



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8835	
Aircraft Registration	ZS-RJO	Date of Accident	17 Sept 2010		Time of Accident	0940Z
Type of Aircraft	Robinson R44 Raven II		Type of Operation		Private	
Pilot-in-command Licence Type		Private	Age	55	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	1487.1		Hours on Type	1487.1
Last point of departure		FAGM (Rand Aerodrome)				
Next point of intended landing		FAKN (Kruger Mpumalanga Aerodrome)				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
GPS position S25° 42,694' E030° 2,664' @ elevation of approximately 1906m (6250 ft) AMSL near the town of Belfast in Mpumalanga						
Meteorological Information		Overcast with low cloud and low visibility, temperature approximately 15°C, no rain at the time.				
Number of people on board	1+2	No. of people injured	3	No. of people killed	0	
Synopsis						
<p>On 17 September 2010 the pilot (a South African citizen) accompanied by 2 passengers, took off in a Robinson R44 from Rand Airport on a private flight to Maputo via FAKN (Kruger Mpumalanga Aerodrome).</p> <p>Later various witnesses observed the helicopter flying very low over the town of Belfast in Mpumalanga. At approximately 0940Z the helicopter collided with some blue-gum trees south-south-west of the outskirts of Belfast.</p> <p>The pilot was correctly licensed and qualified for the flight and was in possession of a valid medical certificate as a private pilot.</p> <p>Low cloud and fog patches were reported in the vicinity at the time of the accident.</p> <p>There were no recorded radio transmissions.</p> <p>There was no evidence that physiological factors or incapacitation affected the performance of the pilot-in-command.</p> <p>The pilot and both passengers sustained serious injuries during the accident.</p>						
Probable Cause						
Collision with trees while flying in IMC (instrument flying conditions (IMC)).						
Contributory factors:						
Pilot not instrument-rated.						
Disorientation when entering IMC.						
IARC Date				Release Date		



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Kawena Aviation (Pty) Ltd
Manufacturer : Robinson Helicopter Company
Model : R44 II
Nationality : South Africa
Registration Marks : ZS-RJO
Place : Belfast
Date : 17 September 2010
Time : 0940Z

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 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 17 September 2010 the pilot accompanied by 2 passengers took off from Rand Airport on a private flight to Maputo via FAKN (Kruger Mpumalanga Aerodrome).
- 1.1.2 At approximately 0930Z, various witnesses observed the helicopter flying very low over the town of Belfast (Mpumalanga) in an easterly direction. A short while later the helicopter returned, again very low, flying in a westerly direction over the town.
- 1.1.3 At approximately 0940Z the helicopter collided with some blue-gum trees approximately 800m south-south-west of the outskirts of Belfast at a GPS position S25° 42,694' E030° 2,664' and an elevation of approximately 1906m (6250 ft) AMSL.
- 1.1.4 Low cloud and fog patches were reported in the vicinity at the time of the accident.

1.2 Injuries to persons

Injuries	Pilot	Crew	Pass.	Other
Fatal				
Serious	1		2	
Minor				
None				

1.3 Damage to aircraft

1.3.1 The helicopter was destroyed during the accident sequence.



A view of the cabin area after the accident



General view of the wreckage



General view of the wreckage from below

1.4 Other damage

- 1.4.1 Minor damage was caused to the vegetation at the accident site and an unknown quantity of fuel was spilled as a result of ruptured fuel tanks.

1.5 Personnel information

Nationality	South African		
Licence No	*****	Gender	Male
		Age	55
Licence valid	Yes	Type Endorsed	Yes
Ratings	Night		
Medical Expiry Date	31 August 2011		
Restrictions	Hypertension Protocol Corrective Lenses – Additional pair in Flight		
Previous Accidents	Nil		

Flying Experience:

(As per last entry in logbook dated 20 Augustus 2010)

Total Hours	1487.1
Total Past 90 Days	19.4
Total on Type Past 90 Days	19.4
Total on Type	1487.1

1.6 Aircraft information**1.6.1 Airframe:**

Type	Robinson R44 II
Serial #	12038
Manufacturer	Robinson Helicopter Company
Year of Manufacture	2007
Total Airframe Hours @ Last MPI (Mandatory Periodical Inspection)	496.8
Hours since Last MPI	28.3
C of A (Issue date) (Standard)	13 February 2008
C of R (Issue Date)	22 January 2008

1.6.2 Engine:

Type	Avco Lycoming IO 540
Ser #	L-32432-48E
Hours since New	525.1
Hours since Overhaul	TBO not reached yet

1.6.3 The helicopter was refuelled to capacity on 10 August 2010 and had flown 1.8 hours after it was refuelled.

1.6.4 Weight and Balance information:

Item	Arm (In)	Weight (lbs)	Moment (in-lb/1000)
Basic empty weight as equipped (includes unusable fuel and full oil) <small>(Last weighed on 27 October 2007)</small>	107.1	1551.4	166.15
Pilot and forward passenger	49.5	340	16.83
Fwd baggage	44	40	1.76
Aft passenger(s) and baggage	79.5	164	13.04
Total weight and balance with zero usable fuel	92.76	2095.4	194.37
Usable main tank fuel @ 6 lbs / gal	106	184	19.50
Usable aux tank fuel @ 6 lbs / gal	102	110	11.22
Total weight and balance with takeoff fuel	82.98	2389.4	198.27

The CG location aft of the datum for the loaded helicopter is determined by dividing the total weight into the total moment.

According to the above calculation, the helicopter was loaded within the manufacturer's limitations and the CG was within the prescribed limits.

1.7 Meteorological information

1.7.1 According to the South African Weather Service, no official weather observations are conducted in the Belfast area. An estimation of the surface conditions during the time of the accident was made by analysing the observational data for the closest reporting station. In this case the data from Witbank and Ermelo was used to approximate the surface conditions at the time and place of the accident. The following weather conditions were most likely to have prevailed at the time and place of the accident:

Wind direction	60°TN	Wind speed	11 kts	Visibility	Low
Temperature	15°C	Cloud cover	Broken to overcast cloud and mist patches	Cloud base	Low
Dew point	9°C				

1.7.2 No evidence was available as to whether the pilot obtained any weather information, nor route and aerodrome forecasts or any details of weather briefings prior to departure or while en-route.

1.7.3 Natural daylight conditions prevailed at the time of the accident and the clouds were reported to be low with mist patches in areas.

1.8 Aids to navigation

1.8.1 The aircraft was equipped with standard navigation equipment as per the minimum equipment list approved by the regulator for the aircraft type. No defects were reported prior to the flight.

1.9 Communications

1.9.1 The aircraft was equipped with standard communication equipment as per the minimum equipment list approved by the regulator for the aircraft type. No defects were reported prior to the flight and there was no recorded communication.

1.10 Aerodrome information

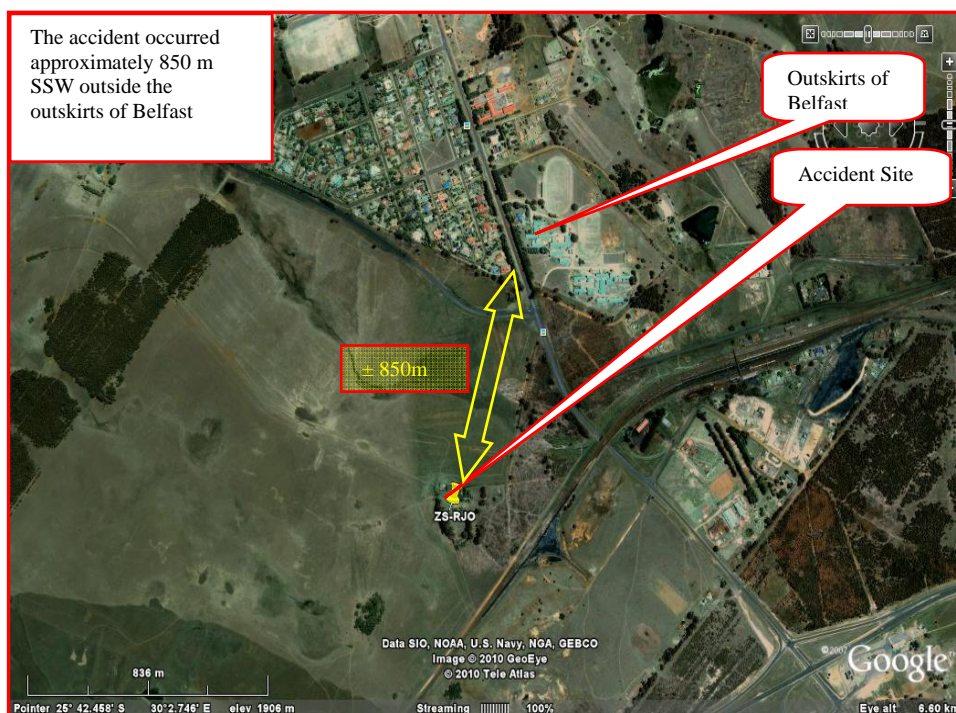
1.10.1 Not applicable.

1.10.2 The aircraft crashed into some blue gum trees a short distance away from the outskirts of the town of Belfast.

1.11 Flight recorders

1.11.1 The aircraft was not equipped with a flight data recorder or a cockpit voice recorder. Neither recorder was required according to the relevant aviation regulations.

1.12 Wreckage and impact information



General view of area where the accident occurred



Aerial view of the crash site area

- 1.12.1 At the time of the accident, the helicopter was flying in a westerly direction at a height of approximately 20 m AGL.
- 1.12.2 It would appear that the pilot noticed the trees just before impact and attempted to turn to the left to avoid a collision. However, the main rotor made contact with the trees, followed by the tail rotor at a height estimated at 15 m AGL.



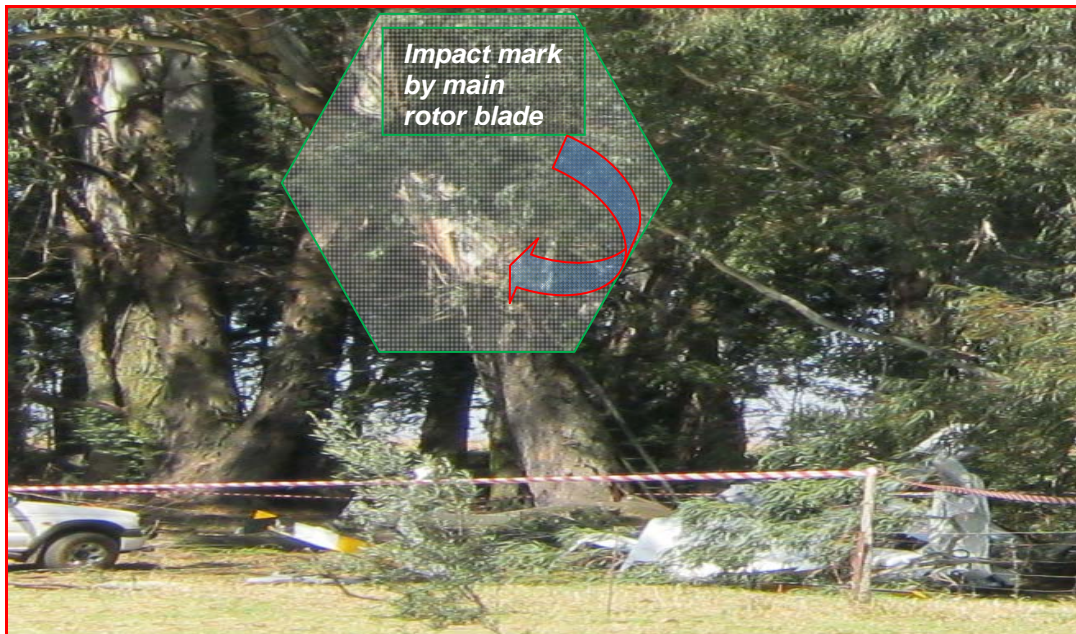
View of the trees struck during the accident sequence.

1.12.3 The helicopter then rolled to its left side and fell to the ground.

1.12.4 The accident occurred at a mere 15 m from the farm dwelling while the residents were inside the dwelling.



View of the accident site in relation to the dwellings on the farm.



View of the impact of the main rotor with the trees.

1.13 Medical and pathological information

1.13.1 There was no evidence that physiological factors or incapacitation affected the performance of the pilot-in-command.

1.14 Fire

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

1.15 Survival aspects

1.15.1 All the occupants were properly restraint with safety harnesses and shoulder harnesses and none of these failed. Both the front seats failed sideways as a result of the impact forces during the accident.

1.15.2 A witness called the ambulance services and the SAPS immediately following the accident. It was reported that the ambulance services arrived at the accident scene within 10 minutes of receiving the call.

1.16 Tests and research

1.16.1 The aircraft was equipped with a Garmin 400 series GPS. This GPS was taken to an approved facility to attempt to recover the last flight details. However, none were recorded as the GPS does not have a recording function.

1.16.2 The engine was recovered to an approved maintenance facility. After mounting it to a test bench, the engine was started and performed within the manufacturer's specifications without any noticeable problems.

1.16.3 The wreckage was recovered to an approved maintenance facility where it was examined for possible reasons for the accident. Apart from accident-related damage, no failures were evident and all flight and engine controls appeared to function normally.

1.17 Organisational and management information

1.17.1 Owner:

This was a private flight and the aircraft was privately owned.

1.17.2 Maintenance:

According to available information, the aircraft was correctly maintained and the maintenance organisation was correctly licensed to carry out the maintenance.

Type of maintenance authorized	B, E & D
Major Findings during last SACAA audit, if any	None
Corrective actions taken re: Major findings during last SACAA audit, if any	Not applicable

1.18 Additional information

1.18.1 A piece of the tail rotor drive shaft, approximately 3 m long, was located in a tree, 15 m above the ground, almost directly above the wreckage.



Piece of the tail rotor drive shaft, 15 m up in the trees

1.18.2 The pilot stated verbally that the weather was clear all the way from FAGM (Rand Airport) up to nearby Belfast. At Belfast there were some low clouds over the town and surrounding area. In an attempt to find a gap through the clouds to land, the pilot reduced his altitude to approximately 700 ft AGL and a little later even more. However, in the process he accidentally entered some clouds and became disorientated. When he came out at the lower end of the cloud, the helicopter was in a steep nose-down attitude close to the ground. At the same time he saw some trees directly ahead of the helicopter and attempted to take evasive action, but the helicopter collided with the trees before it crashed into the ground.

1.19 Useful or effective investigation techniques

1.19.1 None.

2. ANALYSIS

- 2.1 On 17 September 2010 the pilot (a South African citizen) accompanied by 2 passengers (one South African and one a Swiss citizen), took off from Rand Airport on a private flight to Maputo via FAKN (Kruger Mpumalanga Aerodrome). At approximately 0930Z, various witnesses observed the helicopter flying very low over the town of Belfast in Mpumalanga, in an easterly direction. A short while later the helicopter returned, again flying very low in a westerly direction over the town. At approximately 0940Z the helicopter collided with some blue-gum trees. There were no recorded radio transmissions.
- 2.2 The pilot and both passengers sustained serious injuries and the helicopter was destroyed during the accident. The helicopter was flying in a westerly direction at a height of approximately 20 m AGL at the time of the accident. It would appear that the pilot noticed the trees just before impact and attempted to turn to the left to avoid a collision. However, the main rotor made contact with the trees, followed by the tail rotor at a height estimated at 15m AGL. The accident site was a mere 15 m from the farm dwelling, while the residents were inside the dwelling.
- 2.3 The pilot stated verbally that the weather was clear all the way from FAGM (Rand Airport) up to nearby Belfast. At Belfast there were some low clouds over the town and surrounding area. In an attempt to find a gap through the clouds to land, the pilot reduced his altitude at various intervals. He accidentally entered some clouds and became disorientated. When he came out at the lower end of the cloud, the helicopter was in a steep nose-down attitude, close to the ground. At the same time he saw some trees directly ahead of the helicopter and attempted to take evasive action, but the helicopter collided with the trees before it crashed into the ground.

3. CONCLUSIONS

3.1 Findings:

- 3.1.1 The pilot, accompanied by 2 passengers took off from Rand Airport on a private flight to Maputo via FAKN (Kruger Mpumalanga Aerodrome). Later various witnesses observed the helicopter flying very low over the town of Belfast in Mpumalanga.
- 3.1.2 At approximately 0940Z the helicopter collided with some blue-gum trees south-south-west of the outskirts of Belfast.
- 3.1.3 The pilot was correctly licensed and qualified for the flight and was in possession of a valid medical certificate as a private pilot.
- 3.1.4 Low clouds and fog patches were reported in the vicinity at the time of the accident.
- 3.1.5 There were no recorded radio transmissions.

- 3.1.6 The helicopter was equipped and maintained in accordance with existing regulations and approved procedures.
- 3.1.7 The helicopter was loaded within the specifications laid down by the manufacturer.
- 3.1.8 The helicopter was equipped with standard navigation and communication equipment as per the minimum equipment list approved by the regulator for the aircraft type. No defects were reported prior to the flight.
- 3.1.9 There was no evidence that physiological factors or incapacitation affected the performance of the pilot-in-command.
- 3.1.10 The pilot and both passengers sustained serious injuries during the accident.
- 3.1.11 The pilot-in-command was seated in the right front seat and sustained serious injuries to his legs, pelvis, back and sternum. He was airlifted to a hospital in Middelburg and later transferred to a hospital in Johannesburg.
- 3.1.12 The male passenger seated in the left front seat, sustained serious injuries to his legs and pelvis. He was taken to a hospital in Middelburg and was later transferred to a hospital in Johannesburg.
- 3.1.13 The female passenger, seated in the left rear seat sustained serious head and back injuries. She was taken to a hospital in Middelburg and was later transferred to a hospital in Johannesburg.
- 3.1.14 All the occupants had worn safety harnesses and none of these failed.

3.2 Probable Causes

- 3.2.1 Collision with trees while flying in IMC (instrument flying conditions).

3.3 Contributory factors:

- 3.3.1 Pilot not instrument-rated.
- 3.3.2 Disorientation when entering IMC.

4. SAFETY RECOMMENDATIONS

- 4.1.1 None.

5. APPENDICES

- 5.1.1 None.

Compiled by:

Jan du Plessis

Date:

For: Director of Civil Aviation

Investigator-in-charge:

Date:

Co-Investigator:

Date: