

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8816	
Aircraft Registration	ZS-RME	Date of accident	02 July 2010		Time of Accident	1345Z
Type of Aircraft	Eurocopter EC 120B		Type of Operation	Training		
Pilot-in-command Licence Type	Airline transport	Age	43	Licence Valid	Yes	
Pilot-in-command Flying Experience	Total Flying Hours	6 895.4		Hours on Type	75.6	
Last point of departure	Cape Town international airport - FACT (Western Cape province).					
Next point of intended landing	Cape Town international airport – FACT (Western Cape province).					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
General fling area at GPS position determined as South 33° 58' 12.34" East 18° 36' 34.30".						
Meteorological Information	Surface wind 190° @ 5 knots, temperature 22°C, visibility +10 km.					
Number of people on board	1 + 1	No. Of people injured	0	No. Of people killed	0	
Synopsis	<p>The helicopter with two certified pilots was involved in a training flight under Visual Flight Rules (VFR) by day. Both pilots performed a comprehensive pre-flight inspection and the aircraft was uplifted with aviation gasoline Jet A1. Take-off was normal and the aircraft headed towards Cape Town International general flying (GF) area for training purpose. It was a 6th –monthly operator's proficiency check (OPC) for the co-pilot (A trainee at the time of the accident). They started with the simulation of hydraulic failure followed by three simulated engine failure in hover. They climbed to 1000 feet above ground level (AGL) for autorotation practices. The first autorotation went well with the instructor closing the twist grip to ground idle and the trainee going into autorotation. The instructor again opened the twist grip to flight position during flare. The second autorotation was from a downwind position at 1000 feet AGL. The instructor closed the twist grip to ground idle and the trainee went into autorotation. The instructor looked at the Main rotor and Engine N2 (NR/NF) gauge and checked if the main rotor Revolution per Minute (RPM) was under control. The instructor then noticed that the engine RPM was winding down below normal idle indication. The instructor informed the trainee that they have lost an engine and the trainee continued with the normal procedures for autorotation till touchdown. On touchdown the aircraft still had a forward motion, skidded for approximately 3 meters. The speed reduced quite quickly as the skids dug into the soft terrain and the tail boom was chopped off by the main rotor. The aircraft was substantially damaged and no one was injured.</p>					
Probable Cause						
Unsuccessful autorotation resulting into hard landing due to undetermined loss of engine power.						
IARC Date		Release Date				

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Titan Helicopters
Manufacturer : Eurocopter
Model : Eurocopter EC 120B
Nationality : South African
Registration Marks : ZS-RME
Place : Cape Town International
Date : 02 July 2010.
Time : 1345Z

All times given in this report is 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 helicopter with two licensed pilots was involved in a training flight under Visual Flight Rules (VFR) by day. Both pilots performed a comprehensive pre-flight inspection and the aircraft was uplifted with aviation gasoline Jet A1. Take-off was normal and the aircraft headed towards Cape Town International general flying (GF) area for training purpose. It was a 6th –monthly operator's proficiency check (OPC) for the co-pilot (trainee at the time of the accident). They started with the simulation of hydraulic failure followed by three simulated engine failure in hover. They climbed to 1000 feet above ground level (AGL) for autorotation practices. The first autorotation went well with the instructor closing the twist grip to ground idle and the trainee going into autorotation. The instructor again opened the twist grip to flight position during flare. The second autorotation was from a downwind position at 1000 feet AGL.

1.1.2 The instructor closed the twist grip to ground idle and the trainee went into autorotation. The instructor looked at the Main rotor and Engine N2 (NR/NF) gauge and checked if the main rotor Revolution per Minute (RPM) was under control. The instructor then noticed that the engine RPM was winding down below normal idle indication. The instructor informed the trainee that they have lost an engine and the trainee continued with the normal procedures for autorotation till touchdown. On touchdown the aircraft still had a forward motion, skidded for approximately 3 meters. The speed reduced quite quickly as the skids dug into the soft terrain and the tail boom was chopped off by the main rotor. Debris was noticed flying out to the left of the aircraft and the aircraft was substantially damaged.

1.1.3 The airport Air Traffic Control (ATC) was notified of the situation and the airport crash alarm was immediately activated. The airport fire and rescue services dispatched to the accident site and both pilots vacated the aircraft unharmed. The accident happened during daylight conditions at GPS position determined to be S33° 58' 12.34" E18° 36' 34.30".

1.2 Injuries to persons:

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	2	-	-	-

1.3 Damage to aircraft:

1.3.1 The main rotor blades made contact with the tail boom and the tail boom was chopped off. The main rotor blades were damaged, the pitot tube was damaged and the right hand wind screen broke during the accident sequence. **Note:** In order to determine the full extent of the damage, the helicopter would have to undergo extensive inspection due to the unknown stresses placed on the airframe and the skids.



Figure 1: View of the helicopter at the accident site.

1.4 Other damage:

1.4.1 Nil.

1.5 Personnel information:

Trainee: (Pilot flying).

Nationality	South African	Gender	Male	Age	43
Licence Number	#####	Licence Type	Airline transport		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Night Rating, Instrument Rating, Instructor Rating, Under Sling, Winching and Test pilot rating.				
Medical Expiry Date	31 October 2010				
Restrictions	None				
Previous Accidents	Nil				

Flying experience:

Total Hours	6895.4
Total Past 90 Days	5.7
Total on Type Past 90 Days	51.0
Total on Type	75.6

Instructor: (Pilot not flying).

Nationality	South African	Gender	Male	Age	57
Licence Number	#####	Licence Type	Airline transport		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Night Rating, Instrument Rating, Instructor Rating, Under Sling, Winching and Test pilot Rating.				
Medical Expiry Date	30 September 2010				
Restrictions	Corrective lenses				
Previous Accidents	Nil				

Flying experience:

Total Hours	±10400
Total Past 90 Days	10
Total on Type Past 90 Days	0.4
Total on Type	±600

1.6 Aircraft information:

Aircraft description:

An EC 120B is a medium five-seat helicopter, powered with a three-blade rotor system. It is manufactured in Turbomecca France and frequently used as a low-cost aircraft.

Airframe:

Type	EC 120B	
Serial No.	1132	
Manufacturer	Eurocopter	
Date of Manufacture	2000	
Total Airframe Hours (At time of accident)	2149.8	
Last MPI (Hours & Date)	2139.4	07 April 2010
Hours since Last MPI	10.4	
C of A (Issue Date)	29 September 2000	
C of A (Expiry Date)	28 September 2010	
C of R (Issue Date) (Present owner)	03 October 2010	
Operating Categories	Standard	
A'D and S'B Status	Complied	
Aircraft Weight	1800 kg	
Recommended fuel used	Jet A1	

Note: The last MPI (Mandatory periodic inspection) that was carried out on the helicopter prior to the accident was certified at 2131.4 hours on 07 April 2010 by the AMO (Aircraft Maintenance Organisation). The person who certified the task held a valid approved person accreditation from the CAA as well as an AME (Aircraft Maintenance Engineer) licence.

Previous Accidents and Incidents	<p>On 10 October 2001 at 1150Z. The fuel vehicle was parked next to the helicopter and a gust of wind rotated the main rotor blades which subsequently made contact with the fuel vehicle's roll bar.</p> <p>On 03 December 2001 at Grand Central aerodrome (1500Z). After shut down before the pilot pulled the rotor brake, he opened the pilot door and the wind pulled the door fully opened damaging the door and the window.</p>
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Engine:

Type	Turbomecca Arriuss 2F
Serial No.	34143
Hours since New	2149.4
Hours since Overhaul	Not reached

1.7 Meteorological information:

1.7.1 The following weather information was obtained from the pilot questionnaires.

Wind direction	190°	Wind speed	5 Knots	Visibility	10km
Temperature	22°C	Cloud cover	Few	Cloud base	10.000
Dew point	10°C				

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.

1.9 Communications:

1.9.1 No difficulties with communications were known or reported prior to the accident. No malfunction of any of the equipment was reported at the time of the accident.

1.10 Aerodrome information:

Aerodrome Location	Cape Town International	
Aerodrome Co-ordinates	S33° 58'05.2" E018° 36'16.7"	
Aerodrome Elevation	151 feet AMSL	
Aerodrome Status	Licensed	
Runway Designations	01/19	3 322 x 300
Runway Dimensions	16/34	1 820 x 150
Runway Used	Runway 34	
Runway Surface	Asphalt	
Approach Facilities	PAPI, NDB, ILS, VOR, DME, Runway lighting	

1.11 Flight recorders:

1.11.1 The helicopter was not fitted with a flight data recorder (FDR) or a cockpit voice recorder (CVR), neither was it required in terms of the South African Civil Aviation Regulations to be fitted to this aircraft type.

1.12 Wreckage and impact information:

1.12.1 The aircraft landed on threshold runway 34 and after landing the tail boom was chopped off. The wind screen was damaged, pitot tube was damaged and the main rotor blades were damaged during the accident sequence. The position of the twist grip was on fully open position (flight idle) at the time of inspection and the indication on the fuel control unit (FCU) quadrant was on 60°.



Figure 2: Position of the twist grip as found after the accident.

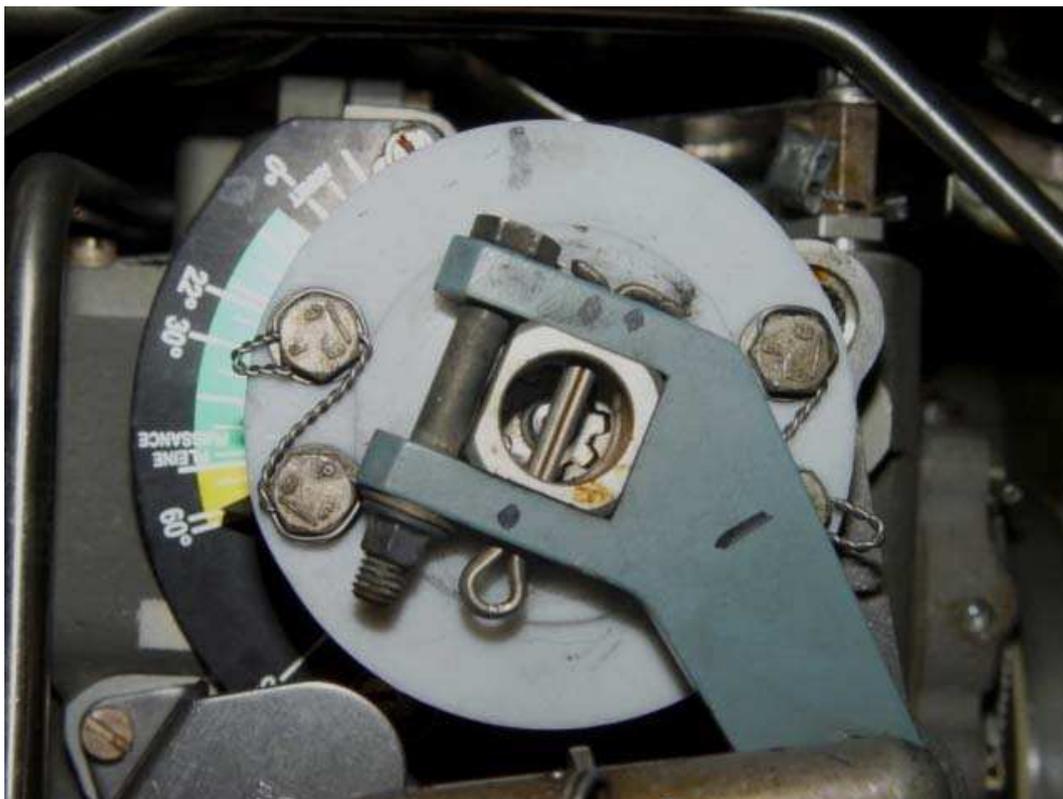


Figure 3: Quadrant position on 60°.

1.12.2 The fuel shut off valve was found in OFF/Closed position.



Figure 4: View of the fuel shut off valve on the aircraft cockpit roof.

1.13 Medical and pathological information:

1.13.1 Both pilots sustained no injuries as result of this accident.

1.14 Fire:

1.14.1 There was no evidence of pre- and post-impact fire

1.15 Survival aspects:

1.15.1 The accident was considered survivable because both occupants were properly restrained and secured by making use of safety harnesses.

1.15.2 The cockpit/cabin area remained intact after the accident sequence.

1.16 Tests and research:

1.16.1 After the accident the aircraft was recovered by a crane to the hanger where further investigation were carried out by two certified Engineers under the auspices of the SA CAA accident investigators.

INSPECTIONS PERFORMED:

- They checked if they could turn the twist grip to off position without powering the aircraft and it was not possible.

- The aircraft was energized and again they tried to turn the twist grip without activating the solenoid and it was not possible.
- Power turbine rotation was free without evidence of metal spatter, blade tip rubbing or visual evidence of over temperature and showed a positive connection to the main gear box drive.
- Functioning of the cyclic and collective controls confirmed that the control systems from the pilot inputs to the hydraulic servos were correctly connected and capable of functioning appropriately.
- With the battery selected 'ON' it was noted that appropriate pitch change movement of the blade roots took place when the cyclic and collective controls were operated.
- They activated the solenoid and turned the twist grip to off position and the indication on the quadrant was +1 degrees. See figure 5 below.

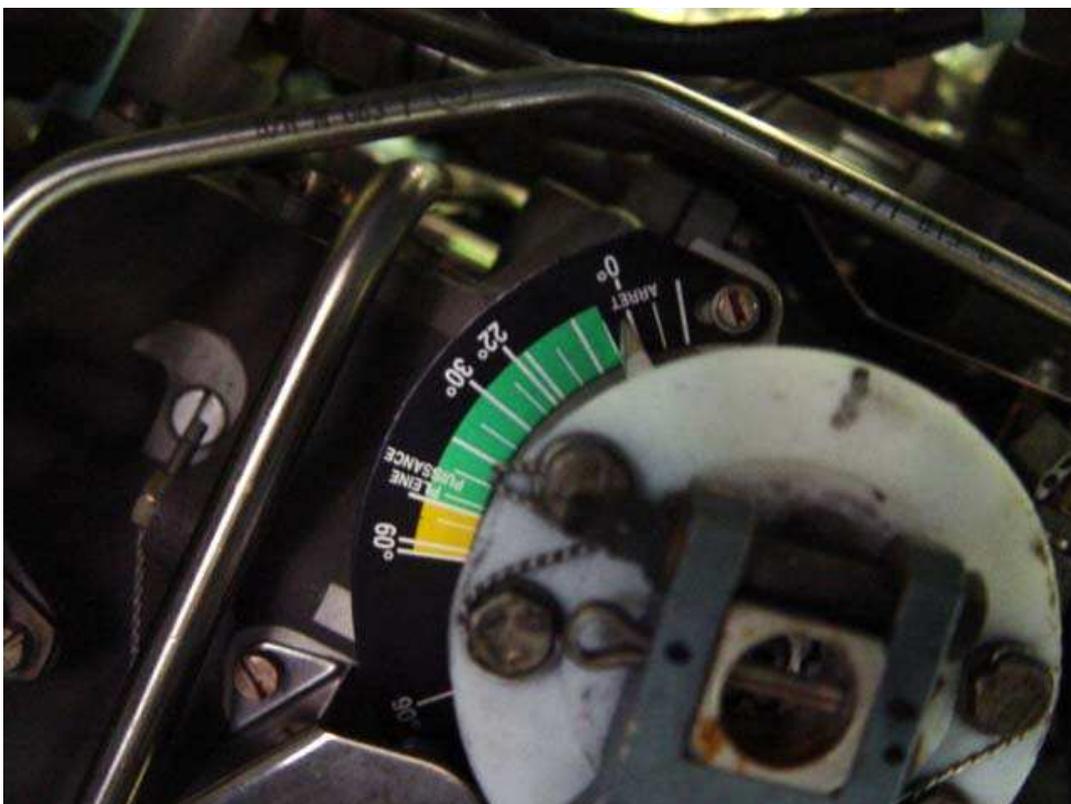


Figure 5: View of the fuel control unit (FCU) quadrant.

- The operation of the anticipator was checked and found operating normally.
- When moving the collective up and down and checking the indication on the quadrant of the anticipator, the reaction was normal.
- The twist grip was moved to idle position and the indication on the quadrant was 28°. See figure 6 and 7 below.



Figure 6: Twist grip at idle position.

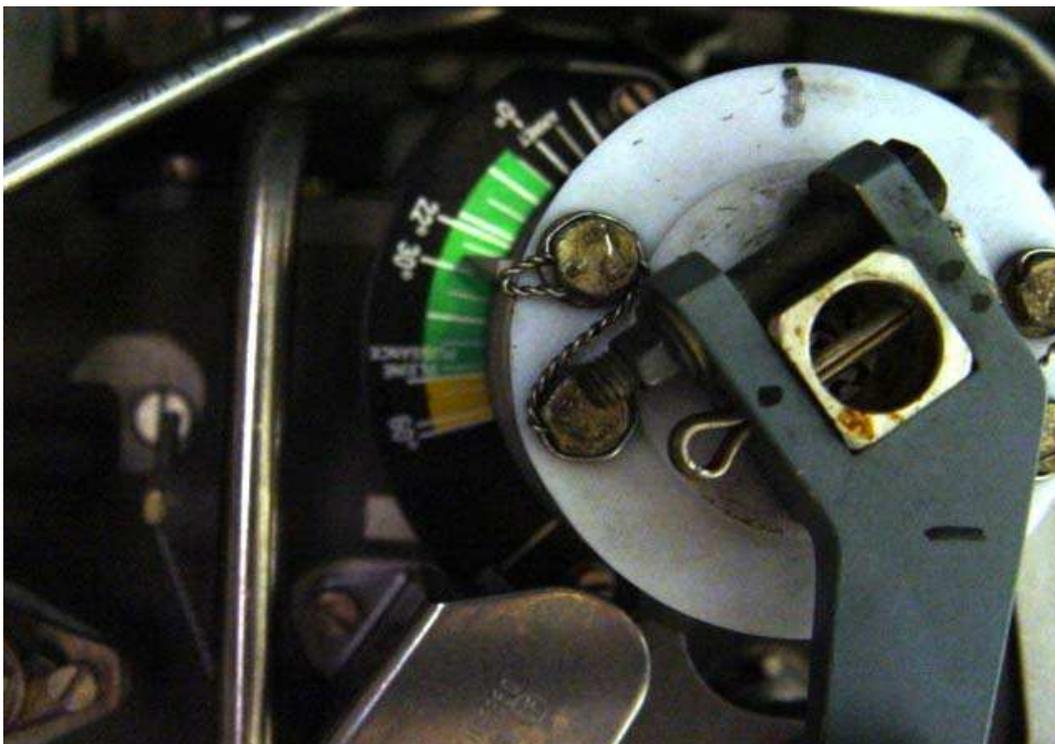


Figure 7: View of the fuel control unit (FCU) quadrant at 28°.

- Fuel sample from the fuel tank and from the fuel filter bowl were taken and analysed > no anomaly found.
- Both fuel filters on the engine were removed and inspected > no anomaly found.

- The airframe fuel strainer was free from any contamination.
- FCU control lever input connection satisfactory.
- Aircraft booster pump activated and no fuel leaks noticed.
- Anticipator input connection satisfactory.
- The rigging of the fuel control was found to be in compliant with the settings specified.
- Oil tank sump electrical magnetic plug was contamination free.
- Engine oil filter was removed and inspected > no anomaly was found.
- Oil above minimum level.
- No evidence of any in-flight fuel or oil leaks.
- The free rotation of the compressor was checked > smooth rotation with no rubbing.
- Boroscopic inspection did not show any evidence of abnormal carbon accumulation or any sign to suspect adverse combustion.

1.17 Organisational and management Information:

1.17.1 This was a training flight.

1.17.2 The last MPI (Mandatory periodic inspection) that was carried out on the helicopter prior to the accident was certified at 2131.4 hours on 07 April 2010 by the AMO (Aircraft Maintenance Organisation). The person who certified the task held a valid approved person accreditation from the CAA as well as an AME (Aircraft Maintenance Engineer) licence.

1.18 Additional information:

1.18.1 None.

1.19 Useful or effective investigation techniques:

1.19.1 None.

2 ANALYSIS:

2.1 Available information indicated that fine weather conditions prevailed in the area at the time of the flight and subsequent accident. The prevailing weather conditions were therefore not considered to have had any bearing on the accident.

- 2.2 The helicopter was properly maintained and no documented evidence was found indicating any defect or malfunction of the helicopter prior the flight that could have contributed to or caused the accident. The helicopter had flown a total of 10.4 hours since the last maintenance inspection was certified.
- 2.3 Both pilots held a valid pilot's licences as well as valid aviation medical certificates that were issued by a SA CAA accredited medical examiner. After the accident the helicopter was recovered to a facility where various tests and analysis were carried out and the investigation did not reveal any deficiencies. Both pilots held valid pilot's licences as well as valid aviation medical certificates that were issued by an SACAA-accredited medical examiner. After the accident, the helicopter was recovered to a facility where various tests and analyses were carried out, and the investigation did not reveal any deficiencies.
- 2.4 The IIC proposed to the regulator that the engine be shipped to France for further analysis (test cell run), but this was not approved. In conclusion, the investigation could not establish any conclusive reason why the engine stopped/flamed out; however, unintentional shut-down of the engine could not be eliminated as a possible or contributing factor to this accident.

3. CONCLUSION:

3.1 Findings:

- i. Both pilots had Airline transport licences with the aircraft type endorsed in their logbooks.
- ii. The pilots were involved in a training flight under Visual flight Rules (VFR) by day.
- iii. Both pilots had ratings at the time of the accident.
- iv. The weather conditions were favorable for VFR flight.
- v. The Instructor's medical was valid with restrictions to put on Corrective lenses at the time of the accident.
- vi. The aircraft was involved in two (2) incidents.
- vii. All control surfaces were accounted for and there was no evidence of any defect or malfunction on the aircraft that could have contributed or have caused the accident.
- viii. The accident was considered survivable.

3.2 Probable cause/s:

3.2.1 Unsuccessful autorotation resulting into hard landing due to undetermined loss of engine power.

3.3 Appendices:

3.3.1 Nil.

4. SAFETY RECOMMENDATIONS:

4.1 None.

Compiled by:

Frans Motaung

for the Commissioner for Civil Aviation

Date:

Investigator-in-charge:

Date:

Co-investigator:

Date: