AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	**CA18/2/3/8427**		
Aircraft Registration	**ZS-NWO**	**Date of Accident**	30 January 2008		**Time of Accident**	0945Z	
Type of Aircraft	Piper PA23-250		**Type of Operation**		Training		
Pilot-in-command Licence Type	Commercial		**Age**	33	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		1 313.4		Hours on Type	67.0	
Last point of departure	Benoni/Brakpan Aerodrome (FABB)						
Next point of intended landing	Benoni/Brakpan Aerodrome (FABB)						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
On the apron at Benoni/Brakpan Aerodrome (FABB)							
Meteorological Information	Wind 090° at 5 kts, temperature 24°C, visibility CAVOK						
Number of people on board	1 + 1	**No. of people injured**	0	**No. of people killed**	0		

Synopsis

The flight instructor and a pilot under training returned from the East Rand general flying area where they were conducting conversion training for the pilot onto the Piper PA23-250 aircraft type.

After landing on runway 18, they turned off the runway onto the taxiway at the end of the runway. The flight instructor stated that they proceeded on the taxiway while he debriefed the pilot on her approach and landing. The aircraft was brought to a complete stop at the yellow 'T' (designated parking area) on the apron in front of the flying school's clubhouse. The pilot then applied the park brake and commenced with the aircraft shutdown procedures. The instructor then noticed that the aircraft was moving forward. He immediately instructed the pilot to apply brakes as the aircraft only had brake pedals on the left-hand side. She replied that she was, but the aircraft continued to move forward and he again insisted that she must apply brakes. She once again indicated that she was applying maximum braking. The instructor then closed the mixture controls on both engines; however the aircraft kept on moving forward until it impacted with two vehicles that were parked on and next to the apron.

The instructor and the pilot sustained no injuries. The aircraft sustained damage to the left-hand wing, both propellers and both the engines.

The last mandatory periodic inspection (MPI) prior to the accident was certified on 13 November 2007 at 10 517.75 airframe hours. At the time of the accident, the aircraft had accumulated a further 64.78 airframe hours since the last MPI was certified. According to available records, the aircraft maintenance organisation (AMO) that certified the last MPI on the aircraft prior to the accident was in possession of a valid AMO Approval, no.159, with an expiry date of 31 July 2008. The SACAA conducted an audit at the AMO on 30 July 2007.

The flying school was the holder of a valid Aviation Training Organisation (ATO) Accreditation and Approval Certificate, CAA/0252, at the time of the accident. The ATO Accreditation Approval Certificate expired on 17 January 2008. The SACAA audited the ATO prior to the accident on 16 January 2008 and no findings were raised. Another Aviation Training Organisation Approval Certificate was issued on 1 February 2008 with an expiry date of 17 January 2009.

Probable Cause			
The pilot under training allowed the aircraft to move forward on the apron area and the aircraft collided with two vehicles that were parked on and near the apron area. Contributory remarks: The pilot under training stepped on the rudder pedals instead of the brakes. The flight instructor failed to intervene soon enough in shutting down the engines.			
IARC Date	27 March 2008	Release Date	

Name of Owner/Operator : Three Diamonds Trading 335 (PTY) LTD
Manufacturer : Piper Aircraft Corporation
Model : PA 23-250
Nationality : South African
Registration Marks : ZS-NWO
Place : Brakpan/Benoni Aerodrome
Date : 30 January 2008
Time : 0945Z

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 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 A flight instructor and a pilot under training returned from the East Rand general flying area (GFA), where they were conducting conversion training for the pilot onto the Piper PA23-250 aircraft type.

1.1.2 After landing on runway 18, they turned off the runway onto the taxiway at the end of the runway.

1.1.3 The flight instructor stated that they proceeded on the taxiway while he debriefed the pilot on her approach and landing. The aircraft was brought to a complete stop at the yellow 'T' (designated parking area) on the apron in front of the flying school's clubhouse.

1.1.4 The pilot then applied the park brake and commenced with the aircraft shutdown procedures.

1.1.5 The instructor then noticed that the aircraft was moving forward. He immediately instructed the pilot to apply brakes as the aircraft only had brake pedals on the left-hand side. She replied that she was, but the aircraft continued to move forward and he again insisted that she must apply brakes. She once again indicated that she was applying maximum braking. The instructor then closed the mixture controls on both engines; however the aircraft kept on moving forward until it impacted with two vehicles that were parked on and next to the apron.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft sustained damages to the left-hand wing, both propellers and both the engines.

Figure 1: Damage to the left-hand wing leading edge

Figure 2: Damage to the left-hand wing's skin

Figure 3: Damage to the right-hand propeller

1.4 Other Damage

1.4.1 Damage was caused to a vehicle that was parked on the apron area and to another vehicle that was parked on grass next to the apron.

Figure 4: Damages to the vehicle parked on the apron

Figure 5: Damage to the vehicle that was parked on grass next to the apron area

1.5 Personnel Information

1.5.1 The Flight Instructor:

Nationality	South African	Gender	Male	Age	33
Licence Number	**********	Licence Type	Commercial		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instructor Gr2; Instrument; Night				
Medical Expiry Date	31 August 2008				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	1 313.4
Total Past 90 Days	162.2
Total on Type Past 90 Days	58.0
Total on Type	67.0

The instructor was converted as an instructor on the Piper PA23-250 aircraft type on 1 November 2007.

1.5.2 Pilot under training:

Nationality	South African	Gender	Female	Age	20
Licence Number	**********	Licence Type	Commercial		
Licence valid	Yes	Type Endorsed	No		
Ratings	Night				
Medical Expiry Date	31 December 2008				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	206.40
Total Past 90 Days	26.40
Total on Type Past 90 Days	6.35
Total on Type	6.35

The pilot started with a twin conversion rating training on 12 January 2008, and at the time of the accident had a total of 6.35 flying hours on the aircraft type.

1.6 Aircraft Information

Airframe:

Type	Piper PA23-250	
Serial Number	27-2243	
Manufacturer	Piper Aircraft Company	
Year of Manufacture	1962	
Total Airframe Hours (At Time of Accident)	10 582.53	
Last MPI (Hours & Date)	10 517.75	13 November 2007
Hours Since Last MPI	64.78	
C of A (Issue Date)	10 April 1997	
C of A (Expiry Date)	09 April 2008	
C of R (Issue Date) (Present owner)	30 January 2006	
Operating Categories	Standard	

Note: The aircraft has been in a previous accident involving a wheels-up landing on 16 November 2003.

Left-Hand Engine:

Type	Lycoming O-540 A1D5
Serial Number	L-15095-40
Hours Since New	Unknown
Hours Since Overhaul	978.30

Left-Hand Propeller:

Type	Hartzell HC-A2VK-2
Serial Number	H2589
Hours Since New	Unknown
Hours Since Overhaul	355.32

Right-Hand Engine:

Type	Lycoming O-540 A1C5
Serial Number	L-5660-40
Hours since New	Unknown
Hours since Overhaul	697.82

Right-Hand Propeller:

Type	Hartzell HC-A2VK-2
Serial Number	H161
Hours Since New	Unknown
Hours Since Overhaul	363.95

1.7 Meteorological Information

1.7.1 Weather information was obtained from the pilot's questionnaire:

Wind direction	090°	Wind speed	5 kts	Visibility	CAVOK
Temperature	24℃	Cloud cover	None	Cloud base	None
Dew point	10℃				

1.8 Aids to Navigation

1.8 The aircraft was equipped with standard navigational equipment for this type of aircraft, including a Garmin 100 Global Positioning System, which was reported serviceable at the time of the accident.

1.9 Communications

1.9.1 The aircraft was equipped with standard communication equipment for this type of aircraft, which was reported serviceable at the time of the accident.

1.9.2 Brakpan/Benoni Aerodrome is an uncontrolled aerodrome and thus unmanned aerodrome procedures were followed by the pilot.

1.9.3 The pilot under training broadcasted their intentions on the local VHF aerodrome frequency of 122.7 MHz.

1.10 Aerodrome Information

Aerodrome Location	Brakpan/ Benoni Aerodrome	
Aerodrome Co-ordinates	S2 6 14' 17.0" E 026 18' 21.0"	
Aerodrome Elevation	5 300 ft	
Runway Designations	18/36	03/21
Runway Dimensions	1 440 m x 15 m	900 m x 10 m
Runway Used	18	
Runway Surface	Asphalt	
Approach Facilities	Runway lights (PAPI)	
Aerodrome Status	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 After the aircraft was brought to a complete stop on the apron area, the aircraft again started moving forward for 12, 5 m before it impacted two vehicles, one of which was parked on the apron, the second of which next to the apron.

Figure 6: Where the aircraft collided with the two vehicles

Figure 7: The yellow 'T' where the aircraft came to a complete stop before it started to move forward and collided with the vehicles

1.13 Medical and Pathological Information

1.13.1 Both the pilots were the holders of valid and unrestricted class 1 aviation medical certificates.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 This was considered a survivable accident due to the low impact forces associated with this type of accident and due to the fact that both the pilots where properly restrained by the aircraft seatbelts.

1.16 Tests and Research

1.16.1 Not considered necessary.

1.17 Organisational and Management Information

1.17.1 This was a training flight.

1.17.2 The flying school was in possession of a valid Aviation Training Organisation (ATO) Accreditation and Approval Certificate, no. CAA/0252, at the time of the accident. The ATO Accreditation Approval Certificate expired on 17 January 2008. The SACAA audited the ATO on 16 January 2008 and no findings were raised. A new ATO Approval Certificate was issued on 1 February 2008 with an expiry date of 17 January 2009.

1.17.3 According to available records, the aircraft maintenance organisation (AMO) that certified the last MPI on the aircraft prior to the accident was in possession of a valid AMO Approval, no. 159, with an expiry date of 31 July 2008. The SACAA conducted an audit at the AMO on 30 July 2007.

1.17.4 According to available information, (CAA file, AMO no. 159), the CAA conducted an audit at the AMO on 30 July 2007 where one major finding and five findings were raised. The findings were addressed by the AMO after the audit.

1.18 Additional Information

1.18.1 This type of aircraft is only fitted with brake pedals on the left-hand side of the aircraft. The right-hand side, where the instructor was seated, was not fitted with brake pedals.

1.18.2 Notes on the brake system of the Piper PA23-250 aircraft as indicated in the Piper Aztec Service Manual Part Number 753-564 dated 15 July 2006 follow:

The brakes are hydraulically actuated by individual master cylinders mounted on the left set of rudder pedals. A reservoir, accessible through an access panel located on the left side of the nose supplies fluid to each master cylinder. From these cylinders, hydraulic fluid is routed through lines and hoses to a parking brake valve, located on the left aft side of the nose section, through wings to the brake assemblies on each main landing gear. The brakes are self-adjusting, single-disc, double-housing and double-piston assemblies. To operate the brakes, apply toe pressure against the top of the rudder pedal. The parking brake may be actuated by applying toe pressure and at the same time as pulling out on the brake handle. To relieve parking brake pressure, apply toe pressure on the pedals and at the same time push in on the parking brake handle.

PIPER AZTEC SERVICE MANUAL

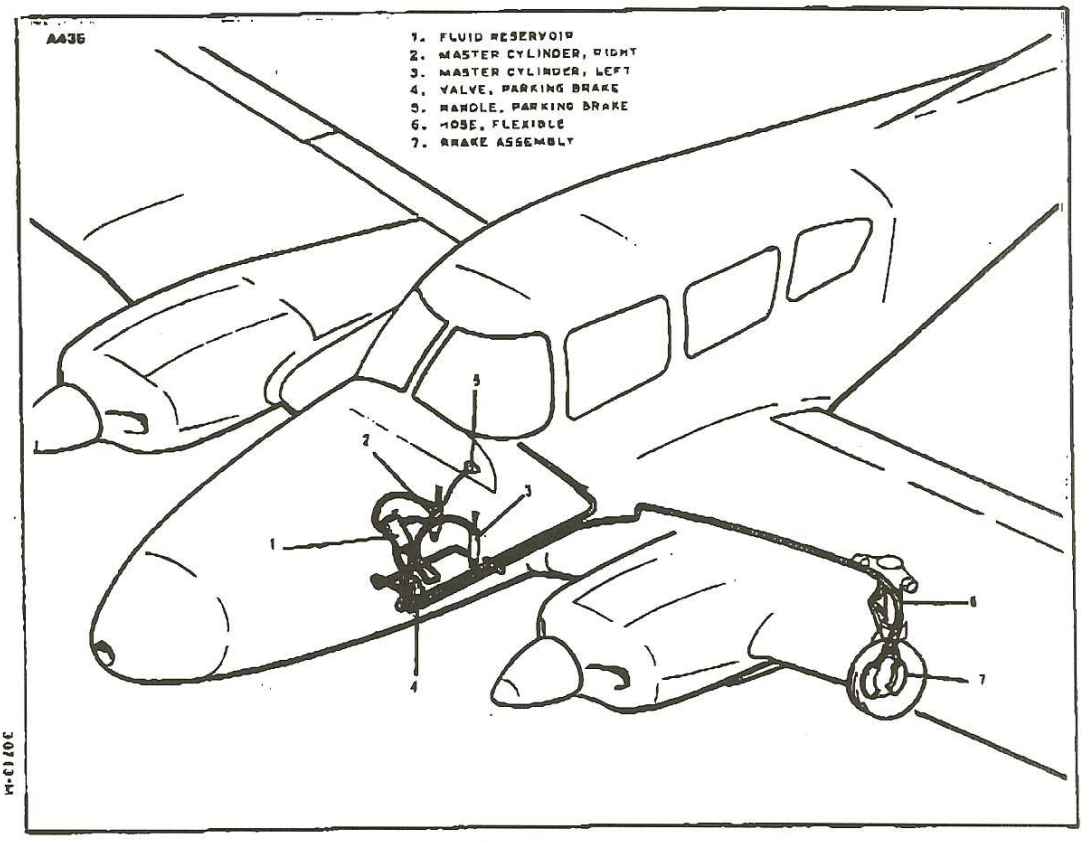

Figure 7-23. Brake Installation

Figure 8: The brake system installation on the Piper Aztec type aircraft

1.18.3 The brakes was examined and tested by an approved AMO approximately one hour after the accident and the brakes were found fully functional and serviceable.

1.18.4 On-site investigation:

No hydraulic system leaks were observed in the brake system and brake assemblies at the main wheels.

It was observed that the apron area had a slight downwards slope towards the clubhouse, which should have had no real influence on the aircraft moving forward.

Figure 9: The on-site investigation revealed that the right rudder/brake pedal was in a slightly forward position

Figure 10: The park brake was found released and not applied

1.18.5 The duration of the conversion training flight was 1.5 flying hours, which required a substantial amount of concentration.

1.18.6 Civil Aviation Regulations 1997 states:

Part 141.02.1 Requirement for approval

No organisation shall conduct standard aviation training except under the authority of, and in accordance with the provisions of, an aviation training organisation approval issued under this Subpart.

1.18.7 According to available information, the Part 141 aviation training organisation made application to the SACAA on 29 November 2007 for the renewal of their ATO Accreditation and Approval. The SACAA only audited the ATO on 16 January 2008. The ATO Approval Certificate was due to expire on 17 January 2008. The SACAA only issued the ATO with a new Accreditation and Approval Certificate on 1 February 2008. The ATO operated for 14 days without an approved certificate.

1.18.8 With regard to aerodromes, International Civil Aviation Organisation (ICAO) Annex 14 recommends in Part 3.13.6, which pertains to clearance distances on aircraft stands on the apron that: "*An aircraft stand should provide the following minimum clearances between an aircraft using the stand and any adjacent building, aircraft, aircraft on another stand and other objects to be 3 m.*"

The clearance between where the aircraft initially stopped on the designated parking area and where the vehicles were parked was therefore complied with.

1.19 Useful or Effective Investigation Techniques

1.19.1 None considered necessary.

2. ANALYSIS

2.1 On the day of the accident, the aircraft was being used by an instructor and a pilot under training who was to be converted onto the Piper PA23-250 aircraft type. After landing, the aircraft was taxied to the apron and stopped at the 'T' section. The instructor occupied the right-hand seat and the pilot under training the left-hand seat.

2.2 The Piper PA23-250 aircraft type was only fitted with toe brakes on the left-hand side. As soon as the aircraft started to move forward again, the pilot under training was therefore the only person who could apply the brakes and park brake. As there are no brake pedals on the right-hand side of the aircraft, the instructor was not able to apply brakes himself.

2.3 The pilot had a total of 6.35 flying hours on the type including the hours flown prior to the accident. The instructor indicated that he debriefed the pilot under training while they where taxiing to the apron, as he was unhappy with the approach and landing. Taking into consideration the flying time for the conversion training and the debrief on the flight while taxiing, the pilot under training may have been suffering a lack of concentration. This human factor issue could have contributed to the accident.

2.4 The brakes and brake system was inspected by an approved maintenance facility an hour after the accident and found fully serviceable and operational.

2.5 It is the opinion of the investigator in charge that the pilot might have had a lack in concentration at that specific point where she was about to commence with the shutdown check procedures. This led to the pilot stepping on the rudder pedals instead of the toe brakes.

2.6 It is also the opinion of the investigator that although the distance clearances as recommended in the ICAO Annex 14 were complied with, that this accident might have been avoided if the vehicles were not parked where they were.

3. CONCLUSION

3.1 Findings

3.1.1 The instructor was the holder of a valid commercial pilot licence and was appropriately instructor rated on the type of aircraft.

3.1.2 The pilot under training was the holder of a valid commercial pilot licence.

3.1.3 The pilot was not yet type rated on the Piper PA23-250 aircraft, but had flown a total of 6.35 hours on the aircraft type.

3.1.4 The operator was the holder of a valid Aviation Training Organisation Accreditation Certificate.

3.1.5 The AMO was in possession of a valid AMO Approval Certificate and was audited by the CAA.

3.1.6 The accident occurred on the apron area at Brakpan/Benoni Aerodrome in daylight conditions.

3.1.7 The aircraft sustained damage to the left-hand wing, both propellers and the engines.

3.1.8 The instructor debriefed the pilot while taxiing to the apron area.

3.1.9 Weather was not considered to not have contributed to the cause of the accident.

3.1.10 The apron had a slight downward slope towards the clubhouse but this had no real influence on the aircraft impacting the vehicles.

3.1.11 The distance clearances between an aircraft and an object on the apron area were in compliance with the recommendation in terms of ICAO Annex 14.

3.2 Probable Cause/s

3.2.1 The aircraft collided with two vehicles that were parked on and near the apron area when the pilot under training stepped on the rudder pedals instead of the brakes.

4. SAFETY RECOMMENDATIONS

4.1 It is recommended that the SACAA ensure that audits for renewal purposes of the ATO approval are conducted in due time, as to ensure that ATOs do not operate without valid approval certificates.

4.2 It is recommended that although the clearance distance between the aircraft and an object was in terms of ICAO Annex 14, the aerodrome operator allocates clearly marked designated parking areas and ensures that all aerodrome users are in compliance with this requirement. This accident might have been avoided if the vehicles were not parked where they were.

4.3 It is recommended that an article be written in the *Safety Link*, advising instructors not to debrief students while flying or taxiing an aircraft. Debriefing should start once they have disembarked the aircraft.

5. APPENDICES

5.1 There are no appendices in this report.

-END-

Report reviewed and amended by Office of the EM: AIID