



## AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

|   |                       |   |                          |                             |                      |     |
|---|-----------------------|---|--------------------------|-----------------------------|----------------------|-----|
|   |                       |   |                          | Reference:                  | CA18/2/3/8953        |     |
| <b>Aircraft Registration</b>  | <b>ZS-HTY</b>         | <b>Date of Accident</b>   | 3 August 2011            | <b>Time of Accident</b>     | 0700Z                |     |
| <b>Type of Aircraft</b>   | Robinson R44 Raven II |   | <b>Type of Operation</b> | Private Flight              |                      |     |
| <b>Pilot-in-command Licence Type</b>  |                       | Private Pilot (H)   | <b>Age</b>               | 58                          | <b>Licence Valid</b> | Yes |
| <b>Pilot-in-command Flying Experience</b>   |                       | Total Flying Hours  | 173.2                    | Hours on Type               | 25.8                 |     |
| <b>Last point of departure</b>  |                       | Cape Town International Airport (FACT), (Western Cape province)                         |                          |                             |                      |     |
| <b>Next point of intended landing</b>   |                       | Cape Town International Airport (FACT), (Western Cape province)                         |                          |                             |                      |     |
| <b>Location of the accident site with reference to easily defined geographical points (GPS readings if possible)</b>  |                       |   |                          |                             |                      |     |
| Next to Cross Campus Road, Cape Town (GPS position: S 33°57'19" E 018°27'53").  |                       |   |                          |                             |                      |     |
| <b>Meteorological Information</b>   |                       | Wind: North-westerly/20 knots; Temperature: 14°C; V isibility: >10km; Clouds: No clouds |                          |                             |                      |     |
| <b>Number of people on board</b>  | 1+3                   | <b>No. of people injured</b>  | 1+0                      | <b>No. of people killed</b> | 0                    |     |
| <b>Synopsis</b>   |                       |   |                          |                             |                      |     |
| <p>On 3 August 2011 at approximately 0630Z the pilot, accompanied by three passengers took-off from Cape Town International Airport on a private flight. The intention of this flight was to do aerial photography of the campus at the University of Cape Town.</p> <p>They approached the lower campus of the University of Cape Town from a north-easterly direction, the helicopter suddenly started an uncontrolled descent. The pilot stated he tried to increase forward speed and height but to no avail.</p> <p>The helicopter collided with high trees before it impacted with the ground and a perimeter fence.</p> <p>Substantial damage was caused to the helicopter during the sequence of the accident.</p> <p>The pilot sustained minor head injuries while none of the passenger sustained any injuries during the sequence of the accident.</p> |                       |   |                          |                             |                      |     |
| <b>Probable Cause</b>   |                       |   |                          |                             |                      |     |
| Vortex ring state (settling with power) rendering ground impact inevitable.   |                       |   |                          |                             |                      |     |
| <b>Contributing factors</b>   |                       |   |                          |                             |                      |     |
| Lack of experience by the pilot on helicopter type.   |                       |   |                          |                             |                      |     |
| IARC Date   |                       |   | Release Date             |                             |                      |     |



## AIRCRAFT ACCIDENT REPORT

**Name of Owner/Operator** : Holographix Properties 69 (PTY) LTD  
**Manufacturer** : Robinson Helicopter Company  
**Model** : R 44 Raven II  
**Nationality** : South African  
**Registration Marks** : ZS-HTY  
**Place** : Cross Campus Road, Cape Town, (Western Cape)  
**Date** : 3 August 2011  
**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 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 produced without prejudice to the rights of the CAA, which are reserved.*

## 1. FACTUAL INFORMATION

### 1.1 History of flight

- 1.1.1 On 03 August 2011, at approximately 0630Z, a Robinson R 44 Raven II helicopter, registration ZS-HTY, which was piloted by a private pilot, accompanied by three passengers, took-off from Cape Town International Airport on a private flight with the intention to land back at Cape Town International Airport. The private flight was being conducted under visual meteorological conditions (VMC).
- 1.1.2 The pilot stated after take-off he flew to the Kenilworth race course and from there to the Rhodes memorial. A cameraman that was onboard, who occupied the right-hand aft seat, where the right hand aft door was removed, took some pictures as they were flying.
- 1.1.3 The approach for the photo shoot was from a north-easterly direction towards the University of Cape Town campus at a speed of between 50-60 knots and approximately 800 feet above mean sea level (AMSL). During the approach, the helicopter suddenly started descending. The pilot stated he tried to increase forward speed to stop the descent rate but to no avail. He then opted to perform a forced landing.
- 1.1.4 At a height of approximately 200 feet above ground level (AGL) the skid gear on the right-hand side of the helicopter made contact with a large tree in the flight path, which the pilot was unable to avoid.

- 1.1.5 The helicopter impacted with the ground and a perimeter fence and rolled over onto its left-hand side.
- 1.1.6 The pilot sustained minor head injuries. None of the passengers were injured during the sequence of the accident.
- 1.1.7 The following information was obtained from a passenger (the photographer) who was wearing a headset at the time and communicated with the pilot during the flight.

According to the passenger, they did not receive any safety briefing from the pilot or sign any indemnity forms before the flight. He discussed with the pilot prior to the flight that he would like to go to ten (10) different locations whereby the pilot informed him the helicopter was allocated for two (2) hours.

When arriving overhead the residential area of the University of Cape Town they did an inspection flight of the residence to be photographed where after they turned out right to approach the residence for the photo shoot. On approaching the residence, the photographer was not happy with the flight path as they were too close. The pilot then turned out right for another approach.

The photographer stated this time they were low and too far to the left and he asked the pilot to hover the helicopter at their current position, however they were not at the right distance from the residence, and the pilot opted to fly another circuit to reposition the helicopter.

This time the pilot opted to fly a left-hand circuit to reposition the helicopter. The photographer stated when they repositioned at the residence for the photo shoot, the pilot experience difficulties in controlling the helicopter in the hover. He stated it felt as if the helicopter was moving forward and descending. Following this, the helicopter started to sink and he heard the pilot saying "we must get out of here". They then flew towards Rhodes Memorial before repositioning again for the photo shoot.

As the pilot reposition the helicopter as requested by the photographer, it felt as if the helicopter entered a "free fall". At that stage it was quiet in the cockpit. They then collided with a tree and the helicopter then descended nose down towards the ground. The main rotor blades then impacted a tree where after the helicopter impacted the ground.

According to the passenger, the pilot made a last minute attitude change by increasing the nose attitude before the helicopter impacted with the ground.

During the impact sequence the left-hand landing skid collapsed and the helicopter rolled onto its left hand side.

After the accident, the pilot was taken to hospital and treated for minor head injuries.

## 1.2 Injuries to persons

| Injuries | Pilot | Crew | Pass. | Other |
|----------|-------|------|-------|-------|
| Fatal    | -     | -    | -     | -     |
| Serious  | -     | -    | -     | -     |
| Minor    | 1     | -    | -     | -     |
| None     | -     | -    | 3     | -     |

## 1.3 Damage to aircraft

1.3.1 The helicopter sustained substantial damage. **See Fig 1.**



**Figure 1** Damage caused to the helicopter as seen after the helicopter was repositioned back onto its skids..

## 1.4 Other damage

1.4.1 Minor damage was caused to the surrounding vegetation, a perimeter fence and a road sign. **See Fig 2.**





**Figure 2** Damage caused to a road sign.

## 1.5 Personnel information

|                     |               |               |                   |     |    |
|---------------------|---------------|---------------|-------------------|-----|----|
| Nationality         | South African | Gender        | Male              | Age | 58 |
| Licence Number      | 0271072050    | Licence Type  | Private Pilot (H) |     |    |
| Licence valid       | Yes           | Type Endorsed | Yes               |     |    |
| Ratings             | None          |               |                   |     |    |
| Medical Expiry Date | 31 July 2012  |               |                   |     |    |
| Restrictions        | None          |               |                   |     |    |
| Previous Accidents  | None          |               |                   |     |    |

Flying Experience :

|                            |       |
|----------------------------|-------|
| Total Hours                | 173,2 |
| Total Past 90 Days         | 4,0   |
| Total on Type Past 90 Days | 1,0   |
| Total on Type              | 25,8  |

## 1.6 Aircraft information

### Airframe :

|  |                             |       |
|--|-----------------------------|-------|
| Type                                       | Robinson R 44 Raven II      |       |
| Serial Number                              | 12458                       |       |
| Manufacturer                               | Robinson Helicopter Company |       |
| Year of Manufacture                        | 2008                        |       |
| Total Airframe Hours (At time of Accident) | 532.9                       |       |
| Last MPI (Date & Hours)                    | 31 May 2011                 | 491.1 |
| Hours since Last MPI                       | 41.8                        |       |
| C of A (Issue Date)                        | 30 October 2008             |       |
| C of R (Issue Date) (Present owner)        | 13 November 2008            |       |
| Operating Categories                       | Standard Part 127           |       |

### Engine :

|                      |                       |
|----------------------|-----------------------|
| Type                 | Lycoming IO-540-AE1A5 |
| Serial Number        | L-33074-48E           |
| Hours since New      | 532,9                 |
| Hours since Overhaul | TBO not reached       |

#### 1.6.1 Weight and balance

| Item                       | Weight (lbs)   | Arm (inches) | Moment (lbs x inches) |
|----------------------------|----------------|--------------|-----------------------|
| Empty weight               | 1540.94        | 106.5        | 164106.7              |
| Pilot (83kg)               | 183            | 49.5         | 9058.5                |
| Fwd passenger (90kg)       | 198            | 49.5         | 9801.0                |
| Rear (L) passenger (95kg)  | 209            | 29.5         | 16615.5               |
| Rear (R) passenger (85kg)  | 187            | 29.5         | 14866.5               |
| Fuel main tank (94 litres) | 149            | 106.0        | 15794.0               |
| Fuel aux tank (57 litres)  | 91             | 102.0        | 9282                  |
| <b>Weight at take-off</b>  | <b>2557.94</b> | <b>93.63</b> | <b>239524.2</b>       |

The maximum gross weight for the helicopter was not allowed to exceed 2500 lbs (1134 kg) according to the pilot's operating handbook (POH), section 2, limitations. The take-off weight was calculated to exceed the maximum gross weight by 57.94 lbs.

At the time of the accident, the helicopter was in the air for approximately 30 minutes. Fuel burn-off for this time period was approximately 55 lbs (35 litres). The weight at the time of the accident was thus calculated to be approximately 2502.94 lbs, which renders the helicopter to be exceeding the maximum gross weight limit even after a flight of 30 minutes.

See **Appendix A** for the weight calculation before take-off.

#### 1.6.2 Maintenance documentation

No documentations could be found indicating the right-hand rear door was removed by a person qualified to do so or as prescribed in the maintenance manual of the

helicopter.

Flight with this door removed is permitted up to a speed of 100 KIAS. (POH Section 2 page 2.5).

## 1.7 Meteorological information

1.7.1 Meteorological information was obtained from the pilot questionnaire.

|                |                |             |        |            |        |
|----------------|----------------|-------------|--------|------------|--------|
| Wind direction | North-westerly | Wind speed  | 20 kts | Visibility | 10000m |
| Temperature    | 14°C           | Cloud cover | None   | Cloud base | None   |
| Dew point      | Unknown        |             |        |            |        |

## 1.8 Aids to navigation

1.8.1 The helicopter 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 helicopter was equipped with standard communication equipment as per Minimum Equipment List approved by the Regulator. There were no recorded defects to communication equipment prior to the flight.

1.9.2 The pilot did not make a distress call before the accident.

## 1.10 Aerodrome information

1.10.1 The accident did not occur at or near an aerodrome.

1.10.2 The accident site was on a public road next to the university campus.

## 1.11 Flight recorders

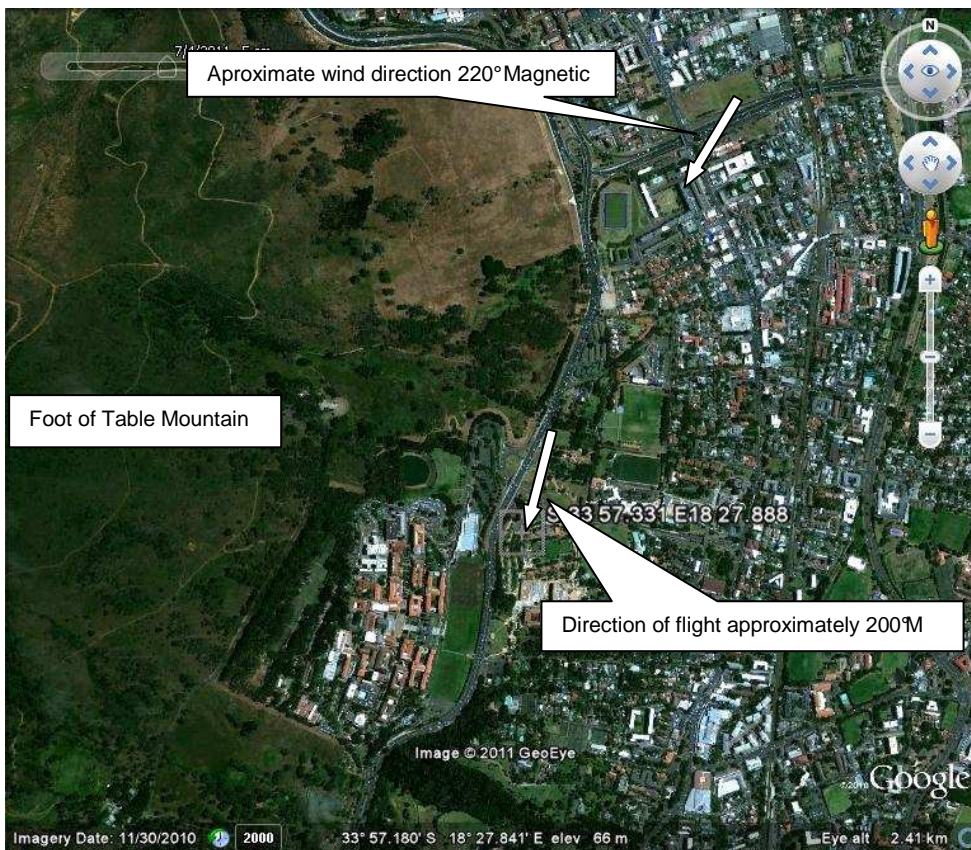
1.11.1 The helicopter was not fitted with a cockpit voice recorder (CVR) or a flight data recorder (FDR) and neither was required by regulations to be fitted to this type of helicopter.

## 1.12 Wreckage and impact information

1.12.1 Final position of the flight path

The final flight path was flown in a direction of approximately 200° Magnetic. **See Fig. 3.**





**Figure 3a.** Direction of flight and approximate wind direction indicated by the arrows.



**Figure 3b.** Final flight path.



### 1.12.2 Impact sequence

Evidence found at the scene of the accident indicated the helicopter impacted high trees to the northern side of the accident scene before the helicopter impacted with the ground.

### 1.12.3 Helicopter attitude during impact

According to a passenger onboard the helicopter, the helicopter was in a level attitude when it first made contact with the trees but the helicopters attitude changed to a steep nose down attitude thereafter. Moments before impact with the ground the pilot manages to changed the helicopters attitude to a nose high attitude.

## 1.13 Medical and pathological information

1.12.1 The pilot sustained minor injuries during the sequence of the accident. He was admitted to hospital but was discharge a few hours later the same day. The pilot assists his passengers to evacuate the helicopter before the emergency services arrived at the scene.

## 1.14 Fire

1.14.1 There was no pre- or post-impact fire.

## 1.15 Survival aspects

1.15.1 The accident was considered survivable as a result of the low kinetic forces associated with the impact and all occupants wearing their safety harnesses.

## 1.16 Tests and research

1.16.1 The day after the accident, the engine was started, while still in the airframe, without any difficulty and operated at various power settings without any abnormalities noted. The airframe of the helicopter was also inspected and no defects other than those caused by the sequence of the accident could be found.

## 1.17 Organizational and management information

1.17.1 The last mandatory periodic inspection (MPI) before the accident was certified on 31 May 2011at 491.1 hours by a SACAA approved Aircraft Maintenance Organization (AMO) that was in possession of a valid AMO certificate.

1.17.2 The helicopter was hired by the pilot on his name to conduct the flight. According to the passengers, neither of them was informed by the pilot to complete an indemnity form prior to the accident flight. However, during the investigation the pilot stated indemnity forms were completed by all passengers before the flight.

1.17.3 According to the pilot's training file, he was instructed on 1 August 2011 to have a

dual instructor session on both the R22 and R44 helicopters and not to fly solo without having a session with an instructor. The pilot then hired and flies the helicopter without having a dual instructor session as instructed in his training file.

- 1.17.4 A weight and balance calculation was available for this flight, but not contain the correct details of the accident helicopter, could be found.
- 1.17.5 At the time of the investigation, the ATO could not provide the Investigator-in-charge with a proper Manual of Procedures. The Manual of Procedure in their possession had several hand written changes which was not approved by the SACAA. Investigation reveals the manual of Procedure was handed to the Flight Operations Department within the SACAA on 10 June 2011 for revision. Several requests were made to the Flight Operations department to have the revised copy returned. The revised copy was not available at the time of the accident.

## 1.18 Additional information

### 1.18.1 Civil Aviation Regulations

According to evidence obtained from the pilot's logbook, the last time he flew the Robinson R 44 as pilot-in-command was on 1 November 2008. Current regulations stated the following in regards of the maintenance of competency of a license holder:

#### ***Maintenance of competency***

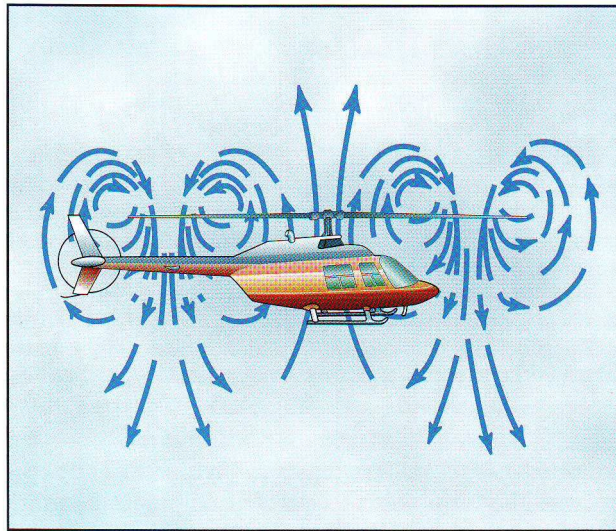
***Part 61.04.11 (1) The holder of a private pilot license (helicopter) shall not act as pilot-in-command of a helicopter transporting passengers or cargo or a combination thereof, by day, unless he or she has, within the 90 days immediately preceding the flight on which such passengers or cargo or combination thereof, are to be transported, executed not less than five circuits, including the take-off and landing, in a helicopter of the same class as that in which such passenger, cargo or combination flight is to be undertaken, or in a simulator.***

### 1.18.2 Vortex ring state (Settling with power)

*“Vortex ring state describes an aerodynamic condition where a helicopter may be in a vertical descent with up to maximum power applied, and little or no cyclic authority. The term “settling with power” comes from the fact that helicopter keeps settling even though full engine power is applied.*

*In a normal out-of-ground-effect hover, the helicopter is able to remain stationary by propelling a large mass of air down through the main rotor. Some of the air is recirculated near the tips of the blades, curling up from the bottom of the rotor system and rejoining the air entering the rotor from the top. This phenomenon is common to all airfoils and is known as tip vortices. Tip vortices consume engine power but produce no useful lift. As long as the tip vortices are small, their only effect is a small loss in rotor efficiency. However, when the helicopter begins to descend vertically, it settles into its own downwash, which greatly enlarges the tip vortices. In this vortex ring state, most of the power developed by the engine is wasted in accelerating the air in a doughnut pattern around the rotor.*

*In addition, the helicopter may descend at a rate that exceeds the normal downward induced-flow rate of the inner blade sections. As a result, the airflow of the inner blade sections is upward relative to the disc. This produces a secondary vortex ring in addition to the normal tip-vortices. The secondary vortex ring is generated about the point on the blade where the airflow changes from up to down. The result is an unsteady turbulent flow over a large area of the disc. Rotor efficiency is lost even though power is still being supplied from the engine".(Fig 4)*



**Figure 4** Vortex ring state.

*“A fully developed vortex ring state is characterized by an unstable condition where the helicopter experience un-commanded pitch and roll oscillations, has little or no cyclic authority, and achieves a descent rate, which, if allowed to develop, may approach 6,000 feet per minute. It is accompanied by increased levels of vibration.*

*A vortex ring state may be entered during any maneuver that places the main rotor in a condition of high upflow and low forward airspeed. This condition is sometimes seen during quick-stop type maneuvers or during recoveries from autorotations. The following combinations of conditions are likely to cause settling in a vortex ring state:*

- 1. A vertical or nearly vertical descent of at least 300 feet per minute. (Actual critical rate depends on the gross weight, r.p.m., density altitude, and other pertinent factors.)*
- 2. The rotor system must be using some of the available engine power (from 20 to 100 percent).*
- 3. The horizontal velocity must be slower than effective translational lift. Some of the situations that are conducive to a settling with power condition are: attempting to hover out of ground effect at altitudes above the hovering ceiling of the helicopter; attempting to hover out of ground effect without maintaining precise altitude control; or downwind and steep power approaches in which airspeed is permitted to drop to nearly zero”.*

#### 1.18.3 Hire and fly schedule

During the investigation into this accident, the following discrepancies were found on the Hire and Fly Schedule: **(See Appendix A)**



- The total all up weight calculated by the pilot initially exceeded the maximum all up weight as prescribed within the POH. It seems like these figures were then manipulated to fall within the limits as stated in the POH.
- The accident aircraft registration numbers did not appear on the Hire and Fly Schedule, the form was manually adjusted to include the accident aircraft registration but the basic empty weight was never corrected under the aircraft registration.
- The pilot certified on the form he has flown the helicopter type within the preceding two months. According to the pilot's logbook, the last time he has flown this type of helicopter as pilot in command was on 1 November 2008 which was 33 months prior to the accident flight.

1.18.4 The pilot conducted several dual flights with an instructor:

Dual flight on 14 August 2010: This dual flight was flown with a Robinson R22. After completion of this dual flight, the instructor mentioned in the pilot's training file he is amazed a person could get a PPL with his standard of flying.

Dual flight on 4 September 2010: This dual flight was flown with a Robinson R22. After completion of this dual flight, the instructor mentioned the pilot is not fit for solo flying.

Comments written in the pilot's training file after the dual flights, indicate the pilot's inability to stabilize the helicopter during the hover flight.

On 1 August 2011, two days prior to the accident flight the pilot flew a dual check where after the instructor comments the pilot should have a dual instructor session before the next flight and he is not fit to fly without an instructor dual check on both the Robinson R22 and the R44 helicopters.

1.18.5 Neither the pilot nor the passenger interviewed recall any warning light or audio warning indicating the helicopter was in a low rotor rpm condition. However, the pilot mentioned as the helicopter start losing height, he used maximum power and increased forward speed but to no avail.

1.18.6 The weather was obtained from the pilot questionnaire which he obtained from the ATC at Cape Town International airport. The pilot reported gusty winds in the vicinity of the accident but mentioned the wind was not strong.

1.18.7 During the interview with the pilot, he indicated the wind direction on his approach before the accident as being North-easterly.

1.18.8 Flight control integrity was inspected after the accident and all damage to flight controls were as a result of the accident. No system failures could be found that could cause or contribute to this accident.

1.18.9 The right aft door was removed from the helicopter prior to the flight to accommodate the photographer. It could not be established who removed the door as no technical documentation was completed after the door was removed. The Civil Aviation Regulations Part 43.03.1, Maintenance records, stipulates any person who carries out maintenance on an aircraft shall record such maintenance.

## 1.19 Useful or Effective Investigation Techniques

1.19.1 None

## 2. ANALYSIS

- 2.1 The pilot was the holder of a Private Pilot License (Helicopter) that was valid at the time of the accident flight. He was also in possession of a valid medical certificate. Although properly licensed, the pilot did not maintained his competency to transport passengers by flying at least five (5) circuits with at least one take-off and landing in the ninety (90) days immediately preceding the accident flight on the Robinson R44 type helicopter.
- 2.2 Although in possession of a valid pilot license, the pilot was instructed by the Aviation Training Organization (ATO) not to do any solo flying on the Robinson R22 and R44 before he completed a dual instructor session satisfactorily.
- 2.3 The last solo flight conducted by the pilot on this type of helicopter was on 1 November 2008, which was 33 months before the accident flight. The total experience of the pilot on the Robinson R44 helicopter at the time of the accident was 25.8 hours, which makes him a low time pilot on type. His proficiency on type should there for be questioned as it increased the risk factor stipulated.
- 2.4 A weight calculation was done before the flight which indicated the aircraft was outside the maximum allowable weight limitation for take-off. It seems this calculation was then manipulated to fall within the allowable maximum gross weight. The take-off was then carried out with the helicopter outside the allowable limit as prescribed within the Pilot Operating Handbook (POH). Calculations done after the accident revealed the helicopter was outside the maximum gross weigh limitation at the time of the accident.

The greater the gross weight of the helicopter, the more lift (rotor thrust) will be required to hover or climb. The amount of lift available is proportional to the collective setting and its associated main rotor blade angle of attack. Therefore, the heavier the helicopter, the greater the power required to hover and sustained flight, there for the smaller the margin between the power required and the power available.

- 2.5 The final approach before the accident was done in a direction of 200M with a north easterly wind (of approximately 20 knots as reported by the pilot) meaning the approach was a downwind approach. Wind on the tail of a helicopter can make a huge difference to the power required to satisfactory control the rate of descent during an approach. Landing with a tailwind often results in an early increase in the power required which may mean that the power available may therefore exceed the power available.
- 2.6 Maintenance documents revealed the last mandatory periodic inspection (MPI) on the helicopter was certified on 31 May 2011 at 491.1 airframe hours by an SACAA approved aircraft maintenance organization (AMO) in possession of an approved AMO certificate at the time of the inspection. No technical defects other than those caused by the accident sequence could be found during the investigation after the

accident.

- 2.7 No evidence could be found indicating proper maintenance procedures was followed in the process of removing the right hand aft door as no maintenance documents was completed after the removal of the door. (Civil Aviation Regulations Part 43.03.1)
- 2.8 Except for a 20 knot wind as reported by the pilot, fine weather conditions prevailed at the time of the accident.

### **3. CONCLUSION**

#### **3.1 Findings**

- 3.1.1 The pilot was properly certified and qualified to fly the helicopter but was not competent to carry passengers as he did not fly the required amount of circuits within 90 days prior to the accident flight.
- 3.1.2 The pilot was also instructed by the ATO not to fly solo, however he disregarded this instruction and did a solo flight with passengers onboard.
- 3.1.3 The pilot did not fly this type of helicopter for at least 33 months as pilot-in-command before the accident flight.
- 3.1.4 The pilots' proficiency and experience could have prevented him from recognised the situation he was in before the accident.
- 3.1.5 The mass and balance calculation on the Hire and Fly schedule was manipulated to fall within the allowable limit for take-off.
- 3.1.6 The maximum gross weight was exceeded during the entire flight.
- 3.1.7 The helicopter had a valid Certificate of Airworthiness and was recorded as being serviceable at the time of the flight.
- 3.1.8 Unauthorised maintenance was done to the helicopter before the flight by removing the right hand rear door.
- 3.1.9 The tail wind condition that prevailed at the time of the accident had a definite influence on the accident with flight manoeuvres associated with this flight being dependant on a high power demand.

#### **3.2 Probable Cause/s**

- 3.2.1 Vortex ring state (settling with power) rendering ground impact inevitable.

#### **3.3 Contributing factors**

- 3.3.1 Lack of experience by the pilot on helicopter type.



**4. SAFETY RECOMMENDATIONS**

4.1 None

**5. APPENDICES**

5.1 Appendix A Weight and Balance from the Hire and Fly Schedule

Compiled by:

C Williams  
**For: Director of Civil Aviation**

Date: .....

Investigator-in-charge: .....

Date: .....

Co-Investigator: .....

Date: .....

**base4**

HELICOPTERS

Hire and Fly Schedule

|            |           |   |             |              |
|------------|-----------|---|-------------|--------------|
| Date & ETD | / / 20    | : | Pilot Name  | Henry Graham |
| Aircraft   | ZS- HTU   |   | Licence No. | 0271092050   |
| Route      | PA4 - PA4 |   |             | 31 8 20 11   |

\*

|                            |                   |            |
|----------------------------|-------------------|------------|
| Aircraft Basic Mass        | 1540              | lbs        |
| Fuel - main                | 96 149            | lbs        |
| Fuel - aux                 | 141 91            | lbs        |
| Pilot + baggage            | 183               | lbs        |
| Fwd left + baggage         | 190               | lbs        |
| Rear right + baggage       | 190               | lbs        |
| Rear left + baggage        | 170               | lbs        |
| Other                      |                   | lbs        |
| <b>Total All Up Weight</b> | <b>25063.2493</b> | <b>lbs</b> |

|          |          |          |          |     |
|----------|----------|----------|----------|-----|
| Aircraft | RRK      | RLG      | RVH      | HTU |
| B.E.W    | 858 lbs  | 864 lbs  | 1520 lbs |     |
| M.A.U.W  | 1370 lbs | 1370 lbs | 2500 lbs |     |

For RSD fuel weight use US Gallons as indicated on the fuel gauge with 50/50 split between tanks

| Aircraft | Main         | Aux          | Main        | Aux         | Main        | Aux        |
|----------|--------------|--------------|-------------|-------------|-------------|------------|
| R22      | 1/2 = 62 lbs | 1/2 = 34 lbs | 3/4 = 94 lb | 3/4 = 51 lb | F = 125 lbs | F = 70 lbs |
| R44      | 1/2 = 99 lbs | 1/2 = 59 lbs | 3/4 = 149lb | 3/4 = 91 lb | F = 199 lbs | F = 119lbs |

| Kilo / Lbs      | 1 kg = 2.2 lbs  |
|-----------------|-----------------|
| 05 kg = 11 lbs  | 60 kg = 132 lbs |
| 10 kg = 22 lbs  | 70 kg = 154 lbs |
| 30 kg = 66 lbs  | 80 kg = 176 lbs |
| 40 kg = 88 lbs  | 90 kg = 198 lbs |
| 50 kg = 110 lbs | 100kg = 220lbs  |

| 1 Litre = 0.26 USG 1 USG = 6.5 Lbs |            |            |
|------------------------------------|------------|------------|
| LTRS                               | US Gallons | Pounds Lbs |
| 10                                 | 2.6        | 17         |
| 20                                 | 5.3        | 34         |
| 30                                 | 7.9        | 52         |
| 40                                 | 10.6       | 69         |
| 50                                 | 13.2       | 86         |


**IMPORTANT** Emergency contact details of all passengers carried.

Passenger 1. Name: Peter GERMANSKI Emergency Tel: 0726700226  
 Passenger 2. Name: J. FEBRUARA Emergency Tel: 072-1592121  
 Passenger 3. Name: J. SUCIAPAL Emergency Tel: 0834500171

**GENERAL RULES:**

1. No passengers may embark or disembark whilst the blades are turning.
2. The helicopter may not be operated over water.
3. The helicopter may not be operated between the official sunset and sunrise hours without prior permission of the CFI.
4. Use only official heliport/stops unless an instructor has approved the proposed landing zones.

I hereby certify that the above aircraft meets all the safety requirements, I have flown the helicopter type within the preceding two months and am fully aware of the rules and conditions covering the hire and fly of helicopters managed by Base 4 Aviation (PTY) Ltd particularly with regards to any excess I might be liable for in case of an accident and wind speed limitation

Pilot's signature: 

Date: 3, 08, 2011