

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	C A18/2/3/8769	
Aircraft Registration	ZU-BUH	Date of Accident	13 March 2010		Time of Accident	0630Z
Type of Aircraft	Windlass Trike		Type of Operation		Private	
Pilot-in-command Licence Type		Microlight	Age	52	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	129,83		Hours on Type	19,5
Last point of departure		Microland Aerodrome (FABA)				
Next point of intended landing		Microland Aerodrome (FABA)				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Microland Aerodrome at GPS coordinates S25° 58' 628" E028° 23' 335"						
Meteorological Information						
Number of people on board	1 + 1	No. of people injured	1	No. of people killed	0	
Synopsis						
<p>The pilot, accompanied by a passenger, took off from Microland aerodrome (FABA) on a pleasure flight. The microlight failed to gain sufficient altitude after takeoff, and the pilot turned to the left of the runway to avoid power cables ahead. During the turn, the airspeed decayed and the aircraft stalled and crashed.</p> <p>The pilot sustained serious injuries while the passenger was unhurt.</p> <p>The aircraft was substantially damaged.</p>						
Probable Cause						
<p>The aircraft was operated outside its limitations and as a result, the pilot did not gain enough altitude, the speed decayed and the aircraft stalled.</p>						
IARC Date					Release Date	



AIRCRAFT ACCIDENT REPORT

Name of Owner : J P Kruger
Name of Operator : Private
Manufacturer : Solo Wings CC
Model : Windlass Trike
Nationality : South African
Registration Marks : ZU-BUH
Place : Microland Aerodrome
Date : 13 March 2010
Time : 0630Z

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 pilot planned to conduct a return pleasure flight, accompanied by a passenger, from Microland aerodrome. According to him, he completed all pre-flight and run-up checks and began his takeoff roll on runway 21. He was aware of the fact that the takeoff might be slower than normal due to a slight crosswind (12 -15 km/h from the SSE), and selected a point along the runway where he anticipated becoming airborne. The aircraft took off slightly before this point, and the pilot continued at low level to gain airspeed before commencing the climb. The microlight did gain airspeed, albeit more slowly than what the pilot was accustomed to due to the fact that he had a passenger on board, and when it reached 48 mph, he considered this sufficient to commence the climb. The altitude (100 - 120 ft) which the aircraft reached was not according to expectation, however, and his airspeed decreased to 42 mph.
- 1.1.2 The pilot decided to execute an emergency landing as the microlight would not have been able to clear the power cables on the R50 road straight ahead. There was insufficient runway length available and he therefore turned slightly upwind to the left in an attempt to land on the level grass field adjacent to the aerodrome. The pilot said that after he had begun a slow turn to the left at 42 mph, the left wing dropped suddenly due to a pocket of air.

1.1.3 During the recovery, he pushed the control bar slightly to the front. He then attempted to correct but the aircraft was slightly banked to the left and at full power. It was also facing directly upwind, resulting in a sudden increase of a few feet in altitude with subsequent decrease in airspeed (down to 38 mph), which caused it to stall. The pilot pulled the control bar abruptly backwards, but immediately pushed it to the neutral position when he realised that the aircraft was stalling. The microlight went into a dive, while drifting to the left after the turn. The pilot realised that he would not be able to execute a safe emergency landing since the aircraft needed at least 200 ft to recover from a stall, and he briefed the passenger to brace himself for an emergency landing.

1.1.4 The aircraft's speed increased further in the dive, but not enough to allow the pilot to do a proper round-out. He did manage to level out the aircraft, however, and pushed the control bar forward prior to the impact. The nose lifted slightly, but not sufficiently, just before touchdown, and the nose wheel caught in the rough grass breaking off on impact.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft sustained substantial damage to the wing and propeller, and the profile tube collapsed on impact.



Figure 1. Wreckage of the aircraft.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

1.5.1

Nationality	South Africa	Gender	Male	Age	52
Licence Number	*****	Licence Type	Microlight		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	30 June 2011				
Restrictions	Corrective lens; annual neurologist's report				
Previous Accidents	None				

1.5.2 Flying Experience

Total Hours	129,83
Total Past 90 Days	19,5
Total on Type Past 90 Days	19,5
Total on Type	129,83

1.5.3 Weight-and-Balance

1.5.3.1 The pilot calculated the weight-and-balance during the pre-flight inspection as follows:

BUH load calculation (initial) 13 March 2010

	Litres	Factor	Mass	Empty Mass	Max Permissible Mass
Fuel in tank	20			150	350
Add Fuel	0				
Total	20	0,66	13		
Payload					
Pilot			87		
Passenger			93		
Baggage			0		
Total (kg)				193	
				Total Mass	Negative = Below MPM Positive = Over MPM
				343	-7

Conclusion: the aircraft was within limitations.

1.5.3.2 The pilot calculated the weight and balance after putting in 22 kg of fuel as follows:

BUH Load calculation (actual - redone 14 June 2010)

	Litres	Factor	Mass	Empty Mass	Max Permissible Mass	Notes
Fuel in tank	20			150	350	Figures confirmed with manufacturer on 14 June 2010 (Aquila Africa: Denise - tel 031 700 2806). See note below.
Add Fuel	22					
Total	42	0,66	28			<u>Important:</u>
Payload						<i>Slight discrepancy on Windlass. Manual reading EM (empty mass) at 150 kg and MP (maximum payload) at 180 kg, thus a total of 320 kg - although the MPW (maximum permissible mass) is stated in the manual as 350 kg (thus allowing for a payload of 200 kg)</i>
Pilot			87			
Passenger			93			
Baggage			0			
Total (kg)				208		
				Total Mass	Negative = Below MPM Positive = Over MPM	
				358	8	

Conclusion: the aircraft was overweight by 8 kg. The pilot was justified in thinking that the aircraft as within its weight limits

1.5.3.3 According to the manufacturer's performance specifications for this aircraft, the maximum takeoff weight (MTOW) is 330 kg and the empty weight is 150 kg.

	Litres	Factor	Mass	Empty Mass	Max Permissible Mass
Fuel in tank	20			150	330
Add Fuel	22				
Total	42	0,66	28		
Payload					
Pilot			87		
Passenger			93		
Baggage			0		
Total (kg)				208	
				Total Mass	Negative = Below MPM Positive = Over MPM
				358	28

From the above calculations, it was concluded that the aircraft exceeded its limitations by 28 kg during the accident flight.

Note: According to the pilot the calculation he made was correct with reference to information he got from the (POH) pilot's operating handbook that the maximum permissible mass is 350kg. There was a discrepancy with the specification performance of the aircraft; according to the manufacturer's specifications, the MTOW was 330 kg whereas the pilot maintained it was 350 kg.

1.6 Aircraft Information

1.6.1 Airframe

Type	Windlass Trike	
Serial Number	WL 721	
Manufacturer	Solo wings CC	
Year of Manufacture	1999	
Total Airframe Hours (at time of accident)	466	
Last Annual Inspection (Date & Hours)	16 September 2009	424
Hours since Last Annual Inspection	42	
Authority To Fly (Issue Date)	22 October 2008	
Expiry date of Authority to Fly	16 September 2009	
C of R (Issue Date) (Present Owner)	9 January 2001	
Operating Categories	Private Operation Authority to Fly	

1.6.2 Engine

Type	Rotax 503
Serial Number	5171547
Hours since New	424
Hours since Overhaul	TBO not yet reached

1.6.3 Propeller

Type	Aero
Serial Number	0386-0373-0391
Hours since New	424
Hours since Overhaul	TBO not yet reached

1.7 Meteorological Information

1.7.1 Weather information as obtained from the South African Weather Services:

Wind direction	090°	Wind speed	5 kt	Visibility	> 10 km
Temperature	21°C	Cloud cover	Nil	Cloud base	Nil
Dew point	14°C				

1.7.2 Weather information as obtained from the pilot's questionnaire:

Wind direction	160°	Wind speed	12-15 km/h	Visibility	Good
Temperature	18°C	Cloud cover	1/8	Cloud base	Nil
Dew point	Unknown				

1.8 Aids to Navigation

1.8.1 The aircraft was fitted with standard navigational instrumentation. No abnormalities were reported prior to the accident.

1.9 Communications

1.9.1 The aircraft was operated on an unmanned airfield. It was equipped with standard communication equipment and none was reported unserviceable during the flight.

1.10 Aerodrome Information

1.10.1	Aerodrome Location	FABA Microland Aerodrome
	Aerodrome Co-ordinates	S25° 58' 00' E028° 23' 00'
	Aerodrome Elevation	5 476 ft
	Runway Designations	03/21 09/27
	Runway Dimensions	323m X 20m 250m X 20m
	Runway Used	21
	Runway Surface	Gravel
	Approach Facilities	Nil

1.11 Flight Recorders

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

1.12 Wreckage and Impact Information

1.12.1 The pilot took off but the aircraft failed to gain altitude. He turned to the left of the runway as there were power lines ahead, approximately 200 m from the end of the runway. The speed decayed and the left wing hit the ground and collapsed, enfolding the cart. The aircraft then rolled over onto its right side. The instrument pod became separated from the microlight as a result of the impact.

1.12.2 During the accident sequence, the profile tube bent and dislocated the pilot's right elbow. The passenger was not hurt, and the pilot instructed him to loosen his safety belt and disembark as fuel was leaking. Four bystanders from Microland Aerodrome arrived within moments and removed the pilot to safety – despite the fact that he had hurt his back – due to the danger posed by the leaking fuel.

1.12.3 The wreckage of the aircraft, which was still intact, was at GPS co-ordinates S25° 58' 628" E028° 23' 335".

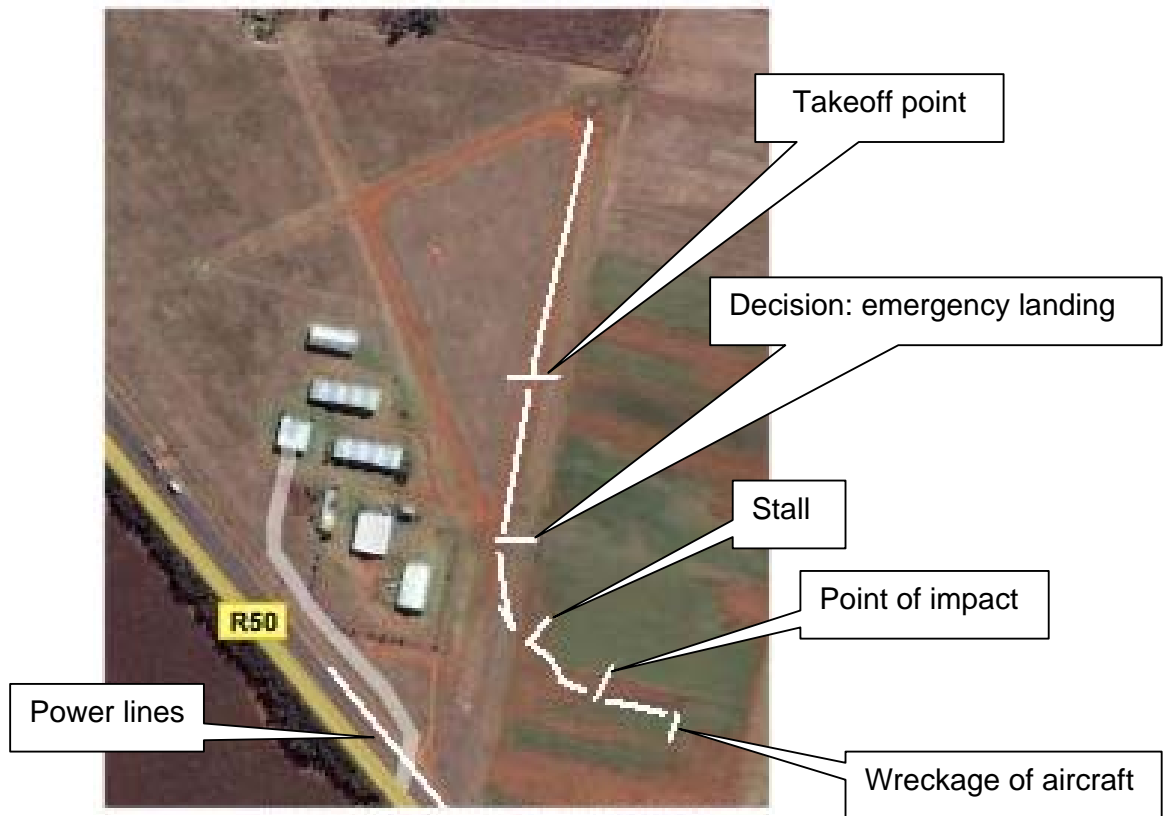


Figure 2. The airport and sequence of events.



Figure 3. Another view of the damaged microlight.

1.13 Medical and Pathological Information

1.13.1 The pilot suffered injuries to his lower back and his right elbow was dislocated.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The accident was considered survivable due to the low impact forces on the cockpit area and the fact that both occupants had been wearing their safety belts.

1.16 Tests and Research

1.16.1 None.

1.17 Organisational and Management Information

1.17.1 This was a private flight.

1.17.2 The last annual inspection was carried out on 16 September 2008 at a total of 368 airframe hours.

1.18 Additional Information

1.18.1 The following information is extracted from *Aircraft Accident Investigation* by Richard H. Wood and Robert W. Sweginnis.

Not all accidents are the same. They don't all have the same causes and they don't all have the same consequences. For instance, some stall accidents occur when the wing exceeds its critical angle of attack and the C_L falls while C_D increases. The lift decreases to the point where the airplane can't maintain level flight and drag increases to the point where the aircraft can't accelerate. The aircraft maintains a roughly wings-level attitude while it "mushes" into the ground. This type of accident is often survivable. On the other hand, during another accident, one wing might stall before the other with the resulting asymmetric lift causing the airplane to roll rapidly toward the stalled wing. If the airplane is too close to the ground to recover from this "out-of-control" condition, it will crash into the ground at an extreme bank and perhaps pitch attitude. This is normally a non-survivable crash. If the aircraft is at higher altitude it might transition into a spin, rolling and yawing into the most deeply stalled wing. Here, inertia and aerodynamic forces are balanced, maintaining the airplane in a downward spiralling helix. If recovery is not completed at sufficient altitude, the airplane will impact the ground in nose-low altitude with very little or no forward speed.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

- 2.1 The pilot had a valid pilot's licence and medical certificate and was properly rated on the aircraft type. During the takeoff, the aircraft did not gain sufficient altitude and it would have been impossible to clear power lines ahead. There was not enough runway left, and the pilot therefore tried to make an emergency landing on the ground to the left of the runway. While turning, he experienced decay in airspeed and the left wing dropped, causing the aircraft to stall. He could not recover from the situation as the microlight was at a low altitude.
- 2.2 The pilot had added 22 litres to the 20 already in the tank; this resulted in the aircraft being operated outside its envelope. The investigator in charge concluded that this was possibly one of the reasons the aircraft had failed to gain sufficient altitude. There was a discrepancy with the specification performance of the aircraft: according to the manufacturer, the MTOW of the aircraft was 330 kg whereas the pilot maintained it was 350 kg.
- 2.3 According to the SA Weather Services, fine weather conditions prevailed in the area at the time. Weather was therefore not a contributory factor to the accident.
- 2.4 The aircraft had an invalid authority-to-fly certificate issued on 22 October 2008 with an expiry date of 16 September 2009.

3. CONCLUSION

3.1 Findings

- 3.1.1 The pilot had a valid licence and was properly rated on the aircraft type.
- 3.1.2 He had a valid medical certificate with an expiry date of 30 June 2010.
- 3.1.3 The aircraft had an invalid authority to fly which expired on the 16 September 2009.
- 3.1.4 The aircraft experienced decay in speed and stalled.
- 3.1.5 There was a discrepancy with the specification performance of the aircraft; according to the manufacturer's specifications, the MTOW was 330 kg whereas the pilot maintained it was 350 kg.
- 3.1.6 The aircraft was operating under VMC conditions.
- 3.1.7 The weather was reported to be fine at the time of accident.

3.2 Probable Cause/s

- 3.2.1 The aircraft was operated outside its limitations and as a result, the pilot did not gain enough altitude, the speed decayed and the aircraft stalled.

4. SAFETY RECOMMENDATIONS

- 4.1 SACAA should ask the manufacturer of the Windlass Trike to investigate the discrepancy of the MTOW of this type aircraft currently in operation operating.

5. APPENDICES

- 5.1 None.

Report reviewed and amended by the Advisory Safety Panel 17 August 2010.

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