



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8653	
Aircraft Registration	ZS-RRO	Date of Accident	18 May 2009		Time of Accident	0600Z
Type of Aircraft	Robinson R22 Beta II		Type of Operation	Private		
Pilot-in-command Licence Type		Commercial Pilot(H)	Age	49	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	2 818.2		Hours on Type	1 921.5
Last Point of Departure		Grootfontein Farm, Vaalwater, Limpopo Province				
Next Point of Intended Landing		Grootfontein Farm, Vaalwater, Limpopo Province				
Location of the Accident Site with Reference to Easily Defined Geographical Points (GPS readings if possible)						
Grootfontein Farm, Vaalwater; Limpopo Province (GPS co-ordinates: S24°03'781" E028° 16'840")						
Meteorological Information		Surface wind 200° at 5 kts, CAVOK, temperature 12°C , dew point 2°C				
Number of People on Board	1 + 1	No. of People Injured	0	No. of People Killed	0	
Synopsis						
<p>On 18 May 2009, the pilot flew from Polokwane to Thabazimbi and landed at Grootfontein Farm in Vaalwater to help with the darting of a buffalo. He then removed the helicopter doors and his personal baggage. After the pilot picked up the veterinarian they took off and proceeded to look for the buffalo. The farm was approximately 1.5 nm from the take-off site on Grootfontein Farm.</p> <p>The pilot stated that they found the buffalo within 5 minutes after take-off. The pilot communicated to the ground crew while guiding the buffalo out of the forested area to the open where the veterinarian would be able to dart the buffalo. The helicopter approached the buffalo from behind, flying into wind, and the veterinarian darted the buffalo. The pilot then turned to the right while trying to keep the buffalo out of the forested area. After turning to the right, the engine and rotor revolutions per minute (RPM) decayed and the pilot attempted to regain rotor RPM by applying throttle while lowering the collective ("milking the collective"). He realised that the helicopter was not gaining RPM and began to move towards a clear area where he could land the helicopter. The helicopter was sinking but he could maintain directional control of the helicopter. The helicopter tail rotor impacted a tree and the helicopter crashed.</p> <p>The helicopter sustained major damages. The pilot and the passenger sustained no injuries.</p>						
Probable Cause						
The helicopter tail rotor impacted a tree and the helicopter crashed.						
Contributory remarks:						
1. Low RPM during the turn.						
IARC Date				Release Date		



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : BMK Electronics CC
Manufacturer : Robinson Helicopter Company
Model : R22 BETA
Nationality : South African
Registration Marks : ZS-RRO
Place : Grootfontein Farm, Vaalwater
Date : 18 May 2009
Time : 0600Z

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 two hours.

Purpose of the Investigation:

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (1997), this report was compiled in the interests 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 On the 18 May 2009, the pilot was flying from Polokwane to Thabazimbi and landed at Grootfontein Farm in Vaalwater to help with the darting of a buffalo. He landed at the Grootfontien Farm to pick up a wildlife veterinarian, removed the helicopter doors and his personal baggage, and then took off to look for the buffalo. The farm was approximately 1.5 nm from the take-off site on Grootfontein farm.
- 1.1.2 The pilot stated that they found the buffalo within 5 minutes after take-off. The pilot communicated to the ground crew while guiding the buffalo out of the forested area to the open where the veterinarian would be able to dart the buffalo. The helicopter approached the buffalo from behind, flying into wind, and the veterinarian darted the buffalo. The pilot then turned to the right while trying to keep the buffalo out of the forested area. After turning to the right, the engine and rotor RPM decayed, and the pilot attempted to regain rotor RPM by applying throttle while lowering the collective ("milking the collective"). He realised that the helicopter was not gaining RPM and began to move towards a clear area where he could land the helicopter. The helicopter was sinking but he could maintain directional control of the helicopter.
- 1.1.3 Just before the pilot could land, the helicopter the tail rotor impacted a tree that was approximately 6 m high and crashed. The main blades impacted the tree in front the helicopter.

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 helicopter sustained substantial damage to the tail boom and collapsed skids.



Figure 1: Damage to the tail boom and skids

1.4 Other Damage

1.4.1 The helicopter main rotor blades struck a tree during impact.

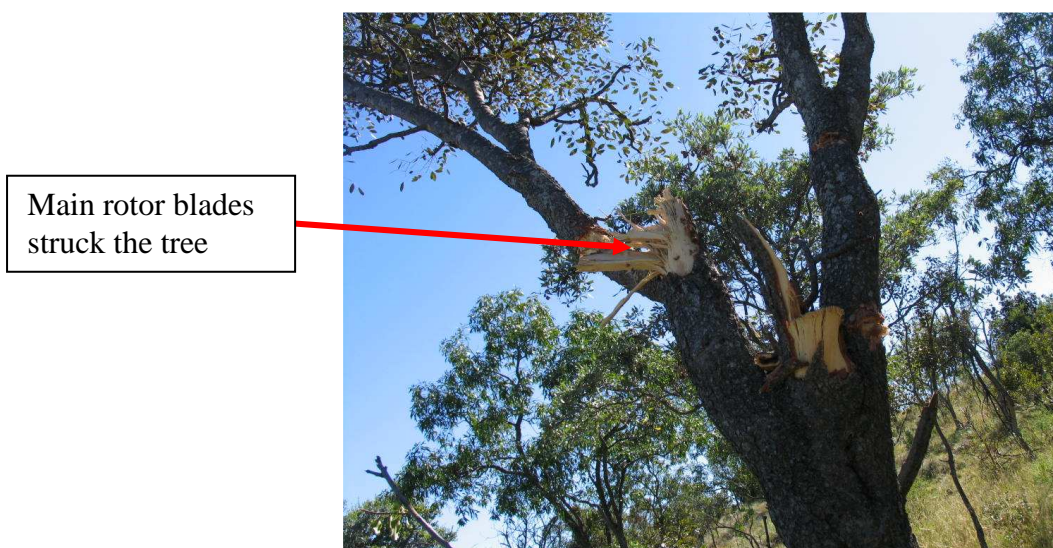


Figure 2: Damage where the main rotor struck a tree

1.5 Personnel Information

1.5.1 Pilot-in-command:

Nationality	South African	Gender	Male	Age	49
Licence Number	*****	Licence Type	Commercial, Helicopter		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night, cull				
Medical Expiry Date	20 April 2010				
Restrictions	Yes (Corrective lenses)				
Previous Accidents	<ol style="list-style-type: none"> 1. On 10 August 1993, the pilot did a hard landing due to an unforeseen situation on the runway; the aircraft was a Maule M5-210C. 2. On 19 February 1999, due to excessive manoeuvring, the pilot allowed the rotor RPM to decay to a point where he was unable to recover from the condition; the aircraft was an R22B. 3. On 1 July 1999, the pilot allowed the tail rotor to make contact with a tree, causing the tail boom to fail and the aircraft to crash; the aircraft was an R22B. 4. On 18 June 2000, the helicopter had an engine failure due to fuel starvation; the aircraft was an R22. 5. On 26 July 2002, one of the rotor link bolts came adrift during flight, which resulted in a loss of rotor control; The aircraft was an R22B. 6. On 30 August 2005, the helicopter experienced an engine and main rotor RPM decay. The accident happened in Zambia; the aircraft was an R22B. 7. On 20 March 2008, the helicopter experienced an engine stoppage; the aircraft was an R22 helicopter. 				

1.5.2 Flying Experience:

Total Hours	2 818.2
Total Past 90 Days	70.6
Total on Type Past 90 Days	70.6
Total on Type	1 921.5

1.6

Aircraft Information

1.6.1 Airframe:

Type	Robinson R22 Beta II	
Serial Number	4408	
Manufacturer	Robinson Helicopter Company	
Date of Manufacture	2008	
Total Airframe Hours (At Time of Accident)	93	
Last MPI (Hours & Date)	4.2	06 February 2009
Hours Since Last MPI	88.8	
C of A (Issue Date)	16 February 2009	
C of R (Issue Date) (Present Owner)	03 March 2009	
Operating Categories	Standard	

Note: The R22 is a single-engine helicopter with a semi-rigid, two-bladed main rotor and a two-bladed tail rotor. The main rotor provides a teetering hinge and two coning hinges. The tail rotor provides only a teetering hinge. The normal production variant has skid landing gear.

1.6.2 Engine:

The R22 uses a horizontally mounted Lycoming (O-360-J2A on the Beta II) four-cylinder, air-cooled, normally aspirated, carburettor-equipped piston engine. It is fuelled with 100LL grade aviation gasoline. Cooling is provided through a direct drive squirrel-cage blower.

Type	Lycoming O-360-J2A
Serial Number	L41282-36E
Hours since New	93
Hours since Overhaul	TBO not yet reached

1.6.3 The owner/pilot used the helicopter for private operation. On the day of the accident, the owner was conducting a game/livestock cull operation for his friend.

1.6.4 The helicopter had 100LL 20 US gallons of Avgas fuel in the tank prior to the accident.

1.6.5 Weight and balance:

	Weight (lbs)	Arm (inches)	Moment (in.lb)
A/C empty weight	870.6	104.0	90 542.4
Pilot pax (73 kg) + (90 kg)	358.6	78.0	27 970.8
Fuel main tank (15 US gal)	90.0	108.6	9 774.0
Auxiliary tank (5 US gal)	30.0	103.8	3 114.0
Total T/O Weight	1 349.2	97.39	131 401.2

The maximum certificated take-off mass for the aircraft as stipulated in the Pilot's

Operating Handbook (POH) is 1 370 lbs. Therefore, the aircraft was within operational limits.

Note: 1 US gallon is 6 pounds.

1.7 Meteorological Information

1.7.1 Weather information from the pilot's questionnaire:

Wind Direction	5°E	Wind Speed	< 5 kts	Visibility	>10 km
Temperature	7°C	Cloud Cover	Clear	Cloud Base	-
Dew Point	Unknown				

1.7.2 The official weather report obtained from the South African Weather Services reported the following weather conditions on the day of the accident:

Wind Direction	200°TN	Wind Speed	5 kts	Visibility	10 km
Temperature	12°C	Cloud Cover	Clear	Cloud Base	
Dew Point	2°C				

1.8 Aids to Navigation

1.8.1 The helicopter was equipped with standard navigational equipment as per the minimum equipment list approved by the regulator. There were no recorded defects to navigational equipment prior to the flight.

1.9 Communications

1.9.1 The helicopter was equipped with standard communication equipment as per the minimum equipment list approved by the regulator. There were no recorded defects to communication equipment prior to the flight.

1.9.2 There was no communication with air traffic control services as the aircraft was operated outside of controlled airspace.

1.9.3 The pilot was communicating with ground crew while flying. The ground crew was listening using a handheld radio.

1.10 Aerodrome Information

1.10.1 The accident happened on a private farm (Grootfontein) at Vaalwater in Limpopo Province (GPS coordinates: S24°03'781" E028°16'840").

1.11 Flight Recorders

1.11.1 The aircraft was not fitted with a flight data recorder (FDR) or cockpit voice recorder (CVR) nor was either required by the regulator.

1.12 Wreckage and Impact Information

1.12.1 After the pilot experienced a power loss, the pilot initiated a forced landing; the helicopter was flying in a northerly direction. While the helicopter was descending, the tail rotor impacted a tree that was approximately 6 m high and the tail rotor was cut off from the helicopter. The main rotor then impacted a tree that was in front of the helicopter. The tail rotor assembly was found 10 m from the helicopter, and was still intact. The tail rotor, tail boom and main rotor were substantially damaged.

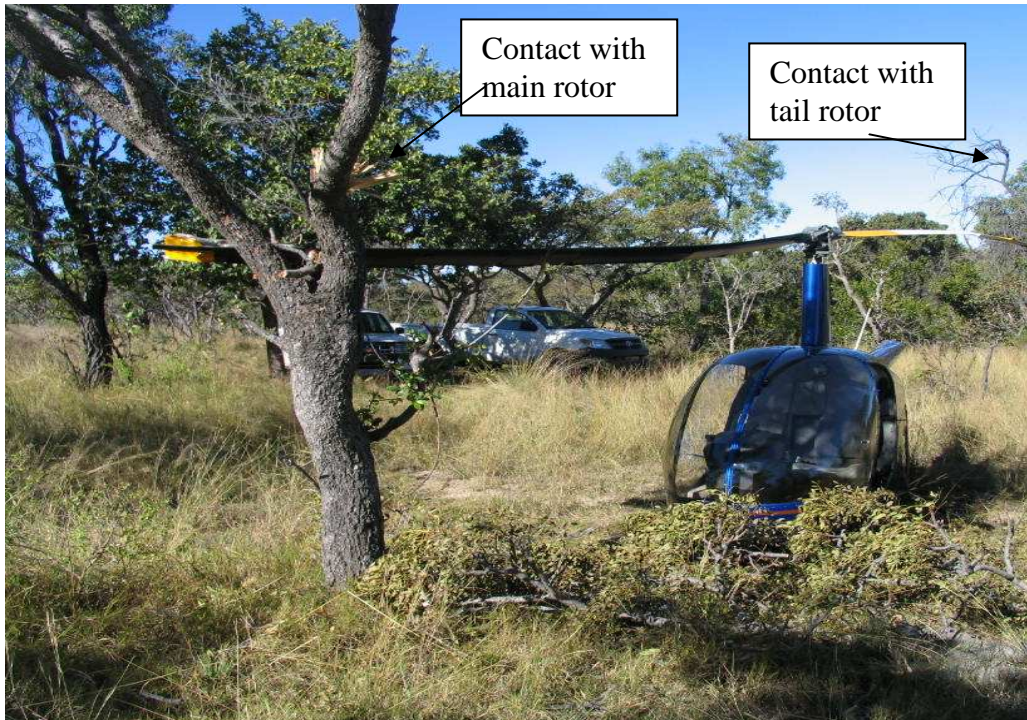


Figure 3: Damage to the aircraft

1.13 Medical and Pathological Information

1.13.1 The pilot and the passenger were not injured in the accident.

1.14 Fire

1.14.1 There was no evidence of a pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 The accident was considered to be survivable as the cockpit/cabin area remained intact (undamaged) and the pilot was properly restrained with safety harnesses at the time of the accident.

1.16 Tests and Research

1.16.1 Engine test:

The aircraft was taken to an aircraft maintenance organisation (AMO) after the

accident for a ground run in the presence of the investigators. The AMO tested the engine and it was found to be running normally at the time of the test.

1.16.2 Visual inspection:

During the on-site investigation, the fuel gauge indicated that 2/3 fuel left in each tank.

1.16.3 The information below was extracted from the R22 POH, indicating how a pilot must react to restore RPM:

LOW RPM HORN & CAUTION LIGHT

A horn and illuminated caution light indicate that rotor RPM may be below safe limits. To restore RPM, immediately roll throttle on, lower the collective, and in forward flight, apply aft cyclic. Horn and caution light are disabled when collective is fully down.

Reference: Robinson R22 Pilot's Operating Handbook, section 3.

1.17 Organisational and Management Information

1.17.1 The pilot was the owner and the operator of the helicopter.

1.17.2 According to available records, the AMO that certified the last mandatory periodic inspection MPI on the helicopter prior to the accident was in possession of a valid AMO approval.

1.18 Additional Information

1.18.1 None.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1 History

2.1.1 On 18 May 2009, the pilot flew from Polokwane to Thabazimbi and landed at Grootfontein Farm in Vaalwater to help with the darting of a buffalo. He landed at the Grootfontien Farm to pick up a wildlife veterinarian, removed the helicopter doors and his personal baggage, and then took off to look for the buffalo on the farm. The farm was approximately 1.5 nm from the take-off site on Grootfontein Farm.

2.1.2 After the pilot guided the buffalo out of the forested area to the open area, he turned to the right and the engine and rotor RPM decayed. He tried to regain height with no success. While the helicopter was descending, the tail rotor impacted a tree that was approximately 6 m high and the helicopter crashed. The main rotor impacted a

tree that was in front of the helicopter. The tail rotor was found 10 m from the helicopter and was still intact.

2.2 Machine

2.2.1 The aircraft was taken to an AMO after the accident for a ground run in the presence of the investigators. The AMO tested the engine and it was running normally at the time of the test.

2.3 Man

2.3.1 The pilot indicated that when he turned to the right, the helicopter's engine RPM decayed. This could be because the pilot failed to compensate in consideration of the power during the turn. The pilot attempted to correct the low main rotor RPM by applying throttle while lowering the collective ("milking the collective"), which was unsuccessful.

2.3.2 The pilot was doing low-level flying for the darting of the buffalo; the area of the operation was forested area and he was concentrating on the buffalo, the cockpit and communicating to the ground personnel as well. Considering the nature of this operation he may have been unable to monitor the RPM gauge regularly enough to ensure that sufficient RPM was applied at all times.

2.4 Environment

2.4.1 At the time of the accident, the pilot was performing darting activities on a farm, which was a forested area. The helicopter tail rotor impacted a tree and was cut off from the helicopter, which crashed.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot was a holder of a valid commercial helicopter pilot's licence and was correctly type rated. His medical was also valid.

3.1.2 The aircraft had flown 93 hours and was considered to be airworthy prior to the accident.

3.1.3 The helicopter had a valid Certificate of Airworthiness and Certificate of Registration at the time of the accident.

3.1.4 The pilot had seven accidents on his file since 1993, mostly in the R22.

3.1.5 The investigation process could not find any anomalies that may have contributed to the engine failure, and the helicopter had sufficient fuel at the time of investigations.

3.2 Probable Cause/s

3.2.1 The helicopter tail rotor impacted a tree and the helicopter crashed.

3.2.2 Contributory factors:

1. Low RPM during the turn

4. SAFETY RECOMMENDATIONS

- 4.1.1 None.

5. APPENDICES

- 5.1.1 None

Report reviewed and amended by the Advisory Safety Panel on 16 March 2010
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