



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8259	
Aircraft Registration	ZS-KFU	Date of Accident	19 February 2007		Time of Accident	1250Z
Type of Aircraft	Piper PA38 Tomahawk		Type of Operation	Training		
Pilot-in-command Licence Type	Commercial		Age	42	Licence Valid	Yes
Pilot-in-command Flying Experience	Total Flying Hours	8 127.35		Hours on Type	2.4	
Last point of departure	Pietersburg Civil Aerodrome (FAPI)					
Next point of intended landing	Springs Aerodrome (FASI)					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Outside the perimeter of runway 26 at Pietersburg Civil Aerodrome (GPS position: S23° 55' 19" E29° 30' 39")						
Meteorological Information	Fine weather. Temperature: 28°C; Wind: 15-18 knots; Visibility: CAVOK					
Number of people on board	2 + 0	No. of people injured	2	No. of people killed	0	
Synopsis						
<p>The instructor, accompanied by a student, flew from Springs aerodrome to Pietersburg civil aerodrome, where they landed safely and viewed an aircraft for sale. Their aeroplane was then refuelled to its full capacity with 100 litres (26.42 US gallons) of avgas prior to their return flight to Springs. The student lined up on runway 08, rotated at approximately 65-70 knots and had a climb rate of approximately 400 ft/minute.</p> <p>The student had control during takeoff. However, the aircraft began slowing down, so the instructor took over and lowered the nose. According to him, the aircraft felt as if it were losing altitude faster. Due to high terrain at end of the runway, he attempted to turn to the right, using the least amount of angle of bank for the turn. The aircraft lost altitude, stalled during the turn and struck the ground.</p> <p>Both crew were injured, and the aeroplane was completely destroyed.</p> <p>The investigation concluded that the aircraft had been overloaded, with its permissible takeoff weight being exceeded by 130 pounds. Also, the aft centre of gravity had increased the angle of attack, resulting in the aircraft losing airspeed and altitude, and bringing about a stall.</p>						
Probable Cause						
<p>The aircraft stalled during a right-hand turn after takeoff and the pilot was unable to recover due to low airspeed at a low altitude.</p> <p>Contributory factors:</p> <ul style="list-style-type: none"> • The aircraft was overloaded. 						
IARC Date				Release Date		



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Relational Software Solutions CC
Manufacturer : Piper Aircraft Corporation
Model : Piper PA-38-112
Nationality : South African
Registration Marks : ZS-KFU
Place : On Runway 26 at Pietersburg Aerodrome
Date : 19 February 2007
Time : 1250Z

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 19 February 2007, the instructor, accompanied by a student pilot, departed from Springs aerodrome and landed at Pietersburg civil aerodrome to view an aeroplane that was for sale.
- 1.1.2 Their aircraft was then refuelled to its full capacity of 30 US gallons for the return flight to Springs Aerodrome.
- 1.1.3 The instructor stated that after a pre-flight inspection had been carried out by the student, the aircraft took off from runway 08 with no flaps. At an indicated airspeed (IAS) of approximately 70 knots and after becoming airborne at an initial climb rate of approximately 400 feet/minute, the aircraft appeared to be slowing down.
- 1.1.4 The student had control of the aircraft during the takeoff, but the instructor advised him that he now had control. The instructor then lowered the nose of the aircraft and the aircraft felt as if were losing altitude. Due to high terrain at end of the runway, he attempted to do a turn to the right where the terrain was flatter, using the least angle of bank.
- 1.1.5 The aircraft lost altitude, stalled during the attempt to turn, and struck the ground.

1.1.6 The accident occurred during daylight conditions at a geographical position determined to be S23° 55' 19" E29° 30' 39".

1.2 Injuries to Persons

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

1.2.1 The pilot sustained second-degree burns on both arms and parts of his face, as well as two cracked vertebrae and a broken knee, while the student had two cracked vertebrae and an injured ankle.

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed by post-impact fire.



Picture1. The remains of the wreckage

1.4 Other Damage

1.4.1 Damage was limited to the area around the accident scene.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	42
Licence number	*****	Licence Type	Commercial		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instrument rating, Night rating, Instructors rating Gr. III				
Medical Expiry Date	31 March 2007				
Restrictions	None				
Previous Accidents	Yes				

Flying Experience

Total Hours	8 127.35
Total Past 90 Days	70.8
Total on Type Past 90 Days	3.3
Total on Type	2.4

1.5.1 The student had 9.2 hours of total flying hours and had not acquired a student pilot license.

1.6 Aircraft Information

Airframe

Type	Piper PA38-112	
Serial Number	38-78A0448	
Manufacturer	Piper Aircraft Corporation	
Date of Manufacture	17 July 1978	
Total Airframe Hours (at time of accident)	8 429	
Last MPI (Date & Hours)	9 February 2007	8 413.5
Hours since Last MPI	15.5	
C of A (Issue Date)	27 September 2000	
C of R (Issue Date) (Present Owner)	11 December 2006	
Operating Categories	Standard	

1.6.2 Engine

Type	Lycoming O-235-L2C
Serial Number	L-22133-15
Hours since New	6 576.5
Hours since Overhaul	1 576.5

1.6.3 Weight and balance calculation:

Table showing maximum take-off for ZS-KFU

	Weight (lbs)	Arm (inches)	Moment (in.lb)
A/C empty weight	1261.031	75.75	95523.113
Pilot & pax (85 kg + 120 kg)	451	85.5	38 560.5
Baggage (0 kg)	0	115.0	0
Fuel main tank (30 US gal)	180	75.4	13 572
Total T/O Weight	1892.031	76.5	137 703.3

The maximum certificated takeoff mass for the aircraft as stipulated in the pilot's operating handbook (POH) is 1 670 pounds.

The aircraft was overweight by 222.031 pounds.
(NB: 1 US gallon = 6 pounds)

1.7 Meteorological Information

1.7.1 Weather information obtained from the pilot's questionnaire:

Wind direction	West	Wind speed	15-18 kts	Visibility	Good
Temperature	29°C	Cloud cover	1/8	Cloud base	None
Dew point	Unknown				

1.7.2 Weather report obtained from the South African Weather Service:

Wind direction	080° T	Wind speed	9 kts	Visibility	>10 km
Temperature	28°C	Cloud cover	A few clouds at 4 500 feet	Cloud base	None
Dew point	15°C				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigation equipment. The navigation equipment was in compliance with its approved equipment list. There were no recorded or reported defects experienced with the navigation equipment and it was in a serviceable condition before the accident.

1.9 Communications

1.9.1 The aircraft had VHF radio communication equipment installed and there were no entries of defects experienced with the communication equipment.

1.9.2 The pilot broadcast his intentions on Gateway frequency 122.7 MHz. However, this was unsuccessful because the ATC was communicating with other aircraft, so they

decided to contact Gateway once airborne.

1.10 Aerodrome Information

1.10.1 The accident occurred during takeoff on runway 08 at Pietersburg civil aerodrome just after runway 26.

Aerodrome Location	Pietersburg Civil Aerodrome	
Aerodrome Co-ordinates	S23° 55' 54.79" E29° 28' 22.25"	
Aerodrome Elevation	4 230 feet	
Runway Designations	08/26	
Runway Dimensions	2 200 m x 25 m	
Runway Used	08	
Runway Surface	Tar	
Approach Facilities	PAPI system 2.96° RWY 08	

1.11 Flight Recorders

1.11.1 The South African Civil Aviation Regulation (SACAR) does not require that flight recorders [a cockpit voice recorder (CVR) and flight data recorder (FDR)] be installed in this aircraft type. Neither was therefore fitted to the aeroplane.

1.12 Wreckage and Impact Information

1.12.1 The accident occurred during takeoff on runway 08 at Pietersburg civil aerodrome. At an indicated airspeed of approximately 70 knots and after it became airborne at an initial climb rate of approximately 400 feet/minute, the aircraft appeared to be slowing down. The student had control of the aircraft during the takeoff, but the instructor thereafter took control. He lowered the nose and the aircraft felt as it was descending faster. Due to high terrain at end of the runway, he attempted to do a turn to the right where the terrain was flatter, using the least angle of bank. The aeroplane lost altitude, stalled in a right-wing-low attitude and struck the ground.

1.13 Medical and Pathological Information

1.13.1 The pilot was a holder of a valid class 1 aviation medical certificate with an expiry date of 31 March 2007 at the time of the accident. The medical certificate had no medical restriction endorsed.

1.13.2 The pilot sustained second-degree burns on both arms and parts of his face, as well as two cracked vertebrae and a broken knee, while the student had two cracked vertebrae and an injured ankle.

1.14 Fire

1.14.1 Post-impact fire erupted and destroyed the aircraft.

1.15 Survival Aspects

1.15.1 This was considered a non-survivable accident because of the post-impact fire, the injuries sustained and the impact forces. However, due to the immediate response of the police and the rescue team at the airport, the occupants survived. The occupants were properly restrained with seatbelts at the time of the accident. The student pilot assisted the instructor to evacuate the aircraft, which was on fire.

1.15.2 Pietersburg tower was informed by a witness that the aircraft had gone down. The tower requested aircraft flying in the vicinity of the aerodrome to confirm that it had gone down and Polokwane municipal fire-fighting rescue and ambulances services were then informed. A police helicopter was dispatched to the crash site, and rescue personnel reached the site in less than ten minutes. A Red Cross helicopter took the occupants to hospital.

1.16 Tests and Research

1.16.1 None.

1.17 Organisational and Management Information

1.17.1 This was a training flight carried out under Aircraft Training Organisation (ATO) number 273.

1.17.2 The ATO had a valid approval certificate (CAA/0273) issued on 12 December 2006 with expiry date 9 December 2007. No findings were identified during the audits that could have contributed to this accident.

1.17.3 The Aircraft Maintenance Organisation (AMO) had an approval certificate issued on 1 November 2006 with an expiry date 31 October 2007.

1.18 Additional Information

1.18.1 Reference: The Air Pilot's manual, chapter 10, p168 by Trevor Thom.

A dropping wing can normally be picked up by moving the control column in the opposite direction. This causes the aileron on the dropping wing to deflect downwards, increasing the angle of attack, and producing more lift on that wing. If the wing is near the stalling angle, the aileron deflection could cause the critical angle to be exceeded on that wing and, instead of rising, the loss of lift would cause the wing to drop further. With any yaw, a spin could develop.

1.18.2 Reference: The Air Pilot's Manual, chapter 10, p169 Trevor Thom

Warnings of a stall:

A reducing airspeed and air noise level, decreasing control effectiveness and a

sloppy feel; operation of a pre-stall warning (such as horn, buzzer, light or whistle); a high nose attitude for the manoeuvre being flown.

The actual stall may be recognised by:

- *The nose dropping (caused by the centre of pressure moving rearwards).*
- *A high sink rate.*

1.18.3 Note: If the C of G is to aft, the aircraft can rotate prematurely on takeoff or tend to pitch up during a climb.

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

2.1 Examination of the wreckage revealed no deficiencies, engine failure or aircraft system failure. On-site investigation was conducted and it was noted that due to propeller damage and scratch marks, the engine had not failed prior to the accident. This is supported by the pilot who stated that the aircraft's systems were normal until the moment that the aeroplane started to lose height and speed.

2.2 The instructor reported that there was no factor that could have affected his or the student's performance.

2.3 The student lined up on runway 08 and took off on an easterly direction; the climb rate was ± 400 feet per minute and the aircraft responded normally. The instructor said that while in a climb, he looked to the right and felt that the aircraft was slowing down and losing height. The instructor told the student that he had control, turned right and the aircraft then stalled and struck the ground. It is believed that the right-hand turn could have aggravated the stall because the right wing had already stalled.

2.4 It is believed that in an attempt to recover from the stall, the instructor took control from the student but did not have enough height and time to recover. The aircraft stalled about 300 feet above ground level and struck the ground with the right wing tip first. Post-impact fire broke out, destroying the aircraft.

2.5 The investigation concluded that the aircraft had been overloaded, with its permissible takeoff weight being exceeded by 130 pounds.

2.6 It is believed that the weather did not contribute to the accident. The crew failed to carry out a proper calculation/pre-flight factoring in the total mass, the temperature of 29°C and the pressure altitude of 4 354 feet, and this led to the performance of the aircraft deteriorating.

3. CONCLUSION

3.1 Findings

- 3.1.1 The pilot was the holder of a valid commercial pilot (aeroplane) licence with the aircraft type, a night rating and an instrument rating endorsed in the licence.
- 3.1.2 The student had 9.2 hours of total flying hours and had not acquired a student pilot license.
- 3.1.3 According to available records, the aircraft was properly maintained by an approved aircraft maintenance organisation and there were no recorded defects.
- 3.1.4 On-site investigations revealed no anomalies of the aircraft engine, airframe or systems.
- 3.1.5 The weather did not contribute to the accident.
- 3.1.6 The aircraft's maximum takeoff weight was exceeded by 222.031 pounds.
- 3.1.7 The aeroplane was destroyed by post-impact fire.
- 3.1.8 According to available information, the instructor and student did not conduct a weight and balance calculation prior to the flight-

3.2 Probable Cause/s

- 3.2.1 The aircraft stalled during the right-hand turn after takeoff and the pilot was unable to recover due to low air speed at low altitude.
 - (i) Contributing factor
The aircraft was overloaded

4. SAFETY RECOMMENDATIONS

- 4.1 None

5. APPENDICES

- 5.1 None

Report reviewed and amended by Advisory Safety Panel: 29 September 2009.

-END-