

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

					Reference:	CA18/2/3/9447	
Aircraft Registration	ZU-BMS	Date of Accident	7 June 2015		Time of Accident	0630Z	
Type of Aircraft	Windlass Trike		Type of Operation	Training			
Pilot-in-command Licence Type	Student		Age	27		Licence Valid	Yes
Pilot-in-command Flying Experience	Total Flying Hours		36.8		Hours on Type	27.5	
Last point of departure	Kroon airfield, Gauteng province.						
Next point of intended landing	Kroon airfield, Gauteng province.						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
The accident happened in bushy terrain on the base leg for Runway 11 at Kroon airfield (GPS position S 25°39'46" 027°59'33").							
Meteorological Information	Wind: Calm, Visibility: 10 000m, Temperature: 8°C, Dew point: 1°C, Cloud cover: Clear sky.						
Number of people on board	1	No. of people injured	0	No. of people killed	1		
Synopsis	<p>The student pilot took off from Runway 11 at Kroon airfield on a solo training flight. After flying a circuit he executed a landing which was uneventful.</p> <p>During his second circuit, when turning on the cross-wind leg for Runway 11 the microlight was doing abnormal turns to the left and right.</p> <p>The instructor pilot who was in radio contact with the student instructed him not to do the turns and stay in the circuit. The student then turned downwind. It seems as if the microlight aircraft was oscillating from left to right with a continuous increase and decrease in height and a continuous change in power settings.</p> <p>According to the instructor pilot it appeared to him the student pilot was not in control of the microlight aircraft and he instructed him to increase power and get control of the aircraft. He also instructed the student to turn towards the airfield as he was passing the normal point of turning base-leg. The pilot then started his turn to the left for base-leg. The turn was at a high angle of bank and the turn continuous until the aircraft was almost inverted.</p> <p>The instructor pilot then lost sight of the aircraft and moments later saw black smoke in the vicinity where he lost sight of the aircraft. He then rushed to the scene and found the wreckage engulfed in flames.</p> <p>The pilot was fatally injured and the microlight aircraft was destroyed by the post-impact fire.</p>						
Probable Cause							
Loss of control due to disorientation.							
Contributing Factor							
The pilot's inexperience in flying this type of aircraft.							
ASP Date				Release Date			

AIRCRAFT ACCIDENT REPORT

Name of Owner : M Nel
Name of Operator : M Nel
Manufacturer : Solo Wings CC
Model : Windlass Trike
Nationality : Tanzanian
Registration Marks : ZU-BMS
Place : Kroon Airfield
Date : 7 June 2015
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 produced without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of Flight

1.1 A Windlass Trike, registration ZU-BMS, took off from Kroon airfield on a dual training flight with the intention to land back at Kroon airfield. The training flight was being conducted under visual meteorological conditions (VMC) and during daylight.

1.2 After four dual circuits, the instructor pilot was satisfied with the student's progress and the engine was switched off next to the runway. The instructor disembarked and asked the student if he was happy to continue with solo circuit training. The student indicated he was happy and the instructor again briefed him on all the aspects of circuit training.

1.3 The instructor then positioned himself next to the runway in such a position that he

could keep the student visible during the complete circuit. The instructor pilot was also in radio contact with the student.

- 1.4 According to the instructor, during the first take-off, the climb angle was higher than normal and the speed looked slower than normal climb speed. He also mentioned that the student kept adjusting the power and did not have a constant power setting during the climb out. He immediately instructed the student to apply full power. The student replied by stating he had experienced a nasty wind.
- 1.5 The turn onto the cross-wind leg for Runway 11 was stable and height control was good. The instructor then request the student to fly around on down-wind to get used to the aircraft after he encountered the wind. The student replied he would overfly the airfield and position himself again on downwind.
- 1.6 The student then placed himself onto base leg and final approach for Runway 11. The instructor then realized the student was preparing himself for a landing and immediately asked him if he was comfortable to land. The student acknowledged he was comfortable to land and the instructor assisted the student in pattering him on speed and altitude. Although the landing was deep, there was no problem with the landing. The instructor then instructed the student to back-track and stop next to the runway. He then briefed the student on the previous take-off and pointed out to him that the climb angle was too high and the speed too low. He also briefed him on the wing that would get heavy at a high angle of attack and that he would experience a buffet to indicate a stall.
- 1.7 The student then took-off and this time the take-off was normal, climb angle and speed were good. The instructor told the student the take-off was good and the student responded normally on the radio conversation.
- 1.8 Once the student turned onto cross-wind, it appeared that he was doing alternating turns to the left and right. The instructor immediately told him not to do the turns and asked him if anything was wrong. The student did not reply and kept on doing the alternating turns to left and right. These turns were steep and at some stages through 90 degrees to either side. At this stage the aircraft speed was low and the instructor instructed the student to fly the aircraft straight and level, to pull the bar in and to gain speed. According to the instructor the aircraft was in a stall condition. The student reacted to the instructions but did not reply on the radio.
- 1.9 At this stage the student looked disorientated as he was not following the circuit pattern but was flying in a northerly direction. When he eventually turned onto down-wind, he continued with alternating steep turns left and right. At this point his height was also alternating up and down and it was clear he was opening and closing the power constantly. The instructor kept talking to the student and told him to come closer to the airfield and to pull the bar in and to apply power to stabilize the aircraft.
- 1.10 The student passed the normal point of turning base-leg for Runway 11. The instructor stated at this point that he believed the student was flying the aircraft on the stall, the wings were buffeting left to right and the altitude of the aircraft was increasing and decreasing. The instructor told the student to turn onto base-leg and again told the student not to make his base-leg turn too steep.
- 1.11 The student responded by turning onto base-leg but the turn was extremely steep. From the position where the instructor was standing it seemed that the bank angle

of the aircraft passed 90 degrees during the turn. The instructor then lost sight of the aircraft due to trees. Moments later he saw a black smoke cloud and immediately proceeded to the origin of the smoke.

- 1.12 On arrival, he saw the wreckage of the aircraft engulfed in flames. He and a worker from the flight school tried to extinguish the post-impact fire but to no avail.



Figure 1. Position of the wreckage as it came to rest.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 Apart from the left wing, the aircraft was destroyed by the post-impact fire. People at the scene tried to extinguish the fire with hand- held fire extinguishers but to no avail.



Figure 2 The wreckage.

1.4 Other Damage

1.4.1 The main impact was with a tree, resulting in damage to the tree, and the post-impact fire damaged the surrounded vegetation.



Figure 3 Broken branches from the tree.

1.5 Personnel Information

1.5.1 Pilot (Student)

Nationality	Tanzanian	Gender	Male	Age	27
Licence Number	0279029045	Licence Type	Recreational Student Pilot		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	31 January 2020				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	36.8
Total Past 90 Days	7.5
Total on Type Past 90 Days	7.5
Total on Type	27.5

1.5.1 The pilot started his flying training in Tanzania on the Cessna 152 on 30 July 2012. Between 30 July 2012 and 15 September 2012 he flew a total of 9.3 hours training before he terminated his flying training in Tanzania.

1.5.2 At the time of the accident flight, the student had a total of 27.5 hours of which 15.5 were dual hours and 12 were solo hours.

1.6 Aircraft Information

Airframe:

Type	Windlass Trike	
Serial Number	WL-661	
Manufacturer	Solo Wings	
Year of Manufacture	1998	
Total Airframe Hours (At time of Accident)	495.3	
Last Annual Inspection (Date & Hours)	11 October 2014	478.0 hours
Hours since Last Annual Inspection	17.3 hours	
Authority to Fly (Issue Date)	28 May 2015	
C of R (Issue Date) (Present owner)	26 May 2015	
Operating Categories	Standard	

1.6.1 The Authority to Fly, issued on 28 May 2015, was for private use only. Correspondence between the owner of the aircraft and the Recreation Aviation Administration (RAASA) on 3 June 2015 indicated the Authority To Fly for training was approved by RAASA although the certificate was only issued on 8 June 2015, which was the day after the accident.

Engine:

Type	Rotax 503
Serial Number	4838725
Hours since New	495.3
Hours since Overhaul	TBO not reached

Propeller:

Type	NC 3 Blade
Serial Number	No serial number
Hours since New	Not known
Hours since Overhaul	TBO not reached

1.6.2 No evidence could be found in the aircraft logbook to indicate when the original propeller was replaced by the three- bladed propeller.

1.7 Meteorological Information

1.7.1 Meteorological information was obtained from the South African Weather Service. The table below indicates the most likely weather conditions at the time of the accident.

Wind direction	Calm	Wind speed	02KT	Visibility	10000m
Temperature	08°C	Cloud cover	Clear	Cloud base	N/A
Dew point	01°C				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as required by the Regulator. There were no recorded defects to navigational equipment prior to the flight.

1.9 Communications.

1.9.1 The aircraft was equipped with standard communication equipment as required by

the Regulator. There were no recorded defects to communication equipment prior to the flight.

1.10 Aerodrome Information

5.1.1 The accident did not happen on or near a licenced aerodrome.

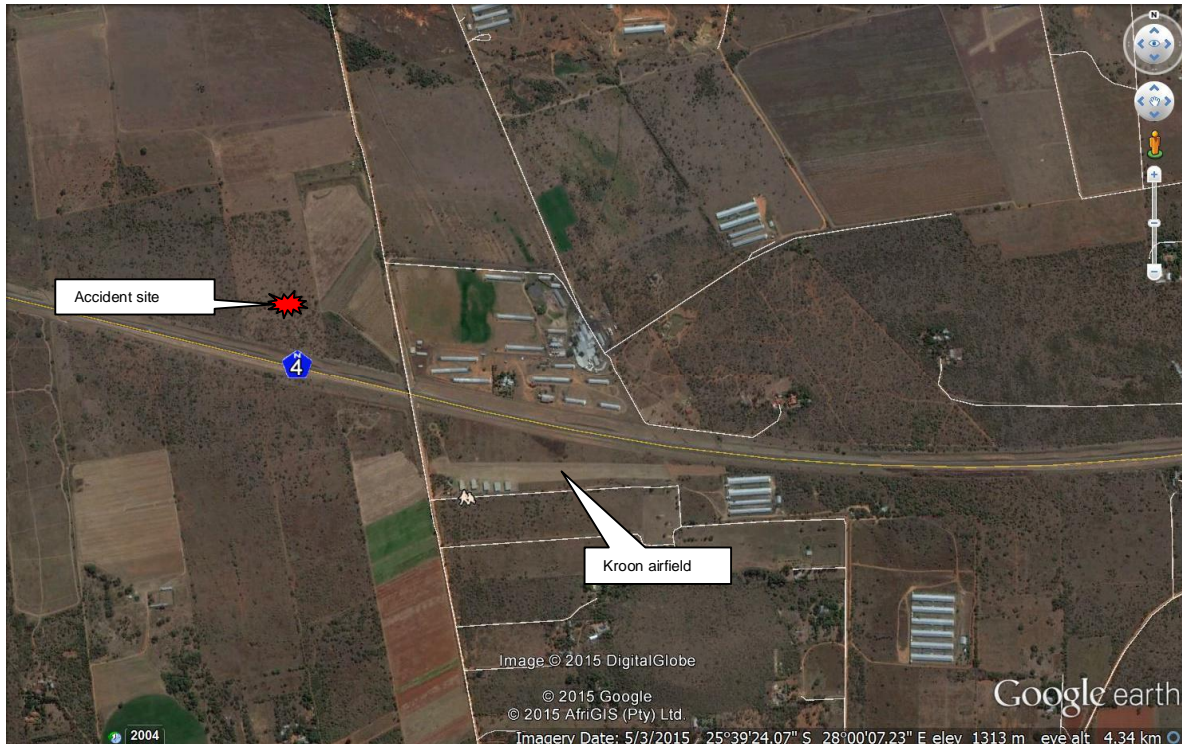


Figure 4 The accident site in relation to the airfield.

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 carriage (cockpit area), including the engine and the right wing was significantly crushed during the impact sequence and was destroyed by the post-impact fire. The left wing was folded around a tree but still attached to the right wing frame.

1.12.2 The engine remained inside the engine mounting support and displayed heavy impact damage and post-impact fire damage.

1.12.3 The propeller hub was still attached to the crankshaft flange but all three blades were separated from the propeller hub. Pieces of the propeller were found as far as 31 meters from the main wreckage.

1.12.4 Orientation of the traces of impact on a tree indicate the general flight direction during impact was 090° magnetic although it was reported that the general direction of flight before impact was approximately 230° magnetic.

1.12.5 The nose landing gear separated from the airframe while the two main landing gear wheels remained close to the main wreckage and were also consumed by the post-impact fire.

1.12.5 The compass, battery and pieces of the pilot's helmet visor were found ejected in the direction of impact.

1.12.6 A detailed inspection on site concluded that all damage to the aircraft was due to the impact.

1.13 Medical and Pathological Information

1.13.1 A post mortem examination was performed on the pilot. The results of the post mortem examination and toxicology tests were not available at the time the report was compiled. Should any of the results once received indicate that medical aspects may have affected the performance of the pilot, this will be considered as new evidence and the investigation re-opened

1.14 Fire

1.14.1 The aircraft was destroyed by the post-impact fire.

1.15 Survival Aspects

1.15.1 The accident was considered not survivable due to the high kinetic forces

associated with the accident and the post-impact fire.

1.16 Tests and Research

1.16.1 None considered necessary.

1.17 Organizational and Management Information

1.17.1 The last Annual Inspection before the accident was certified on 11 October 2014 at 478.0 airframe hours by an approved person (AP) who was in possession of a valid AP accreditation issued by the Aero Club of South Africa.

1.17.2 Although the owner was informed in writing by RAASA that his Training Authority to Fly was approved, the owner was not in possession of a Training Authority to Fly at the time of the accident.

1.18 Additional Information

1.18.1 The student pilot started his training on 24 January 2015 on microlight aircraft. For personal reasons his training was interrupted between February and May 2015 for 14 weeks, after which he resumed his training. The pilot had flown approximately 6.5 hours after the break, of which 1 hour was dual training and 5.5 hours was solo flying.

1.18.2 The pilot's last flight before the accident was on 1 June 2015. Weather conditions did not permit any flying between 2 and 6 June 2015.

1.18.3 On the morning of the accident flight the pilot did 4 dual flying circuits before going solo. The total time of the accident flight is not known but is estimated to be 45 minutes.

1.18.4 Controlling roll/yaw oscillations on flex wing hang gliders (Wills Wing manufacturer)

“Minimizing or avoiding oscillations is a matter of using proper flying technique. The oscillations are not “pilot induced” as they are sometimes called, but to some degree they can be “pilot controlled.” Specifically, what is required is that the pilot fly

“ahead of the glider” instead of “behind the glider.” Flying ahead of the glider means being able to sense, by feel, what the glider is about to do in the future rather than observing what the glider has already done. The pilot must be sensitive enough to the glider that he can feel through the pressures on the control bar, and by sensing very small attitude changes, that the glider is about to begin veering to one side. He must also be sensitive enough to be able to feel when the glider is beginning to respond to a correcting control input. Pilots without this sensitivity will instead only be able to respond to their observation that the glider has actually changed heading. By the time the glider has actually changed heading, the control input to correct is too late.

For example, if the glider gives an indication through the pilot’s feel of the control bar that it is about to veer towards the right, the pilot should immediately respond by inputting a weight shift correction to the left. The glider at this point hasn’t changed heading. By applying the proper left control input, the pilot will prevent the change in heading. Then, however, the pilot must be able to feel the glider’s diminishing tendency to veer right (experienced as a reduction of roll bar pressure as the glider begins to respond to the left control input), and then immediately re-center on the control bar.

What pilots often tend to do instead is to input the left correction only after the glider has actually veered to the right, and hold the correction until the glider’s heading has returned to the original desired heading. The glider in this case will way overshoot the desired heading, and the oscillation process has begun, and will continue to get worse as long as the pilot continues to input corrections in response to what the glider has already done instead of what it is about to do. The other thing pilots often tend to do is to respond to any perception of loss of control by doing two things: gripping the bar more tightly and pulling in for more speed. Both of these will only aggravate a roll/yaw oscillation, as the glider becomes more subject to this the faster one flies, and the pilot loses all feel for the glider by tightening his grip.

There is no way to develop the sensitivity required to execute these techniques properly, except by lots of experience. There is a technique that pilots can use, however, to achieve some measure of the same results.

First, if you experience severe oscillations in free flight do not continue trying to fly fast. Immediately bring the bar smoothly to the normal trim position in pitch (slow down to trim speed) and center yourself on the bar. The glider will recover to normal flight right away. If the glider ends up in a turn, it will be a simple matter to correct it once you have slowed down.

If while flying fast you notice that the glider has begun to veer to one side, make a quick, sharp and deliberate weight shift in the opposite direction, and then immediately return to the center of the bar (without waiting for the glider to respond).

If the first correction of this type isn't enough, do another one, but don't hold the correction longer. This technique approximates the proper technique of flying ahead of the glider by feel, without requiring the same degree of sensitivity from the pilot".

1.19 Useful or Effective Investigation Techniques

1.19.1 No new methods were applied.

2. ANALYSIS

2.1 Man (Pilot)

The pilot was the holder of a valid Student Pilot Licence (Recreational Student Pilot) at the time of the accident and had the aircraft type endorsed on it. The pilot was in possession of a valid medical certificate with no restrictions imposed on it.

The pilot's total flying hours at the time of the accident was 36.8 hours. 27.5 hours were flown on the Windlass Trike.

The pilot's total training time of approximately four and a half months was interrupted, resulting in his not flying for approximately three months of this period. The pilot was also not able to fly during the week before the accident flight due to weather conditions.

During the cross-wind and down-wind legs the aircraft was seen to oscillate left and right. Power application during this time was also irregular, which caused the nose to pitch up and down. It is most likely that the oscillations, together with the nose pitch, caused the pilot to panic as he could not correct the situation and therefore did not communicate with the instructor, who was in radio contact with the student at all times. Soon thereafter it seems the student lost control and collided with a tree and the ground.

2.2 Machine (Aircraft)

Maintenance documents revealed the last annual inspection on this aircraft was

certified at 478.0 hours on 11 October 2014 by an approved person (AP) who was in possession of a valid AP certificate.

Although the owner applied for a Training Authority to fly, a Private Authority to Fly was issued by RAASA. The Training Authority to Fly was only issued on 8 June 2015, which was the day after the accident.

The circumstances of the accident and the examination of the wreckage did not show any technical anomaly that could explain the cause of the accident.

2.3 Environment (Weather)

Fine weather conditions prevailed on the day of the accident.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot was under training but he was properly certified and qualified according to regulations to perform this flight and was in possession of a valid medical certificate.

3.1.2 The Authority to Fly at the time of the accident was for private use only and not for training and issued only one day after the accident.

3.1.3 During the cross-wind and down-wind leg of the flight the oscillations and nose up and down pitch movements increased. The pilot was not able to correct the oscillations and pitching moments, resulting in the aircraft hitting a tree and then the ground.

3.1.4 Weather conditions had no influence on the accident.

3.2 Probable Cause/s

3.2.1 Loss of control in flight while positioning the microlight aircraft on left base-leg.

4. SAFETY RECOMMENDATIONS

- 4.1 It is recommended to the Director of Civil Aviation (DCA), in the interest of aviation safety, to consult with the Recreational Aviation Administration-South Africa (RAASA) to implement a procedure whereby a different instructor from the one conducting the training of a student be appointed to send the student on his/her first solo flight. This procedure is standard practice during private pilot training (PPL) when a student is sent on his first solo flight.
- 4.2 It is recommended to the Director of Civil Aviation (DCA) to ensure that there is better coordination between SACAA and RAASA on issuing of ATF to ensure no training flights are executed without the proper certificates issued.

5. APPENDICES

- 5.1 None.