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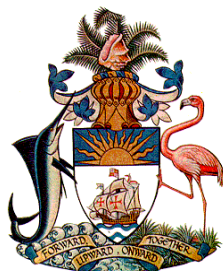
BAHAMAS FLIGHT STANDARDS INSPECTORATE

NASSAU, N. P., BAHAMAS

AIRCRAFT ACCIDENT REPORT

**GEAR UP LANDING
EMBRAER EMB 110-P1, C6-CAB
LYNDEN PINDLING INT'L AIRPORT
FEBRUARY 25, 2008**





Flight Standards Inspectorate Bahamas Department of Civil Aviation

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March 31, 2008

Mr. Cyril Saunders
Director
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Sir

The attached report summarizes the investigation into the circumstances of the accident involving Embraer 110-P1, Bahamas Registration C6-CAB, registered to Leair Charter Service Limited. This accident occurred on February 25, 2008 at 17:00 local time at Lynden Pindling International Airport, Nassau, Bahamas on Runway 32.

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

In accordance with Annex 13 to the Convention on International Civil Aviation (ICAO), and Schedule 19 of the Bahamas Civil Aviation (Safety) Regulations (CASR April 17, 2001), the fundamental purpose of such investigations is to determine the circumstances and causes of these events, with a view to the preservation of life and the avoidance of similar occurrences in the future. It is not the purpose of such investigations to apportion blame or liability.

This information is published to inform the aviation industry and the public of the circumstances surrounding this accident. The contents of this Report may be subjected to alterations or corrections if additional information becomes available.

Philip C. Romer
Investigator in Charge
Flight Standards Inspectorate
Bahamas Department of Civil Aviation



Participants in the Investigation

**Philip Romer
Jehu Edwards
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**Flight Standards Inspectorate
Flight Standards Inspectorate
Flight Standards Inspectorate**

**IIC
Airworthiness
Airworthiness**





BAHAMAS
CIVIL AVIATION DEPARTMENT
FLIGHT STANDARDS INSPECTORATE

AIRCRAFT ACCIDENT

REPORT No. A0826610

SYNOPSIS

Operator: LeAir Charter Service Limited

Manufacturer: Embraer

Model: EMB 110-P1

Registration: C6-CAB

Place of Accident: Lynden Pindling International Airport
Nassau, Bahamas

Date of Accident: February 25, 2008

Investigating Authority: Flight Standards Inspectorate

Investigator in Charge: Philip Romer

Notification: Director of Civil Aviation

Releasing Authority: Flight Standards Inspectorate

Date of Report: March 31, 2008



ABBREVIATIONS and TERMINOLOGY

| | |
|----------|---|
| ADDS | Aviation Digital Data Service - Report by Meteorological Department |
| AIS | Automatic Information Services |
| ATS | Air Traffic Services |
| BDCA | Bahamas Department of Civil Aviation |
| CASR | Bahamas Civil Aviation (Safety) Regulations (April 17, 2001) |
| C of A | Certificate of Airworthiness |
| C of R | Certificate of Registration |
| CG | Center of Gravity |
| CVR | Cockpit Voice Recorder |
| DCA | Director of Civil Aviation |
| DFDR | Digital Flight Data Recorder |
| DOO | Director of Operations |
| DRTL | Disaster Response Team Leader |
| DS | Director of Safety |
| CAD | Civil Aviation Department |
| EST | Eastern Standard Time (-5 hours (-4DT) to convert from UTC) |
| ERM | Emergency Response Manual |
| FAA | Federal Aviation Administration |
| FSI | Flight Standards Inspectorate |
| FSS | Flight Service Station |
| ICAO | International Civil Aviation Organization |
| ILS | Instrument Landing System |
| IFR | Instrument Flight Rules |
| IMC | Instrument Meteorological Condition |
| LH MLG | Left Hand Main Landing Gear |
| MALSF | Medium-intensity Approach Lighting System (with sequenced flashers) |
| MD | Manager of Dispatch |
| MCM | Maintenance Control Manual |
| MET | Meteorological Office / Department |
| METAR | Weather Report furnished by Meteorological Department |
| MIRL | Medium Intensity Runway Lights |
| MYEH | ICAO Airport Designation – Governors Harbour |
| NDB | Non-directional Beacon |
| NM or nm | Nautical Miles |
| NTSB | National Transportation Safety Board |
| PAPI | Precision Approach Path Indicator |
| RCA | Root Cause Analysis |
| SEP | Survival and Emergency Procedures Training |
| T/L | Technical Log |
| TSBC | Transportation Safety Board of Canada |
| USA | United States of America |
| VFR | Visual Flight Rules |
| VOR | (Very High Frequency) Omni-directional Range Station |
| VMC | Visual Meteorological Conditions |
| UTC | Universal Coordinated Time |
| Z | Zulu time |



DEFINITIONS

When the following terms are used in this report, they have the following meanings as per CASR 2001 and ICAO Annex 13;

“Aircraft Accident”– means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage or the aircraft is missing or completely inaccessible.

"Fatal injury" - means any injury which results in death within 30 days of the accident.

“Flight recorder” - Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation.

"Incident" - means an occurrence other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operations.

“Investigation”- A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations.

“Serious injury” - means any injury which:

- Requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received;
- Results in a fracture of any bone (except simple fractures of fingers, toes, or nose);
- Causes severe hemorrhages, nerve, muscle, or tendon damage;
- Involves any internal organ; or
- Involves second or third degree burns, or any burns affecting more than 5 percent of the body surface.
- Involves verified exposure to infectious substances or injurious radiation.

“Serious incident” - An incident involving circumstances indicating that an accident nearly occurred.

“State of Design” - The State having jurisdiction over the organization responsible for the type design

“State of Manufacture” - The State having jurisdiction over the organization responsible for the final assembly of the aircraft.

"Substantial damage" - means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent failings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered "substantial damage" for the purpose of this Report.



OVERVIEW

On February 25, 2008 at approximately 1700 hours an Embraer 110-P1, twin engine, turboprop airplane, C6-CAB, owned and operated by LeAir Charter Service Limited on a commercial flight from New Bight Airport, New Bight, Cat Island landed on runway 32 at Lynden Pindling International Airport with its landing gear not extended.

The aircraft departed New Bight Airport, New Bight, Cat Island for Nassau. There were 14 passengers and 2 crew members on board. There were no reported injuries to passengers or crew. The aircraft sustained damages to the Right Hand and Left Hand propellers, engine nacelle, underside of Fuselage and associated antennas, Right and Left Hand flap and nose gear door.

The weather conditions in the vicinity of Lynden Pindling International Airport between 1700 UTC and 2300 UTC February 2, 2008 had winds at 030 degrees at 7 knots, temperature at 27 degrees Celsius with a dew point at 22 and a barometric pressure at 30.02 inches of mercury. The official sunset was at 6:19 pm.

FACTUAL INFORMATION:

1.1 HISTORY OF THE FLIGHT

On February 25, 2008, C6-CAB, registered to Leair Charter Limited, a Basic Air Taxi Operator landed on Runway 32 at Lynden Pindling International Airport with its landing gear not extended.

The Commercial Air Transport Flight departed New Bight, Cat Island, Bahamas. The aircraft was in contact with Air Traffic Control and never made any reports of having any gear malfunction that would require the aircraft to land without its gear.

The accident occurred during the evening at approximately 1700 local (2200Z). Both crews were qualified in accordance with BASR Schedule 14 and both have valid and current Medical Certificates.

1.2 INJURIES TO PERSONS No fatal or serious injuries were reported up to the production of this report.

1.3 DAMAGE TO AIRCRAFT

Both propellers, engine nacelle, underside of fuselage and associated antennas, Right Hand and Left Hand flap and nose landing gear doors were substantially damaged.

1.4 OTHER DAMAGE

All damages reported were confined to the aircraft.

1.5 PERSONNEL INFORMATION

1.5.1 At the time of the accident the aircraft was under the command of Captain Calvin Pugh assisted by First Officer Jarred Major. Captain Pugh, a 32 year old male, was in possession of a valid Bahamian License number CP-425.



Captain Pugh's flying experience consists of approximately 3,500 hours total time with approximately 2,000 hours on the EMB-110. A satisfactory proficiency check was completed on March 26, 2007. Captain Pugh was experienced on route. Captain Pugh's duty and flight time in the last 24 hours, 7 and 90 days are no hours flown in the last 24 hours and 7 days and 97.3 hours in the last 90 days.

- 1.5.2** At the time of the accident First Officer Jarred Major was the flying pilot. F/O Major, a 20 year old male was in possession of a valid Bahamian license number CP-596 and a valid Medical Certificate. F/O Major hours and experience on type could not be verified by records reviewed. F/O Major did not log any duty and flight time in the 24 hours and 7 day period preceding the accident. His flight times in the preceding 90 days were 65.8 hours. A proficiency check was completed satisfactory on April 25, 2007 this check is however questionable *see Findings section 3.0*.

1.6 AIRCRAFT INFORMATION

C6-CAB, an EMB-110-P1, Serial Number 110-198 was manufactured in 1978 by Embraer. It is registered in the Bahamas as C6-CAB to Leair Charter Limited. It has a certificate of airworthiness valid to December 17, 2008. Since manufacture, C6-CAB had flown 15,343.2 hours. Since overhaul and last scheduled inspection (B1) it had flown 135.3 and 130.9 hours respectively. Aircraft was maintained under BASR 2001 Schedules 5, 6, 10, 12.

Engines

C6-CAB is fitted with Pratt & Whitney PT6A-34 engines with overhaul periods of 4,000 hours. Last scheduled inspection was conducted on December 12, 2007 at airframe total time 15,343.2 hours and airframe cycles 17,358.

The engine fitted to the #1 position of the aircraft is serial number PCE56950 and had accumulated 3,494.30 hours since overhaul. Since last scheduled inspection, it had accumulated 130.9 hours.

The engine fitted to the #2 position of the aircraft is serial number PCE56615 and had accumulated a total of 3,288.0 hours since overhaul. Since last scheduled inspection, it had accumulated 130.9 hours.

Propellers

The propellers attached to the engines of C6-CAB were manufactured by Hartzell Propeller. The propellers have overhaul periods of 3,000 hours.

The propeller attached to the #1 engine was serial number BUA26078 and had accumulated 1,119.9 hours since overhaul.

The propeller attached to the #2 engine was serial number BUA22970 and had accumulated 204.8 hours since overhaul.



Aircraft Load

Operational weight of the aircraft listed as 8,235.2 pounds. 9 pieces manifested at a weight of 349 pounds. 13 people were manifested at a total weight of 2,010 pounds. The total weight of the aircraft was manifested at 11,578 pounds with a take off maximum weight of 11,644 pounds.

1.7 METEOROLOGICAL INFORMATION

The weather conditions in the vicinity of The Lynden Pindling International Airport between 1700 UTC and 2300 UTC February 25, 2008 had winds at 030 degrees at 07 knots, temperature at 27 degrees Celsius with a dew point at 22 degree and a barometric pressure at 30.02 inches of mercury. The official sunset was at 1819 UTC.

1.8 AIDS TO NAVIGATION

Navigational aids were not a factor in this accident.

1.9 COMMUNICATIONS

The pilot was in communication with the control tower at Lynden Pindling International Airport (MYNN), at all times up until the time of the crash. At no time during the approach, up to the landing, did the pilot advise ATC of any problems with the landing gear.

1.10 AERODROME INFORMATION

Landing was made at the Lynden Pindling International Airport on Runway 32, approximately 3,600 feet from threshold of the 11,000 feet runway.

1.11 FLIGHT RECORDERS

C6-CAB was not equipped with a Cockpit Voice Recorder.

1.12 WRECKAGE AND IMPACT INFORMATION

The accident aircraft was examined at the crash site on February 25, 2008 by Accident Investigators from the Flight Standards Inspectorate.

The aircraft came to rest in an upright position approximately 1,300 feet from the initial touch down point of approximately 3,600 from the threshold of Runway 32 just beyond Intersection Bravo (B) at Lynden Pindling International Airport. There was no pre or post impact fire and no ground injuries. The aircraft remained on the centerline of the runway.

LEFT WING

The left wing remained attached to the fuselage and no visible damage was noted. The left flap and aileron remained attached with damages noted to the flaps and flap hinge attachments. The left main landing gear was also still attached to the aircraft and damages noted to the doors only.

LEFT PROPELLER

Left Propeller received minor damages.



RIGHT WING

The right wing remained attached to the fuselage. The aileron remained attached to wing and received no damages. The flap was also still attached to its hinges and was damaged. The flap hinge attachment however, was substantially damaged

RIGHT PROPELLER

Right Propeller received minor damages.

FUSELAGE

The extent of damages was confined to both left and right main and the nose gear doors and several antennas on the underside of the fuselage.

ENGINES

Based on the extent of damages noted to both propellers, possibility exists that both engines may also have received substantial damages.

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

Not a factor in this investigation

1.14 FIRE

There was no pre or post impact fire.

1.15 SURVIVAL ASPECTS

Not a factor in the investigation.

1.16 TESTS AND RESEARCH

No testing conducted.

1.17 ADDITIONAL INFORMATION

Not Applicable



ANALYSIS

2.1 GENERAL

- **Pilot qualifications** –
 - Pilot may not have been qualified in accordance with Bahamas Civil Aviation (Safety) Regulations according to files reviewed. Pilot had accomplished Proficiency Checks and Line Checks on the Embraer EMB-110-P1 as required by regulations. However, no evidence exists to show that pilot had accomplished required ground and flight training prior to conducting his proficiency check *see findings 3.0*. Pilot held appropriate flight and medical certificates.
 - Pilot was employed at the time of the accident by LeAir Charter Service Limited and was PIC of an Embraer EMB110-P1.
 - First Officer Qualifications also questionable *see findings 3.0*.
- **Weather** – Visual Meteorological Conditions existed at the time and was not a factor in this accident.
- **ATC** – Air Traffic Control was available at the Lynden Pindling International Airport and provided assistance to the aircraft.
- **Aids to Navigation** – navigational aid were operational and was not a factor in the accident.

2.2 AIRCRAFT

The Embraer EMB110-P1 aircraft is a twin turbine-engine airplane with a retractable tricycle landing gear configuration.

Inspections accomplished on the aircraft over the past twelve months are as follows:

- A B1 Inspection c/w on December 12th, 2007 at 15,343.2 hrs.
- A B1 & B2 Inspection c/w on October 4th, 2007 at 15,202.5 hrs
- A B1 Inspection c/w on September 1, 2007 at 15,069.5 hrs
- A B1,B2 & C1 Inspection c/w on July 21st, 2007 at 14,925.8 hrs
- A B1 Inspection c/w on June 14, 2007 at 14,781.3 hrs
- A B1 Inspection c/w on March 28th, 2007 at 14,499.7 hrs.
- A B1, B2, C, 2C, 3C, 4C, 6C, and 12C Inspection c/w on February 1st, 2008 at 14,354.2 hrs.

The airplane was properly certificated, and there was no evidence that airplane maintenance was a factor in the accident.

- **Aircraft performance** – Aircraft performance was not a factor.
- **Mass and balance** – The aircraft was last weighed on November 29th, 2006. Mass and balance report was completed by the pilot for this flight as required by Bahamas Civil Aviation Regulations.



- **Aircraft Navigational Instrumentation** – aircraft navigational instrumentation was operational and was not a factor in the accident.
- **Human factors** – There was no evidence that incapacitation or physiological factors affected the crew performance prior to the accident.
- **Psychological and physiological factors affecting personnel involved.** - There was no evidence that the crew suffered any sudden illness or incapacitation which might have affected their ability to control the aircraft.



FINDINGS:

1. The airplane was properly certificated and maintained in accordance with existing regulations.
2. There were no airplane system or powerplant anomalies that contributed to the cause of the accident.
3. The flight crew were properly certificated in accordance with existing regulations, however, qualification and currency are questionable (see item 10).
4. Meteorological conditions were not a factor in this accident.
5. Pilot and co-pilot gave differing accounts of the accident.
6. Crew failed to follow standard operating procedures.
7. Aircraft mass and Balance were within prescribed limitations.
8. Crew held appropriate flight and medical certificates.
9. Eyewitness reports that Captain was preoccupied completing entries in the technical log book while the aircraft was on final to the runway.
10. The training records for the crew were examined and the following findings were noted;

Pilot

1. Pilot last proficiency check conducted on March 26th, 2007.
2. Pilot recurrent ground school conducted March 16, 2007.

Based on records reviewed or the lack of records provided, it appears that;

3. Pilot did not accomplish Recurrent Company Procedures Indoctrination as required by BASR 14.065
4. Pilot did not accomplish Recurrent Dangerous Goods Training as required by BASR 14.070
5. Pilot did not accomplish Recurrent Security Training as required by BASR 14.075
6. Pilot did not accomplish Recurrent Crew Resource Management Training as required by BASR 14.080
7. Pilot did not accomplish Recurrent Emergency Equipment Drills as required by BASR 14.085
8. Pilot did not accomplish Recurrent Aircraft Flight Training as required by BASR 14.095

First Officer

1. First Officer last proficiency check conducted on March 25th, 2007.
2. First Officer Initial Ground Training completed March 16, 2007.

Based on records reviewed or the lack of records provided, it appears that;

3. First Officer did not accomplish Initial Company Procedures Training as required by BASR Schedule 14.065.
4. First Officer did not accomplish Initial Dangerous Goods Training as required by BASR Schedule 14.070.
5. First Officer did not accomplish Initial Security Training as required by BASR Schedule 14.075.
6. First Officer did not accomplish Initial Crew Resource Management Training as required by BASR Schedule 14.080.
7. First Officer did not accomplish Initial Emergency Equipment Drills Training as required by BASR Schedule 14.085.
8. First Officer did not accomplish Initial Flight Training as required by BASR Schedule 14.095.

Additionally N/A



Probable Cause

The Flight Standards Inspectorate determines that the probable cause of this accident has been determined as crew failure to extend landing gear.

Contributing Factors

1. The crew failed to follow standard operating procedures.
2. The crew failed to follow approved check list.
3. Crews were not qualified in accordance with Bahamas Civil Aviation (Safety) Regulations.

SAFETY RECOMMENDATIONS:

As a result of this investigation the Flight Standards Inspectorate makes the following recommendations;

1. Crew must be removed from active duty and retrained.
2. Crew must be re-examined for competency to continue to hold a Bahamian pilot certificate.
3. Crew must be made to undergo Crew Resource Management Training prior to being reinstated in this aircraft type or any aircraft requiring a two man crew.
4. Investigation must be initiated to determine why company failed to ensure crew met requirements prior to assigning duty in commercial air transport.
5. Investigation must be initiated to determine why crew accepted and conducted commercial air transport operations while not qualified.

