

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

					Reference:	CA18/2/3/8994	
Aircraft Registration	ZS-HHW	Date of Accident	20 December 2011		Time of Accident	0750Z	
Type of Aircraft	Bell 206B		Type of Operation	Private			
Pilot-in-command Licence Type	Private (Helicopter)		Age	52	Licence Valid	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		Unknown		Hours on Type	Unknown	
Last point of departure	Wonderboom aerodrome (FAWB) (Gauteng province).						
Next point of intended landing	Bakubung bush lodge (North West province).						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Near the foot of Sun City mountain at GPS position determined to be South 25° 21.411' East 027° 05.407'.							
Meteorological Information	Dew point 12°C: Temperature 27°C: Surface Wind @ 05 knots: Visibility, Good.						
Number of people on board	1 + 0	No. of people injured	0	No. of people killed	1		
Synopsis	<p>On the morning of 20 December 2011 the pilot being the sole occupant onboard the helicopter departed Wonderboom aerodrome (FAWB) on a private local flight bound for Bakubung bush lodge. A flight plan was not filed and the purpose of the flight was not known however according to FAWB Air Traffic Control (ATC) officer who was on duty at the time, climb out was uneventful. En-route to Bakubung the pilot communicated his intention with Pilanesberg ATC and was cleared to cross the extended centre line Runway 23. The pilot was requested to report on final approach to the Bakubung but was not heard from again. The helicopter was spotted by three eyewitnesses heading South of Sun City complex flying at a low altitude (approximately 330 feet AGL) and ultimately colliding with the zip line cable on the lower wind shield. The zip line cable is spanned from the top of Sun City Mountain. According to the witnesses, the helicopter sounded normal and immediately after colliding with the cable, a loud bang was heard. The cable swung site ways and the helicopter went down and impacted the ground near the foot of the mountain. One of the witnesses immediately phoned the zip line operator who immediately notified the authorities. The South African Police Services (SAPS) and the Emergency Medical Services (EMS) simultaneously rushed to the scene to render some assistance and secure the area. The helicopter was destroyed and the pilot was fatally injured.</p>						
Probable Cause							
The aircraft collided with the zip line cable spanned from Sun City Mountain top rendering ground impact inevitable.							
IARC Date				Release Date			



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Evening Star Trading 579 (PTY) LTD
Manufacturer : Bell Helicopter Textron
Model : Bell 206B
Nationality : South African
Registration Marks : ZS-HHW
Place : Near the foot of Sun City Mountain
Date : 20 December 2011
Time : 0750Z

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 On the morning of 20 December 2011 the pilot being the sole occupant onboard the helicopter departed Wonderboom aerodrome (FAWB) on a private local flight bound for Bakubung bush lodge. A flight plan was not filed and the purpose of the flight was not known however according to FAWB Air Traffic Control (ATC) officer who was on duty at the time, take off was uneventful. The helicopter climbed to 500 feet above ground level (AGL) and everything appeared normal.
- 1.1.2 En-route to Bakubung, the pilot communicated with Pilanesberg (FAPN) ATC on 118.4 MHz frequency and was cleared to cross extended centre line Runway 23. The pilot was further requested to report on final approach to Bakubung. The pilot acknowledged the request but was not heard from again. The helicopter was spotted by three eyewitnesses heading South of Sun City complex flying at a low altitude (approximately 330 feet AGL) and ultimately colliding with the zip line cable on the lower wind shield. According to the witnesses, the helicopter sounded normal and immediately after colliding with the cable, a loud bang was heard.

- 1.1.3 The cable swung sideways and the helicopter impacted the ground near the foot of the mountain and rolled over on its right hand side. One witness who is an employee at Sun City (was positioned at the zip slide bottom station), phoned the zip line operator who immediately notified the South African Police Services (SAPS) and the Emergency Medical Services (EMS). They immediately rushed to the scene to render some assistance and secure the area. The zip line cable did not fail and the helicopter was destroyed after impact with the ground.
- 1.1.4 Pilanesberg ATC was notified and Accident and Incident Investigation (AIID) department was notified and two investigators were immediately dispatched to the scene. According to the eyewitnesses, the pilot was thrown out of the helicopter from the air after impact with the zip line cable. The body of the pilot was approximately 80 metres away from the wreckage. Below are pictures of the zip line cable and how it operates.



Figure 1: View of the zip line cable running from the high ground on the right of the picture.



Figure 2: View of the zip slide cable spanned from the mountain top and how it operates (Photo found on internet).

- 1.1.5 The zip slide (an adventure facility) was not operational at the time of the accident. The slide operates at 09h00, 11h00, 13h00 and 15h00. The zip cable runs from the launching station/platform located from Sun City Mountain top, 280 metres high {924 feet} above the flat surface and the other is attached below to a 'receiving platform/station' some 2 kilometres further on.
- 1.1.6 The accident occurred near the foot of Sun City Mountain during day light conditions at geographical position determined to be South 25° 21.411' East 027°.

1.2 Injuries to Persons:

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

1.2 Damage to Aircraft:

- 1.2.1 The aircraft was destroyed.

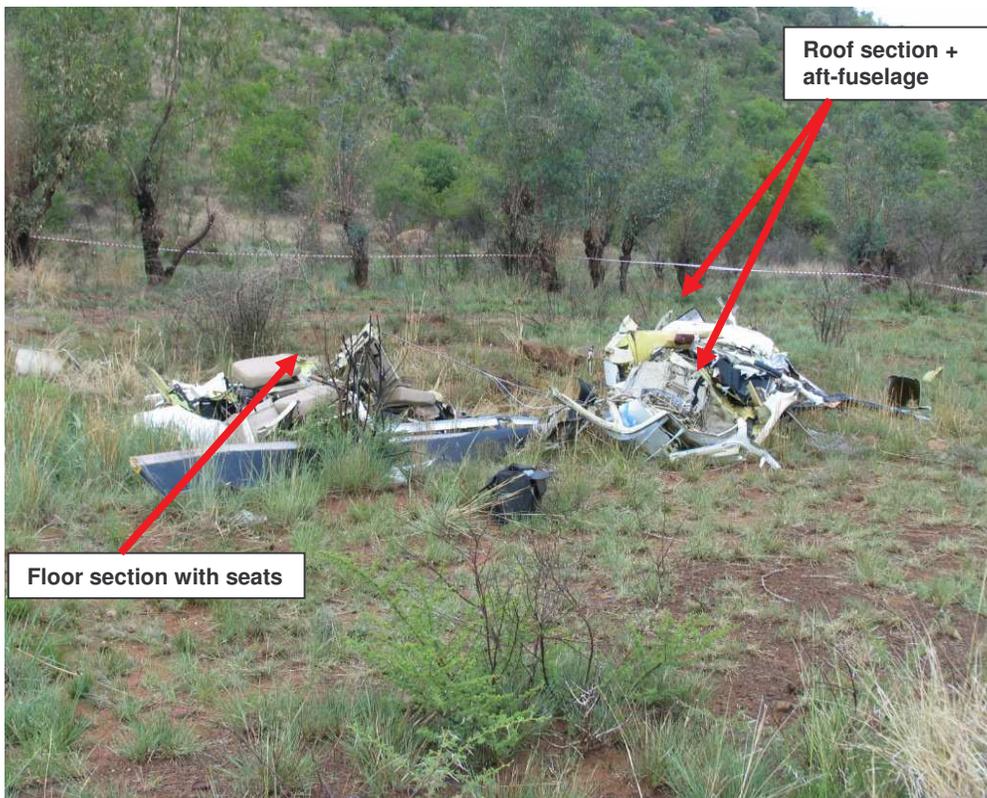


Figure 3: View of the accident site and the helicopter wreckage.

1.3 Other Damage:

1.3.1 Damage was limited to the zip line cable.

1.5 Personnel Information:

Nationality	South African	Gender	Male	Age	52
Licence Number	0270261969	Licence Type	Private (Helicopter)		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Nil				
Medical Expiry Date	03 June 2019				
Restrictions	Corrective lenses				
Previous Incidents	On 24 December 2006 at Cullinan (Gauteng province), the aircraft encountered a gust of wind in-flight and the pilot responded by applying left cyclic at a fast rate resulting in the main rotor blade strike.				

*Note: The pilot was in a possession of SA CAA issued pilot licence and was rated on aircraft type.

Flying Experience:

Total Hours	Unknown
Total Past 90 Days	Unknown
Total on Type Past 90 Days	Unknown
Total on Type	Unknown

*Note: The pilot's log-book could not be found during the investigation however his total flying hours obtained from the SA CAA pilot's file during his last pilot's licence renewal dated 11 July 2011 appeared to be 534.7 hours.

1.6 Aircraft Information:

Aircraft general description:

The Bell 206 is a two-bladed, single engine helicopter, manufactured by Bell Helicopter Textron.



Figure 4: Picture of ZS-HHW before the accident (Picture found on internet).

Airframe:

Type	Bell 206B	
Serial Number	2551	
Manufacturer	Bell Helicopter Textron	
Date of Manufacture	1978	
Total Airframe Hours (At time of Accident)	Unknown	
Last MPI (Hours & Date)	13317.9	07 April 2011
Hours since Last MPI	Unknown	
C of A (Issue Date)	13 May 2011	
C of A (Expiry Date)	12 May 2012	
C of R (Issue Date) (Present owner)	23 March 2011	
Operating Categories	Standard	
Recommended fuel used	Jet A1	

*NOTE: According to the flight folio, the last helicopter's Hobbs metre entry made at Wonderboom aerodrome (FAWB) dated 27 November 2011 was logged at 1612.6 hours and after the accident it was found to be on 1613.5 hours which meant that the helicopter had flown a total of 0.9 hours. See the Hobbs metre on figure 5 below:

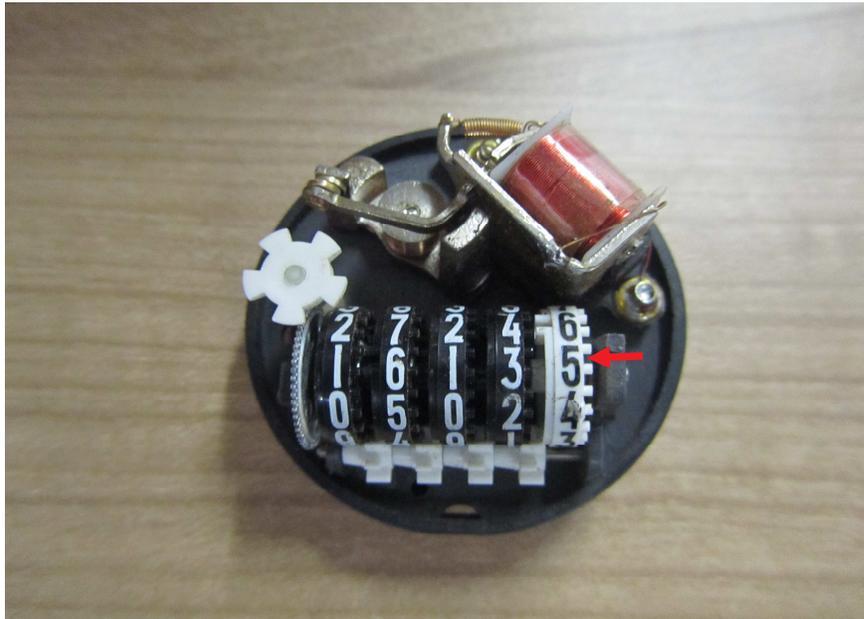


Figure 5: View of the Hobbs metre as found at the accident site.

*NOTE: The operating categories and conditions as specified on the Authority to Fly that was issued for this helicopter was indicated as Commercial, which only allowed the following operations; Transport of passengers, Forest and Wildlife Conservation and External Load Operations. The helicopter was exported from Botswana and was owned by Sefofane Air Charters (A2-HOP). The helicopter was first registered on the South African register on 24 March 2006 (ZS-HHW).

Engine:

Type	Allison 250
Serial Number	CAE.822773
Hours since New	6209.8
Hours since Overhaul	TBO Not reached

1.7 Meteorological Information:

1.7.1 An official weather report was obtained from the South African Weather services (SAWS).

WEATHER REPORT NEAR SUN CITY.

The most likely weather conditions at the place of the accident were as follows:

Temperature: 27°C

Dew point : 12°C

Surface Wind: 05 Knots

Cloud covers: Clear skies

Visibility : 10 km

Below is a satellite image on 20 December 2011.

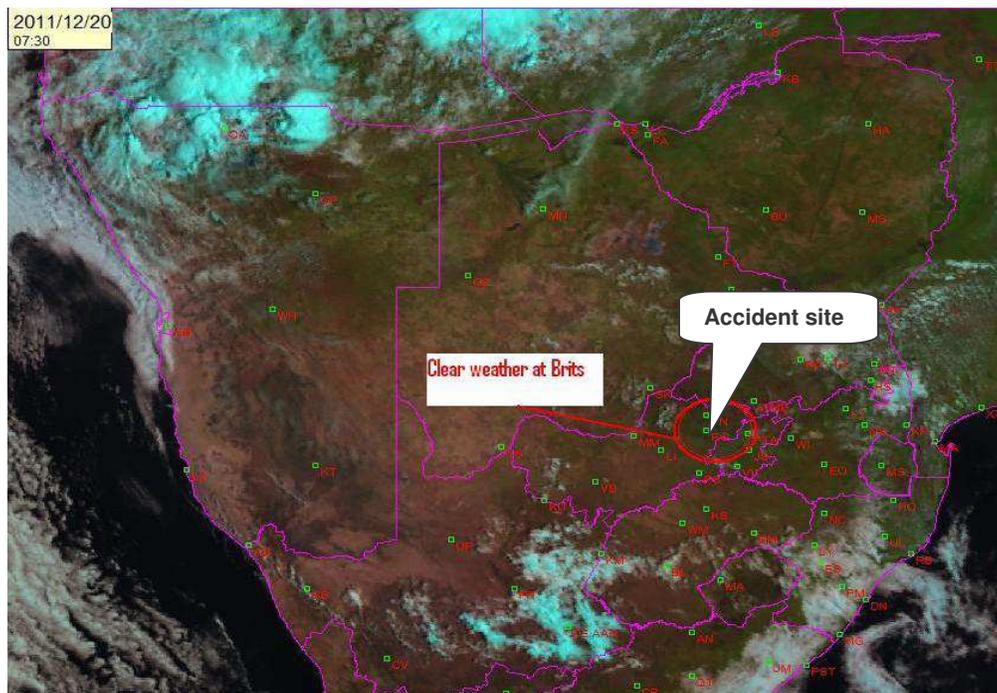


Figure 6: View of satellite information at the accident site.

1.8 Aids to Navigation:

1.8.1 The helicopter was fitted with standard navigation equipment for this helicopter type as approved at the time of certification. The pilot was in possession of a portable Garmin GPS (Global Positioning System).

1.9 Communications:

1.9.1 The pilot communicated with Pilesburg ATC at 118.4 Megahertz (MHz) frequency.

1.10 Aerodrome Information:

1.10.1 The accident occurred near the foot of Sun City Mountain at geographical position determined to be South 25° 21.411' East 027° 05.407'.

1.11 Flight Recorders:

1.11.1 The helicopter was not fitted with a Cockpit Voice Recorder (CVR) or a Flight Data Recorder (FDR) and neither was required by regulations to be fitted to this type of helicopter.

1.12 Wreckage and Impact Information:

1.12.1 The accident occurred near the foot of Sun City Mountain. The helicopter was destroyed after colliding with the zip line cable spanned from the top of Sun City Mountain but the cable did not fail. On site examination of the wreckage revealed that the helicopter struck the cable on the lower wind shield as it can be seen on figure 7 below.

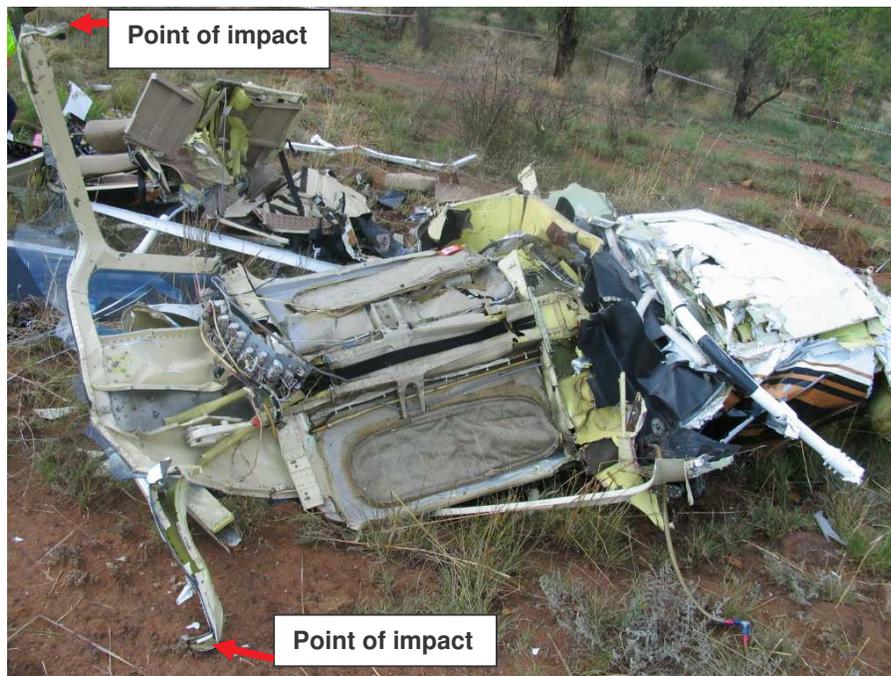


Figure 7: Evidence of cable impact on the helicopter's lower wind shield area.

1.12.2 The tail boom was destroyed after impact with the ground and the tail rotor gear box detached from the tail rotor. The fuel tank ruptured during the impact sequence and there was evidence of fuel (Jet A1) smell at the wreckage. Examination of the engine and the main rotor (two bladed) revealed that the engine was operating normally prior the accident. All the doors detached from the helicopter and were severely damaged. The helicopter battery ruptured after impact with the ground. Although the cockpit instrument console was severely damaged airspeed indicator, which was found to have separated from the instrument panel, displayed a reading of 85 mph.



Figure 8: Airspeed indicator.

1.12.3 Both skids suffered substantial damage after impact. The cockpit cabin area was substantially damaged and the following were observed.

- i. Wind screen (Perspex) was destroyed.
- ii. All rudder pedals (pilot and co-pilot) broke.
- iii. Cyclic and collective pitch controls including the twist grip throttle broke.
- iv. Tail rotor was severely damaged.
- v. Pilot safety harness failed and some of the seats broke.
- vi. Some of the seats detached from their mounting points.

1.13 Medical and Pathological Information:

1.13.1 The toxicology test results were not available at the time this report was compiled. Should the result have any bearing on the circumstances, it will be evaluated and the report might be revised accordingly. The pilot held a current SA CAA medical certificate and had a known eye-sight difficulties and was required to wear corrective lenses as a limitation of his medical certificate.

1.14 Fire:

1.14.1 There was evidence of pre and post impact fire.

1.15 Survival Aspects:

1.15.1 The accident was regarded to be a non-survivable due to the impact forces associated with it. There was evidence that the pilot safety harnesses failed most probably due to deceleration after collision with the zip line cable and the pilot was thrown out of the aircraft. The helicopter was equipped with an Artex 406 Emergency Locator Transmitter (ELT), serial number 14412. The selector was found on ARM; however, the ELT was found separated from its mount and antenna. The investigator in charge (IIC) was however not advised by the South African Search and Rescue Coordination Centre of any ELT signals being received at the time of the accident.

1.16 Tests and Research:

1.16.1 The Garmin GPS 296 found at the wreckage site was analyzed and the last recorded track points indicated that the accident flight took approximately 32

minutes from FAWB aerodrome.

1.17 Organisational and Management Information:

1.17.1 The helicopter was operated privately.

1.17.2 The last MPI that was carried out on the helicopter prior to the accident was certified at 13317.9 airframe hours on 07 April 2011 by an approved Aircraft Maintenance Organisation (AMO). The person that certified the task was accredited by the CAA.

1.18 Additional Information:

1.18.1 Background on zip-line construction at Sun City as contained in regulation 139.01.33 of the Civil Aviation Regulations, 1997:

The zip line construction was erected during 2004 after being granted permission from the South African Civil Aviation Authority and was certified by the department of labour. It is secured in a harness and suspended below a free running trolley that is attached to a steel cable. The slide is approximately 280 metres high, two kilometres long, reaches a speed of 150 kilometres per hour plus and guarantees a two to three minute adrenalin rush.

The start of the zip slide is on the top of a koppie (on the mountain), 5 minutes from Sun City. Sliders are at times 100 metres in the air and at the other times only 2.5 metres above the ground. Towards the end of the ride, the descent is slowed as they go uphill, then they will roll back to the lowest point on the wire where they are assisted to dismount the ride. The purpose of the zip line was purely to be used for team building exercises as one of the objectives for corporate groups visiting Sun City. The company that erected the line is responsible for facilitating all team building exercises. According to the facilitator, they erected the zip line construction and did not consider it to be a hazard or danger to anybody.

1.19 Useful or Effective Investigation Techniques:

1.19.1 None.

2 ANALYSIS:

2.1 Weather information obtained from the South African Weather Bureau indicated that fine weather conditions prevailed in the area at the time of the accident. The helicopter was properly maintained and available documentation did not reflect any defect or malfunction that could have contributed or have caused the accident. The pilot has been flying for many years and was in possession of a valid private helicopter pilot license as well as a valid aviation medical certificate at the time of the accident.

- 2.2 The pilot was also appropriately rated and there was no indication that medical factors might have affected his performance at the time of the accident. On-site investigation and examination of the wreckage revealed that the helicopter collided with the zip line cable spanned from Sun City Mountain top on the lower windshield and was destroyed.
- 2.3 The zip line operation was documented in the Aeronautical Information Publication (AIP) under the Pilanesburg aerodrome (FAPN) as a hazard. It clearly states that flights below 2 000 feet above the ground South of Pilanesburg Nature Reserve (in which area the zip line has been erected) are prohibited (FAP). Furthermore all laid down aviation procedures are directed away from the zip line site. However, with FAPN not being the pilot's intended destination, he most probably never acquainted himself with the AIP's nor was he aware of the zip line operation and the location there of, which had been in operation since 2004.
- 2.4 It is the responsibility of the pilots to consult with the AIP's, the Aeronautical Information Circulars (AIC's); Notice to Airmen (NOTAMS) so that they be aware of local airspace restricted (FAR) areas and take steps to avoid infringing them. During the planning and erection phase of the zip line, SA CAA was consulted and documented correspondence between the two parties is available.

3. CONCLUSION:

3.1 Findings:

- 3.1.1 The pilot was the holder of a valid pilot's helicopter license and had the helicopter type endorsed on his license.
- 3.1.2 The zip line operation was documented in the Aeronautical Information Publication (AIP) under the Pilanesburg aerodrome (FAPN) as a hazard.
- 3.1.3 During the planning and erection phase of the zip line, SA CAA was consulted and documented correspondence between the two parties is available.
- 3.1.4 The helicopter collided with the zip line cable spanned from Sun City Mountain top rendering ground impact inevitable.
- 3.1.5 The helicopter was first registered on the South African Register on 24 March 2006 (ZS-HHW).
- 3.1.6 The helicopter's Certificate of Airworthiness was valid at the time of the accident.
- 3.1.7 The helicopter was maintained in accordance with manufactures procedures.

3.1.8 The Aircraft Maintenance Organisation (AMO) that certified the last MPI prior to the accident was in possession of a valid AMO approval certificate.

3.1.9 Weather condition at the time of the accident was fine.

3.1.10 The pilot's medical certificate was valid with restrictions to wear corrective lenses.

3.2 Probable Cause/s:

3.2.1 The helicopter collided with the zip line cable spanned from Sun City Mountain top rendering ground impact inevitable.

3.3 Contributing factor/s:

3.3.1 Disregard for Standard/Safe/Regulatory Operating Procedure.

3.3.2 Collision with wires/Wire strike.

4. SAFETY RECOMMENDATIONS:

4.1 None.

5. APPENDICES:

5.1 Transcript between the pilot and Pilanesburg ATC with the zip line cable lay out.

Transcript for ZS-HHW

Events

Location: Sun City Mountain

Date: 20 December 2011

Aircraft: Bell 206

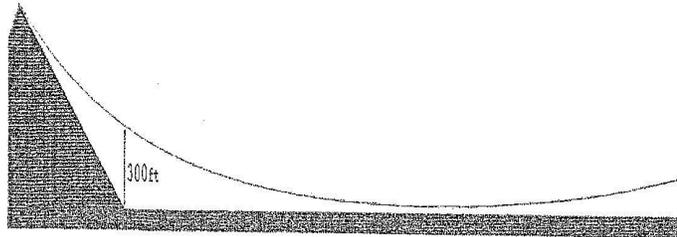
Accident time: 09:28 B

*- unintelligible word

HHW- Accident Aircraft

ATC- Air traffic controller

Source	Text of transmission (frequency 118.4 MHz)	Comments
HHW	Piannesburg HHW I am just ready to cross * your extended.	
ATC	Good day HHW cleared to cross extended center line Runway 23 and report final for Bakubong.	
HHW	Ok sir cleared to cross your extended and I will report to you on finals for Bakubong, thank you for your help HHW.	



5.2 Aeronautical Information Publication (AIP).



FAPN AD 2.10 - 3

FAPN AD 2.10 Aerodrome Obstacles

In Area 2					
OBST ID/Designation	OBST type	OBST position	ELEV/HGT	Markings/Type, colour	Remarks
a	b	c	d	e	f
	Cable way	S252111 E0270540 S252203 E0270458	4464 / 295FT 3648 / 295 FT	unmarked	S of Sun City
Power line below APCH RWY 05 and mountains N & W of AD.					

FAPN AD 2.11 Meteorological Information Provided

No information available

FAPN AD 2.12 Runway Physical Characteristics

Designations RWY NR	TRUE & MAG BRG	Dimensions of RWY (M)	Strength (PCN) and surface of RWY and SWY	THR coordinates	THR elevation and highest elevation of TDZ of precision APP RWY
1	2	3	4	5	6
05 23		2750M x 30M	ASPH PCN 58/F/C/X/T	S252037,37 E0270954,86 S251939,39 E0271043,34	3408FT 3401FT
Designations RWY NR	Slope of RWY-SWY	SWY dimensions (M)	CWY dimensions (M)	Strip dimensions (M)	OFZ
1	7	8	9	10	11
05 23					
Remarks 12					
(1) Circuit procedure: RWY 05 right-hand - RWY 23 left-hand. Note: No flights authorised over the Pilanesberg Nature Reserve (Circle radius 7 NM centred on S251430 E0270510) below 2 000 FT GND.					

FAPN AD 2.13 Declared Distances

RWY Designator	TORA(M)	TODA (M)	ASDA (M)	LDA (M)	Remarks
05	2750	2810	2750	2750	

Civil Aviation Authority

A041 / 15 JUL 07

Compiled by:

Frans Malose Motaung

Date: 02 February 2012

For: Director of Civil Aviation