SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Occurrence Investigation**

Form Number: CA 12-12a

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8297		
Aircraft Registration	**ZS-RTZ**	**Date of Accident**	13 May 2007		**Time of Accident**	1400Z	
Type of Aircraft	Robinson R22 Beta II		**Type of Operation**		Private		
Pilot-in-command Licence Type	Private		**Age**	41	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		195.4		Hours on Type	187	
Last point of departure	Wonderboom Aerodrome (FAWB)						
Next point of intended landing	Wonderboom Aerodrome (FAWB)						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
On a farm 5 nm north of the Carousel Casino at S25 15.423 E02817.723							
Meteorological Information	**Surface wind:** northerly and light; **Visibility:** CAVOK; **Temperature:** 26˚C						
Number of people on board	1 + 1	**No. of people injured**	Nil		**No. of people killed**	Nil	

Synopsis

The pilot was on a local private flight from Wonderboom to Warmbaths and back when the accident occurred. The outbound leg was uneventful. However, on the inbound leg about 5 nm north of the Carousel Casino, while flying at low-level at approximately 45 kts, the pilot noticed that the clutch actuator light had come on. The light stayed on and he reacted by lowering the collective.

The light then went off, but was followed by the low rotor RPM warning. The pilot immediately flared aggressively using the aft cyclic, and this resulted in the tail section striking the ground, followed by the right skid. The helicopter came to rest leaning to the right and facing in a westerly direction.

The aircraft sustained extensive damage to the fuselage, skids, main rotor, tail rotor and tailboom.

The occupants survived the accident without injuries.

Probable Cause

Incorrect technique used by the pilot in response to the clutch light warning.

IARC Date		Release Date	

SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Occurrence Investigation**
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Form Number: CA 12-12a

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Private
Manufacturer : Robinson
Model : R22 Beta
Nationality : South African
Registration Marks : ZS-RTZ
Place : Pienaarsrivier
Date : 13 May 2007
Time : 1400Z

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 pilot was on a local private flight from Wonderboom to Warmbaths and back when the accident occurred. The outbound leg was uneventful. However, on the inbound leg about 5 nm north of the Carousel Casino, while flying at low level at about 45 kts, the pilot noticed that the clutch actuator light had come on. The light stayed on and he reacted by lowering the collective.

1.1.2 The light then went off but was followed by the low rotor RPM warning. The pilot immediately flared aggressively using the aft cyclic, and this resulted in the tail section striking the ground, followed by the right skid. The helicopter came to rest leaning to the right and facing in a westerly direction.

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 was substantially damaged.

Figure 1: Rear view of the damaged helicopter at the crash site.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	41
Licence Number	**********	Licence Type	Private		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	6 September 2007				
Restrictions	Next electrocardiogram test (ECG) 2008				
Previous Accidents	Nil				

Flying Experience

Total Hours	195.4
Total Past 90 Days	35.1
Total on Type Past 90 Days	30.5
Total on Type	187.0

1.6 Aircraft Information

1.6.1 Airframe

Type	Robinson R22 Beta	
Serial Number	3530	
Manufacturer	Robinson	
Date of Manufacture	2003	
Total Airframe Hours (At time of Accident)	1 147	
Last MPI (Date & Hours)	4 May 2007	1 101
Hours since last MPI	46	
C of A (Issue Date)	30 May 2004	
C of R (Issue Date) (Present Owner)	5 September 2006	
Operating Categories	Standard	

1.6.2 Engine

Type	Lycoming
Serial Number	L-39370-36A
Hours since New	1 147
Hours since Overhaul	TBO not yet reached

1.7 Meteorological Information

1.7.1 Weather information as reported by the pilot:

Wind direction	Northerly	Wind speed	Light	Visibility	+10 km
Temperature	26℃	Cloud cover	None	Cloud base	None
Dew point	Unknown				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as approved by the regulator for the aircraft type and there were no recorded defects prior to or during the flight.

1.9 Communications

1.9.1 The aircraft was equipped with standard communication equipment as approved by the regulator for the aircraft type and there were no recorded defects prior to or during the flight.

1.9.2 There was no communication made with air traffic control as the aircraft was operating in uncontrolled airspace.

1.10 Aerodrome Information

1.10.1 The accident did not happen at, or in close proximity to, an aerodrome.

1.10.2 The helicopter came down on open grassland on a farm near Pienaarsrivier in the Limpopo Province at S25 ˚15.423´ E028˚17.723´.

1.11 Flight Recorders

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

1.12 Wreckage and Impact Information

1.12.1 The tail section struck the ground first, followed by the right skid. The helicopter came to rest leaning to the right and facing in a westerly direction. It sustained damage to the main rotor blades, fuselage, skids, tail boom and tail rotor.

Figure 2. Right-hand side of the helicopter.

1.13 Medical and Pathological Information

1.13.1 None was considered necessary or relevant to this accident.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The accident was survivable, as both pilot and passenger were properly restrained.

1.15.2 All seats, safety belts, harnesses and the cabin itself remained intact. In addition, impact forces were low.

1.15.3 The occupants evacuated the helicopter unassisted.

1.16 Tests and Research

1.16.1 The Pilot Operating Handbook states that "the clutch light may come on momentarily during run-up or during flight to re-tension the belts as they warm up and stretch slightly. This is normal. If, however, the light flickers or comes on in flight and does not go out within 4 or 5 seconds, pull the clutch circuit breaker, reduce power, and land immediately. Be prepared to enter autorotation. Inspect drive system for a possible malfunction".

1.16.2 According to the Robinson maintenance manual for the R22 series, it is normal for the clutch actuator to come on for 1-6 seconds during flight as it re-tensions the drive belts. However, if the clutch actuator comes on for over 6 seconds, the probable causes could be the following:

i. The drive belts were stretched beyond the limit of the actuator overtravel switch and the belts must be replaced.
ii. The actuator overtravel switch was activated by outside force

1.16.3 The following safety notice was also issued in 1994 by the manufacturer regarding the clutch warning light:

"It is normal for the clutch light to occasionally come on while in flight for a short time period (varies between aircraft, but is usually not more than 3 or 4 seconds) to re-tension the vee-belts as they become warm and stretch slightly. However, if the clutch light flickers or stays on for a longer time than usual, it can indicate a belt or bearing failure in the vee-belt drive. If that occurs, immediately pull the CLUTCH circuit breaker. Select the closest safe landing site and make a normal power-on landing. Be prepared to enter autorotation should failure of the drive system occur. The smell of burning rubber may also indicate an impending belt failure. After landing, perform a normal shutdown. Check the vee-belt drive to insure that the belts are in their grooves and not broken or deteriorating. Check the upper and lower actuator bearings for seal damage. Also check the Telatemp indicator readings. If there is seal damage or the temperature reading is unusually high, have the aircraft inspected by a mechanic before further flight."

1.16.4 An on-site visual inspection was performed and the following was ascertained:

i. The vee-belt drive showed that the belts were in their grooves and there were no signs of deterioration.
ii. The upper and lower actuator bearings showed no signs of seal damage.
iii. The Telatemp indicator showed no anomalies or high temperature.

1.17 Organisational and Management Information

1.17.1 The aircraft had a valid certificate of airworthiness and a valid certificate of registration.

1.17.2 The last mandatory periodic inspection (MPI) prior to the accident was carried out on 4 May 2007 at a total of 1 101.0 airframe hours, and certified by the relevant aircraft maintenance organisation.

1.17.3 The maintenance organisation was in possession of a valid AMO Approval, with an expiry date of 31 January 2008.

1.18 Additional Information

1.18.1 None.

1.19 Useful or Effective Investigation Techniques

1.19.1 None considered necessary.

2. ANALYSIS

2.1. The pilot was correctly licensed and qualified for the flight in accordance with the existing regulations.

2.2. The helicopter was in a serviceable condition prior to and during the flight, according to the owner, and no defect or malfunction was recorded that could have contributed to or have caused the accident.

2.3. Fine weather conditions with a northerly and light surface wind prevailed at the time of the flight and were not considered to have had a bearing on the accident.

2.4. During the investigation, it could not be established how long the clutch actuator had came on during flight as the pilot admitted that he had forgotten the exact details which led to the accident.

2.5. Since the pilot mentions the fact that the clutch light went off following the lowering of the collective and no anomalies could be seen on the vee-belt drive, actuator bearings and Telatemp indicator, it can be concluded that the clutch warning could have come on for less than six seconds. As stated in the POH, this is considered a normal operation of the actuator as it re-tensions drive belts.

2.6. As set out in 1.16.1 above, the POH emergency landing procedure is to be followed only if the clutch light stays on for six seconds or longer. The pilot applied the wrong technique in this case by lowering the collective before six seconds was up.

2.7 It can be concluded that the pilot's concentration was disturbed by the clutch actuator light and as a result, he allowed the main rotor rpm to decay.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot was in possession of a valid pilot's licence at the time of the accident.

3.1.2 The pilot had never been involved in any serious incident or accident prior to this accident.

3.1.3 The aircraft had a valid certificate of registration and a valid certificate of airworthiness.

3.1.4 The maintenance records indicated that the helicopter was maintained in accordance with the existing SACAA regulations and procedures

3.1.6 The aircraft maintenance organisation (AMO) was in possession of a valid approval, with an expiry date of 31 January 2008.

3.1.7 The clutch light warning came on for less than six seconds.

3.1.8 The pilot responded too quickly to the clutch warning light by lowering the collective before six seconds was up.

3.1.9 The technique used by the pilot in response to the clutch warning light was incorrect.

3.1.10 No anomalies could be seen on the vee-belt drive, actuator bearings or Telatemp indicator.

3.2 Probable Cause/s

3.2.1 The accident was attributed to the incorrect technique used by the pilot in response to the clutch warning light.

4. SAFETY RECOMMENDATIONS

3.1.1 None considered necessary.

5. APPENDICES

4.1.1 None.

Report reviewed and amended by the Advisory Safety Panel on 19 January 2010

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