AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8657		
Aircraft Registration	**ZS-RHC**	**Date of Accident**	22 May 2009		**Time of Accident**	0833Z	
Type of Aircraft	Robinson R22 Beta		**Type of Operation**		Training		
Pilot-in-command Licence Type	Student		**Age**	42	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		30,7		Hours on Type	5,7	
Last point of departure	Grand Central Aerodrome (FAGC)						
Next point of intended landing	Grand Central Aerodrome (FAGC)						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
On grass next to taxiway "V" at FAGC							
Meteorological Information	Wind: 240/7kts, Temperature: 20C, Clouds: CAVOK						
Number of people on board	1 + 0	**No. of people injured**	1	**No. of people killed**	0		

Synopsis

The student pilot took off on an initial solo flight from Grand Central Aerodrome (FAGC). During the liftoff, he failed to compensate for weight and gravity shift and as a result the helicopter entered a dynamic rollover. Since it was very close to the ground, he was unable to recover from the situation.

The student pilot suffered a broken collar bone and rib.

The aircraft sustained substantial damage to the main rotor and skids, and the windscreen was shattered.

Probable Cause

The student pilot used a poor technique during liftoff, which resulted in the helicopter entering a dynamic rollover.

IARC Date		Release Date	

AIRCRAFT ACCIDENT REPORT

Name of Owner : Vesta Aviation Services (PTY)
Name of Operator : Air Training Services
Manufacturer : Robinson Helicopter Company
Model : R22 Beta
Nationality : South African
Registration Marks : ZS-RHC
Place : Grand Central
Date : 22 May 2009
Time : 0833Z

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 The flight instructor and student pilot took off from Grand Central Aerodrome (FAGC) for training purposes. The training included mast bumping, VNE limitations, centre of gravity consideration, cyclic limits and all ground emergencies, and was uneventful.

1.1.2 The flight instructor authorised the student pilot for his first solo consolidation. During the liftoff in a hover, the student pilot failed to compensate for weight and gravity shift and, as a result, the helicopter entered a dynamic rollover.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft sustained substantial damage.

Figure 1. The damaged helicopter.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	42
Licence Number	* * * * * * * * * *	Licence Type	Student		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	31 August 2009				
Restrictions	None				
Previous Accidents	None				

Flying experience:

Total Hours	30,7
Total Past 90 Days	5,7
Total on Type Past 90 Days	5,7
Total on Type	30,7

1.6 Aircraft Information

Airframe

Type	Robinson R22 Beta	
Serial Number	2596	
Manufacturer	Robinson Helicopter Company	
Year of Manufacture	1996	
Total Airframe Hours (at time of accident)	5 484,0	
Last MPI (Date & Hours)	28 April 2009	5 461,1
Hours since Last MPI	22,9	
C of A (Issue Date)	31 July 1996	
C of R (Issue Date) (Present Owner)	6 June 2008	
Operating Categories	Standard	

Engine

Type	Lycoming 0-360-J2A
Serial Number	L-34821-36A
Hours since New	5 484,0
Hours since Overhaul	473,4

1.7 Meteorological Information

1.7.1 Weather information as obtained from the pilot's questionnaire

Wind direction	240˚	Wind speed	7 kt	Visibility	>10 km
Temperature	20	Cloud cover	CAVOK	Cloud base	CAVOK
Dew point	Unknown				

1.8 Aids to Navigation

1.8.1 The aircraft was fitted with standard navigational instruments as approved by the regulator for this aircraft type. No abnormalities were reported prior to the accident.

1.9 Communications

1.9.1 The aircraft was fitted with standard communication equipment. No abnormalities were reported before the accident.

1.9.2 The pilot broadcasted his intentions to the air traffic controller on the frequency 122.8 MHz

1.10 Aerodrome Information

1.10.1 The accident occurred at a heliport.

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 main rotor struck the ground before the helicopter rolled over onto its right side.

Figure 2. The gouges made in the ground by the main rotor.

Figure 3. Front view of the damaged aircraft.

1.13 Medical and Pathological Information

1.13.1 The student pilot sustained minor injuries.

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 to be survivable as there was minimal damage to the cabin area and the pilot was properly restrained with the safety belt.

1.15.2 The emergency services responded to the scene immediately after being notified by the ATC. The student pilot was sent to hospital.

1.16 Tests and Research

1.16.1 None

1.17 Organisational and Management Information

1.17.1 This was a training flight. The training school had a valid aviation training organisation certificate issued on 4 November 2008 with an expiry date of 9 November 2009

1.17.3 The aircraft maintenance organisation (AMO) responsible for the maintenance of the aircraft had a valid certificate issued on 17 October 2008. The last audits prior to the accident were carried out on 27 February 2009 and 30 September 2008, and no major findings that could have contributed to the accident were identified.

1.18 Additional Information

1.18.1 The following information is extracted from the Rotorcraft Flying Handbook (FAA-H-8083-21) page 11.7 to 11.8:

1.18.1.1 Dynamic rollover

A helicopter is susceptible to a lateral rolling tendency, called dynamic rollover, when lifting off the surface. For dynamic rollover to occur, some factor has to first cause the helicopter to roll or pivot around a skid, or landing gear wheel, until its critical rollover angle is reached. Then, beyond this point, main rotor thrust continues the roll and recovery is impossible. If the critical rollover angle is exceeded, the helicopter rolls on its side regardless of the cyclic corrections made.

Dynamic rollover begins when the helicopter starts to pivot around its skid or wheel. This can occur for a variety of reasons, including the failure to remove a tiedown or skid securing device, or if the skid or wheel contacts a fixed object while hovering sideward, or if the gear is stuck in ice, soft asphalt, or mud. Dynamic rollover may also occur if you do not use the proper landing or takeoff technique or while performing slope operations. Whatever the cause, if the gear or skid becomes a pivot point, dynamic rollover is possible if you

do not use the proper corrective technique.

Once started, dynamic rollover cannot be stopped by application of opposite cyclic control alone. For example, the right skid contacts an object and becomes the pivot point while the helicopter starts rolling to the right. Even with the full left cyclic applied, the main rotor thrust vector and its moment follows the aircraft as it continues rolling to the right. Quickly applying down collective is the most effective way to stop dynamic rollover from developing. Dynamic rollover can occur in both skid- and wheel-equipped helicopters, and all types of rotor systems.

1.18.1.2 Normal takeoffs and landings

Dynamic rollover is possible even during normal takeoffs and landings on relatively level ground, if one wheel or skid is on the ground and thrust (lift) is approximately equal to the weight of the helicopter. If the takeoff or landing is not performed properly, a roll rate could develop around the wheel or skid that is on the ground. When taking off or landing, perform the manoeuvre smoothly and trim the cyclic so that no pitch or roll movement rates build up, especially the roll rate. If the bank angle starts to increase to an angle of approximately 5° to 8° and full corrective cyclic does not reduce the angle, the collective should be reduced to diminish the unstable rolling condition.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1 The student pilot had a valid licence and the type rating was endorsed in his licence. He had a valid medical certificate at the time of the accident.

2.2 During the liftoff in a hover, the student pilot failed to compensate for weight and gravity shift, and the helicopter entered a dynamic rollover. Dynamic rollover is possible even during normal takeoffs and landings on relative level ground, if one wheel or skid is on the ground and thrust (lift) is approximately equal to the weight of the helicopter. If the takeoff or landing is not performed properly, a roll rate could develop around the wheel or skid that is on the ground.

2.3 The helicopter sustained substantial damage to the main rotor blades and skids, and the windscreen was shattered. The aircraft was properly maintained and, according to available documentation, did not exhibit any defect or malfunction that could have contributed to or caused the accident.

2.3 The available information revealed that fine weather conditions prevailed in the area at the time of the accident flight. It was therefore concluded that weather was not a contributory factor to the accident.

3. CONCLUSION

3.1 Findings

3.1.1 The student pilot had a valid student pilot's licence and was properly rated at the time of the accident.

3.1.2 The student pilot had a valid medical certificate with no restrictions.

3.1.3 The helicopter was properly maintained.

3.1.4 The helicopter had a valid certificate of airworthiness and certificate of registration.

3.1.5 Weather was not a contributory factor to the accident.

3.1.6 The left skid of the helicopter touched the ground, resulting in a dynamic rollover.

3.2 Probable Cause/s

3.2.1 The student pilot used a poor technique during liftoff, which resulted in the helicopter entering a dynamic rollover.

4. SAFETY RECOMMENDATIONS

4.1 None.

5. APPENDICES

5.1 None.

Report reviewed and amended by the Advisory Safety Panel on 20 July 2010

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