



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

| | | | | | | |
|---|------------|--|--------------------------|-----------------------------|-------------------------|-------|
| | | | | Reference: | CA18/2/3/9001 | |
| Aircraft Registration | ZS-MAV | Date of Accident | 08 January 2012 | | Time of Accident | 0848Z |
| Type of Aircraft | Cessna 150 | | Type of Operation | Training | | |
| Pilot-in-command Licence Type | | Private | Age | 53 | Licence Valid | Yes |
| Pilot-in-command Flying Experience | | Total Flying Hours | 2177.3 | | Hours on Type | 20.2 |
| Last point of departure | | Grand Central Aerodrome in Gauteng: FAGC | | | | |
| Next point of intended landing | | Grand Central Aerodrome in Gauteng: FAGC | | | | |
| Location of the accident site with reference to easily defined geographical points (GPS readings if possible) | | | | | | |
| 5 nm south of Grand Central Aerodrome at S 26°04' E 28°07' | | | | | | |
| Meteorological Information | | Surface Wind: 270/05 Visibility: CAVOK Temperature: 25°C | | | | |
| Number of people on board | 2 + 0 | No. of people injured | 0 | No. of people killed | 0 | |
| Synopsis | | | | | | |
| <p>On 8 January 2012 a flight instructor accompanied by a private pilot (student) departed from Grand Central Aerodrome (FAGC) for a training flight to the General Flying Area (south of FAGC) with the intention to return to FAGC for landing. The instructor reported that while on the outbound leg, overhead Emeridge Dam, the engine started to lose power and eventually failed. They decided to execute a forced landing on an open field in the Modderfontein Conservancy during which the aircraft sustained damage to the right wing and the nose wheel.</p> <p>Further investigation of the engine had revealed that the no 2 cylinder exhaust valve had seized in-flight causing the engine to fail.</p> <p>Both the instructor and the student were not injured.</p> | | | | | | |
| Probable Cause | | | | | | |
| <p>Unsuccessful forced landing due to an engine failure.</p> <p>Contributory Factor: The number 2 cylinder exhaust valve seized in the open position during flight.</p> | | | | | | |
| IARC Date | | | Release Date | | | |
| CA 12-12a | | | 25 MAY 2010 | | Page 1 of 10 | |



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : ZS-DOV Aircraft CC
Manufacturer : Cessna Aircraft Company
Model : Cessna 150M
Nationality : South African
Registration Marks : ZS-MAV
Place : South of Grand Central Aerodrome
Date : 08 January 2012
Time : 0848Z

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 8 January 2012 a flight instructor accompanied by a private pilot (student) departed from Grand Central Aerodrome (FAGC) for a Private Pilot License renewal test to the General Flying Area (south of FAGC) with the intention to return to FAGC for landing.
- 1.1.2 The instructor reported that while on the outbound leg at 7000 ft, overhead the Emeridge Dam, the engine started running rough. They applied carburettor heat and reset the mixture but the engine performance still did not improve instead the engine failed.
- 1.1.3 When the instructor and the student realised that the aircraft was losing height at about 100 ft. per minute, and that they would not make it to FAGC, they decided to execute a forced landing on a grass field in the Modderfontein Conservancy.
- 1.1.4 On the touchdown, the aircraft collided with an earth embankment damaging the right wing and the nose wheel.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 The aircraft sustained damage to the right wing and the nosewheel.

1.4 Other Damage

1.4.1 No other damage caused.



Figure 1: showing the aircraft after the forced landing.

1.5 Personnel Information

1.5.1 Instructor information:

| | | | | | |
|---------------------|---|---------------|------|-----|----|
| Nationality | South African | Gender | Male | Age | 53 |
| Licence Number | 0270107618 | Licence Type | ATP | | |
| Licence valid | Yes | Type Endorsed | Yes | | |
| Ratings | Instrument, Night, Multi-engine and Test pilot rating | | | | |
| Medical Expiry Date | 30 November 2012 | | | | |
| Restrictions | Corrective lenses | | | | |
| Previous Accidents | None | | | | |

Flying Experience:

| | |
|----------------------------|--------|
| Total Hours | 2177.3 |
| Total Past 90 Days | 46.7 |
| Total on Type Past 90 Days | 1.2 |
| Total on Type | 20.2 |

1.5.2 The personnel information and flying experience of the student pilot was not available at the time the report was finalised.

1.6 Aircraft Information

Airframe:

| | | |
|--|-------------------------|----------------|
| Type | Cessna 150M | |
| Serial Number | 150-77619 | |
| Manufacturer | Cessna Aircraft Company | |
| Date of Manufacture | 1963 | |
| Total Airframe Hours (At time of Accident) | 8432.1 | |
| Last MPI (Date & Hours) | 8374 | 28 August 2011 |
| Hours since Last MPI | 58.1 | |
| C of A (Expiry Date) | 30 March 2012 | |
| C of R (Issue Date) (Present owner) | 18 July 2002 | |
| Operating Categories | Part 141 | |

Engine:

| | |
|----------------------|---------------------|
| Type | Continental O-200-A |
| Serial Number | 23R277 |
| Hours since New | 3532.47 |
| Hours since Overhaul | 1497.47 |

Note: On recovery of the aircraft, approximately 60litres of fuel was drained from the fuel tanks. Given the total usable fuel of 22.5 US gallons (83.3 litres) for both tanks in the Cessna 150M, the 60 litres drained was considered sufficient for the flight.

Propeller:

| | |
|----------------------|--------------------------|
| Type | McCauley 1A102OCM6948 |
| Serial Number | RB003 |
| Hours since New | 1478.1 |
| Hours since Overhaul | 67.6 |

1.7 Meteorological Information

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|----------------|------|-------------|-------|------------|-------|
| Wind direction | 270° | Wind speed | 05 kt | Visibility | CAVOK |
| Temperature | 25°C | Cloud cover | clear | Cloud base | n/a |
| Dew point | 15°C | | | | |

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigation equipment as per the equipment list approved by the Regulator for the aircraft type. No defects were reported prior to the flight.

1.9 Communications.

1.9.1 The aircraft was equipped with standard communication equipment as per the equipment list approved by the Regulator for the aircraft type. No defects were reported at the time of the accident.

1.9.2 The crew maintained two-way communication with Grand Central Air Traffic Control on the frequency 122.8 MHz

1.10 Aerodrome Information

1.10.1 The accident did not occur on an aerodrome. The accident site was located 5nm south of Grand Central Aerodrome on a bushy terrain, at a geographical GPS position determined to be S26°04 ' E28°07 ', at an elevation of 5325 feet.

1.11 Flight Recorders

11.1 The aircraft was not fitted with either a cockpit voice recorder (CVR) or a flight data recorder (FDR), nor was it required by regulation.

1.12 Wreckage and Impact Information

1.12.1 During the forced landing, the aircraft touched down on a grass field. At the end of the landing roll the aircraft collided with an earth embankment causing damage to the right wing and the nose wheel.

1.13 Medical and Pathological Information

1.13.1 None

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The accident was considered survivable as the crew were properly restrained and the cabin remained intact.

1.15.2 The occupants of the aircraft disembarked the aircraft unassisted.

1.16 Tests and Research

1.16.1 The aircraft was recovered to a local Aircraft Maintenance Organisation (AMO) for a further engine examination. The engine could not be rotated therefore an engine strip was conducted.

1.16.2 On inspection it was revealed that the number 2 cylinder was damaged. The cylinder was removed and it was found that the exhaust valve had seized in the open position, and the piston had made contact with the valve, bending the valve at the stem. (See figure 2 below)



Figure 2: showing damage caused in the no. 2 cylinder chamber.



Figure 3: showing the exhaust valve head through the manifold port.



Figure 4: showing damage caused to the no.2 cylinder piston

1.6.2 Further inspection of the cylinder showed a large amount of carbon build up on the piston crown (on the base of the valve guides).

1.17 Organizational and Management Information

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1.17.1 The Aircraft Maintenance Organisation responsible for the maintenance of the aircraft had a valid AMO approval certificate at the time of the accident.

1.17.2 The training school had a valid ATO (Aviation Training Organisation) accreditation and the authorisation sheet was signed.

1.18 Additional Information

1.18.1 None

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

- 2.1.1 During flight, the licensed instructor and the student pilot experienced a loss of engine power and a subsequent engine failure. They spotted an open field 5nm south of Grand Central Aerodrome and decided to execute a forced landing, during which the aircraft sustained damages.
- 2.1.2 The prevailing weather conditions at the time of accident were not considered to be a factor in this accident, with the reported surface wind being calm and “CAVOK” weather conditions reported at the time of the accident.
- 2.1.3 From the examination made by the AMO, it is clear that the engine suffered a catastrophic failure due to the number two cylinder exhaust valve becoming stuck in the open position. The piston then struck the valve, bending the valve at the stem. This led to the damage of the piston followed by an engine failure.
- 2.1.4 It could not be established as to what could have caused the exhaust valve to get stuck in the open position.
- 2.1.5 When the engine failed, it left the pilot with only one option, to attempt an emergency landing which resulted in damage to the aircraft.

3. CONCLUSION

3.1 Findings

- 3.1.1 The crew held valid pilot’s licences and valid aviation medical certificates, issued by a CAA-approved medical examiner.
- 3.1.2 This was an approved training flight and the training school involved had a valid accreditation by the SACAA.
- 3.1.3 Fine weather conditions prevailed at the time of the occurrence, and the weather was not considered to be a factor in this accident.
- 3.1.4 The aircraft was maintained by an approved Aircraft Maintenance Organisation (AMO), which was in possession of a valid AMO approval certificate at the time of the accident.
- 3.1.5 The aircraft experienced an engine failure due to a stuck no.2 cylinder exhaust valve and the crew executed a forced landing.

3.2 Probable Cause/s

- 3.2.1 Unsuccessful forced landing due to an engine failure.
- 3.2.2 Contributory Factor: The number 2 cylinder exhaust valve seized in the open position during flight.

4. SAFETY RECOMMENDATIONS

4.1 None

5. APPENDICES

5.1 None.