hours	969
Total Past 6 Months	Unknown
Total Past 12 Months	36
Total on Type Past 90 Days	Unknown
Total on Type	Unknown
Instrument Flying For the year prior to renewing his licence on 10 December 2001	2.3

1.6 Aircraft Information

1.6.1 Airframe:

Type	PA 23-250	
Serial #	27-7305185	
Manufacturer	Piper Aircraft Corporation	
Year of Manufacture	1973	
Total Airframe Hours (At Time of Accident)	3 198.4	
Last MPI (Date & Hours)	17 April 2003	3 192.21
Hours Since Last MPI	6.19	
C of A (Issue Date)	7 March 1974	
C of A (Expiry Date)	6 March 2003	
C of R (Issue Date)	17 May 1994	
Operating Categories	Standard	

1.6.2 Engine 1 (Left):

Type	Lycoming T10-540-CIA
Serial #	L1704-61
Hours Since New	3 192.21
Hours Since Overhaul	120.22

1.6.3 Engine 2 (Right):

Type	Lycoming T10-540-CIA
Serial #	L2786-61
Hours Since New	3 192.21

Hours Since Overhaul	120.22
----------------------	--------

1.6.4 Propeller 1 (Left):

Type	Hartzell HCE2YK-2RBSF
Serial #	BP8954
Hours Since New	3 192.21
Hours Since Overhaul Midlife Inspection on 4 November 1998	467.13

1.6.5 Propeller 2 (Right):

Type	Hartzell HCE2YK-2RBSF
Serial #	BP9301
Hours Since New	3 192.21
Hours Since Overhaul Midlife Inspection on 4 November 1998	467.13

1.6.6 Weight and Balance:

Item	Weight (lb)	Arm (In)
Basic Empty Weight (As on 30 June 2000, including oil and 4 gal unusable fuel)	3 415	89.5
Pilot and Co-pilot	440	90.3
Middle-seat Passengers	352	93.5
Rear-seat Passengers	132	98.7
Forward Baggage (Max. 150)	44	95.6
Rear Baggage (Max. 150)	0	98.4
Fuel (140 US gal total @ 6 lb/gal)	740	100.6
Take-off weight (Maximum Allowed = 5 200 lb)	5 123	

Calculations showed that the centre of gravity (CG) was within the allowable limits as per the applicable CG envelope in the Pilot's Operating Manual.

1.7 Meteorological Information

1.7.1 No official weather observations were available at the time and place of the accident. According to the South African Weather Bureau, the most likely conditions at the place of the accident were as follows:

Wind Direction	300°	Wind Speed	05 kt	Visibility	+10 km
Temperature	30 °C	Cloud Cover	Scattered	Cloud Base	N/A
Dew Point	10 °C				

1.7.2 Surface Analysis:

A high-pressure system was dominant over the north-eastern part of the country, with a low pressure over south-western Cape and a cold front west of Cape Town.

1.7.3 Upper Air Analysis:

An upper air trough was present just east of the country, with a high-pressure system over the north of Namibia.

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment.

1.9 Communications

1.9.1 There was no recorded verbal communication between the pilot and any other party, and no flight plan was filed.

1.10 Aerodrome Information

Aerodrome Location	Private aerodrome close to Ellisras
Aerodrome Co-ordinates	S23°56'04.3" E027°17'38.6"
Aerodrome Elevation	5 150 ft AMSL
Runway Designations	06/24
Runway Dimensions	1 200 m
Runway Used	06
Runway Surface	Grass

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 accident occurred during daytime in fine weather conditions near Ellisras at a GPS position of S23°56'04.3" and E027°17'38.6". The site elevation was determined to be 5 150 ft AMSL.

1.12.2 The aircraft impacted the ground in a 20° nose-down attitude with the right wing low by approximately 20°, in a direction determined as 080 °M during impact.

1.13 Medical and Pathological Information

1.13.1 The pilot did not have a valid Medical Certificate. The Medical Certificate expired on 31 October 2002.

1.13.2 According to the Medico-Legal Post-mortem Examination, the cause of death of the pilot was multiple injuries.

1.13.3 No blood or eye liquid was available for analysis due to the extensive burning of all the occupants of the aircraft.

1.14 Fire

1.14.1 The aircraft was destroyed and minor damage to the surrounding vegetation was caused during the ensuing fire.

1.15 Survival Aspects

1.15.1 The aircraft impacted the ground nose down with the right 20° down from the horizon. Upon impact, the aircraft immediately caught fire, destroying the aircraft and causing minor damage to the surrounding vegetation.

1.15.2 The intense heat generated by the ensuing fire together with the injuries sustained by the occupants during the accident rendered the accident as a non-survivable accident.

1.16 Tests and Research

1.16.1 Engine examination:

Left-hand Engine (4 June 2003)		Right-hand Engine (5 June 2003)	
Item checked	Result	Item checked	Result
Engine Type	Lycoming TIO-540 CIA	Engine Type	Lycoming TIO-540 CIA
Engine Serial #	L1704-61	Engine Serial #	L2786-61
Turning	Unable to turn due to extensive fire damage	Turning	Unable to turn due to extensive fire damage
Oil Sump & rear case	Burnt away	Oil Sump & rear case	Burnt away
Magnetos	Destroyed by fire, but drive shafts in place	Magnetos	Destroyed by fire, but drive shafts in place
HT leads	Destroyed by fire	HT Leads	Destroyed by fire
Spark plugs	All tested OK	Spark plugs	All tested OK
Flywheel	Failed around attachment flange	Flywheel	In position but drive gear failed

Vacuum pump	In position but fire damaged	Vacuum pump	In position but fire damaged
Starter motor	Attached but fire damaged	Starter motor	Separated from mounting pad and fire damaged
CSU	Checked and found to be OK. Pitch position against fine pitch stop	CSU	Checked and found to be OK. Pitch position against fine pitch stop
Alternator	Fitted but extensively damaged by fire	Alternator	Fitted but extensively damaged by fire
Fuel Distributor Valve	Opened and found to be OK	Fuel Distributor Valve	Opened and found to be OK
Fuel Nozzles	Appear to be OK, but flow test not possible due to debris in intake manifold	Fuel Nozzles	Appear to be OK. All open but flow test not possible due to debris in intake manifold
Valve Operating Mechanism	Operating mechanism fine and all valves appear to be in a good condition	Valve Operating Mechanism	Operating mechanism fine and all valves appear to be in a good condition
Cylinders and Pistons	All cylinders difficult to remove. 1 Cylinder and piston in good condition 2 Cylinder and piston in good condition 3 Cylinder and piston in good condition; piston pin seized 4 Cylinder and piston in good condition; piston pin seized 5 Lower internal surface of cylinder plating blistered; piston seized in cylinder 6 Piston OK but piston pin seized in piston	Cylinders and Pistons	All cylinders difficult to remove. 1 Cylinder and piston in good condition 2 Cylinder and piston in good condition 3 Unable to remove cylinder and piston 4 Unable to remove cylinder and piston 5 Cylinder and piston in good condition 6 Cylinder and piston in good condition.
Big- and Small-end Bearings	All in good condition	Big- and Small-end Bearings	All in good condition
Oil Filter	Cut open – no metal debris inside	Oil filter	Cut open – no metal debris inside

1.16.2 Propeller examination:

Left-hand Propeller		Right-hand Propeller	
Item checked	Result	Item checked	Result
Propeller Type	Hartzell HCE2YK-2RBSF	Propeller Type	Hartzell HCE2YK-2RBSF
Propeller Serial #	BP8954	Propeller Serial #	BP9301
Pitch Change Pin	Broken – Accident damage	Pitch Change Pin	Broken – Accident damage
Pitch Change Rod	Bent – Accident damage	Pitch Change Rod	Bent – Accident damage
Pitch Change Fork	No damage	Pitch Change Fork	No damage

Based on the above findings, it is concluded that there was no propeller failure on either the left-hand or right-hand propellers.

1.16.3 Maintenance:

1.16.3.1 The last mandatory periodic inspection (MPI) was certified on 17 April 2003 at 3 192.21 airframe hours. Certification of the inspection also implies that all Airworthiness Directives (ADs) and Service Bulletins (SBs) had been complied with by the aircraft maintenance organisation (AMO) at the time that the MPI was certified.

1.16.3.2 Below are details of Service Bulletin #604A, applicable to the forward baggage door, including the state of compliance/non-compliance by the AMO:

Subject	Purpose	Compliance/Non-compliance
<i>Part I:</i> Forward Baggage Door Locking System Modification	The forward or nose baggage door locking system on the above-mentioned aircraft is similar amongst the different models, and is a simple, effective method of securing the forward baggage door. However, it is possible to close the door and turn the lock to the lock position without the lock tang engaging the door handle. As a result, the door would not be properly secured and could possibly come open in flight; this could adversely affect the flight characteristics of the airplane.	6 August 1979

<i>Part II:</i> Forward Baggage Door Lock Arm Assembly Inspection	The door lock arm assemblies on the forward or nose baggage door are secured to brackets by steel rivets. It has been determined that for optimum arm-to-bracket security, the bucked (peened) head of the rivet should have a diameter of 0.281 inch or greater.	6 August 1979
---	---	---------------

1.17 Organisational and Management Information

1.17.1 The operator was not in possession of an Air Operating Certificate at the time of the accident and therefore no SACAA Oversight/Surveillance was ever conducted on the operator.

1.17.2 No passenger tickets were issued to the passengers by the operator.

1.18 Additional Information

1.18.1 The forward baggage door opened during the flight and the pilot attempted to turn back to the aerodrome. This had an adverse effect on the flight characteristics of the aircraft as cautioned by Service Bulletin #604 A.

1.18.2 Although Service Bulletin #604A had been complied with, it would appear that the forward baggage door was closed without the tang engaging the door handle. This could indicate that the pilot's attention might have been distracted during closure of the door which resulted in its opening in flight, adversely affecting the flight characteristics of the airplane.

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

HUMAN BEHAVIOURAL FACTORS ANALYSIS		
SUBJECT	RATING 2 = Probably contributory 3 = Evidence of hazard	COMMENTS
GENERAL FACTORS		
Error in judgement	2	Turn The forward baggage door opened in flight. This had an adverse effect on the flight characteristics of the aircraft as

		<p>cautioned by Service Bulletin #604 A. The pilot attempted to turn back to the airfield in order to land the aircraft.</p> <p><i>It would appear that the pilot failed to maintain flying speed and allowed the aircraft to stall and to enter a spin during the turn, from which he was not able to recover. It is the opinion of the Investigator-in-Charge (IIC) that this may have been an error in judgement as a result of anxiety.</i></p>
TASK-RELATED FACTORS		
Distractions	3	<p>Door</p> <p>Although Service Bulletin #604A has been complied with, it would appear that the forward baggage door was closed without the tang engaging the door handle, which resulted in the door opening in flight, adversely affecting the flight characteristics of the airplane. This indicates that the pilot's attention was distracted</p> <p><i>It is the opinion of the IIC that this may have resulted in the pilot being distracted, which caused him to fail to maintain flying speed and allow the aircraft to stall and to enter a spin from which he was not able to recover.</i></p>
ACCIDENT FACTORS ANALYSIS		
Discussion Point		Comments
The right-hand nose baggage compartment opened during take-off.		<i>It is the opinion of the IIC that although SB #604A, was complied with, the application there-off does not serve the intended purpose of the SB and should be re-looked at by the Certification section of the SACAA.</i>
The aircraft climbed to approximately 200 ft AGL whereafter the pilot executed a left-hand turn. During the turn, the nose dropped and the aircraft crashed into dense bush and burst into flames.		<i>It is the opinion of the IIC that the pilot did not close the door properly and that the pilot probably panicked when the door opened. In an attempt to cope with the situation, the pilot failed to maintain flying speed.</i>

The operator was not in possession of an Operating Certificate at the time of the accident and therefore no CAA Oversight/Surveillance was ever conducted on the operator and no passenger tickets were issued to the passengers.

This raises a question as to whether the operator was aware of such practices and, furthermore, what control do operators have over the movements of aircraft in their fleets.

3. CONCLUSION

3.1 Findings

- 3.1.1 On 20 April 2003 at approximately 1520Z, the pilot, accompanied by four passengers conducted a commercial flight without the necessary approvals from a private aerodrome near Ellisras to FAGC (Grand Central).
- 3.1.2 According to an eyewitness, the right-hand nose baggage compartment door opened during the take-off.
- 3.1.3 It was reported that the aircraft climbed to approximately 200 ft AGL, whereafter the pilot executed a left-hand turn. During the turn, the nose dropped and the aircraft crashed into dense bush and burst into flames.
- 3.1.4 The aircraft was destroyed during the ensuing fire and all the occupants sustained fatal injuries during the accident sequence.
- 3.1.5 The pilot's licence was not valid at the time of the accident, as he was not the holder of a valid medical certificate. The aircraft type was endorsed in the pilot's licence.
- 3.1.6 The last MPI was certified on 17 April 2003 at 3 192.21 airframe hours. Since the last MPI was certified, the aircraft flew a further 6.19 hours. During this inspection, it was also certified that all ADs and SBs had been complied with by the AMO. This included Service Bulletin #604A, applicable to the forward baggage door.
- 3.1.7 According to calculations, the aircraft was operated within the weight and balance limitations specified in the Pilot's Operating Handbook (POH) at the time of the accident.
- 3.1.8 No official weather observations were available at the time and place of the accident. However, according to the South African Weather Bureau, weather conditions prevailing at the time and place of the accident were fine.
- 3.1.9 According to the Medico-Legal Post-Mortem Examination, the cause of death of the pilot was multiple injuries. No blood or eye liquid was available for analysis due to the extensive burning of all the occupants of the aircraft.
- 3.1.10 Examination of the engines and propellers did not reveal any reasons for an engine failure or a propeller failure.
- 3.1.11 The fuel nozzles could not be flow tested due to debris in the intake manifold after the accident.

3.2 Probable Cause/s

3.2.1 When the right-hand nose baggage compartment opened during take-off, the pilot became distracted and failed to maintain flying speed during the turn, allowing the aircraft to stall and enter a spin from which he was not able to recover.

4. SAFETY RECOMMENDATIONS

4.1 It is possible to close the nose baggage compartment door without it being properly latched. This implies that SB #604A does not serve its intended purpose. It is recommended that the Certification section of the SACAA should investigate this possibility and implement corrective action.

4.2 It is recommended that the syllabus for flying training should address the actions required in case of any door opening unintentionally during flight.

5. APPENDICES

5.1 None

Compiled by:

Jan du Plessis

Date:

For: Director of Civil Aviation

Investigator-in-charge:

Date:

Co-Investigator:

Date: