AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA 18/2/3/8562		
Aircraft Registration	**ZS-HBS**	**Date of Accident**	18/10/2008		**Time of Accident**	± 1100Z	
Type of Aircraft	**ROBINSON R 44 II**		**Type of Operation**	Pleasure Flight			
Pilot-in-command Licence Type	Commercial (H)		**Age**	36	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		4115		Hours on Type	1440	
Last point of departure	The farm Lepeng, Lydenburg district. (Mpumalanga)						
Next point of intended landing	Rand Aerodrome (FAGM). (Gauteng)						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
In a gorge next to the Spekboom River. (S 24° 58.029 E 030° 25.701)							
Meteorological Information	Temperature: 21°, Visibility: > 10km, Dew point: 13°C, Surface wind: 310/10KT						
Number of people on board	1+2	**No. of people injured**	0	**No. of people killed**	1+2		

Synopsis

On 18 October 2008, the aircraft was on a return flight from the farm Lepeng to Rand Aerodrome.

At approximately 1100Z a witness who was at Kudu Ranch, overlooking the Spekboom River valley, heard the sound of a helicopter. He heard what sounded like a sudden loss of power and within a few seconds he heard a loud bang. As he looked in the direction of the bang, he saw a large explosion followed by a large plume of smoke.

Investigation revealed that the helicopter had collided with a high tension earth cable, where after it collided with the ground.

The three occupants of the helicopter were fatally injured.

The aircraft was destroyed by the impact and post-impact fire and minor fire damages were caused to the surrounded vegetation.

Probable Cause

Collision with a high tension electrical earth cable before impacting with the ground.

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Blue Sphere Investments and Trading 103 (PTY) LTD
Manufacturer : Robinson Helicopter Company
Model : R 44 II
Nationality : South African
Registration Marks : ZS-HBS
Place : Spekboom River, Lydenburg district.
Date : 18 October 2008
Time : ± 1100Z

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 18 October 2008 at approximately 0300Z, the aircraft took off from Rand Aerodrome (FAGM) to pick up two passengers at Kitty Hawk Aerodrome. The time of arrival and the time of departure from Kitty Hawk Aerodrome are not known.

1.1.2 On 18 October 2008 at approximately 0530Z, the helicopter with the pilot and two passengers arrived on the farm Lepeng in the Lydenburg District.

1.1.3 After landing on the farm, the pilot in command removed the doors of the helicopter and 25 litres of fuel was uplifted. After the fuel was uplifted, the pilot, accompanied by three farmers, took off to conduct a game count on the farm Lepeng. The game count lasted about 50 minutes. A second game count was conducted thereafter with the same farmers, which lasted approximately 40 minutes.

1.1.4 After the second game count, the pilot-in-command re-fitted the doors and the helicopter was refuelled with 150 litres of fuel, whereafter the pilot took off with two passengers on a pleasure flight which lasted approximately 20 minutes.

1.1.5 At approximately 1050Z the pilot and the two passengers, whom had flown with him in the morning from Kitty Hawk Aerodrome, took off for the return flight to Kitty Hawk Aerodrome via Lydenburg.

1.1.6 At approximately 1100Z, a witness (with no flying experience) at Kudu Ranch, which overlooks the Spekboom River, heard the sound of a helicopter approaching

from a northerly direction, heading down the valley. He did not pay much attention until he heard what sounded like a loss of power. He then looked up across the valley in the direction of the sound. At that moment he saw a large explosion, followed by a large plume of smoke. He then realised that the helicopter had just crashed and immediately informed the Lydenburg SAPS.

1.1.7 The witness then called a friend at Nelspruit who arranged a helicopter from Bird Dog Aviation to fly out to the scene with 3 medical personnel on board. The medical personnel arrived at the scene at approximately 1250Z where they found the burnt-out wreckage of the helicopter and the bodies of the three occupants.

1.1.8 Medical personnel found evidence, on the ground, of a severed high tension electrical earth cable approximately 100 metres from the wreckage.

1.1.9 An onsite investigation revealed that the helicopter had collided with the sole remaining earth cable of a three cable high tension line suspended accross the valley. These pylon suspended cables were no longer live or in use. Two of the cables appear to have failed and dropped to the ground some time previously.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The helicopter was destroyed by the impact and the post-impact fire.

1.4 Other Damage

1.4.1 A broken high tension earth cable was found approximately 100 metres from the accident site.

1.4.2 Minor damages were caused to the vegetation as a result of the post-impact fire.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	36
Licence Type	Commercial (Helicopter)				
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instructors (Class II), Test Pilot, Instrument and Night rating				
Medical Expiry Date	31/3/2009				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	4115
Total Past 90 Days	241.7
Total on Type Past 90 Days	120.0
Total on Type	1440

1.6 Aircraft Information

Airframe:

Type	Robinson R44II	
Serial Number	11863	
Manufacturer	Robinson Aircraft Company	
Year of Manufacture	2007	
Total Airframe Hours (At time of Accident)	102.5	
Last MPI (Date & Hours)	5 August 2008	102.5
Hours since Last MPI	Unknown	
C of A (Issue Date)	28 August 2008	
C of R (Issue Date) (Present owner)	22 August 2008	
Operating Categories	Standard	

1.16.1 As the aircraft flight folio was destroyed during the post-impact fire, the airframe hours and hours since the last Mandatory Periodic Inspection (MPI) is not known. Information obtained from the owner indicated that the aircraft had flown approximately 12.5 hours since the last MPI. No accurate calculation of the total airframe hours could be done, as no evidence was available.

Engine:

At the time of the last Mandatory Periodic Inspection on 5 August 2008, the engine hours were as indicated in the table below:

Type	Lycoming IO-540-AE1A5
Serial Number	L-32096-48E
Hours since New	102.5
Hours since Overhaul	TBO not reached

1.7 Meteorological Information

1.7.1 The Meteorological Information was obtained from the South African Weather Services.

1.7.2 No official observations were available at the time and place of the accident. The most likely weather conditions at the time and place of the accident were as follows:

Wind direction	310°TN	Wind speed	10 knots	Visibility	> 10km
Temperature	21°C	Cloud cover	Scattered	Cloud base	3000ft
Dew point	13°C				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as per 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 aircraft was equipped with one (1) VHF (Very High Frequency) radio which was approved within the Minimum Equipment List by the Regulator. It is not known whether the pilot had communicated with anyone on frequency 124.8 Mhz while flying in the area.

1.10 Aerodrome Information

1.10.1 Aerodrome information is not relevant to this accident as the helicopter was operating from the farm Lepeng and the accident occurred in a valley approximately 14.5 kilometres North of Lydenburg at the following coordinates: S24° 58.029 E030° 25.701.

1.11 Flight Recorders

1.11.1 The helicopter was not fitted with either the Flight Data Recorder (FDR) or the Cockpit Voice Recorder (CVR) and none of the recorders were required by existing regulations in this type of helicopter.

1.12 Wreckage and Impact Information

1.12.1 The accident site:

The helicopter collided with the ground in a steep valley next to the Spekboom River. The helicopter's direction on impact was at 191° Magnetic at a height of 3519 feet above mean sea level. The site was in a steep valley with rocky terrain. **(Figure 1)**

Figure 1 The accident site.

The aircraft collided with a huge rock, which prevented the aircraft from rolling down the valley.

A piece of the tail boom was separated from the aircraft and was located approximately 50 metres from the main wreckage.

The severed end of the high tension earth cable was found approximately 100 metres before the accident site which made the investigator believe that the cable was dragged by the helicopter after the collision with the high tension cable. This severed cable hanged down from the pylon and touched the ground about 400 m before the accident site. **(Figure 2)**

Figure 2 High tension earth cable on the ground.

It would appear as if this cable had been dragged by the helicopter after being servered.

The high tension earth cable did not have any high visibility markers to indicate its position across the valley.

Except for fire damage, no other damage was evident to the surrounding trees and bushes. There was no evidence on the surrounding terrain of any scoring marks caused by the aircraft during the accident sequence.

1.12.2 Examination of the aircraft

Due to the impact and post-impact fire, the aircraft was destroyed. The only parts not destroyed by the post-impact fire were a part of the tail boom that separated from the aircraft and the broken skids of the helicopter.
The part of the tail boom that separated from the aircraft **(Figure 3)** was found approximately 50 m past the main wreckage in the direction of intended flying. Evidence (paint marks the same colour as the main rotor blades) shown this part of the tail boom was separated from the rest of the tail boom as a result of the main rotor blades cutting through the tail boom. It was also evident, when inspecting the damage to the tail rotor blades; that the tail rotor was not rotating when this part of the tail boom made contact with the ground.

Figure 3 Part of the tail boom that was separated from the aircraft

During the inspection of the aircraft skid gear, scoring marks on the left-hand front skid strut indicated that the aircraft had made contact with the high tension earth cable. **(Figure 4)** No scoring marks were found on the right-hand skid gear.

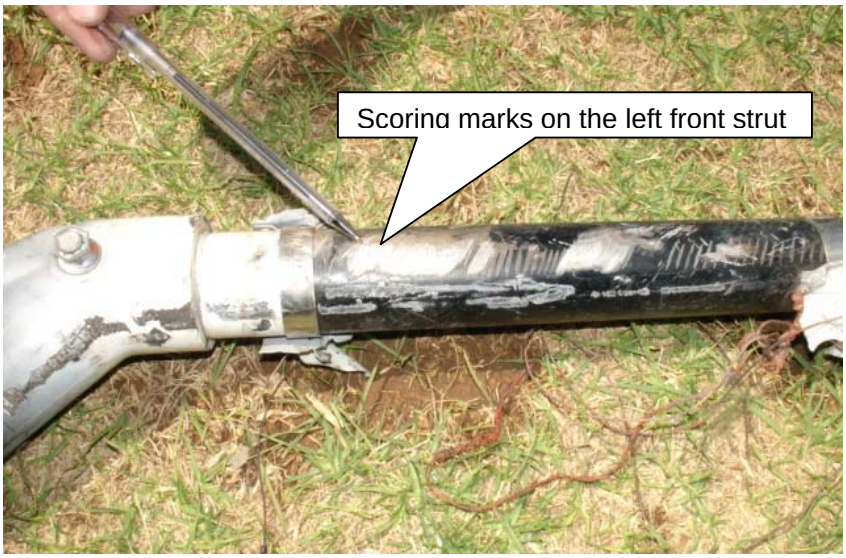

Figure 4 Scoring marks on the left-hand skid gear.

It was also found the left hand side of the skid gear was deformed to the rear (**Figure 5)** One of two bolts connecting the cross tube to the elbow at the right front side was sheared during the collision with the high tension wire.

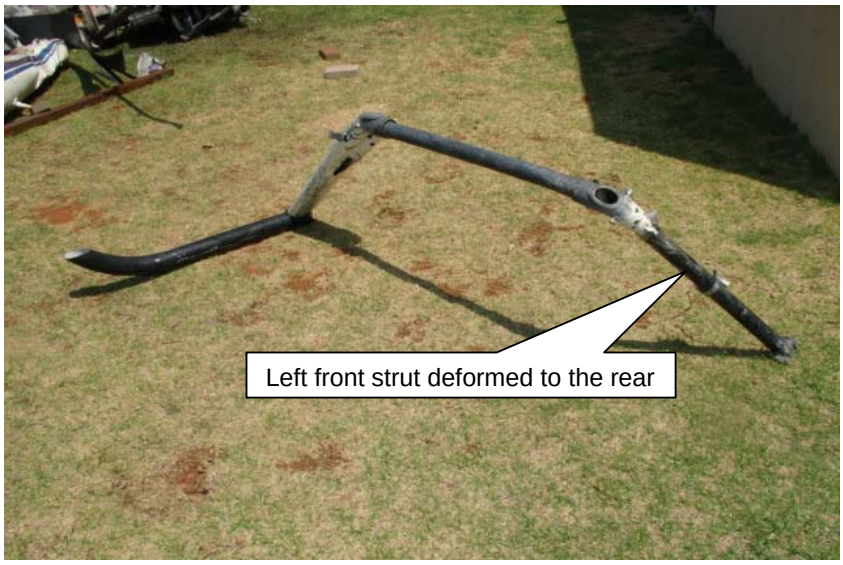

Figure 5 Left front strut deformed to the rear

The main rotor blades were also destroyed during the sequence of the accident and by the ensuing post-impact fire.

1.12.3 Examination of the engine

No teardown examination of the engine was done as the engine was not seen as the cause of the accident. The engine was examined on site. All damages to the engine were apparently caused by the accident sequence and post-impact fire.

1.13 Medical and Pathological Information

1.13.1 A post-mortem examination was performed on the deceased pilot on 21 October 2008 at 0800Z. According to the forensic pathologist's report, death resulted from multiple injuries sustained during the aircraft accident.

1.13.2 The result of the toxicology tests were not available at the time that the report was compiled. Should the results of the toxicology report be positive (indicating new evidence, an attachment will be added to this report and the investigation re-opened.

1.14 Fire

1.14.1 A post-impact fire erupted after the aircraft impacted with the ground and contributed significantly to the destruction of the aircraft and the fatality of the occupants.

1.15 Survival Aspects

1.15.1 The accident was considered as not survivable due to the high impact forces on the

fuselage during the accident sequence and the ensuing post impact fire. The aircraft was fitted with lap seat belts and sash-type upper body restraints for each occupant.

1.15.2 The local police at Lydenburg and the Medical Rescue Personnel from Nelspruit were informed of the accident by a visitor at Kudu Ranch. Kudu Ranch overlooks the Spekboom River and the site of the accident. The accident happened in a rural area that was not easily accessible by vehicle; a helicopter with medical personal only arrived at the scene at 1250Z, followed by the police. Upon arrival at the scene the medical personnel found the burnt-out wreckage, with the remains of the occupants inside the wreckage.

1.16 Tests and Research

1.16.1 Tests conducted on a similar aircraft revealed that maximum downwards movement of the main rotor blades, when stationary, will stop approximately 1.5 centimetres above the tail boom. **(Figure 6)**

Figure 6 Maximum downward positions of the main rotor blades when stationary.

1.16.2 The position of the main rotor blades in relation to the tail boom correlates to the precise position of damage on the tail boom of the aircraft involved in the accident. **(Figure 6 and 7)**

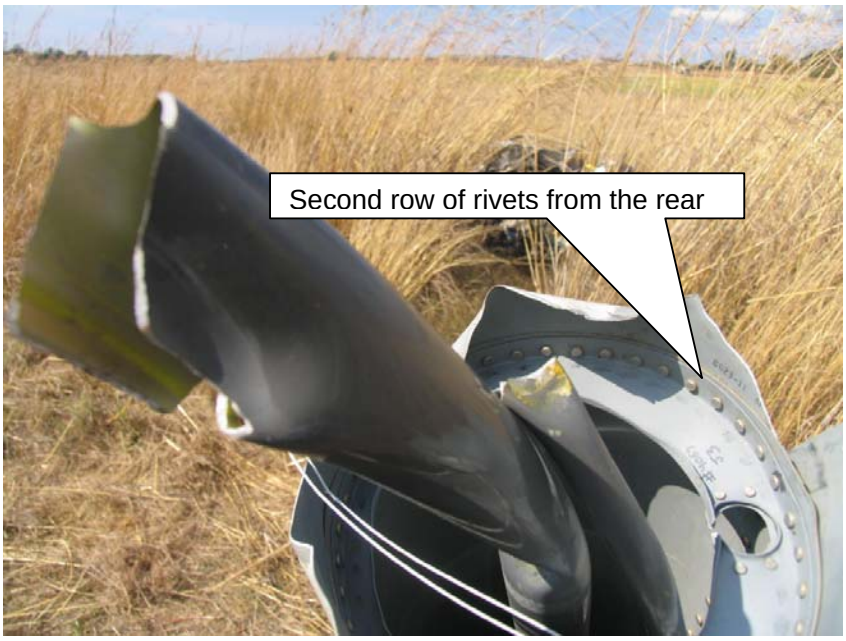

Figure 7 Damage caused at the second row of rivets on the accident aircraft.

1.17 Organisational and Management Information

1.17.1 The aircraft was privately operated by the owner. The owner of the aircraft had an agreement with a Training Organisation at Rand Aerodrome to make use of the hangar facilities, but the aircraft was not utilized by the Training Organisation.

1.18 Additional Information

1.18.1 According to a witness the high tension power line under discussion was not a live line and had not been in use for approximately two (2) years. According to the witness, a worker on the farm, the original line consisted of three wires. At the time of the accident, only the earth wire was hanging across the valley. Evidence of a second high tension wire (which was marked with high visibility markers), was found on the ground in a nearby valley. According to the witness, he noticed this marked wire on the ground two months before the accident when he was working in the area. The reason why this wire was on the ground and how long it was on the ground was not known. He never came across evidence of a third high tension wire.

1.18.2 The accident flight was not a charter flight. The pilot had permission from the owner of the helicopter to use the helicopter for a private flight to Lepeng in the Lydenburg district at no cost.

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

2.1 Verification of the pilot-in-command's personal file confirms that he was in possession of a Commercial Pilot's Licence (Helicopter). He was rated on the Robinson R44 II helicopter and had an Instrument rating, Night rating and a Test Pilot's rating endorsed onto his licence. He had a total of 1440 hours' experience on the Robinson R 44 II. At the time of the accident, the pilot was also in possession of a valid medical certificate.

2.2 The most likely weather conditions at the time and place of the accident as obtained from the South African Weather Service indicate fine weather with good visibility, scattered clouds and a 10 knot wind in a south-easterly direction.

2.3 The Aircraft's log books were verified and all records indicated that the airframe and engine were properly maintained and all work carried out was properly certified. Minor defects could not be traced and an accurate calculation of the aircraft's hours could not be done as the flight folio of the aircraft was destroyed during the post-impact fire.

2.4 Inspection of the helicopter's tail boom revealed that the rear part of the tail boom was separated from the aircraft by the main rotor blades. The investigator is of the opinion that a harsh movement on the cyclic control caused a flap movement of the main rotor blades which caused the main rotor blade path to be lower than normal where by it made contact with the tail boom and separated the rear end of the tail boom from the aircraft. The rear part of the tail boom was found approximately 50 metres from the main site. Evidence showed that the tail rotor was not rotating when the rear part of the tail boom made contact with the ground.

2.5 The investigator is of the opinion that the pilot did not see the high tension earth cable or saw it too late and thus made the harsh movement on the cyclic as a last attempted movement to avoid a collision with the high tension earth cable.

2.6 The left landing gear skid strut showed clear evidence of an object rubbing against the strut with associated scoring marks. The investigator is of the opinion that these scoring marks were caused by the high tension electrical earth cable struck by the landing gear skid. The left-side landing gear strut was also found to be deformed to the rear.

2.7 On the day of the accident, the pilot's working day had started at approximately 0200Z when he started his preparations for the flight before he took off from Rand Aerodrome at approximately 0300Z. The pilot flew approximately 4.5 hours on the day before the accident.

2.8 Although a witness (without any flying experience) stated that the helicopter's engine sounded to him as having a power loss, the investigator is of the opinion this was not the case. If the direction in which the wind was blowing and the witness's position in relation to the accident site is taken into consideration, it is highly unlikely that the witness could establish if it was a power loss. The investigator is of the opinion that the change in sound as experienced by the witness was as a result of the collision with the high tension wires and subsequent pilot actions.

2.9 The lack of evidence of damage to the surrounding vegetation (except for fire damage) and the absence of scoring marks on the ground, made the investigator to believe that the aircraft was spinning vertically down before it impacted with the ground and the huge rock at the point of impact.

2.10 The broken end of the high tension earth cable was found approximately 100 metres before the accident site which made the investigator believe that the cable was dragged by the helicopter after the collision with the high tension cable.

2.11 Although there were two passengers on board the aircraft, it appears as if the flight was not a charter flight. The pilot had gained permission from the owner to use the aircraft at no cost on a private flight.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot was licensed, medically fit and qualified for the flight.

3.1.2 The maintenance records indicated that the aircraft was equipped and maintained in accordance with existing regulations and approved procedures.

3.1.3 The pilot did not see, or saw the high tension earth cable too late and collided with the cable.

3.1.4 The accident was not survivable due to the magnitude of the deceleration forces and the severity of the post-impact fire.

3.1.5 The accident flight was a private flight. The pilot had permission from the owner to use the helicopter at no cost to do the private flight with two of his friends.

3.2 Probable Cause/s

3.2.1 Collision with a high tension electrical earth cable before impacting with the ground.

4. SAFETY RECOMMENDATIONS

4.1.1 It is therefore recommended that,

a) The SACAA issue a safety recommendation to pilots to minimize the unnecessary exposure of aircraft and crews to low-level hazards, including power lines, and thus reduce the risk of wire strikes.

b) The SACAA issue guidance material to inform pilots on safety hazards during low-level operations.

c) The SACAA and ESCOM consider the feasibility of the establishment of a national database of information on the location of known power lines and tall structures for access by pilots and to be used for flight route planning purposes.

d) The SACC addresses a letter to ESCOM advising them of the cause of this accident and request a review of their policy in respect of the marking of power lines and other lines that infringe on aviation safety.

5. APPENDICES

5.1 None.

-END-

Report reviewed and amended by Office of the EM:AIID
30 April 2009.