



REPUBLIC OF NAMIBIA

MINISTRY OF WORKS AND TRANSPORT

Directorate of Aircraft Accident and Incident Investigations

Accident Reference: ACCID/082821/01-01

Aircraft Accident Investigation Final Report

ROBINSON R44 V5-HJL

RELEASE DATE: 13DECEMBER 2021

Aircraft Accident Report

DESCRIPTION OF OCCURRENCE: Helicopter Collision with Terrain

TYPE OF OPERATION: Game capture operations.

AIRCRAFT TYPE: Robinson R44 (V5-HJL)

LOCATION: GPS: 19° 42'08.10" S & 15° 12'15.88" E Farm Karros. Kamajab Namibia

DATE AND TIME: 28th August, 2021(09:30 UTC).



Foreword

This report presents the information, data analysis, conclusions, and safety recommendations reached during the investigation. The purpose of the investigation was to establish the circumstances surrounding this accident.

In accordance with the provisions of Annex 13 to the Convention on International Civil Aviation Organization, the accident's analysis, conclusions, and safety recommendations contained therein are intended neither to apportion blame nor to single out any individual or group of individuals. The main objective was to identify the systematic deficiencies and draw lessons, from the occurrence, which might help to prevent accidents and incidents in the future. To this end, many a time, the reader may be interested in whether or not an issue was a direct cause of the accident (that has already taken place), whereas the investigator is mainly concerned with the prevention of future accidents/incidents.

As a result, the usage of this report for any purpose other than (the letter and spirit of Annex 13 and other relevant statutes) prevention of similar occurrences in the future might lead to erroneous interpretations and applications.

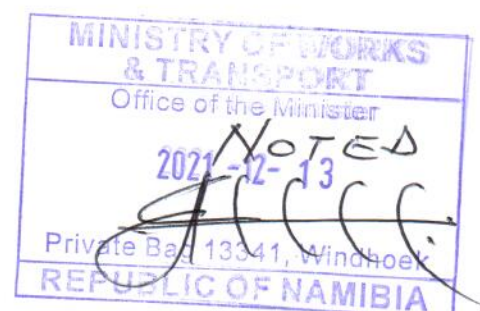


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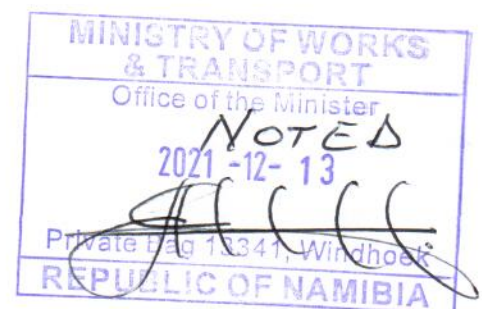
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ABBREVIATION

AD	-	Airworthiness Directives
AMO	-	Aircraft Maintenance Organization
AME	-	Aircraft Maintenance Engineer
AIP	-	Aeronautical Information Publication
AOC	-	Air Operating Certificate
CPL	-	Commercial Pilot License
DAAII	-	Directorate of Aircraft Accident and Incident Investigation
ELT	-	Emergency Locator Transmitter
ICAO	-	International Civil Aviation Organization
NTSB	-	National Transportation Safety Board
NCAA	-	Namibia Civil Aviation Authority
NAMCARs	-	Namibian Civil Aviation Regulations
NCAA		Namibian Civil Aviation Authority
NTSB	-	National Transportation Safety Board
PPL	-	Private Pilot License
MPI	-	Mandatory Periodic Inspection
SB	-	Service Bulletins
UTC	-	Universal Time Co-ordinated
VHF	-	Very Higher Frequency



Ministry of Works and Transport

ACCID/082821/01-01



DIRECTORATE OF AIRCRAFT ACCIDENT INVESTIGATION ACCIDENT REPORT – EXECUTIVE SUMMARY

Aircraft Registration	V5-HJL	Date of Accident	28 th August, 2021	Time of Accident	09:30 UTC
Type of Aircraft	ROBINSON R44	Type of Operation	Private		
Pilot- In - command License Type	PR 71013	Age	54	License Valid	(Not signed by the owner)
Pilot-In-command Flying Experience	Total Flying Hours	896.8	Hours on Type	896.8	
Last point of departure	Farm karros (kamajab)				
Next point of intended landing	Farm karros (kamajab)				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)					
GPS: 19° 42'08.10" S & 15° 12'15.88" E Farm Karros. Kamajab Namibia					
Meteorological Information	Wind Direction: 180 °, Wind speed: 2 kt, Visibility: clear, Temperature: 25° C Cloud cover: clear, Cloud base: CAVOK, Dew point: 0				
Number of people on board	1+1	No. of people injured	0	No. of people killed	0
Synopsis					

On the 28th August, 2021, at around 11:30 local time a privately owned, Namibian registered helicopter got airborne from Farm Karros. Kamajab for a private flight around the farm. On-Board were the pilot and one passenger.

According to the pilot, he was at an altitude of approx. 50ft above ground, when the low rotor rpm buzzer went off. He stated that he saw the rotor rpm and the engine rpm was decaying, he then made an emergency landing, the right skid collapsed and the main rotor hit the ground.

The Aircraft was substantially damaged on impact. No one was injured.

The Directorate of Aircraft Accident and Incident Investigation (DAAII) was informed telephonically by the pilot. The Minister of Works and Transport Ministry was responsible for the release of the official final accident report.

The weather was fine with good visibility.

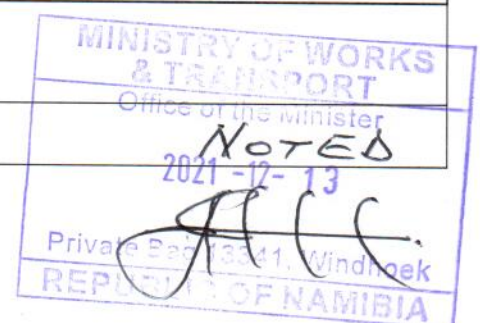
The pilot was a South African citizen who was a holder of a Private Pilot License.

The last Annual Inspection (AI) was carried out and certified on 14 July 2021, in accordance with the Robinson Maintenance Manual and NAMCARS 2001 by a Namibian AMO with approval No. 066, issued on the 20 May 2021 with the expiry date of 19 May 2022 at the total of 1466.20 airframe hours. The approval was issued in accordance with Part 145 of the NAMCARS 2001. At the time of the accident, the aircraft accumulated a further 60 hours since the last (AI) was certified.

Probable Cause: Loss of engine power and subsequent collision with terrain.

Contributing factor (s):

1. Decay of rotor RPM (speed)





AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Golden game CC
Manufacture : Robinson Helicopters
Model : 44
Nationality : Namibian
Registration : V5 - HJL
Location : GPS: 19° 42'08.10" S & 15° 12'15.88" E Farm Karros. Kamajab
Date : 28th August, 2021 Time: 09:30 UTC

All times given in this report are in Co-ordinated Universal Time (UTC).

Disclaimer:

The report is given without prejudice to the rights of the Directorate of Aircraft Accident and Incidents Investigations, which are reserved.

Purpose of the Investigations:

In terms of Namibia Civil Aviation Act (Act No. 6 of 2016) and ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of risk of aviation accident or incidents and **not to establish blame or legal liability.**

This report contains fact relating to aircraft accidents or incidents that have been determined at the time of issue. The report may therefore be revised should new and substantive facts be made available to the investigator (s).

1. FACTUAL INFORMATION

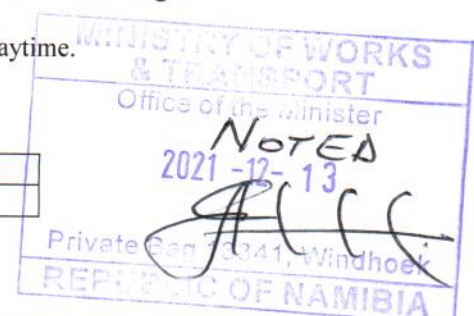
1.1 History of Flight

- 1.1.1 On the 28th August, 2021, at around 09:30 UTC, a Namibian registered Robinson Helicopter got airborne from Private farm Karros for a flight around the farm. The pilot and a passenger were on-Board the aircraft.
- 1.1.2 According to the pilot, he was at an altitude of approx. 50ft above ground, when the low rotor rpm buzzer went off. He stated that he saw the rotor rpm and the engine rpm was decaying fast. He immediately lowered the collective and made an emergency landing.
- 1.1.3 The right skid collapsed and the main rotor hit the ground on the right-hand side of the aircraft. The engine was running at 100%, but the main rotor was stationary after impact. He switched off the engines.
- 1.1.4 The aircraft was substantially damaged. No one was injured.
- 1.1.5 The helicopter was recovered and transported for engine teardown at a local maintenance organization.

GPS: 19° 42'08.10" S & 15° 12'15.88" E Farm Karros. Kamajab Namibia. Daytime.

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-



Serious	-	-	-	-
Minor	-	-	-	-
None	1	-	1	-

1.3 Damage to Aircraft

1.3.1 The aircraft was substantially damaged.



Figure 1: The R44 helicopter as it came to rest. Blades drooping.

1.4 Other Damage

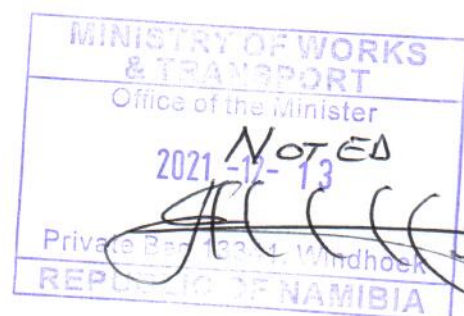
1.4.1 There was no other damage.

1.5 Personnel Information

1.5.1 Pilot-in-in command

Nationality	Namibian			
Licence No	PR 71013	Gender	Male	Age 55
Licence valid	The license was not signed by the owner.		Type Endorsed	Yes
Type Ratings	RH44			
Medical Expiry Date	04/12/2021			
Restrictions	Valid only with correction for defective near vision			
Previous Accidents	On the 31 august 2017, farm Obab in Tsumeb			

Total Hours	896.8
Total Past 90 Days	83.8
Total on Type Past 90 Days	83.8
Total on Type	896.8



1.6 Aircraft Information



Figure 1: Robinson 44 (for illustration purpose)

The R44 is a single-engined helicopter with a semi-rigid two-bladed main rotor, a two-bladed tail rotor and a skid landing gear. It has an enclosed cabin with two rows of side-by-side seating for a pilot and three passengers. T-bar cyclic, streamlined instrument panels, and a crash-worthy fuel system. An aluminum monocoque and powder-coated steel tube structure provide a lightweight yet robust airframe while the aerodynamic fuselage optimizes airspeed and fuel economy. Hydraulically boosted controls eliminate cyclic and collective feedback forces and provide responsive handling. A low tail-rotor tip speed and large cambered tail reduce flyover noise. Raven II and Clipper II helicopters are powered by Lycoming's IO-540 fuel-injected engine. The IO-540 delivers improved altitude performance, increased payload and eliminates the need for carburettor heat.

Airframe:

Type	R44 Raven II
Serial No.	13667
Manufacture	Robinson Helicopters
Year of Manufacture	2013
Total Airframe Hours (At time of Accident)	1526.0
Last MPI (Date & Hours)	14/08/2020 at 1466.20 airframe hours
Hours since Last MPI	60 hours
C of safety for flight	06/07/2021 valid till 06/08/2021
C of R (Issue Date) Present owner	02 November 2014
Operating Categories	Standard

Engine:

Type	Lycoming IO-540
Serial No.	L - 35693-48E
Hours since New	1526.0



1.7 Meteorological Information

Wind direction	180°	Wind speed	2kts	Visibility	clear
Temperature	25° C	Cloud cover	clear	Cloud base	CAVOK
Dew point	0				

1.8 Aids to Navigation

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

1.9 Communications.

1.9.1 The helicopter was equipped with standard communication equipment as approved by the Regulator for the type.

1.10 Aerodrome Information

The accident did not occur on an aerodrome.

1.11 Flight Recorders

1.11.1 The Aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR) nor was it required by the relevant aviation regulations.

1.12 Wreckage distribution and Impact Information

The accident occurred at farm Karros 34.6km from Kamajab town. The helicopter right skid was broken, its main rotor blades exhibited huge drooping. One of the blade trailing edges was bent forward.

1.13 Medical and Pathological Information

1.13.1. The pilot medical certificate was valid

1.14 Fire

1.14.1. There was no evidence of fire inflight or after the impact...

1.15 Survival Aspects.

1.15.1 This was a survivable accident as the impact forces were minimal as the aircraft was on a low-level flight.

1.16 Tests and Research.

1.16.1. DAAII contacted a local Aviation Maintenance Organization to conduct an engine teardown and determine if there was pre-existing failure prior to the accident flight.

1.17 Organizational and Management Information.

1.17.1. The aircraft was flown for private use.

1.17.2 Game auction of rhinos, elephants and other large animals is always done in august each year and weeks before the auction game is captured and transported.

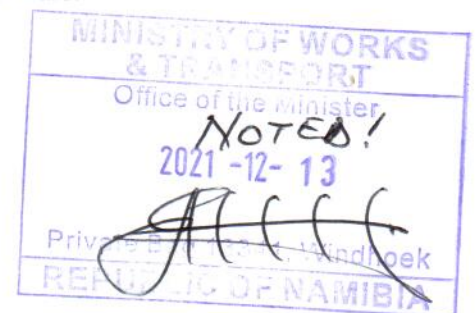
1.18 Additional Information

1.18.1 Previous occurrences

A review of the NCAA aircraft records revealed that the accident aircraft with the same pilot experienced a low rotor RPM and shortly after that crash-landed at almost identical dates (31 august 2017). According to records the aircraft which was flying on the farm Obab in Tsumeb experienced the loss of engine power during a game viewing operation, the aircraft tail hit the trees, it sustained structural damage to its main rotor, tail rotor and tail boom. The aircraft was used for game netting, game capturing, game counting and other similar operations. DAAII did not receive this occurrence notification and also did not record it.

Safety issue

There was no Namibian requirement for endorsement and recurrent training conducted on Robinson Helicopter R44 helicopters to specifically address the preconditions for, recognition of, or recovery from, low main rotor RPM.



1.19 Useful or Effective Investigation Techniques.

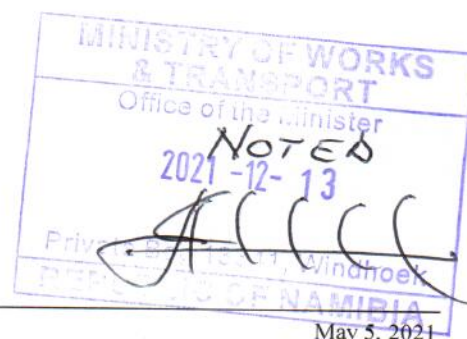
1.19.1 Not applicable.

2. ANALYSIS

- 2.1. The aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures
- 2.2. The aircraft was equipped with standard navigation and communication by the regulator for the Aircraft type.
- 2.3. The pilot had a valid medical certificate.
- 2.4. The clutch assembly did not exhibit any sign of distortion failure other than normally associated with a crash of these type indicating that the assembly was functional during the last flight
- 2.5. The main transmission displayed substantial damage to the upper vertical firewall (Aft cabin wall) so much that you could see that the Main Rotor mast assembly had oscillated and destroyed the fuel tank structures as well as the vertical firewall. The upper frame assembly part number Nr C020-1 had not failed during this crash. This indicates that the housing failed because of a destructive imbalance on the rotating assembly (rotor system) in flight, this caused the upper transmission case to fail and subsequently the loss of main rotor rpm.
- 2.6. The mounting of the forward mounted hydraulic servos were destroyed and rendered the servos system unserviceable. None of the control rods failed expect for one pitch-link that broke off during the accident.
- 2.7. The free wheel unit was inspected for overheating and the cause of failure thereof, no evidence of overheating was found. The oil in the unit was also drained and inspected for metal however, no metal was detected. There was no evidence of an oil leak in the unit.
- 2.8. The main rotor system displayed signature of extreme coning, this indicated that the rotor speed had decayed so much that the rotor blades most probably was not driven by the transmission at the time of impact with the terrain.
The main rotor blades did not touch the tail boom.
Blade no 1 was bent backwards outboard of the trim tab and blade no two's trailing edge had damages which could not be explained at the time, if the blade got damaged in flight the deformation on the training edge would have caused severe dynamic imbalance of the rotating components that could lead to catastrophic failure of the main transmission.
- 2.9. Game operations i.e. game counting, netting, capture, culling etc. usually involve low-speed low altitude and often-high manoeuver operations where steep turns are utilized. These are highly complex operations that tend to stretch the aircraft as well as the pilot's performance envelope to its limits.
These complex operations are riskier than the ordinary sightseeing, basic transport operations that are used by most operators of this type of helicopter who may only have a private pilot license.

Commercial pressure to meet deadlines for instance an upcoming auction further exacerbates the situation placing man and machine in a higher category of risk.

Commercial Pilot License training equips the pilot with sufficient training to perform these operations safely.



3. CONCLUSION

3.1 Findings

- 3.1.1 The maintenance records indicated that the aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures.
- 3.1.2 The aircraft had a valid Certificate of safety for flight.
- 3.1.3 There was no evidence of airframe failure or system malfunction prior to the accident.
- 3.1.4 The mounting of the forward mounted hydraulic servos were destroyed and rendered the servos system unserviceable. None of the control rods failed expect for one pitch-link that broke off during the accident.
- 3.1.5 The pilot had a valid Private Pilot Licence.

3.2. Probable Cause/s

- 3.2.1. Loss of engine power and subsequent collision with terrain.

3.3 Contributing factor

- 3.3.1 1. Decay of rotor RPM (speed).

4.0 Safety Recommendations

4.1 None



Hafeni Mweshixwa

Investigator-in-Charge

Date: 23/11/2021

Released by:



Hon John Mutorwa, MP

MINISTER: MINISTRY OF WORKS AND TRANSPORT

Date: 13.12.2021

