SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-55

LIMITED ACCIDENT INVESTIGATION REPORT

Reference Number	CA18/2/3/10057						
Classification	Accident	**Date**	23 October 2021	**Time**	0530Z		
Type of Operation	Private (Part 94)						
Location							
Place of Departure	Bathawk City Aerodrome, Nelspruit, Mpumalanga Province	Place of Intended Landing	Bathawk City Aerodrome, Nelspruit, Mpumalanga Province				
Place of Occurrence	About 2 nautical miles (nm) north of Bathawk City Aerodrome						
GPS Co-ordinates	Latitude	S25° 33’ 28 .6”	Longitude	E30°52’56.4”	Elevation	2392 feet	
Aircraft Information							
Registration	ZU-CYK						
Model/Make	Bantam B22J (Serial No: 03-0216)						
Damage to Aircraft	Substantial	Total Aircraft Hours	408.9				
Pilot-in-command							
Licence Valid	Yes	Gender	Female	Age	60		
Licence Type	National Pilot Licence (NPL)						
Total Hours on Type	11.7	Total Flying Hours	60.6				
People On-board	1 + 1	Injuries	0	Fatalities	0	Other (On Ground)	0
What Happened							

On Saturday morning, 23 October 2021, a pilot on-board a Bantam B22J aircraft with registration ZU-CYK was on a private flight from Bathawk City Aerodrome in Nelspruit, Mpumalanga Province, with the intention to land at the same aerodrome. The aircraft is a high-wing monoplane with conventional controls and two-place side-by-side seating arrangement. Visual meteorological conditions (VMC) by day prevailed at the time of flight and no flight plan was filed. The pilot conducted a pre-flight inspection on the aircraft and no abnormalities were found. The aircraft had about 30 litres of Octane 95 Unleaded fuel in the tank. The pilot, having started the engine, waited for the engine parameters to settle in the green arch. Within 2 minutes, the pilot taxied the aircraft to Runway 33 threshold where she took off uneventfully. The pilot completed two touch-and-go landings, followed by a full stop landing on Runway 33. After landing, the pilot taxied the aircraft to the identified parking area where she picked up her partner.

After making sure that her partner was properly harnessed to his seat, she taxied the aircraft back to Runway 33 threshold where after she took off uneventfully. The aircraft climbed to a height of 500 feet (ft) above ground level (AGL), travelling at 65 knots indicated air speed (KIAS). The pilot stated that all the engine parameters were within limits in accordance with (IAW) the engine maintenance manual (EMM) document No. JEM0005-5, page serial No: 14 of 74, dated 30 May 2020.

After approximately 4 minutes into the flight, the engine revolutions per minute (rpm) dropped from 2600 to 2300. The pilot reported that she tried to regain the engine power by adjusting the throttle setting, but this did not improve the situation. She then decided to return to the aerodrome with insufficient engine power available. In less than a minute, the engine rpm indication started to oscillate, and the pilot decided to execute a forced landing on an open field which was approximately 2 nautical miles (nm) north of the aerodrome. The pilot stated that she lowered the nose to maintain airspeed and the landing was uneventful for the first part, but then the nose wheel hit an anthill and the aircraft nosed over and came to rest in an inverted position. After switching off the electrics, the pilot and her partner loosened their safety harnesses and vacated the aircraft. The aircraft sustained substantial damage and the two occupants were unharmed. The flight lasted about 0.5 hours.

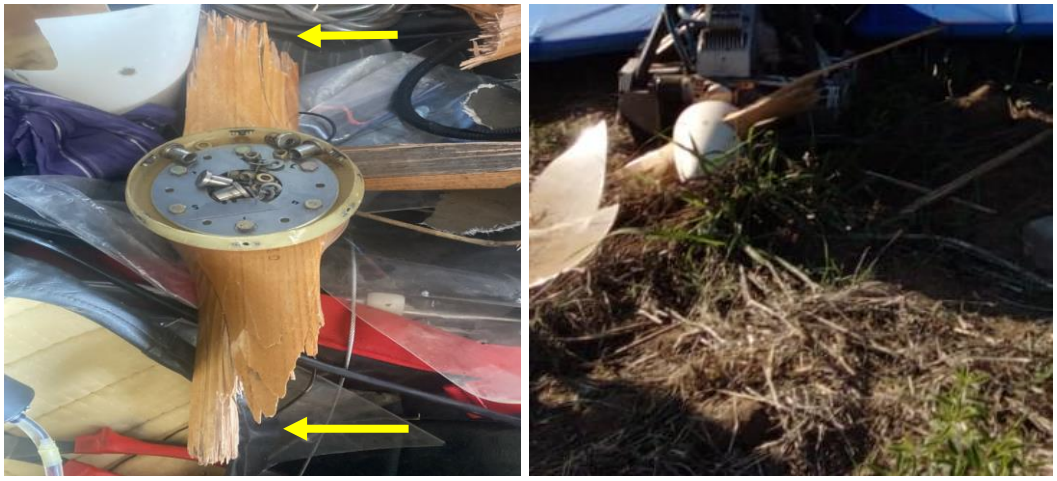
Figure 1: The aircraft at the accident site. (Source: Operator)

The aircraft was powered by a Jabiru 2200A four-cylinder four-stroke horizontally opposed air-cooled engine with serial No:22A1492. The engine develops 80 horsepower (hp) at 3300rpm driving a fixed-pitch wooden carbon fibre propeller. The wreckage was recovered to the approved aircraft maintenance organisation (AMO) in Bathawk City Aerodrome for further examination by the approved person (AP). Both wings showed severe chordwise damage. There was no evidence of an in-flight structural wing failure.

All extremities and control surfaces were accounted for at the site. Although flight control cable runs were disrupted by impact forces, pre-accident control integrity was established. The engine had remained attached to its mounting point and the wooden carbon fibre and glass weave covered P-prop propeller had also remained attached to the hub. The propeller blades had shattered, and the distribution of fragments indicated that the propeller was turning at the time of the accident.

During wreckage examination, the AP noticed that the master fuse was blown, and that the wiring harness was damaged during the accident sequence. The master fuse was replaced to enable the engine to be started while still installed in the airframe. Fuel had leaked from the tank as the aircraft was in an inverted position after the accident. Fuel from the engine carburettor bowl and the fuel-filter had leaked, meaning that no fuel was available for examination on the aircraft. The temperature was recorded at 22° Celsius around the time of the flight which made the possibility of carburettor-icing condition unlikely. During consultation with the owner, he indicated that he bought more fuel than what was required to refuel the aircraft and that about 10 litres remained in the container at his facility. The owner shared a sample of the Unleaded 95 octane fuel, which was found to be free of contaminants.

Figure 2: Fuel sample from the owner. (Source: Owner)



Figures 3/4: Damaged propeller blades. (Source: AP)

According to the AP, before the engine could be started, cylinder compression and suction were noted on all cylinders while the engine was rotated by hand. The damaged propeller had to be removed before the engine run. The engine sparkplugs were intact and undamaged; they showed no evidence of combustion chamber malfunction. The carburettor fuel bowl was empty, and no evidence of dirt was found entrapped in it. Fuel was uplifted before the engine was started. The fuel line from the pump to the gascolator was replaced to get the engine running as it was damaged during the accident. The engine started without fault. The engine was operated at different rpm settings IAW the phases of flight, and no abnormalities were noted. The engine met all parameters IAW the EMM Issue 1 on page serial No: 18 of 94, dated 26 July 2012.

Post-accident examination of the aircraft maintenance records showed that the aircraft was certificated, equipped and maintained in accordance with existing regulations and approved maintenance procedures. According to the aircraft maintenance records, on 9 September 2020, an annual inspection was carried out on the aircraft at 346.1 airframe hours.

The accident occurred on 23 October 2021 at 408.9 airframe hours, meaning that the aircraft had flown 62.8 hours since the last annual inspection was carried out. All applicable or relevant aircraft documentation such as the Certificate of Registration, the Authority to Fly, the radio station licence and the mass and balance certificates were scrutinised during the investigation, and all were found to be valid in accordance with the existing regulations. Further examination of the technical documentation was done by the aircraft maintenance organisation (AMO) and all entries made were appropriately certified in terms of general maintenance rules.

The AP who performed the last annual inspection on the aircraft prior to the occurrence was in possession of a valid AP approval certificate No 274 and was rated to perform maintenance on the aircraft type.

Examination of the pilot's file kept at the South African Civil Aviation Authority (SACAA) indicated that she was correctly licensed and fit to undertake the flight on the day of the accident. The pilot had a National Pilot Licence (NPL) and the aircraft type was endorsed in her licence. The pilot also had a valid Class 4 aviation medical certificate issued on 1 March 2021 with an expiry date of 11 March 2023.

Probable cause/s:

A reported engine power loss in-flight resulted in an unsuccessful forced landing. The engine run was conducted and no abnormalities were noticed.

Contributing factor/s:

During the forced landing, the nose gear wheel hit an anthill which caused the aircraft to nose over.

Safety Action/s

None.

Safety Message and/or Safety Recommendation/s

None.

Purpose of the Investigation
In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, 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 apportion blame or liability****.*
About this Report
Decisions regarding whether to investigate, and the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, no investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this brief report. The report has been compiled using information supplied in the initial notification, as well as follow-up information to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar accident. *This report provides an opportunity to share safety message/s in the absence of an investigation.* *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.*
Disclaimer
This report is produced without prejudice to the rights of the AIID, which are reserved.

This report is issued by:

Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa