



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/7952	
Aircraft Registration	ZS-BTO	Date of Accident	24 April 2005		Time of Accident	0850Z
Type of Aircraft	Chipmunk		Type of Operation		Private	
Pilot-in-command Licence Type		Commercial	Age	43	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	1 154.8		Hours on Type	8
Last point of departure		What's Landing (Eastern Cape)				
Next point of intended landing		What's Landing (Eastern Cape)				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
What's Landing (Eastern Cape)						
Meteorological Information		Temperature: 17°C; Wind: 320°/10 kts; Visibility: 10 km+				
Number of people on board	1 + 1	No. of people injured	2	No. of people killed	0	
Synopsis						
<p>On 24 April 2005, the pilot, accompanied by a passenger, took off from What's Landing private aerodrome on a pleasure flight in the area. The pilot stated that after executing a few orbits over the Nature Reserve of Kwelere river mouth, he returned to What's Landing and flew four circuits on runway 30. He then flew up the coast towards Cintsu, climbing to 1 500 feet above mean sea level (AMSL).</p> <p>On the return flight to What's Landing, the pilot did steep turns and practised rolling on point co-ordination; thereafter, he initiated a slow descent with 1 notch of flap, ¼ throttle and carburettor heat. On final approach to runway 30 at What's Landing, the pilot realised that his approach was too high and elected to execute a 360° orbit to the right in order to lose altitude. On base leg, he opened the throttle marginally, and while turning onto long final approach he realised that the aircraft was sinking faster than desired.</p> <p>He slowly opened the throttle; the engine responded by spluttering, then surged and stopped completely. After numerous unsuccessful attempts to restart it, the pilot concentrated on looking for a suitable place to execute a forced landing, and decided on some thick bushes. He pulled the throttle back (there was still no power) and rounded out, mashing into the bush. The aircraft skidded for 30 metres before coming to a halt.</p> <p>According to available records, the last Mandatory Periodic Inspection (MPI) prior to the accident was certified on 4 February 2005 at 6 658.0 total airframe hours. The aircraft had flown a further 26.7 hours since then.</p>						
Probable Cause						
Engine failure, probably due to carburettor icing.						
IARC Date	27 May 2008		Release Date			



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : DH Chipmunk CC
Manufacturer : De Havilland
Model : DHC-1-22
Nationality : South African
Registration Marks : ZS-BTO
Place : What's Landing (Eastern Cape)
Date : 24 April 2005
Time : 0850Z

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 On 24 April 2005, the pilot, accompanied by a passenger, took off from What's Landing private aerodrome on a pleasure flight in the area. The pilot stated that after executing a few orbits over the Nature Reserve of Kwelere river mouth, he returned to What's Landing and flew four circuits on runway 30. He then cruised up the coast towards Cintsa, climbing to 1 500 feet above mean sea level (AMSL).
- 1.1.2 On the return flight to What's landing, the pilot did steep turns and practised rolling on point co-ordination; thereafter he initiated a slow descent with 1 notch of flap, ¼ throttle and carburettor heat. On final approach for runway 30 at What's Landing, the pilot realised that his approach was too high and elected to execute a 360° orbit to the right in order to lose altitude. On base leg, he opened the throttle marginally, and while turning onto long final approach he realised that the aircraft was sinking faster than desired.
- 1.1.3 He slowly opened the throttle; the engine responded by spluttering, then surged and stopped completely. After numerous unsuccessful attempts to restart it, the pilot concentrated on looking for a suitable place to execute a forced landing, and decided on thick bush. He pulled the throttle back (there was still no power) and rounded out, mushing into the bush. The aircraft skidded for 30 metres before coming to a halt.
- 1.1.4 The accident occurred in daylight conditions.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft sustained damage to the undercarriage, fuselage and engine cowling.

1.4 Other Damage

1.4.1 There was some damage to the surrounding vegetation.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	43
Licence Number	*****	Licence Type	Commercial		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Instrument, Tug pilot and Night ratings				
Medical Expiry Date	30 November 2005				
Restrictions	Corrective lenses				
Previous Accidents	None				

Flying Experience

Total Hours	1 154.8
Total Past 90 Days	28.8
Total on Type Past 90 Days	8
Total on Type	8

1.6 Aircraft Information

Airframe

Type	De Havilland	
Serial Number	C1/0360	
Manufacturer	De Havilland	
Year of Manufacture	1951	
Total Airframe Hours (at time of accident)	6 684.7	
Last MPI (Date & Hours)	4 February 2005	6 658.0
Hours since Last MPI	26.7	
C of A (Issue Date)	4 June 2004	
C of R (Issue Date) (Present Owner)	20 May 2004	
Operating Categories	Standard	

Engine

Type	Gipsy Major 10
Serial Number	11425/A640612
Hours since New	1 272.9
Hours since Overhaul	TBO not reached

Propeller

Type	Hoffmann
Serial Number	78435
Hours since New	165.3
Hours since Overhaul	TBO not reached

1.7 Meteorological Information

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

Wind direction	320°	Wind speed	10 kts	Visibility	10 km+
Temperature	17°C	Cloud cover	SCT	Cloud base	2 000ft
Dew point	13°C				

No official weather observations at the exact time and place of the accident are available, but the most likely weather conditions are as shown in the table above.

1.8 Aids to Navigation

- 1.8.1 The aircraft was fitted with standard navigational equipment and none was reported unserviceable prior to the flight.

1.9 Communications

- 1.9.1 No information is available regarding the communication. The pilot never made a distress call.

1.10 Aerodrome Information

- 1.10.1 The accident occurred on final approach to runway 30 at What's Landing private aerodrome.

1.11 Flight Recorders

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

1.12 Wreckage and Impact Information

1.12.1 The aircraft mushed into thick bush and stopped within 30 metres at a bearing of 30°M



Figure 1. The aircraft and wreckage site.

1.13 Medical and Pathological Information

1.13.1 Not applicable to this accident.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 Most of the impact forces exerted on the aircraft and its occupants were absorbed by the thick bush, rendering the accident survivable. The persons on board were adequately restrained and the seats were found to have been effective during the accident sequence.

1.16 Tests and Research

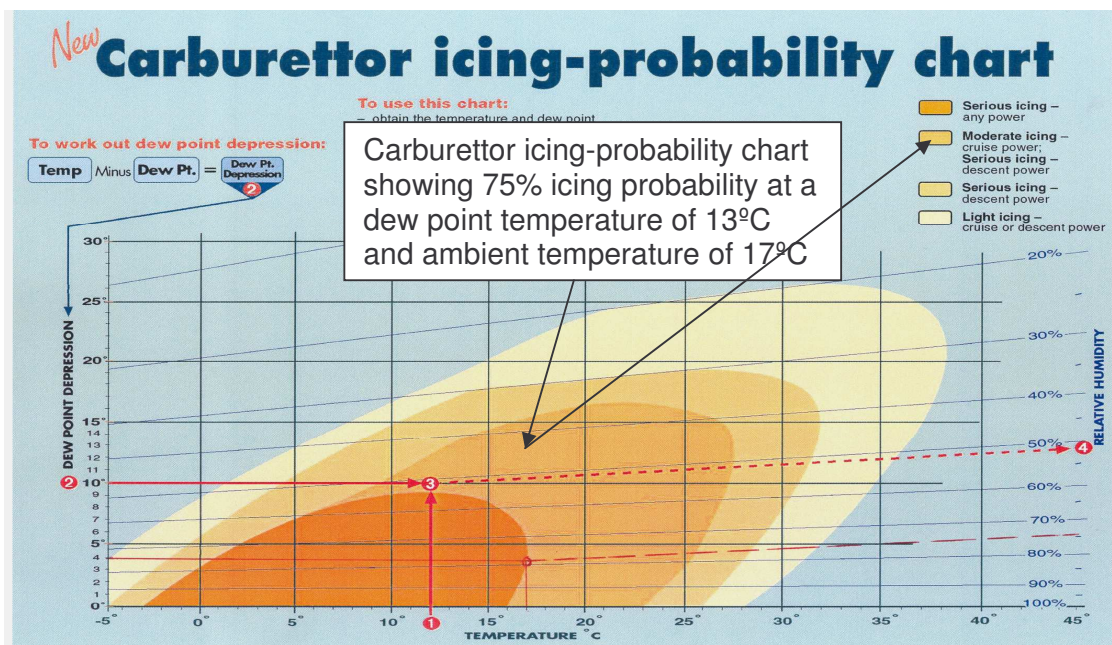
1.16.1 During the on-site investigation, the following were checked and no anomalies were found:

- Main fuel-supply line from the fuel pump to the carburettor disconnected – fuel drained from the line
- Fuel from carburettor float bowl drained – no evidence of contamination discovered
- Spark plugs removed and found to be typical of a Gipsy engine
- Carburettor intake checked for obstruction – none could be seen
- Magneto covers removed and propeller partially rotated – both magnetos rotated
- Propeller rotated freely – only half rotation attempted
- All controls to the engine checked for security and found satisfactory except for the throttle connection from the firewall – this had accident damage
- Right-hand magneto removed and tested for operation – found serviceable
- Contents of the right-hand fuel tank inspected for water contamination – none discovered.

1.16.2 The carburetor heat control on the right-hand cockpit side is operative on the Chipmunk. The Royal Air Force wired this control into the “warm” position as the Gipsy Major engine is very susceptible to carburetor icing (even in weather conditions considered unlikely to cause it). The control operates a flap that causes air to be drawn into the carburetor from within the cowling, so the air is warm rather than hot, and has little effect on the engine’s performance. The carburetor heat control is best left in the “warm” position – that is, pulled back and locked.

(Extracted from the website: Chipmunk user's notes)

Carburettor icing-probability chart



1.17 Organisational and Management Information

1.17.1 This was a private flight.

1.17.2 The Aircraft Maintenance Organisation (AMO) that certified the last inspection on the aircraft prior to the accident was audited by SACAA Airworthiness Department during the last two years.

1.18 Additional Information

1.18.1 Carburettor Icing

Positive evidence of carburettor icing is rarely found as it can form at ambient temperatures well above freezing. By the time you get there, it has melted. The mechanism of induction system icing is fairly simple as the air goes through the induction system; it goes through a series of narrowing passage ways culminating in the carburettor. These provide a ventura effect and, in accordance with the universal gas law, the velocity of the air is increased and its pressure and temperature are both decreased. The ventura effect can lower the air temperature about 5°C. The evaporation of fuel in the fuel-air mixture can lower the temperature up to 40°C. If the temperature is lowered below freezing and the air contains a certain amount of water, it forms instant ice which may block further airflow or impede the operation of the butterfly valve in the carburettor. With no air flow, the engine quits and the plane crashes (or lands prematurely.)

Aircraft Accident Investigation by Richard H. Wood and Robert W. Sweginnis, Page 75.

1.19 Useful or Effective Investigation Techniques

1.19 None.

2. ANALYSIS

2.1 According to the pilot, he was on a private flight and accompanied by a passenger. During an approach to runway 30 at What's Landing Aerodrome, he felt that the aircraft was sinking faster than desired. He slowly opened the throttle, and the engine responded by spluttering, then surged and stopped completely.

2.2 There was no evidence of maintenance anomalies or defects with the aircraft prior to the flight reported by the pilot. The aeroplane had flown approximately 26.6 airframe hours since the last Mandatory Periodic Inspection (MPI).

2.3 The pilot had only eight hours of experience on the aircraft type. He had no record of any previous incident or accidents. His flight medical was valid.

- 2.4 During the investigation at the accident site, the investigator-in-charge (IIC) could not find any anomalies that might have contributed to the engine failure. However, when considering the meteorological conditions of that day – a dewpoint temperature of 13°C and ambient temperature of 17°C – there was a 75% chance of carburettor icing, as depicted on the carburettor icing probability chart. Although the pilot stated that he had had the carburettor heat ON, it is unlikely that this was the case, because there was no evidence of any carburettor heating system failure. Thus the possibility exists that the pilot did not in fact have the carburettor heat on. This may have led to the engine stopping and the pilot being forced to execute an emergency landing.

3. CONCLUSION

3.1 Findings

- 3.1.1 The pilot was a holder of a valid commercial pilot's licence and was correctly type-rated. His medical was valid.
- 3.1.2 The aircraft was correctly maintained and was considered to have been airworthy prior to the accident.
- 3.1.3 No anomalies could be found that might have contributed to the engine failure.
- 3.1.4 The weather conditions were such that there is a probability that carburettor icing occurred.

3.2 Probable Cause/s

- 3.2.1 Engine failure, probably due to carburettor icing

4. SAFETY RECOMMENDATIONS

- 4.1 None.

5. APPENDICES

- 5.1 None.

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Report reviewed and amended by Office of the EM: AIID