



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8628	
Aircraft Registration	ZS-RKA	Date of Accident	23 March 2009		Time of Accident	0700Z
Type of Aircraft	Robinson R44 Astro		Type of Operation		Private	
Pilot-in-command Licence Type		Private	Age	49	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	350		Hours on Type	230
Last Point of Departure		Sea Rest Farm, Port Elizabeth (GPS co-ordinates: S33°45'05.44" E26°26'16.35") elevation 650 ft AMSL				
Next Point of Intended Landing		East London Aerodrome (FAEL)				
Location of the Accident Site with Reference to Easily Defined Geographical Points (GPS readings if possible)						
Woody Cape Beach near Port Elizabeth (GPS co-ordinates: S 33°0.752' E26°0.437 7') elevation 121 ft AMS L						
Meteorological Information		Temperature 22°C, surface wind 250° at 13 kts, vis ibility > 10 km				
Number of People on Board	1 + 1	No. of People Injured	0	No. of People Killed	0	
Synopsis						
<p>The pilot and a passenger took off from a private helipad on a farm near Port Elizabeth on a private flight to East London Aerodrome. The pilot flew out in a south-westerly direction (240° M), climbed to 800 ft and turned in an easterly direction. The pilot reported that the helicopter then experienced a loss of engine power, where after the low rotor revolutions per minute (RPM) horn sounded and the engine failed.</p> <p>The pilot immediately entered autorotation and carried out a forced landing on the beach at Woody Cape. The aircraft sustained damage to the tail boom, right windshield and left-hand skid.</p> <p>An onsite test investigation was conducted; the drum used to refuel the aircraft was found to have water in it.</p> <p>The aircraft maintenance organisation (AMO) that recovered the helicopter found water in the tanks, gascolator and carburettor fuel bowls.</p>						
Probable Cause						
Engine failure due to fuel contamination resulted in the pilot executing a forced landing.						
IARC Date				Release Date		



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Super Pro Dairy (Pty) Ltd
Manufacturer : Robinson Helicopter Company
Model : Robinson R44 Astro
Nationality : South African
Registration Marks : ZS-RKA
Place : Private Helipad at Sea Rest Farm, Port Elizabeth
Date : 23 March 2009
Time : 0700Z

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 23 March 2009, the pilot and a passenger took off from a private helipad at Sea Rest Farm near Port Elizabeth with the intention to fly a direct route to East London Aerodrome. The helicopter had 70 litres of fuel in the tanks and was refuelled with 30 litres of fuel the morning before the flight, which equated to 100 litres of usable fuel.
- 1.1.2 The pilot took off in a south-westerly direction (240°M) from 650 ft elevation above mean sea level (AMSL), climbed to 800 ft and turned in an easterly direction. He then felt a loss of engine power, whereafter the low rotor RPM horn came on, and the engine failed.
- 1.1.3 The pilot immediately entered autorotation and carried out a forced landing on Woody Cape Beach, facing east. The helicopter sustained damage to the tail boom, right windshield and left-hand skid.

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 major damage in the accident.



Figure 1: Damage to the tail boom



Figure 2: Damage to the left windshield

1.4 Other Damage

1.4.1 No other damage was caused.

1.5 Personnel Information

1.5.1 Pilot-in-command:

Nationality	South African	Gender	Male	Age	49
Licence Number	*****	Licence Type	Private		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	30 November 2009				
Restrictions	None				
Previous Accidents	None				

1.5.2 Flying Experience:

Total Hours	350.0
Total Past 90 Days	36.2
Total on Type Past 90 Days	36.2
Total on Type	230.0

1.6 Aircraft Information

1.6.1 Airframe:

Type	Robinson R44 Astro	
Serial Number	0436	
Manufacturer	Robinson Helicopter Company	
Date of Manufacture	1998	
Total Airframe Hours (At Time of Accident)	3 026.4	
Last MPI (Date & Hours)	19 Oct 2008	2 971.3
Hours Since Last MPI	55.1	
C of A (Issue Date)	29 April 1998	
C of R (Issue Date) (Present Owner)	25 May 2007	
Operating Categories	Standard	

1.6.2 Engine:

Type	Lycoming O-540-F 1b5
Serial Number	L-25183-40A
Hours Since New	2 533.3
Hours Since Overhaul	1 020.3

1.6.3 Weight and Balance Calculation:

	Weight (lbs)	Arm (inches)	Moment (in.lbs)
A/C empty weight	1 400	106.5	149 100.0
Pilot & pax (70 kg) + (100 kg)	375	49.5	18 562.5
Aft passengers	0	79.5	0.0
Baggage (10 kg)	22	44.0	968.0
Fuel main tank (16 US gal)	96	106	10 176.0
Auxiliary tank (10 US gal)	60	102	6 120.0
Total T/O Weight	1 953	94.68	184 926.5

1.6.3.1 The maximum certificated take-off mass for the aircraft as stipulated in the Pilot's Operating Handbook (POH) is 2 400 lbs.

1.6.3.2 The aircraft was within the weight limits by 447 lbs, as per the POH.

1.6.3.3 **NB:** 1 US gal is 6 lbs.

1.7.1 Meteorological Information

1.7.1 The following weather information was obtained from the pilot questionnaire:

Wind Direction	240°	Wind Speed	12 kts	Visibility	Clear
Temperature	22°C	Cloud Cover	1/8	Cloud Base	Nil
Dew Point	unknown				

- 1.7.2 The following weather information was obtained from the South African Weather Services:

Metar: FAPE 230630Z 250013KT 9999 FEW 012 22/19 Q1016 NOSIG=

Wind Direction	250°	Wind Speed	13 kts	Visibility	> 10 km
Temperature	22°C	Cloud Cover	1/8	Cloud Base	Nil
Dew Point	19°C				

1.8 Aids to Navigation

- 1.8.1 The aircraft was equipped with the standard navigational equipment for this type of helicopter and such equipment was serviceable. The navigation equipment was in compliance with its approved equipment list.

1.9 Communications

- 1.9.1 The aircraft was equipped with the standard communication equipment for this type of helicopter.
- 1.9.2 The pilot was broadcasting his intentions on the general frequency 124.8 MHz.

1.10 Aerodrome Information

- 1.10.1 The pilot took off from a private helipad at Sea Rest Farm near Port Elizabeth (GPS co-ordinatesL S33°45'05.44" E26°26'16.35").



Figure 4: Private helipad at Sea Rest Farm (S33°45'05.44" E26°26'16.35")

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 either required by regulations to be fitted to this aircraft type.

1.12 Wreckage and Impact Information

1.12.1 The helicopter's engine failed and the pilot immediately entered autorotation, intending to land the helicopter on the beach sand. In the process of recovering, the main rotor blades cut the tail boom before the tail rotor. The skids impacted the ground causing damage to the left-hand skid. The aircraft came to rest in soft sand at Woody Cape Beach.

1.12.2 The aircraft impacted the ground, facing east, at the Woody Cape Beach at a geographical position of S33°0.752' E26°0.4377', elevation 121 ft.

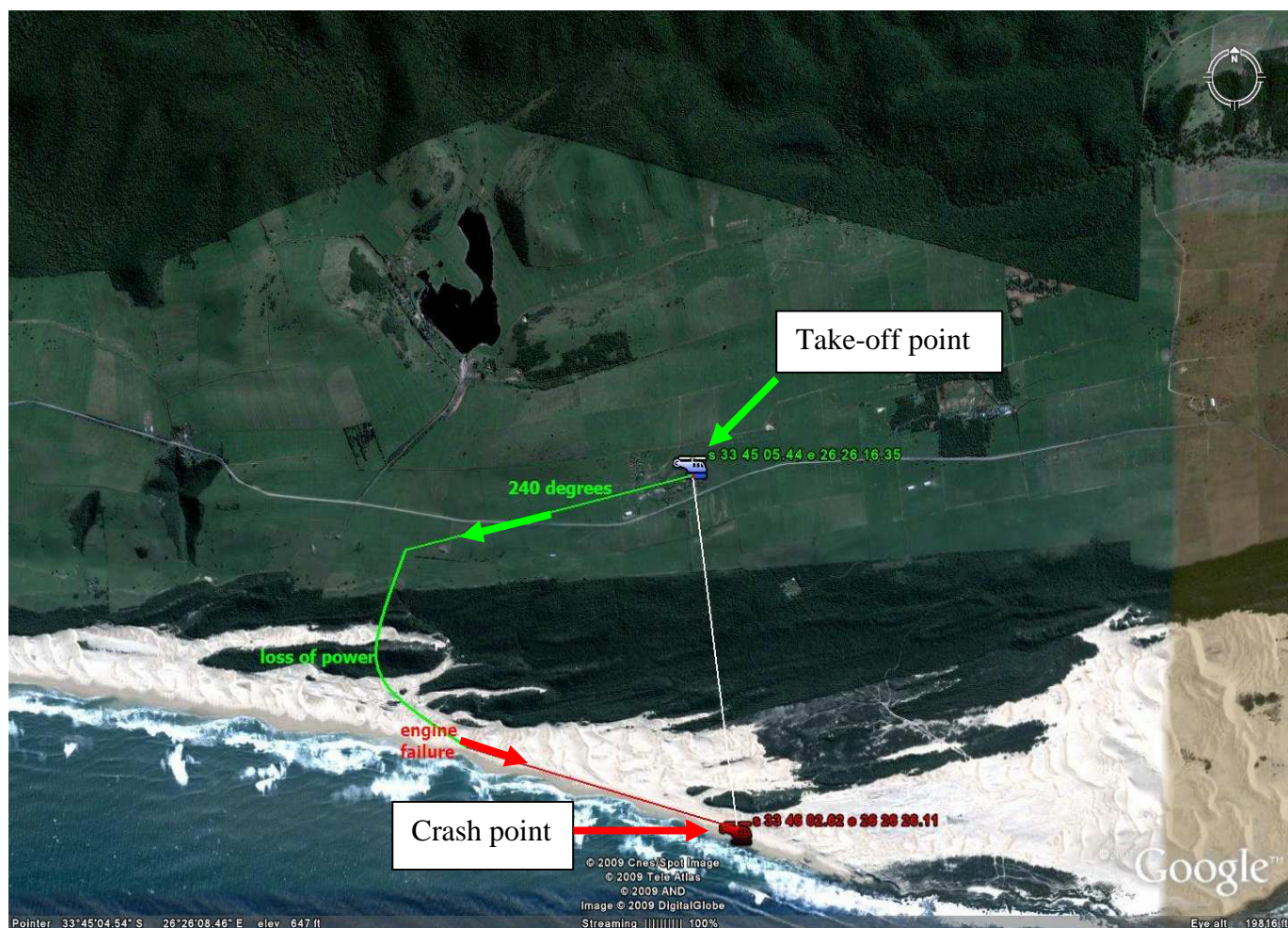


Figure 5: The flight sequence to the crash point

1.13 Medical and Pathological Information

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

1.14 Fire

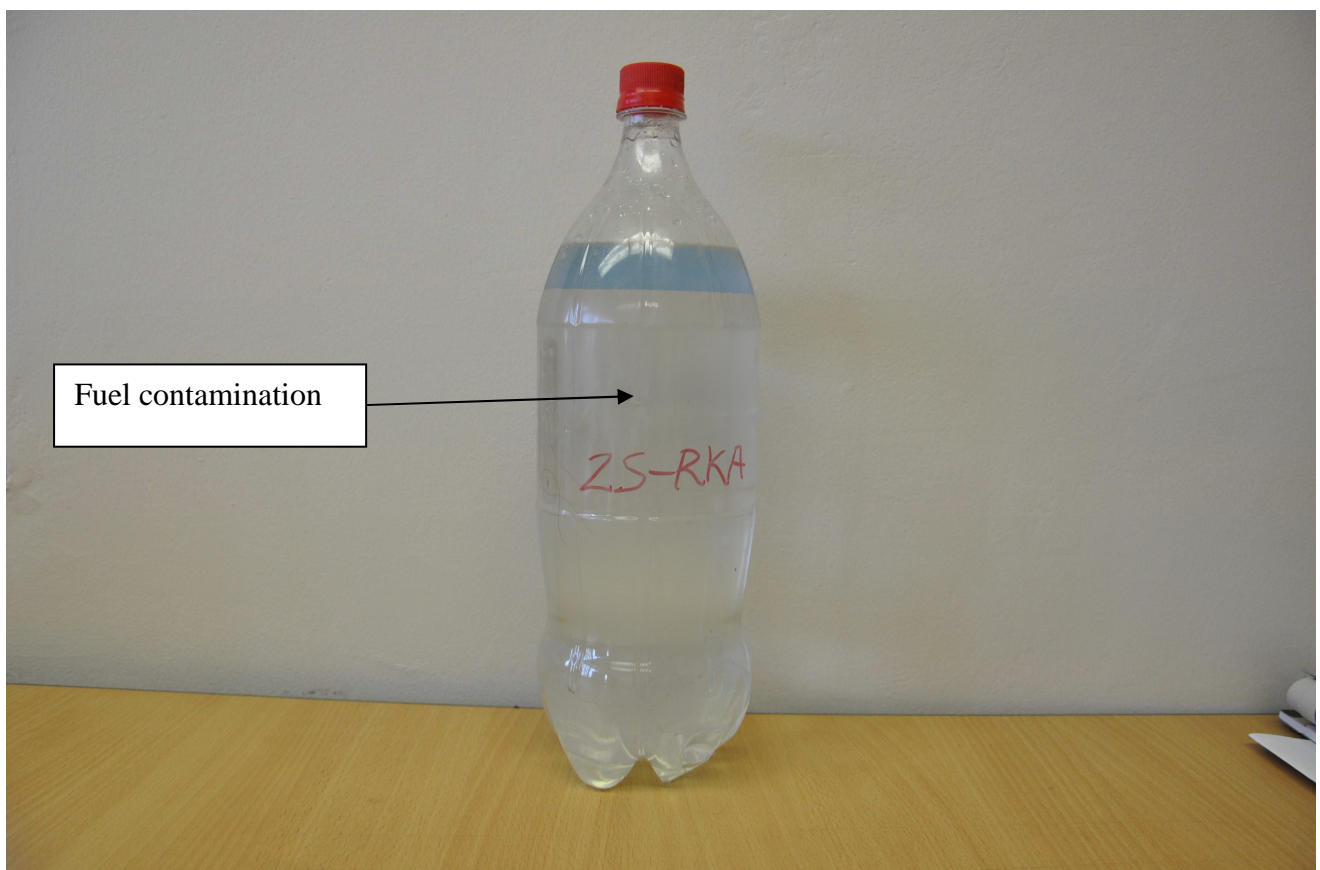
1.14.1 There was no evidence of a pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 This was considered a survivable accident because of low-impact forces sustained by the helicopter as evidenced by the minor damages to the cabin structure. The pilot and passengers were properly restrained with seatbelts at the time of the accident, and evacuated unassisted.

1.16 Tests and Research

1.16.1 An onsite test investigation was conducted; the drum used to refuel the aircraft was found to have water in it.



Picture 6: Fuel contaminated by water

1.16.2 The aircraft maintenance organisation (AMO) that recovered the helicopter found three litres of water in the fuel tanks. Water was also evident in the gascolator and carburettor fuel bowls.

1.17 Organisational and Management Information

1.17.1 This was a private flight.

1.17.2 The pilot was the owner and the operator of the aircraft.

1.17.3 The aircraft was maintained by an AMO that was in possession of a valid AMO Approval from the CAA.

1.18 Additional Information

1.18.1 Description of fuel system:

The aircraft fuel is stored in main and auxiliary fuel tanks, which have a combined capacity of 190 litres. The auxiliary fuel tank is mounted on the right side of the main transmission and feeds directly into the main fuel tank, which is mounted on the left side of the transmission. The unusable capacity of the main and auxiliary fuel tanks is 4 litres and 1 litre respectively. Each fuel tank has its own water drain point and a refueling orifice, the sides of which are raised above the surface of the tank. From the main fuel tank the fuel is fed, under gravity, to the gascolator and then on to the carburettor fuel bowl. The gascolator is also equipped with a water drain point.

1.18.2 Section 7: Systems Description (Pilot Operating Handbook, Robinson R44):

The engine will operate normally with either or both fuel pumps functioning. The auxiliary pump primes the engine for starting and runs in flight to provide fuel pump redundancy.

The ignition switch prime (momentary) position operates the auxiliary fuel pump for priming prior to engine start. After start, the pump runs continuously as long as the engine has oil pressure and the clutch switch is in the engage position.

A drain is located at the forward left side of the main tank and is opened by pushing the plunger. A drain is also provided on the gascolator located on the lower right side of the vertical firewall. It is opened by pushing up on the plastic tube, which extends below the belly. The auxiliary tank drain is located inside the cowl door below the tank. It is opened by extending the plastic tube clear of the aircraft and pushing up on the drain. All three drains should be opened daily prior to flight to check for water, sediment and fuel type/grade.

1.18.3 Section 8: Handling and Maintenance (POH, Robinson R44):

A small quantity of fuel should be drained from the gascolator and from each tank using the quick drains prior to the first flight each day. Drain enough fuel to remove any water or dirt and check for approved fuel colour. If fuel contamination is

suspected, continue to drain fuel from gascolator and tank until all contamination is eliminated.

1.18.3 Duties of Pilot-in-command regarding flight preparation in the Civil Aviation Regulations states thus;

91.02.8 (4) The pilot-in-command of an aircraft shall (a) ensure that the pre-flight inspection has been carried out, and where applicable, the flight deck procedures and other instructions regarding the operation of the aircraft, the limitations contained in the aircraft flight manual referred to in Regulation 91.03.2, or equivalent certification document are fully complied with at the appropriate times during flight.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1.1 The pilot was correctly licensed and was the holder of a valid medical certificate with no restrictions.

2.1.2 The pilot and passenger took off from a private helipad at Sea Rest Farm near Port Elizabeth, with an intention to fly a direct route to East London Aerodrome. The helicopter had 70 litres in the tanks and was refuelled with 30 litres of fuel the same morning before the flight, which equated to 100 litres of usable fuel.

2.1.3 The pilot took off in a south-westerly direction (240°M), from an elevation of 650 ft, climbed to 800 ft and turned in an easterly direction. He then felt a loss of power, the low rotor RPM horn came on and the engine failed.

2.1.4 The prevailing weather conditions at the time of the accident were considered not to be a factor in this accident, with the reported surface wind being calm.

2.1.5 The AMO that recovered the helicopter found three litres of water in the fuel tanks and in the gascolator and carburettor fuel bowls. Referring to 1.18.3, a small quantity of fuel should be drained from the gascolator and from each tank using the quick drains prior to the first flight each day. Enough fuel should be drained to remove any water or dirt and checked for approved fuel colour. If fuel contamination is suspected, one should continue to drain fuel from gascolator and tank until all contamination is eliminated. Out of the tests and analysis, the conclusion was that fuel contamination was a contributory factor to the engine failure.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot was the owner and the operator of the aircraft.

- 3.1.2 The pilot had a valid class 1 medical certificate.
- 3.1.3 This was a private flight.
- 3.1.4 The aircraft was maintained by an AMO, which was in possession of a valid AMO Approval from the CAA at the time the last maintenance was certified on the aircraft prior to the accident.
- 3.1.5 The pilot had a valid private pilot licence and the aircraft type was endorsed in his licence.
- 3.1.6 The aircraft had a valid Certificate of Registration and a valid Certificate of Airworthiness.
- 3.1.7 The maintenance records indicated that the aircraft was maintained in accordance with existing regulations and procedures.
- 3.1.8 The prevailing weather conditions at the time of the accident were considered not to be a factor in this accident, with the reported surface wind being calm.
- 3.1.9 The AMO that recovered the helicopter found three litres of water in the fuel tanks and in the gascolator and carburettor fuel bowls.

3.2 Probable Cause/s

- 3.2.1 Engine failure due to fuel contamination, which resulted in the pilot executing a forced landing.

4. SAFETY RECOMMENDATIONS

- 4.1 None.

5. APPENDICES

- 5.1 None

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