

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9111	
Aircraft Registration	ZU-OIL	Date of Accident	28 November 2012		Time of Accident	0700Z
Type of Aircraft	Jabiru SP 2000		Type of Operation		Private	
Pilot-in-command Licence Type		Private	Age	22	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	107.7		Hours on Type	56.3
Last point of departure		Rustenburg Aerodrome (FARG) North-west Province				
Next point of intended landing		Springs Aerodrome (FASI) Gauteng				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Runway 03 at Springs Aerodrome at GPS co-ordinates S26°1500 E028°2400. Cloud CAVOK						
Meteorological Information		The weather was fine: Temperature 18°C; Wind 060/3-5kt				
Number of people on board	1 + 0	No. of people injured	0	No. of people killed	0	
Synopsis						
<p>The pilot who was the sole occupant on board the aircraft, departed from Rustenburg Aerodrome (FARG) to Springs Aerodrome (FASI) on a private flight.</p> <p>The pilot stated that the flight from Rustenburg to Springs with a flight time of approximately 1 hour was uneventful. However, as he reduced the engine power slowly on downwind for landing at Springs aerodrome at an altitude of approximately 6400ft AMSL, the engine suddenly vibrated and stopped during flight. The pilot then made a blind transmission on radio frequency 122.4 MHz and reported an engine failure before landing safely onto Runway 03 at Springs Aerodrome.</p> <p>The aircraft sustained no damage as a result of the forced landing. The pilot inspected the aircraft and observed damage sustained to the engine and propeller.</p> <p>The pilot was not injured during the forced landing.</p>						
Probable Cause						
<p>Engine failure due to mechanical failure and a successful forced landing followed.</p> <p><u>Contributory Factor:</u> Piston No. 2 gudgeon pin wire retainer circlip became adrift causing the gudgeon pin to migrate forward out of position and subsequently caused substantial damage to the engine that stopped abruptly.</p>						
IARC Date				Release Date		
CA 12-12a		25 MAY 2010			Page 1 of 9	



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : J. J. Mostert
Manufacturer : Shadow Lite CC
Model : Jabiru SP
Nationality : South Africa
Registration Marks : ZU-OIL
Place : Springs Aerodrome
Date : 23 November 2012
Time : 0700Z

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 who was the sole occupant on board the aircraft, departed from Rustenburg Aerodrome (FARG) to Springs aerodrome (FASI) on a private flight.
- 1.1.2 The pilot stated that the flight from Rustenburg to Springs with a flight time of approximately 1 hour was uneventful. However, as he reduced the engine power slowly on downwind for landing at Springs aerodrome at an altitude of approximately 6400ft AMSL, the engine suddenly vibrated and stopped during flight. The pilot then made a blind transmission on radio frequency 122.4 MHz and reported an engine failure before landing safely onto Runway 03 at Springs Aerodrome.
- 1.1.3 The aircraft sustained no damage during the forced landing. The pilot inspected the aircraft and observed damage sustained to the engine and propeller.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The engine was subjected to an in-flight contained engine failure. As a result, the engine mounting cradle that supports the engine was distorted, and the bulkhead behind the engine dented. The propeller was also substantially damaged when the engine suddenly stopped due to a mechanical failure.

1.3.2 The aircraft sustained no further damage during the forced landing.



Figure 1: Shows the aircraft recovered at Springs aerodrome.

1.4 Other Damage

1.4.1 There was no other damage caused during the forced landing.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	22
Licence Number	0272359704	Licence Type	Private		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	31 November 2014				
Restrictions	None				
Previous Accidents	None				

Flying Experience :

Total Hours	107.7
Total Past 90 Days	6.4
Total on Type Past 90 Days	6.4
Total on Type	56.3

1.6 Aircraft Information

Airframe :

Type	Jabiru SP 2000	
Serial Number	370	
Manufacturer	Shadow Lite CC	
Date of Manufacture	2001	
Total Airframe Hours (At time of Accident)	612.1	
Last MPI (Date & Hours)	17 October 2012	606.9
Hours since Last MPI	5.2	
Authority to Fly (Issue Date)	23 October 2012	
C of R (Issue Date) (Present owner)	03 March 2008	
Operating Categories	Private	

Engine :

Type	Jabiru 2200A
Serial Number	22A773
Hours since New	612.1
Hours since Overhaul	Not yet reached

Propeller :

Type	De Necker
Serial Number	N3484
Hours since New	5.2
Hours since Overhaul	On condition

1.7 Meteorological Information

Wind direction	060°	Wind speed	3-5kt	Visibility	10Km
Temperature	18°C	Cloud cover	CAVOK	Cloud base	CAVOK
Dew point	N/a				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with the standard navigation equipment as approved by regulations.

1.8.2 The navigation equipment was serviceable and no defects were experienced with the navigation equipment prior to the accident.

1.9 Communications.

1.9.1 The aircraft was equipped with the standard communication equipment as approved by regulations.

1.9.2 The communication equipment was serviceable and no defects were experienced with the communication equipment prior to the accident.

1.10 Aerodrome Information

Aerodrome Location	Springs Aerodrome	
Aerodrome Co-ordinates	S26°15 00 E028° 24 00	
Aerodrome Elevation	5340ft AMSL	
Runway Designations	03/21	
Runway Dimensions	1600 x 18m	
Runway Used	Runway 03	
Runway Surface	Asphalt	
Approach Facilities	None	

1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a cockpit voice recorder (CVR) or a flight data recorder (FDR), nor was either required to be fitted on the type aircraft.

1.12 Wreckage and Impact Information

1.12.1 The engine suddenly vibrated and stopped during flight causing substantial damage to the engine and engine cradle that supports the engine and the propeller. The pilot then executed a forced landing onto Runway 03 at Springs Aerodrome without further damage to the aircraft.

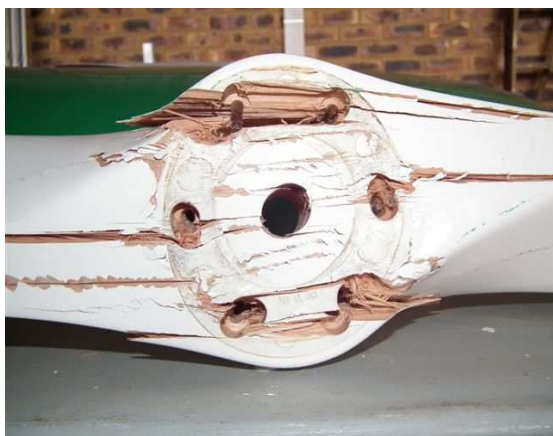


Figure No 2 & No 3: Shows damage to the propeller and the bolts bent during sudden stoppage of the engine in flight.



Figure 4: Shows the engine cradle bent.

1.13 Medical and Pathological Information

1.13.1 Not applicable.

1.14 Fire

1.14.1 There was no post or impact fire.

1.15 Survival Aspects

1.15.1 The accident was considered survivable as the aircraft landed safely during the forced landing without any damage sustained to the aircraft. The pilot was also properly restrained with the safety harnesses installed in the aircraft.

1.16 Tests and Research

1.16.1 The Jabiru 2200A engine was recovered to an approved AMO 1181 and engine overhaul facility at Springs for further investigation purposes.

- The propeller blades were found substantially damaged when the engine failed and came to an abrupt stop during flight. Unable to rotate the engine in a clockwise direction.
- No. 2 cylinder head was removed and evidence found that the inlet valve came into contact with the piston crown and subsequently severed from the connecting rod at the gudgeon pin holes. The piston crown showed evidence of the inlet valve contacting the piston top in a rotating manner after the piston crown severed from the connecting rod. The lower part of the piston was completely broken as well as damage to the oil rings and grooves.
- No. 2 cylinder gudgeon pin showed evidence of migrating forward out of the piston attachment hole as strike marks from the gudgeon pin were evident on the forward side of the crankcase. One gudgeon pin retainer wire circlip was located in the engine sump.
- The connecting rod was found bent into a “U” shape at the upper end of the left hand side of the crankcase. 3 Pieces of the gudgeon pin was also located in the engine sump and the pin broken lengthwise.
- Conclusion: Piston No. 2 forward gudgeon pin wire retainer circlip became adrift causing the gudgeon pin to migrate forward out of position and subsequently caused substantial damage to the engine and the engine to stop abruptly. The sudden stop caused damage to the propeller as well as distortion of the engine cradle and engine mounting.

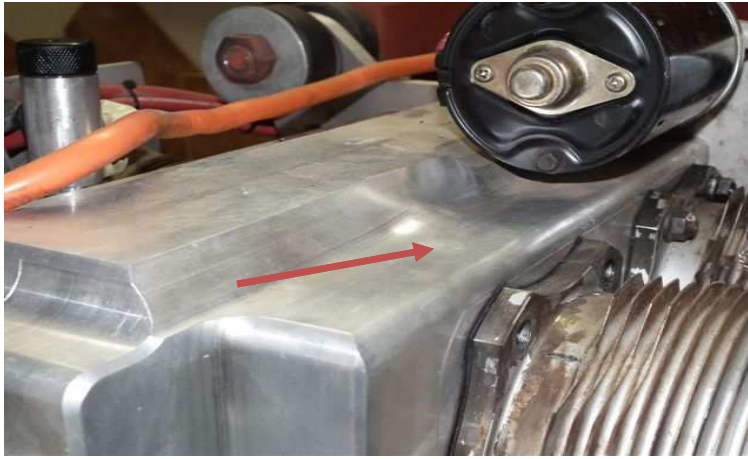


Figure 5: Shows the hump caused when No. 2 cylinder piston and associate parts failed.



Figure 6 and 7: Shows damage caused No 2 engine piston.

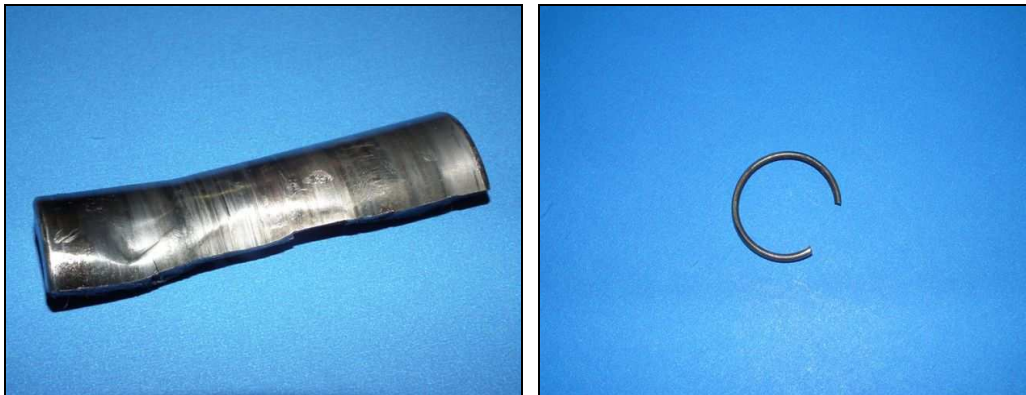


Figure 8 & 9 :Shows piece of gudgeon pin and gudgeon pin retainer circlip

1.17 Organizational and Management Information

1.17.1 The aircraft was operated on a private flight.

1.17.2 The Authority to Fly for the aircraft was valid with the expiry date of 17 October 2013.

1.17.3 The AMO that carried out the MPI inspection on the aircraft was in possession of a valid AMO certificate.

1.18 Additional Information

- 1.18.1 According to the aircraft information, the aircraft had flown 612.1 hours since new. The engine was the original product installed on the aircraft since new. There is no evidence that the engine was overhauled or worked performed on No 2 cylinder since new.

1.19 Useful or Effective Investigation Techniques

- 1.19.1 None

2. ANALYSIS

- 2.1 The private flight from Rustenburg aerodrome to Springs aerodrome was uneventful. However, as the engine power was reduced during the downwind leg for landing, the engine suddenly vibrated and stopped as result of an engine failure.
- 2.2 The aircraft sustained no damage during the forced landing. The pilot inspected the aircraft and observed damage sustained to the engine and propeller.
- 2.3 The engine was recovered to an approved AMO and engine overhaul facility for further investigation. It was established that the Number 2 piston gudgeon pin wire retainer circlip became adrift, causing the gudgeon pin to migrate out of position and subsequently caused substantial damage to the engine and the engine to stop abruptly. The sudden stop caused damage to the propeller as well as distortion of the engine cradle and engine mounting.

3. CONCLUSION

3.1 Findings

- 3.1.1 The pilot who was also the owner of the aircraft was in possession of a valid Private Pilot License (PPL) with the aircraft type rating endorsed on it.
- 3.1.2 The pilot had a valid aviation medical certificate without any restrictions. There was no evidence found to show that he had any medical condition that may have prevented him from flying the aircraft.
- 3.1.3 The private flight from Rustenburg aerodrome to Springs aerodrome with a flight time of approximately 1 hour was uneventful. The pilot did not experience any mechanical defects during the flight, but as he reduced power for landing at Springs aerodrome, the engine suddenly stopped due to a mechanical failure.
- 3.1.4 Except for mechanical failure of the engine and damage to the engine cradle that supports the engine and propeller, the aircraft sustained no further damage during the forced landing.
- 3.1.5 The engine was recovered to an approved AMO and engine overhaul facility at Springs aerodrome for further investigation in order to establish the cause of the engine failure.

3.2 Probable Cause/s

3.2.1 Engine failure due to mechanical failure and a successful forced landing followed

3.2.2 Contributory Factor:

Piston No. 2 gudgeon pin wire retainer circlip became adrift causing the gudgeon pin to migrate out of position and subsequently caused substantial damage to the engine that stopped abruptly.

4. SAFETY RECOMMENDATIONS

4.1 None.

5. APPENDICES

Compiled by:

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For: Director of Civil Aviation

Date:

Investigator-in-charge:

Date:

Co-Investigator:

Date: