

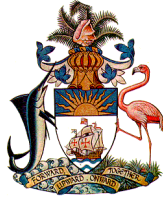
AIRCRAFT ACCIDENT REPORT

FINAL REPORT FUEL EXHAUSTION

**Flamingo Air Charter
Britten Norman (BN2-A) Islander
C6-ASA
Moss Town, Exuma Bahamas
16 May, 2005**

Report A0516517





**AIRCRAFT ACCIDENT REPORT
FUEL EXHAUSTION**

REPORT No. A0516517

FLAMINGO AIR CHARTER LIMITED

**BRITTEN NORMAN (BN2-A) ISLANDER
C6-ASA**

**Moss Town Exuma, Bahamas
16 May, 2005**

**Flight Standards Inspectorate
Bahamas Department of Civil Aviation**



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Mrs. Glennys Hanna-Martin
Minister of Transportation

Mr. Cyril Saunders
Director of Civil Aviation

Captain Patrick Rolle
Manager of Flight Standards Inspectorate

The attached report summarizes an investigation made into the circumstances of an accident involving Britten Norman BN-2A Islander aircraft, registration C6-ASA that crashed in bushes 3 miles short of runway 12 in Moss Town, Exuma, Bahamas on 16 May 2005.

This report is submitted pursuant to Part XII, Regulation 80, and Schedule 19 of the Bahamas Aviation Safety Regulation (BASR 2001) and in accordance with Annex 13 to the Convention on International Civil Aviation (ICAO).

Dion Demeritte
Aviation Safety Inspector
Investigator in Charge
Flight Standards Inspectorate
Department of Civil Aviation (Bahamas)

July 28, 2005

APPROVED FOR RELEASE AS A PUBLIC DOCUMENT

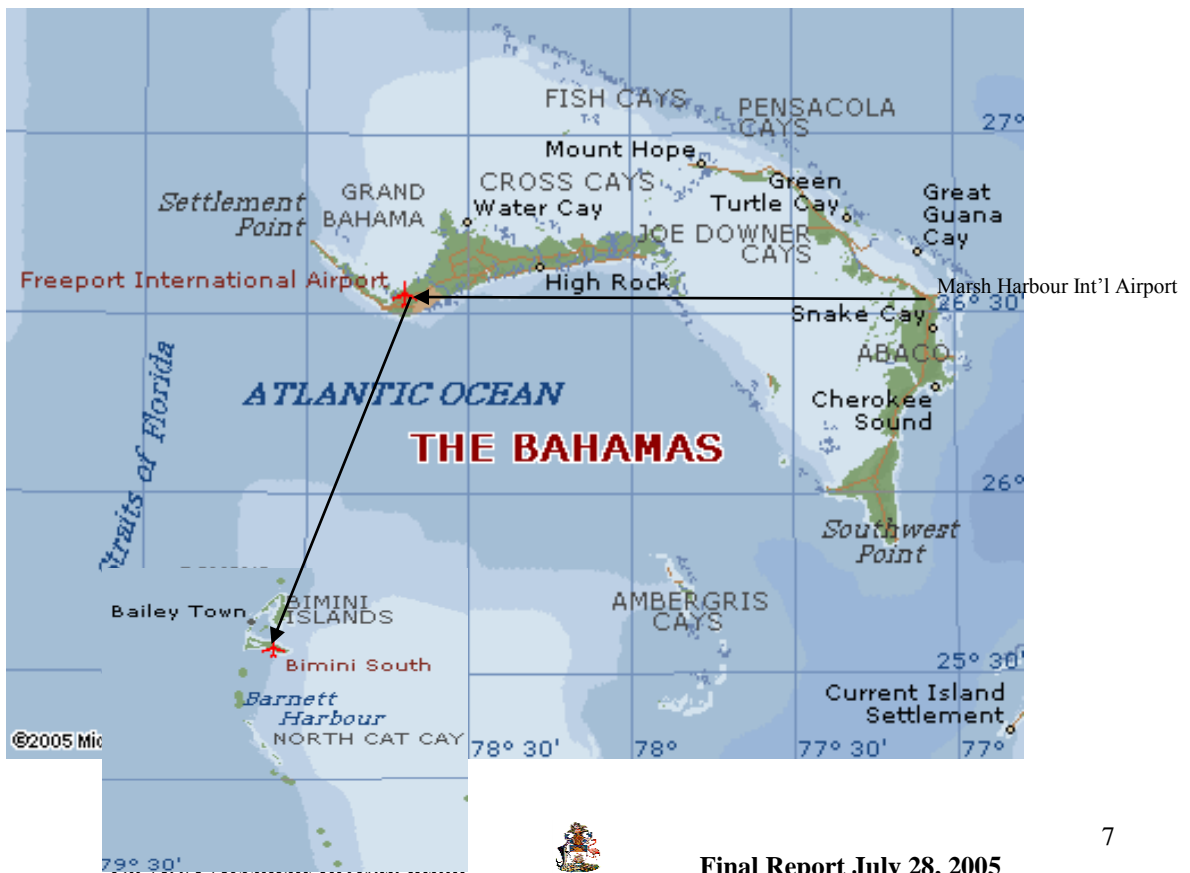
In accordance with Annex 13 to the Convention on International Civil Aviation (ICAO), and Schedule 19 of the Bahamas Aviation Safety Regulations (BASR April 17,2001) it is not the purpose of aircraft accident investigation to apportion blame or liability. The sole objective of the investigation and the Final Report is the prevention of accidents and incidents.







Map of route showing direction and flight path from Marsh Harbour, Abaco to Freeport, Grand Bahama to South Bimini to Moss Town, Exuma.





This is a map of the Exuma Islands, Bahamas showing the appropriate crash position of Aircraft C6-ASA. Aircraft C6-ASA crashed appropriate three [3] miles short of runway 12 at Moss Town International Airport, Moss Town, Exuma, Bahamas.



Section 1**Abbreviations and Terminology used in this report.**

ADDS	Aviation Digital Data Service - Report furnished by Meteorological Department
BASR	Bahamas Aviation Safety Regulations (April 17, 2001)
BDCA	Bahamas Department of Civil Aviation
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CAD	Civil Aviation Department
CFR	Code of Federal Regulations
CG	Center of Gravity
DCA	Director of Civil Aviation
EDT	Eastern Daylight Time (+5 hours to convert to UTC or Zulu time)
FAA	Federal Aviation Administration
FSI	Flight Standards Inspectorate
ICAO	International Civil Aviation Organization
IFO	International Field Office (FAA)
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Condition
MEL	Minimum Equipment List
METAR	Meteorological Aerodrome Report
NM or nm	Nautical Miles
NTSB	National Transportation Safety Board
USA	United States of America
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
Zulu or UTC	Universal Coordinated Time also termed Zulu time or Z



FLIGHT STANDARDS INSPECTORATE
CIVIL AVIATION DEPARTMENT
(Bahamas)

AIRCRAFT ACCIDENT REPORT
FUEL EXHAUSTION

REPORT No. A0516517

BRITTEN NORMAN ISLANDER BN2A
C6-ASA
16 MAY 2005

A. BASIC INFORMATION

Operator: Flamingo Air Limited

Manufacturer: Britten Norman

Place of Accident: Appropriately 3 nautical miles Northeast of Moss Town International Airport, Moss Town, Exuma, Bahamas.

Investigating Authority: Manager - Flight Standards Inspectorate

Investigator in Charge: Dion Q. Demeritte – Aviation Safety Inspector

Notification: State of Manufacturer / Design

Party to Investigation: None

Releasing Authority: Director - Bahamas Civil Aviation Department

Date of Report: July 28, 2005



B. SYNOPSIS:

The occurrence of this accident was notified to the Flight Standards Inspectorate by the Nassau Control Tower. On May 16, 2005 about 1305 eastern daylight time (1805Z) a Britten Norman Islander aircraft, registration number C6-ASA registered to Flamingo Air Limited of Freeport, Bahamas, and operated by Flamingo Air Limited of Freeport, Bahamas, crashed approximately three (3) nautical miles northeast of Runway 12 at Moss town International Airport, Moss Town, Exuma, Bahamas

The State of Manufacture of the airframe and engines (Great Britain – Airframe & United States - Engines) were advised of the accident and invited to participate in the investigation. The aircraft was a Bahamas registered aircraft operating on an approved On-Demand Air Operator Certificate.

The flight was operated under Visual Flight Rules [VFR]. Aircraft C6-ASA operated as an on-demand air commuter, on a domestic transport flight. The flight originated from Freeport, Grand Bahama, Bahamas to Moss Town, Exuma, Bahamas with an intermediate stop in South Bimini, Bahamas. The airplane sustained substantial damage. The occupants of the aircraft consisted of two (2) passengers and the pilot (1). The Pilot in Command held a Commercial Pilot License rating. The crew was certificated by the Flight Standards Inspectorate, Bahamas Civil Aviation Department. No serious injuries or fatalities were reported.

1.0 FACTUAL INFORMATION:

1.1 History of the Flight

On May 16, 2005 about 1230EST (1845Z), a Britten Norman Islander aircraft, registration C6-ASA crashed approximately 3nm northeast of the Moss Town International Airport. The Pilot reported, *“about 35 minutes south of Nassau International Airport [MYNN] I noticed that my ground speed was very low. I continued with my flight to MYEF because I should have had 1 hour and 30 minutes of fuel. About 10 miles from MYEF my right engine quit then 2 minutes later my left engine quit. I then look a suitable place to land three miles from the airport.”* The one (1) pilot and two (2) passengers received no serious injuries. The aircraft was destroyed from impact sustained as it contacted the trees. The accident flight originated from Freeport, Grand Bahama, Bahamas to Moss Town, Exuma, Bahamas with an intermediate stop in South Bimini, Bahamas. Visual Flight Rules Conditions existed at the time of the accident.

The aircraft was operated by Flamingo Air Limited, a Bahamian Air Operator Certificate holder. Flamingo Air Limited operated as a Commuter, Unscheduled / On Demand Operator in commercial air transport. Flamingo Air Limited operated under the provision of the Bahamas Aviation Safety Regulations (BASR 2001). Its aircraft are maintained under the provision of Bahamas Aviation Safety Regulations (BASR 2001).



The aircraft had flown a total of 2 flights including the accident flight. The pilot flew both flights [the same pilot later flew the accident flight]. The pilot reported no problems with the aircraft prior to the accident. There were no open MEL items. There were no open (uncorrected) mechanical irregularities written in the Technical and Journey Log.

On May 15, 2005 the pilot uplifted a total of 130 gallons of fuel, which is the maximum capacity for this aircraft. Prior to the accident flight, the aircraft completed two flights, MYAM to MYGF [flown on May 15, 2005] which lasted 45 minutes and MYGF to MYBS [flown on May 16, 2005] which lasted 30 minutes. No fuel was uplifted prior to the next flight which was MYBS to MYEF, the accident flight [flown on May 16, 2005].

During post accident interviews, the pilot confirmed that he had not noticed anything unusual about the airplane. The pilot later surmised that he had simply run out of fuel.

1.2 Injuries to persons No fatal or serious injuries to occupants were reported.

1.3 Damage to aircraft The aircraft was destroyed by the impact forces.

1.4 Other Damage - No other damage was reported.

1.5 PERSONNEL INFORMATION

1.5.1 The Captain

The pilot age 38 is the Chief Pilot for Flamingo Air Limited. He holds a current Bahamas Commercial Pilot Certificate. The pilot most recent first class medical was issued February 25, 2005 with no limitations.

Flamingo Air limited records indicated that the pilot had accumulated approximately 6,000 hours total flight time and had flown 66.2, 31.8 and 08 hours in the preceding 90 days, 30 days and 24 hours respectively preceding the accident. The hours flown indicate compliance with the flight duty and rest scheme approved for Flamingo Air Limited and Bahamas Aviation Safety Regulations (BASR 2001).

The pilot's last proficiency check was conducted by Flight Safety International a United States approved Flight Training School on October 27, 2004.

1.6 AIRCRAFT INFORMATION – GENERAL

The Britten Norman Islander is a fixed wing, twin engine, propeller-driven, piston airplane. The accident airplane, serial number 599 was manufactured in 1970. It was registered as C6-ASA. It was registered to and operated by Flamingo Air Limited, Freeport, and Grand Bahama, Bahamas.

The aircraft has a Certificate of Registration dated October 20, 2003. It's most recent Certificate of Airworthiness was issued on November 19th, 2004.



Up to the time of the accident the aircraft had flown a total of 16,711.7 hours since manufacture. It had flown a total of 21.1 hours since the last 100 hour inspection. The aircraft was maintained under Flamingo Air Limited Air Operator Certificate by a Title 14 CFR 49 Part 145 repair station validated and authorized by the Authority.

The accident airplane was configured with a two [2] pilot seats and eight [8] passenger seats. The airplane had two [2] main entry doors one [1] on the left aft side of the fuselage and one [1] on the forward side of the fuselage. In addition, the aircraft also had one [1] crew door on the left forward side of the fuselage. The airplane also had a cargo door on the left side of the fuselage. The cargo storage area began at the partition immediately aft of the triple passenger seat and extended almost to the aft pressure bulkhead.

The aircraft engines, O-540E4C5 were manufactured by Lycoming A Textron Company. The left engine Serial Number L-12475-40A had accumulated 667.8 total hours since overhaul and 21.1 hours since last inspection.

The right engine Serial Number RL-19662-40C had accumulated 698.2 total hours since overhaul and 21.1 hours since last inspection.

The propellers were manufactured by Hartzell Propellers. Model HC-C2YK-2CUF propellers were fitted to C6-ASA.

Serial Number AU4880E was fitted to the left engine. A total of 315.9 flight hours had accumulated since overhaul and 21.1 hours since last inspection.

Serial Number AU9508B was fitted to the right engine. A total of 315.9 flight hours had accumulated since overhaul and 21.1 hours since last inspection.

The accident aircraft was not equipped with an auto pilot.

1.7 Meteorological information

Bahamas Area Forecast

Valid from 2100Z

Special Features. Weak area of low pressure and a stationary surface trough near Inagua Island continues to create some instability over the Bahamas. For all areas weather partly cloudy to mostly cloudy tonight with few isolated showers or a thundershower in the northwest Bahamas. Some scattered showers and isolated thundershowers in the southern Bahamas. Winds northeast to east at 12 to 18 knots in the northwest and east northeast to east southeast at 12 to 18 knots in the central and southeast Bahamas.

1.8 Aids to Navigation

No problems with any navigational aids were reported.

1.9 Communications



Communications were established with the Moss Town Control Tower.

During the exchange between Moss Town Control Tower and the Pilot of aircraft C6-ASA, the pilot advised the control tower that the aircraft was experiencing mechanical problems with the right engine. The pilot later advised the Moss Town Control Tower that he had lost the right engine and was experiencing problems with the left engine but was trying to make runway 12. The last communications by the pilot to the tower was to advise them that he was looking for a suitable place to put the aircraft down.

1.10 AIRCRAFT LOAD

Maximum take off mass and landing mass

- The maximum takeoff mass and landing mass was determined to be 6200 lbs as per the Load Manifest Page 0449 flight MYBS to MYEF dated May 16, 2005.

Actual take off mass at time of occurrence

- The actual take off mass at the time of the occurrence was determined to be 5047 lbs as per the Load Manifest Page 0449 flight MYBS to MYEF dated May 16, 2005.

CG at take off and at time of the occurrence

- The CG at take off and at the time of occurrence was 24 inches.

1.11 Cockpit Voice Recorder

The aircraft was not equipped with a Cockpit voice recorder.

1.11.1 Flight Data Recorder

The aircraft was not equipped with a Flight Data Recorder.

1.12 Wreckage and Impact information

The wreckage was examined on May 17, 2004 by Flight Standards Inspectors Edwards and Demeritte. The aircraft wreckage remained intact and all components were accounted for at the scene.

Examination of the wreckage area was carried out. The aircraft came to rest approximately 3 nautical miles northeast of the Moss International Airport, Moss Town, Exuma, Bahamas. There was no in flight or post impact fire.

The aircraft came to rest upright. The wings, the nose and the fixed landing gears bore the impact of the crash; however the damage to the wings did not deform the wing and did not affect the integral fuel tank [wet wings]. The fuselage remained intact. The cockpit and empennage were intact. The rudder had no visible impact or post impact damage.

Both engines were intact in the nacelles. The propellers showed little or no signs of damage. Both propellers were found to be in an un-feathered position.

The instrument panels were intact. A tree branch destroyed the left windshield and lodged itself in the opening. Right windshield did not sustain any damage.

Left and Right engine throttle levers, and left and right mixture control levers were found in the



“Idle / Cut Off” range of travel. Left and Right propeller control levers were found in the un-feathered range of travel. Both fuel standby pumps were found in the “ON” position.

All seats were intact and in their original position.

1.13 Medical and Pathological Information

No serious or fatal injuries occurred.

1.14 Fire

No in-flight or post accident fire occurred

1.15 Survival Aspects

Not a factor as there were no fatalities.

1.16 Tests and research

1.17 Organizational and Management Information

Flamingo Air Limited is a Non-scheduled / on demand commuter basic air taxi operator based in Freeport, Grand Bahama, Bahamas at the Freeport International Airport. Flamingo Air Limited operates under the provision of the Bahamas Aviation Safety Regulations (BASR 2001).

At the time of the accident Flamingo Air Limited operated three [3] aircraft, one [1] Britten Norman Islander [the accident aircraft] and two [2] Piper Aztec PA23-250.

Flamingo Air Limited maintenance was authorized to be conducted in accordance with the Bahamas Aviation (Safety) Regulations 2001 [BASR 2001] and the guidance outlined in the company Maintenance Control and Procedures Manual. Maintenance was performed under Flamingo Air Limited Air Operator Certificate by a Title 14 CFR 49 Part 145 repair station validated and authorized by the Authority.

1.17.1 Post Accident Actions

Captain Meadows Commercial Pilot License #381 was suspended by the Flight Standards Inspectorate due to the on-going investigation. Statements made by Captain Raymond Meadows after the accident indicated fuel exhaustion and pilot inability to manage his fuel as the probably causes of the accident. Flamingo Air Limited took a proactive approach in this matter by removing Captain Meadows from the active duty roster immediately following the accident.

The Flight Standards Inspectorate sent out an Information Advisory to all Bahamas Air Operator Certificate Holders requiring an immediate audit of their fuel management policy to ensure compliance with all fuel requirements [in particular fuel reserves requirements] of Bahamas Aviation (Safety) Regulations 2001 [BASR 2001].



1.18 Other Information

1.18.1 Pilot statement

On May 17, 2005 Captain Raymond Meadows filed an Aircraft Occurrence Report dated May 16, 2005. In the filed report section 22. 'Pilot's Report or Description of Occurrence' Captain Meadows stated, "*I notice that my ground speed was very low. I continued with my flight to MYEF because I should have had 1:30 min of fuel.*" Captain Meadows stated in section 23. Heading 'Probable Cause of Occurrence', "*Low altitude with heavy wind and pilot inability to manage fuel*". Captain Meadows also stated in section 25. 'Recommendation to Avoid a Recurrence', "*Proper fuel management*".

On August 2, 2005 Captain Meadows supplied calculations for flights between MYAM – MYGF, MYGF – MYBS & MYBS – MYEF, however the Approved Flight Manual is in the possession of the Flight Standards Inspectorate. The Approved Flight Manual does not have graphs for calculating fuel burn.

2.0 ANALYSIS:

2.1 General

The pilot was properly certificated and qualified under Bahamas Aviation (Safety) Regulations 2001 [BASR 2001]. No evidence indicated any preexisting medical or behavioral conditions that might have adversely affected his performance during the accident flight. Fatigue was not a factor in this accident.

Analysis of injuries and fatalities – There were no serious or fatal injuries to passengers or crew.

The accident aircraft was properly certified and equipped in accordance with Bahamas Aviation (Safety) Regulations 2001 [BASR 2001]. No evidence indicated that the airplane was improperly maintained. There was no fuel present in either wing or any indication of leakage.

Weather was not a factor in this accident. Aircraft Navigational Instrumentation not a factor in the accident. The emergency response for this accident by the airport crash and rescue services was timely, but ineffective, as aircraft never made it to the airport. However, other emergency services dispatched to the scene were timely and effective.

Aircraft Engines – were found intact with no visible damage.

Fuel Sample – There was no fuel found in either wing integral tank and no signs of damage were evident to either wing.

2.2 Loading and Preflight Activities

On the day of the accident, the aircraft had flown one [1] flight prior to the accident flight; this flight was also flown by the same pilot. The post accident interview and the records all

confirmed that the pilot conducted a preflight inspection. Captain Meadow's signature was on the Technical and Journey Log, as well as the Operation Flight Plan Form, certifying that he had conducted a preflight inspection as required by the regulations. He did not report anything unusual about the airplane from his preflight inspection.

The pilot completed all required flight preparation documents as per Bahamas Aviation (Safety) Regulations 2001 [BASR 2001].

3.0 CONCLUSIONS

3.1 Findings

1. The pilot was properly certificated and qualified under Bahamas Aviation (Safety) Regulations 2001 [BASR 2001]. No evidence indicated any preexisting medical or behavioral conditions that might have adversely affected his performance during the accident flight. Fatigue was not a factor in this accident.
2. Approximately 35 miles south of Nassau, Bahamas Captain Meadow's first notice his ground speed low but he elected to continue on to Moss Town International [MYEF] rather than diverting to Nassau International Airport [MYNN]. The Pilot exercised poor judgment by not landing at Nassau International Airport [MYNN].
3. Analysis of injuries and fatalities – There were no serious or fatal injuries to passengers or crew. They were all transported to medical facility at George Town, Exuma and discharged after being examination by the local medical personnel.
4. The accident aircraft was properly certified and equipped in accordance with Bahamas Aviation (Safety) Regulations 2001 [BASR 2001]. No evidence indicated that the airplane was improperly maintained.
5. Weather was not a factor in this accident.
6. Aircraft Navigational Instrumentation not a factor in the accident.
7. Both Engines stopped from fuel exhaustion (no usable fuel on board).
8. All control surfaces were accounted for, and all damages to the aircraft were attributable to the severe impact forces.
9. The flight was not conducted in accordance with the procedures in the company Operations Manual i.e. minimum fuel requirement.
10. The pilot's decision to attempt a landing at a suitable site other than Moss Town International Airport ultimately resulted in no lives lost and no major injuries.

11. The Flight Standards Inspectorate and Captain Meadows attempt to re-compute the minimum fuel [VFR flight Rules] required for the flight between MYBS and MYEF and found: -

- I. Flamingo Air Limited did not have fuel burn graphs for the Britten Norman Islander.
- II. The accident aircraft was not carrying the sufficient amount of fuel required by BASR 2001.

3.2 Probable Cause

The Flight Standards Inspectorate determined that the probable cause of this accident as Fuel Exhaustion.

The Pilot could not calculate the fuel for the intended journey.

The Pilot used poor judgment when he elected to continue on to Moss Town International Airport rather than returning back to Nassau International Airport when he first experienced the problem.

4.0 SAFETY RECOMMENDATIONS:

Flamingo Air Limited conducts additional training for Captain Meadows to ensure his knowledge of the BASR 2001 fuel reserves requirements for all VFR operations and to ensure he is knowledgeable of Flamingo Air Limited fuel management policy.

1. **Captain Meadows to be reexamine for fitness to hold current license.**
2. **Review of Flamingo Air Limited fuel management policy.**
3. **Flamingo Air Limited must ensure that fuel burn graphs for all aircraft are available and all crew members are trained on its usage.**
4. **Flamingo Air Limited operations procedures for aircraft with mechanical defects are reviewed.**

5.0 APPENDICES

A-1
A-2

**Aircraft Occurrence Report
Captain Meadows statement**

6.0 DEFINITIONS

Load Manifest – an aircraft specific document required to summarize the mass and balance and loading calculations of aircraft in commercial air transport.



Operational Flight Plan – a document required to record the planned route information, minimum fuel calculations, applicable weather conditions and notices to airmen (NOTAMS) and alternate airport selection for flights in commercial air transport.

Technical and Journey Log – a document attached to an aircraft for recording defects and malfunctions discovered during operations and for recording details of all maintenance carried out whilst the aircraft is operating between scheduled visits to the base maintenance facility. It also contains operating information relevant to flight safety and maintenance data that the crew needs to know.



APPENDICE A-1



APPENDICE A-2



