



## AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8247	
<b>Aircraft Registration</b>	ZS-BXT	<b>Date of Accident</b>	27 January 2007		<b>Time of Accident</b>	0600Z
<b>Type of Aircraft</b>	Tiger Moth (DH-82A)		<b>Type of Operation</b>	Private		
<b>Pilot-in-command Licence Type</b>		Private	<b>Age</b>	47	<b>Licence Valid</b>	Yes
<b>Pilot-in-command Flying Experience</b>		Total Flying Hours	612.0		Hours on Type	263.0
<b>Last point of departure</b>		Oak Valley District near Grabouw (Western Cape)				
<b>Next point of intended landing</b>		Oak Valley District near Grabouw (Western Cape)				
<b>Location of the accident site with reference to easily defined geographical points (GPS readings if possible)</b>						
Private farm in Oak Valley District, Grabouw. GPS position: S34° 10" 404' E019° 03" 512'						
<b>Meteorological Information</b>		<b>Wind:</b> South-easterly, light & variable; <b>Visibility:</b> CAVOK				
<b>Number of people on board</b>	1 + 1	<b>No. of people injured</b>	1 + 1	<b>No. of people killed</b>	0	
<b>Synopsis</b>						
<p>The pilot, accompanied by a passenger, took off in calm wind conditions on a local private flight from a private farm in the Oak Valley District near Grabouw.</p> <p>According to the pilot, the engine ran roughly on one of the magnetos during the pre-takeoff checks, but after a while ran normally prior to the takeoff. However, shortly after takeoff, the engine failed without any warning. The pilot immediately put the aircraft into a nosedive and checked that fuel and magnetos were "on", which they were.</p> <p>He executed a forced landing in an orchard. The aircraft mushed into several pear trees in a slightly nose-down attitude before coming to rest.</p> <p>Both occupants sustained injuries and were admitted to hospital.</p> <p>The aircraft's left and right, upper and lower wings, nose section and lower fuselage were substantially damaged. The propeller separated from the engine.</p> <p>The aircraft had a valid Authority to Fly Certificate with the expiry date being 20 December 2007. The Annual Inspection had been certified on 20 December 2006 at a total of 1 807.0 airframe hours and the aircraft had flown a further 7.0 hours since then.</p>						
<b>Probable Cause</b>						
<p>Cylinder temperatures were too high, leading to excessive carbon build-up in the exhaust valve guides. This resulted in the No. 2 &amp; 3 exhaust valves becoming stuck in the open position.</p>						
IARC Date	27 May 2008		Release Date			



## AIRCRAFT ACCIDENT REPORT

**Name of Owner/Operator** : A J M Smith  
**Manufacturer** : De Havilland  
**Model** : DH-82A  
**Nationality** : RSA  
**Registration Marks** : ZS-BXT  
**Place** : Oak Valley Aerodrome  
**Date** : 27 January 2007  
**Time** : 0600Z

*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, accompanied by a passenger, took off on a local private flight from a private farm in the Oak Valley District near Grabouw in calm wind conditions.
- 1.1.2 According to the pilot, the engine ran roughly on one of its magnetos during the pre-takeoff checks, but after a while the engine ran normally prior to takeoff. During takeoff, however, the engine failed without any warning. The pilot immediately put the aircraft into a nosedive and checked that fuel and magnetos were "on", which they were.
- 1.1.3 He executed a forced landing in a pear tree orchard. The aircraft struck several trees in a slightly nose-down attitude before coming to rest.

### 1.2 Injuries to Persons

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

### 1.3 Damage to Aircraft

1.3.1 The aircraft's left and right, upper and lower wings, nose section and fuselage were substantially damaged on impact with the pear trees and the ground. The propeller separated from the engine.

### 1.4 Other Damage

1.4.1 The aircraft damaged several pear trees during the forced landing in the orchard.



Figure 1. The wreckage of ZS-BXT.

### 1.5 Personnel Information

Nationality	South African	Gender	Male	Age	47
Licence Number	*****	Licence Type	Private		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Nil				
Medical Expiry Date	28 February 2007				
Restrictions	Nil				
Previous Accidents	None				

#### Flying Experience

Total Hours	612.0
Total Past 90 Days	6.0
Total on Type Past 90 Days	6.0
Total on Type	263.0

## 1.6 Aircraft Information

### Airframe

Type	Tiger Moth	
Serial Number	T6402	
Manufacturer	De-Havilland	
Year of Manufacture	1 941	
Total Airframe Hours (at time of accident)	1 814	
Last Annual Inspection (Date & Hours)	20 December 2006	1 807.0
Hours since Last Annual Inspection	7.0	
Authority To Fly (Issue Date)	8 January 2007	
C of R (Issue Date) (Present Owner)	15 March 2002	
Operating Categories	Private	

### Engine

Type	Gipsy Major 1C
Serial Number	84631
Hours since New	Unknown
Hours since Overhaul	1 553.95

### Propeller

Type	Dunbar DC 193-150 LOH 110
Serial Number	A1332
Hours since New	Unknown
Hours since Overhaul	400

## 1.7 Meteorological Information

1.7.1 The following weather information was obtained from the pilot's questionnaire:

Wind direction	South-east	Wind speed	1 kt	Visibility	Good
Temperature	14°C	Cloud cover	CAVOK	Cloud base	Nil
Dew point	Unknown				

## 1.8 Aids to Navigation

1.8.1 The aircraft was fitted with standard navigational equipment.

## 1.9 Communications

1.9.1 There was no communication during takeoff from the private aerodrome.

## 1.10 Aerodrome Information

1.10.1 The aircraft operated from a private farm in the Oak Valley District near Grabouw.

Aerodrome Location	Private farm near Grabouw
Aerodrome Co-ordinates	S34° 10' 44" E019° 03' 512"
Aerodrome elevation	1 065 ft AMSL
Runway designations	14/32
Runway dimension	700 m
Runway used	14
Runway surface	Grass

## 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 struck a pear tree in an orchard slightly left of the extended centreline of runway 15. The aircraft skidded for approximately 10 m before coming to rest.



**Figure 2.** The wreckage of the aircraft – side view.



### 1.13 Medical and Pathological Information

1.13.1 The occupants were admitted to hospital with back and leg injuries respectively.

### 1.14 Fire

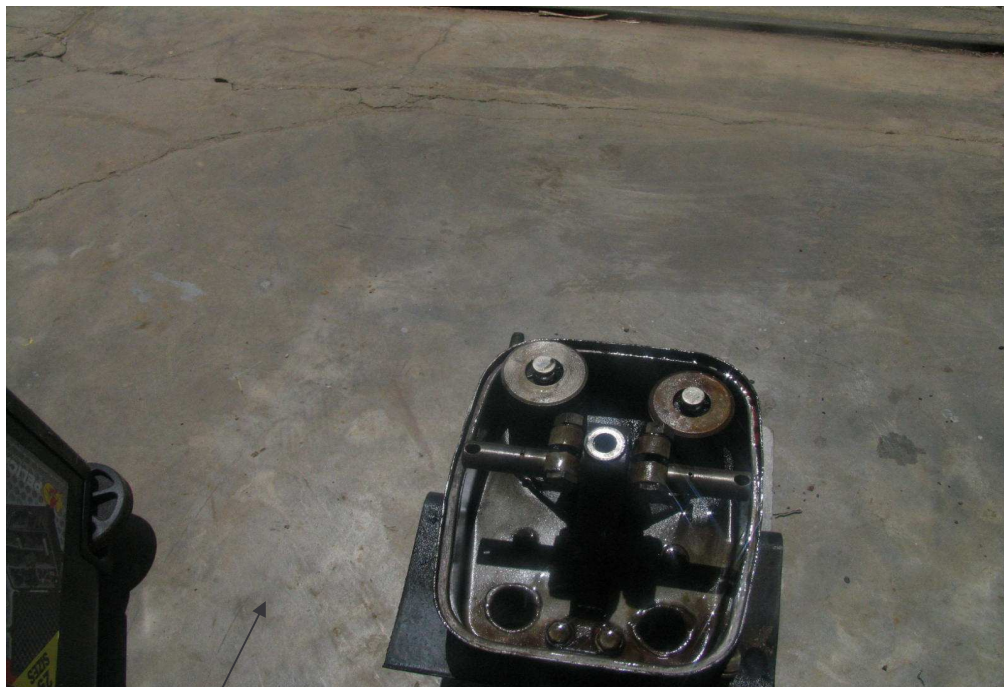
1.14.1 There was no pre- or post-impact fire.

### 1.15 Survival Aspects

1.15.1 The pilot and passenger were properly restrained and as a result sustained only back and leg injuries respectively.

### 1.16 Tests and Research

1.16.1 The engine was examined by an Approved Person, who established that the number 2 and 3 cylinders exhaust valves were stuck in the open position due to excessive carbon build-up in the valve guides – an indication that the engine had been running at too high a temperature. As a result, both cylinders had a complete loss of compression and a subsequent loss of power.



**Figure 3.** The cylinder removed from the engine.



**Figure 4.** The exhaust valve stuck in an open position.

## **1.17 Organisational and Management Information**

1.17.1 The aircraft was operated in a private capacity.

## **1.18 Additional Information**

1.18.1 None.

## **1.19 Useful or Effective Investigation Techniques**

1.19.1 None.

## **2. ANALYSIS**

**2.1** According to the pilot, the engine backfired and ran slightly roughly during the pre-takeoff checks, but after a while and prior to takeoff, ran normally again. During takeoff, however, the engine started backfiring and eventually failed. As there was no open area available, the pilot was committed to executing a forced landing in a pear tree orchard. The aircraft struck several trees in a slightly nose-down attitude before coming to rest. The pilot sustained back injuries and the passenger leg injuries on impact with the trees and they were admitted to hospital.

### **3. CONCLUSION**

#### **3.1 Findings**

- 3.1.1 The pilot had a valid licence at the time of the accident.
- 3.1.2 Weather was not a contributing factor to the accident.
- 3.1.3 The No. 2 and 3 cylinder exhaust valves stuck in the open position due to excessive carbon build-up in the exhaust valve guides.
- 3.1.4 The pilot followed the correct emergency procedure.

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

- 3.2.1 Cylinder temperatures were too high, causing excessive carbon build-up in the exhaust valve guides. This resulted in the No. 2 & 3 exhaust valves becoming stuck in the open position.

### **4. SAFETY RECOMMENDATIONS**

- 4.1 None

### **5. APPENDICES**

- 5.1 None

-END-

Report reviewed and amended by Office of the EM: AIID October 2009