



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:		CA18/2/3/8109	
Aircraft Registration	ZS-FET	Date of Accident	25 April 2006		Time of Accident	1200Z	
Type of Aircraft	Beech D95A		Type of Operation		Training		
Pilot-in-command Licence Type		Airline Transport	Age	62	Licence Valid	Yes	
Pilot-in-command Flying Experience		Total Flying Hours	9 300		Hours on Type	Unknown	
Last point of departure		Cape Town International Aerodrome (FACT)					
Next point of intended landing		Cape Town International Aerodrome (FACT)					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Atlantis area near Cape Town (GPS co-ordinates: S33° 35.806' E018° 33.507'), elevation 316 ft							
Meteorological Information		Weather was fine.					
Number of people on board	2 + 1	No. of people injured	0	No. of people killed	3		
Synopsis							
<p>The instructor and pilot accompanied by a passenger (also an instructor) took off on a training flight from Cape Town Aerodrome (FACT). The training to be conducted was indicated on the flight authorisation sheet as "Air Exercises: Asymmetric Circuits (Engine Failure During Missed Approach). The flight routing was to be FACT – Delta 200(FADX) – Fisantekraal (FAFK) and back to FACT. The aircraft wreckage found at GPS co-ordinates S33° 35.806' E018° 33.507' in the bushes, approximately 5.4 nm north-east of FADX. There were no eyewitnesses nor was there any emergency call.</p>							
Probable Cause							
<p>The aircraft entered a spin during a training exercise and impacted the ground in a steep nose-down attitude.</p>							
IARC Date				Release Date			

AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Cape Aero Club
Manufacturer : Beech Aircraft Corporation
Model : Beech D95 A
Nationality : South African
Registration Marks : ZS-FET
Place : Atlantis, Cape Town
Date : 25 April 2006
Time : 1200Z

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 two 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 instructor and pilot, accompanied by a passenger (also an instructor), took off on a training flight from Cape Town International Aerodrome (FACT). The flight authorisation sheet indicated that the training to be conducted was "Air Exercises: Asymmetric Circuits (Engine Failure During Missed Approach). The route for the flight was recorded as: Cape Town (FACT) – Delta 200 (FADX) – Fisantekraal (FAFK) and back to FACT.
- 1.1.2 According to the FACT air traffic controller (ATC), the aircraft took off, reported when outbound and then flew in a northerly direction towards the Atlantis/Philadelphia area. The ATC radar screen recordings at FACT observed the aircraft in and around the Atlantis/Philadelphia area until it disappeared from the radar screen when it went below radar altitude detection at about 3 800 ft.
- 1.1.3 The wreckage of the aircraft was located at a geographical area recorded as S33° 35.806' E018° 33.507' in the Atlantis area. The undercarriage was in an extended position.
- 1.1.4 The accident occurred in daylight conditions.

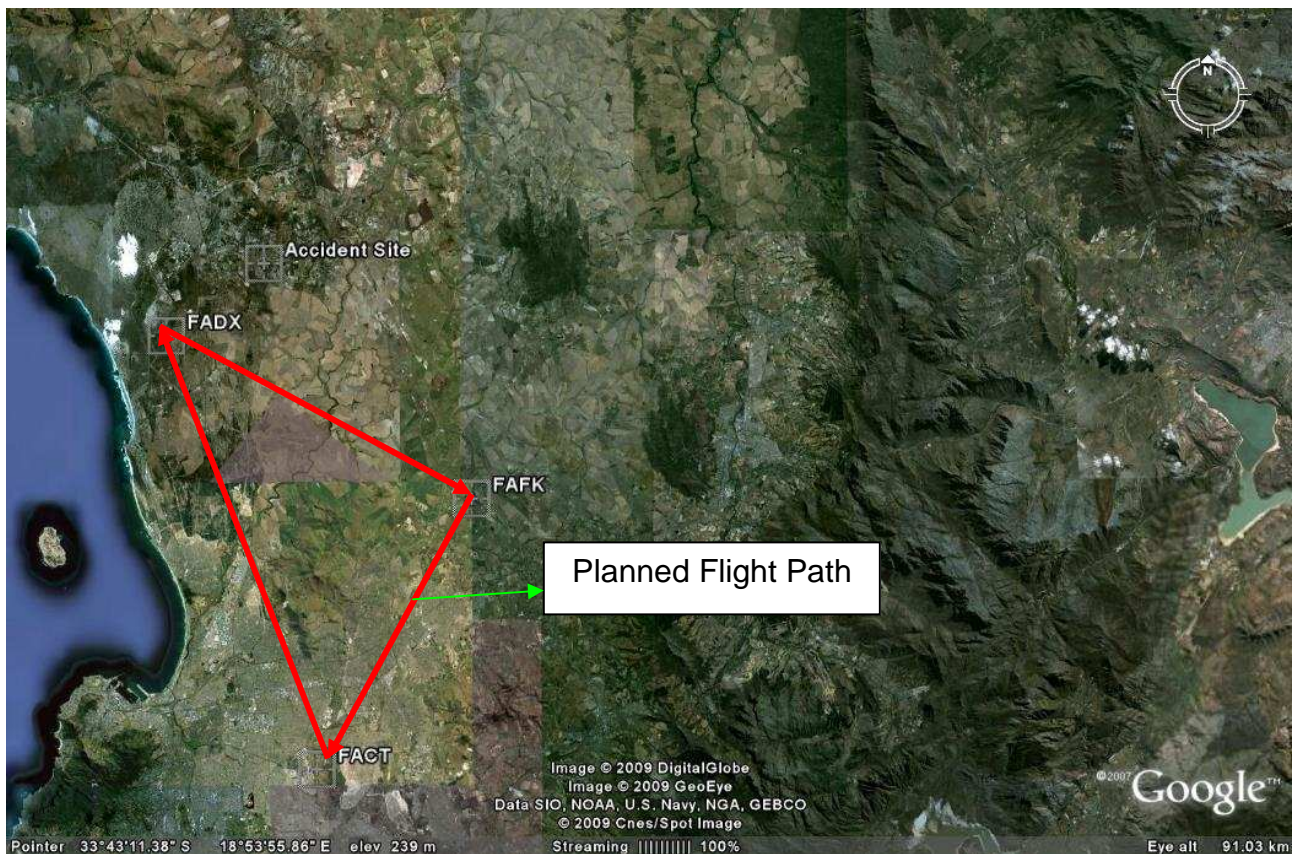


Figure 1: Google image showing the planned flight path and accident site

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass	Other
Fatal	2	-	1	-
Serious	-	-	-	-
Minor	-	-	-	-
None	-	-	-	-

1.3 Damage to Aircraft

13.1 The aircraft was destroyed during the impact sequence.



Figure 2: Aircraft wreckage

1.4 Other Damage

1.4.1 Surrounding trees were damaged. There was no post-impact fire.

1.5 Personnel Information

1.5.1 Instructor:

Nationality	South African	Gender	Male	Age	62
Licence Number	*****	Licence Type	Airline Transport		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Test Pilot, Night, Instructor Grade 2, Instrument				
Medical Expiry Date	31 May 2006				
Restrictions	Corrective lenses				
Previous Accidents	None				

1.5.2 Instructor Flying Experience:

Total Hours	9 300
Total Past 90 Days	Unknown*
Total on Type Past 90 Days	Unknown*
Total on Type	Unknown*

* It was not possible to determine the instructor's flying experience as the logbook of the instructor could not be located.

1.5.3 Pilot:

Nationality	Sudanese	Gender	Male	Age	21
Licence Number	*****	Licence Type	Commercial		
Licence valid	Yes	Type Endorsed	No		
Ratings	Night				
Medical Expiry Date	31 July 2006				
Restrictions	None				
Previous Accidents	None				

1.5.4 Flying Experience:

Total Hours	232
Total Past 90 Days	5.4
Total on Type Past 90 Days	5.4
Total on Type	5.4

According to the pilot's training file, the pilot had already completed most of his conversion training exercises all of which were signed out by the instructor. The Asymmetric Circuits (Engine Failure During Missed Approach) was only exercise left to complete the aircraft type rating conversion.

1.6 Aircraft Information

1.6.1 Airframe:

Type	Beechcraft	
Model	Beech D95A	
Serial Number	TD 688	
Manufacturer	Beech Aircraft Corporation	
Date of Manufacture, (Year)	1967	
Total Airframe Hours (At Time of Accident)	5 220.5	
Last MPI (Date & Hours)	30 November 2005	5 184.7
Hours Since Last MPI	35.8	
C of A (Original Issue Date)	14 February 1969	
C of R (Issue Date) (Present Owner)	02 June 2003	
Operating Categories	Standard	

1.6.2 Left-hand Engine:

Type	Lycoming
Model	IO-360-B1B
Serial Number	L-18331-51A
Hours Since New	6 291.6
Hours Since Overhaul	387.7

1.6.3 Right-hand Engine:

Type	Lycoming
Model	IO-360-B1B
Serial Number	L-27506-51A
Hours Since New	2 590
Hours Since Overhaul	387.7

1.6.4 Left-hand Propeller:

Type	Hartzell
Model	HC-C2YK-2CUF
Serial Number	AU8911B
Hours Since New	1 418.5
Hours Since Overhaul	121.5

1.6.5 Right-hand Propeller:

Type	Hartzell
Model	HC-C2YK-2CUF
Serial Number	AU8893B
Hours Since New	1 418.5
Hours Since Overhaul	121.5

1.7 Meteorological Information

1.7.1 According to the people around the accident site, the weather was as indicated in the table below:

Wind Direction	Calm	Wind Speed	Calm	Visibility	> 10 km
Temperature	Unknown	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	Unknown				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigation instrumentation as per manufacturer design. No instruments were reported unserviceable during the flight or prior to the accident.

1.9 Communications

1.9.1 The aircraft was equipped with very high frequency (VHF) equipment and no components were reported unserviceable during the flight or prior to the accident.

1.9.2 All transmissions from the aircraft were normal and no emergency calls were received or recorded from the aircraft.

1.10 Aerodrome Information

1.10.1 The accident occurred in bushes approximately 5.4 nm north-east of FADX. The GPS co-ordinates were determined to be S33° 35.806' E018° 33.507'.

1.11 Flight Recorders

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

1.12 Wreckage and Impact Information

1.12.1 The initial examination of the wreckage revealed that the aircraft was rotating in an anti-clockwise direction on impact. The nose-down pitch angle at impact was determined to be approximately 15°. The impact marks suggested minimal or no horizontal movement of the aircraft, as the wreckage was not scattered. The aircraft was destroyed by the impact forces.



Figure 3: Aerial view of the accident site

1.12.2 All flying control cables had been correctly connected and secured. The observed damage was as a result of the accident sequence.

1.12.3 The instrument panel was still intact and it was possible to read some of the indications as they would have been on impact. Of interest was the turn and bank indicator. The indication on the turn and bank instrument showed that the aircraft

was in a left-turn attitude.



Figure 4: The instrument panel, showing the turn and bank indicator

1.12.4 The flap lever was in the 20° position. The landing gear was in an extended position. The control column was in the aft position with the yoke broken. The left-hand wing was destroyed, but the right-hand wing was still intact with wrinkles on the top surface.



Figure 5: Damage to the left-hand wing



Figure 6: Damage to the right-hand wing

1.12.5 The propellers were embedded in the ground. After removal, no sign of rotation on either the propellers was evident.

1.13 Medical and Pathological Information:

1.13.1 The post-mortem reports were still outstanding at the time of compiling this report. Should any of the results have a bearing on the circumstances leading to this accident, it will be treated as new evidence, which will necessitate the reopening of this investigation.

1.13.2 The results of the toxicology tests conducted on the specimens revealed the following results:

1.13.2.1 Instructor:

- The concentration of alcohol in the specimen was 0.00 g per 100 ml.
- The concentration of the sodium fluoride in the specimen was >3.0%.

1.13.2.2 Pilot:

- The concentration of alcohol in the specimen was 0.00 g per 100 ml.
- The concentration of the sodium fluoride in the specimen was >3.0%.

1.14 Fire

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

1.15 Survival Aspects

- 1.15.1 When the aircraft could not be tracked on the radar and did not arrive as planned at FACT, search and rescue action was initiated. The aircraft was later located in bushes in the Atlantis area. All persons onboard the aircraft were fatally injured.
- 1.15.2 The high-impact forces associated with this accident led to the destruction of the cabin. The occupants on board were exposed to high-impact forces during the accident sequence. The accident is categorised as not survivable.

1.16 Tests and Research

- 1.16.1 During the onsite investigation, fuel was drained from the right-hand tank and found to be the correct grade of fuel. No evidence of contamination was found.
- 1.16.2 The aircraft engines were recovered to an approved facility for further testing to ascertain the operation conditions prior to impact. The conclusion was that though some components were damaged due to impact, thorough checks could still be conducted on various engine components, which included, among others, fuel injection systems and supply to the engine, oil system filters, magnetos, etc. These were found to have operated normally.
- 1.16.3 The engines turned freely and showed no obvious signs of malfunctioning, internal damage or resistance.

1.17 Organisational and Management Information

- 1.17.1 The aviation training organisation (ATO) held a valid approval certificate, which was valid until 30 June 2006.
- 1.17.2 The planned exercise was for the pilot to demonstrate the capability of maintaining asymmetric climb with one engine inoperative. During the performance of the missed approach procedure and during climb (with the aircraft in the landing configuration), the instructor would simulate an engine failure by feathering one engine – the pilot is supposed to correct and maintain the flight.
- 1.17.3 No deficiencies in the training methods implemented by the ATO were identified.

1.18 Additional Information

- 1.18.1 The following information was taken from Wikipedia (www.wikipedia.org):

A missed approach is an instrument flight rules procedure which is a standard (but optional) component segment of an instrument approach. Generally, if the pilot-in-command determines by the time the aircraft is at the decision height (for a precision approach) or missed approach point (for a non-precision approach), that the runway or its environment is not in sight, or that a safe landing cannot be accomplished for any reason, the landing approach must be discontinued and the missed approach procedure must be initiated immediately. It is also common for pilots to deliberately execute a missed approach as part of initial or recurrent

instrument training. In such cases, a pilot may execute three or four instrument approaches in a row with a missed approach between each one.

The missed approach procedure normally includes an initial heading or track and altitude to climb to, typically followed by holding instructions at a nearby navigation fix. The pilot is expected to inform ATC by radio of the initiation of the missed approach as soon as possible.

ATC may simply acknowledge the missed approach call, or modify the missed approach instructions, for example with vectors to some other fix. ATC may subsequently clear the flight for another approach attempt, depending on the pilot's intentions, as well as weather and traffic considerations.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

- 2.1 The instructor and pilot accompanied by a passenger (also an instructor) took off on a training flight from FACT when the accident occurred. The flight authorisation sheet indicated that the training to be conducted was "Air Exercises: Asymmetric Circuits (Engine Failure During Missed Approach). The route for the flight was recorded as FACT – FADX – FAFK and back to FACT. The aircraft was later found crashed in the bushes approximately 5.4 nm north-east of FADX. The GPS co-ordinates of the accident site were determined as S33° 35.806' E018° 33.507'.
- 2.2 The instructor had 9 300 total flying hours and was rated on the aircraft type. He had no previous incidents or accidents. His pilot's licence and flight medical were valid.
- 2.3 The pilot had 234 total flying hours and 5.4 hours on the aircraft type – the latter were all part of the conversion training into type. He had no previous incidents or accidents. His pilot's licence and flight medical were valid.
- 2.4 There was no evidence of maintenance anomalies and/or defects reported by the pilot or instructor, which were experienced with the aircraft prior to the flight. The aircraft had flown for 35.8 airframe hours without any problem since certification of the last inspection.
- 2.5 The onsite evidence suggested that the aircraft entered into an anti-clockwise spin before crashing in a steep nose-down attitude, fatally injuring all onboard. To establish a possible cause for the departure from normal flight, the intention of the flight, which was "Air Exercises: Asymmetric Circuits (Engine Failure During Missed Approach) was reviewed. The pilot had to be provided with training as to how to conduct and maintain asymmetric climb of the aircraft during a missed approach procedure. The possibility exists that the instructor feathered the left engine. The effect of this would be a yaw of the aircraft to the left. If the pilot under training does not initiate the appropriate action or is not yet proficient in maintaining control of the aircraft, a spin can result. This would require considerable height to affect a recovery to normal flight.
- 2.6 The impact indications of the aircraft wreckage displayed the typical impact damage that results during impact in a spin.

- 2.7 By the nature of the exercise being practised, the aircraft could have been at a low altitude, which would have precluded the instructor from being able to recover the aircraft to normal flight.

3. CONCLUSION

3.1 Findings

- 3.1.1 The pilot and instructor were licenced and qualified for the flight in accordance with existing regulations and requirements.
- 3.1.2 The maintenance records indicated that the aircraft was equipped and maintained in accordance with existing regulations and approved procedures.
- 3.1.3 This was a twin-engine conversion training flight.
- 3.1.4 The aviation training organisation (ATO) held a valid approval as required by the regulations.
- 3.1.5 The aircraft entered a spin and impacted the ground in a steep nose-down attitude.
- 3.1.6 Weather was not considered a factor in this accident.

3.2 Probable Cause/s

- 3.2.1 The aircraft entered a spin during a training exercise and impacted the ground in a steep nose-down attitude.

4. SAFETY RECOMMENDATIONS

- 4.1 None.

5. APPENDICES

- 5.1 None.

Report reviewed and amended by the Advisory Safety Panel on 16 February 2010
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