SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-12a

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9254	
Aircraft Registration	**ZS-CUB**	**Date of Accident**	13 December 2013		**Time of Accident**	0622Z
Type of Aircraft	Cessna 172C (Aeroplane)		**Type of Operation**		Training	
Pilot-in-command Licence Type	Private Pilot's Licence		**Age**	18	**Licence Valid**	Yes
Pilot-in-command Flying Experience	Total Flying Hours		70,6		Hours on Type	70,6
Last point of departure	Mafikeng Aerodrome (FAMM, North West)					
Next point of intended landing	Mafikeng Aerodrome (FAMM, North West)					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Left of Runway 04 at FAMM (GPS position: 25°48'26.8 1" South 025°32'40.09" East)						
Meteorological Information	Wind: 330°/26 kt, Visibility: CAVOK					
Number of people on board	1+0	**No. of people injured**	0	**No. of people killed**	0	

Synopsis

The pilot returned to FAMM following a solo flight to the general flying area (GFA). The pilot was given landing clearance for Runway 04 by the air traffic controller (ATC) at FAMM. When the aircraft touched down, it bounced and the pilot struggled to maintain directional control of the aircraft due to the high touchdown speed.

The pilot decided to initiate a go-around because only a limited amount of runway remained. During the go-around, the pilot increased the aircraft's power. However, following rotation the pilot failed to transition the aircraft into a climb attitude with the wings in a level position. The aircraft rolled to the left and hit a tree before coming to rest. A post-impact fire erupted in the engine area.

Aerodrome fire and rescue services arrived shortly thereafter and extinguished the fire. The pilot was evacuated from the aircraft and did not sustain any injuries. The aircraft was substantially damaged during the impact sequence.

Probable Cause

Loss of directional control during landing

Contributing factor:
Poor technique

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner : Praetor Trust
Name of Operator : Afrika Union Aviation Academy
Manufacturer : Cessna Aircraft Company
Model : Cessna 172C
Nationality : South African
Registration Marks : ZS-CUB
Place : FAMM
Date : 13 December 2013
Time : 0622Z

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

1.1.1 The pilot returned to FAMM following a 2,5 hours solo flight to the GFA. The pilot was given landing clearance for Runway 04 by the air traffic controller at FAMM. The pilot stated that he configured the aircraft with 10 degrees of flap for the landing. When the aircraft touched down, it bounced and the pilot struggled to maintain directional control of the aircraft due to the high touchdown speed. The pilot initiated a go-around because only a limited amount of runway remained. During the go-around, the pilot increased the aircraft's power. However, following rotation the pilot failed to transition the aircraft into a climb attitude with the wings in a level position.

1.1.2 The aircraft rolled to the left and hit a tree on the side of the runway before coming to rest. The left fuel tank ruptured and a post-impact fire erupted shortly afterwards.

1.1.3 ATC activated the crash alarm and aerodrome rescue and firefighting personnel responded to the accident site. The fire was extinguished and the pilot evacuated from the aircraft. The pilot did not sustain any injuries during the impact sequence. The aircraft was substantially damaged.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft sustained substantial damage.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Nationality	Motswana	Gender	Male	Age	18
Licence Number	0272410630	Licence Type	PPL		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	28 February 2014				
Restrictions	None				
Previous Accidents	None				

Flying Experience

Total Hours	70,6
Total Past 90 Days	5,1
Total on Type Past 90 Days	5,1
Total on Type	70,6

1.6 Aircraft Information

Airframe:

Type	Cessna 172C	
Serial Number	172-49165	
Manufacturer	Cessna Aircraft Company	
Year of Manufacture	1962	
Total Airframe Hours (At time of Accident)	10 788,9	
Last MPI (Date & Hours)	7 June 2013	10 694,6
Hours since Last MPI	94,3	
C of A (Expiry Date)	30 January 2014	
C of R (Issue Date) (Present owner)	7 June 2013	
Operating Categories	Standard Part 91	

Engine:

Type	Continental 0-300C
Serial Number	22114-D5CR
Hours since New	1 151,1
Hours since Overhaul	TBO not yet reached

Propeller:

Type	McCauley 1C172EM7651
Serial Number	AAA44004
Hours since New	1 088,1
Hours since Overhaul	TBO not yet reached

Weight and Balance

Basic Empty Weight	1 395
Pilot and Passengers	154
Fuel on board	240
Take-off weight	1 684 lbs

Note: The maximum take-off weight for this aircraft is 2 250 lbs. The aircraft was within the take-off weight limitation.

1.6.1 The aircraft had 40 US gallons of Avgas. The fuel quantity was sufficient for the flight.

1.7 Meteorological Information

1.7.1 The following information was obtained from the pilot's questionnaire.

Wind direction	330°	Wind speed	6 kt	Visibility	CAVOK
Temperature	Nil	Cloud cover	Sky clear	Cloud base	Nil
Dew point	Nil				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with the minimum visual flight rules navigation equipment required by the regulations. There were no recorded defects on the navigation equipment prior to the flight.

1.9 Communications

1.9.1 The aircraft was equipped with standard communications equipment as required by the Regulator. There were no recorded defects on communications equipment prior to the incident.

1.9.2 The pilot transmitted on FAMM aerodrome's designated frequency of 119,3 MHz.

1.10 Aerodrome Information

1.10.1 FAMM aerodrome is a SACAA-licensed facility.

Aerodrome Location	FAMM	
Aerodrome Co-ordinates	25°48'26.81" S 025°32'40.09" E	
Aerodrome Elevation	4 181ft	
Runway Designations	04/22	
Runway Dimensions	4 999 x 45 m	
Runway Used	04	
Runway Surface	Asphalt	
Approach Facilities	VOR/DME	

1.11 Flight Recorders

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

1.12 Wreckage and Impact Information

1.12.1 The aircraft sustained damage to the nose oleo, propeller, tailplane, right wing, left engine cowling, undercarriage and left wing.

1.12.2 The left wing hit a tree on the side of the runway before the aircraft came to rest.

1.12.3 The left fuel tank ruptured and shortly afterwards a fire erupted in the area of the engine.

Figure 1: Damage to aircraft

1.13 Medical and Pathological Information

1.13.1 None

1.14 Fire

1.14.1 A post-impact fire erupted in the area of the engine.

1.14.2 The aerodrome rescue and firefighting personnel extinguished the fire on arrival at the scene of the accident.

1.15 Survival Aspects

1.15.1 The incident was considered survivable due to the low kinetic energy associated with the impact.

1.15.2 The pilot was properly restrained by the aircraft-equipped safety harness.

1.16 Tests and Research

1.16.1 None.

1.17 Organizational and Management Information

1.17.1 This was a solo training flight.

1.17.2 The flight school was in possession of a valid aircraft training organisation (ATO) certificate. The flight in question was conducted under the auspices of the ATO and authorised by a flight instructor.

1.17.3 The aircraft maintenance organisation was in possession of a valid approval certificate.

1.18 Additional Information

1.18.1 *The following information was extracted from the Air pilot's manual Volume 1:*

Common faults during the landing

Every pilot learns how to land through experience. It is inevitable that many landings will be far from perfect, but progress will be made when you can recognise faults and correct them. Three very common faults are the balloon (when the aeroplane moves away from the ground before touchdown), the bounced landing (when it moves away from the ground after touchdown, perhaps after several touchdowns) and rounding out too high.

The balloon

A balloon can be caused by either:

- *Too much back pressure on the control column; and/or*
- *Too much power left on; and/or*
- *Too high an airspeed; and/or*
- *A gust of wind.*

To correct for a small balloon:

- *Relax some of the back pressure on the control column;*
- *Allow the aeroplane to commence settling (sinking) again;*
- *When approaching the hold off height, continue the backward movement of the control column; and*
- *Complete the landing normally*

A large balloon

A large balloon may call for a go-around, certainly for an inexperienced pilot. As experience is gained, it may be possible to reposition the aeroplane (possibly using power) for the flare and landing, but this uses up lots of runway. The decision to attempt a recovery from a large flare will therefore depend on the extent of your experience and on the runway length remaining

The bounced landing

A bounce can be caused by:

- *A failure to round out sufficiently*
- *Touching down on the nose wheel (possibly caused by looking over the nose);*
- *Touching down too fast*
- *Excessive backward movement of the control column; or*
- *Flaring too high.*

An inexperienced pilot should consider an immediate go-around following a bounce. With experience, however, a successful recovery from a bounce can be made (provided that the runway length is adequate) by relaxing the back pressure and adding power if necessary to reposition the aeroplane suitably to recommence the landing. Avoid pushing the nose down as a second bounced landing may result. Avoid a second touchdown on the nose wheel – a series of Kangaroo hops down the runway is not a desirable way to land an aeroplane! Prior to touchdown, make sure that the aeroplane is in the correct nose-high attitude (even if it is the second touchdown).

Rounding out and holding off too high

The hold off is best completed within a foot or so of the ground. Any more than this and the landing somewhat heavier than usual will result. If you recognise before "impact" that you are too high, add power; this will break the descent rate somewhat and allow a less heavy touchdown. Immediately the wheels touch the ground, close the throttle, otherwise the aeroplane may not decelerate.

Holding off too high usually results from either:

- *Not looking far enough into the distance, with the result that the ground rushing by is blurred and depth perception is poor; or*
- *A second attempt to land following a balloon or bounce.*

Note: the more experienced you become, the less likely you are to find yourself bouncing, ballooning or rounding out too high. It is part of the average student pilot's lot to become somewhat of an expert at recovering from misjudged landings, but this phase will not last too long.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1 Pilot (Man)

The pilot was appropriately licensed for the flight and had been authorised to complete the solo flight by a flight instructor. During the landing phase, the aircraft bounced, which may be attributed to several factors such as a failure to round out sufficiently, touching down on the nose wheel, touching down too fast etc. The pilot did not immediately initiate a recovery from the bounced landing and struggled to maintain directional control of the aircraft on the runway. The pilot realised that there was an insufficient stretch of runway remaining and then attempted to initiate a go-around. The pilot increased the aircraft's power and rotated the aircraft. The pilot did not transition the aircraft correctly from rotation to the climb and the aircraft began to bank to the left. The aircraft collided with a tree and came to rest. The aircraft was serviceable and maintained in accordance with the regulations. The surface wind conditions at the aerodrome were calm and did not contribute to the accident. This was not the pilot's first flight at FAMM. Therefore, this flight was nothing out of the norm.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot was licensed and qualified for the flight in accordance with existing regulations.

3.1.2 The maintenance records indicated that the aircraft was maintained in accordance with existing regulations and approved procedures.

3.1.3 The weather conditions were safe and within the aircraft's limitation for the pilot to conduct a flight to the general flying area.

3.1.4 The pilot did not recover from the bounced landing timeously and struggled to maintain directional control of the aircraft following touchdown.

3.1.5 The pilot initiated a go-around due to insufficient runway remaining but did not keep the aircraft's wings in a level position for the climb resulting in the aircraft banking to the left and colliding with a tree.

3.2 Probable Cause/s

3.2.1 Loss of directional control during landing

3.3 Contributing factors

3.3.1 None

4. SAFETY RECOMMENDATIONS

4.1.1 None

5. APPENDICES

5.1.1 None