



National Transportation Safety Board Aviation Accident Final Report

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|-------------------------|----------------------|-------------------------|-------------|
| Location: | FORT LAUDERDALE, FL | Accident Number: | MIA99FA226 |
| Date & Time: | 08/16/1999, 2347 EDT | Registration: | N63HJ |
| Aircraft: | Canadair CL-600 | Aircraft Damage: | Substantial |
| Defining Event: | | Injuries: | 3 None |

Flight Conducted Under: Part 91: General Aviation - Positioning

Analysis

While enroute from Pueblo, Colorado, to Columbia, South Carolina, the captain's windshield delaminated, and the flight diverted to Fort Lauderdale, Florida, for repairs. The flight crew stated the first officer was flying the airplane and had been instructed by the captain to make a firm landing at Fort Lauderdale to get the airplanes weight on the wheels, due to the airplane being light. The landing was firm and the first officer activated the engine thrust reversers. As the nose landing gear touched down, the airplane began veering to the left. Attempts to control the veer to the left were unsuccessful and the airplane ran off the left side of the runway. The airplane then ran over a taxiway and collided with a taxiway sign and the concrete base for the sign. The nose landing gear collapsed and the airplane came to rest. Examination of the runway showed alternating dark and light marks from the left main landing gear tire were present on the runway about 160 feet before marks from the right main landing gear tire are present. Post accident examination of the airplanes landing gear, tires, wheels, bakes, spoilers, and engine thrust reversers, showed no evidence of pre-accident failure or malfunction. At the time of the accident the flight crew had been on duty for about 17 hours 45 minutes.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the flight crew to maintain directional control of the airplane after landing, resulting in the airplane going off the side of the runway and colliding with a taxiway sign, collapsing the nose landing gear, and causing substantial damage to the airplane. A factor in the accident was flight crew fatigue due to being on duty for about 17 hours 45 minutes.

Findings

Occurrence #1: LOSS OF CONTROL - ON GROUND/WATER
Phase of Operation: LANDING - ROLL

Findings

1. (C) DIRECTIONAL CONTROL - NOT MAINTAINED - FLIGHTCREW
2. (F) FATIGUE - FLIGHTCREW

Occurrence #2: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: LANDING - ROLL

Findings

3. OBJECT - AIRPORT SIGN/MARKER

Occurrence #3: NOSE GEAR COLLAPSED
Phase of Operation: LANDING - ROLL

Findings

4. LANDING GEAR, NOSE GEAR - OVERLOAD

Factual Information

HISTORY OF THE FLIGHT

On August 16, 1999, about 2347 (all times eastern daylight time), a Canadair CL-600, N63HJ, registered to Chaljet 1021 Holdings, Inc., and operated by Hop-A-Jet, Inc., as a Title 14 CFR Part 91 positioning flight from Pueblo, Colorado, to Fort Lauderdale, Florida, ran off the side of the runway, collided with a taxiway sign, and collapsed the nose landing gear while landing on runway 8 at Fort Lauderdale Executive Airport. Visual meteorological conditions prevailed at the time and an instrument flight rules flight plan was filed. The aircraft received substantial damage and the airline transport-rated pilot, first officer, and one flight attendant were not injured. The flight originated from Pueblo, Colorado, the same day, about 2018.

The captain stated they departed Fort Lauderdale Executive Airport on August 14, 1999, about 1220, en route to Durango, Colorado, with passengers. On taxi in at Durango, he had to make a sharp 180-degree turn and the nose steering "went off the rack". The nose wheel was turned to the right 60-80 degrees. After the passengers got off the airplane, he tried to use the steering tiller to get the nose steering back on the rack. This was not successful, and he called the operator's representatives at Fort Lauderdale. They told him to use a board to turn the nose wheel. He used a railroad tie and 4x6 inch board moved with a "come along" and the nose wheel turned and went back onto the rack. He then taxied the airplane and performed a high-speed taxi on the runway to 100 knots, and observed no problems with the nose steering. They spent the night at Durango.

Late in the morning on August 15, 1999, they departed for Santa Fe, New Mexico, where they picked up passengers and flew to Charleston, South Carolina. They spent the night at Charleston, and on the morning of August 16, 1999, about 0700, they departed for Newnan, Georgia, to pick up one passenger. After picking up this passenger, they flew to New Orleans, and dropped the passenger. They then flew to Houston, Texas, and picked up two passengers for Aspen, Colorado. After dropping the passengers in Aspen, they flew to Pueblo, Colorado, fuel. After refueling at Pueblo, they departed at 2018, en route to Columbia, South Carolina. About 1 hour 20 minutes into the flight, the left windshield cracked. He called the representatives of the operator in Fort Lauderdale, and was told to divert to Fort Lauderdale for repairs.

The captain stated the decent and approach to Fort Lauderdale were normal. On landing, when the nose-landing wheel touched down, the airplane veered to the left. He applied full right rudder and full right brake with no results. The airplane left the runway and came to a stop about 50 feet into the sand. They then evacuated the airplane.

The first officer stated he was the pilot flying and he was in the right pilot seat. As they approached to land at Fort Lauderdale Executive Airport, the captain briefed him that the landing would need to be firm for the airplane was light. The touchdown was firm, but not severe, on the main landing gear, near the runway centerline. As the nose wheel touched down he was attempting to deploy the thrust reversers. Simultaneously, the airplane began tracking to the left without command. As he began to apply brakes to regain control, he did not remember seeing the thrust reverser unlock lights illuminate. The airplane swerved faster to the left and he applied full right brake and rudder, while reducing power to idle. The airplane continued to deviate to the left, not responding to the right brake input. The airplane departed the runway surface, struck a taxiway sign, and came to rest on its main gear and collapsed nose

gear.

The flight attendant stated the landing was firm, but not unusual. She then felt the airplane going sharply to the left and it started to jostle her in her seat. She heard a loud bumping sound and they came to an abrupt stop. She unfastened her seat belt and went to the front of the airplane where she met the captain and first officer. The first officer opened the door and they exited the airplane.

Review of the cockpit voice recorder transcript showed that 9 minutes before landing, the first officer asked the captain if he was tired. The captain replied, "been a long day." The first officer then replied "yeah we're not gonna have any trouble sleeping tonight." About 1 minute before touchdown, the captain told the first officer "remember you're only gonna probably have one reverser." A few seconds later the captain said, "ahhh go with the right TR." The first officer replied okay. The captain then said, "or excuse me the left one." The first officer replied, "I'll try 'em both and see what happens." Eight seconds before touchdown, the captain told the first officer to bring engine power to idle, and the first officer replied "roger." Three separate sounds of the airplane touching down are heard followed by two clicks and the increase in background noise. About three seconds later the sound of two clicks was heard again followed by a background noise increase, the sound of two thumps, the sound of impact, and the sound of the landing gear warning tone. See CVR Specialist's Factual Report.

PERSONNEL INFORMATION

The captain holds a FAA Airline Transport Pilot certificate with airplane multiengine land, Learjet, and Canadair CL-600 ratings, and commercial privileges airplane single engine land. The certificate was last issued on October 1, 1998. The captain holds a first class medical certificate, with no limitations, issued on July 1, 1999. The captain was hired by the airplane operator on November 6, 1995, and assigned to the position of Captain on the Canadair CL-600 on October 1, 1998. At the time of the accident the captain reported having 10,162 total flight hours and 540 flight hours in the Canadair CL-600, 530 of those hours as pilot-in-command. On the day of the accident the captain began his workday about 17 hours 45 minutes before the accident and flew 8.5 flight hours.

The first officer holds a FAA Airline Transport Pilot certificate with a airplane multiengine land rating and commercial privileges airplane single engine. The certificate was last issued on June 10, 1998. The first officer holds a first class medical certificate, with no limitations, issued on September 29, 1998. The first officer was hired by the operator on June 11, 1998, and assigned to the position of first officer on the Canadair CL-600 on February 18, 1999. At the time of the accident, the first officer reported having 3,076 total flight hours and 157 flight hours in the Canadair CL-600. On the day of the accident the first officer began his workday about 17 hours 45 minutes before the accident and flew 8.5 flight hours.

AIRCRAFT INFORMATION

The airplane is a Canadair model CL-600 Challenger, serial number 1021, registration number N63HJ. The airplane was manufactured on August 7, 1981. At the time of the accident the airplane had accumulated 9,503 total flight hours. The airplane received a 9,600-hour inspection on July 1, 1999, 123 flight hours before the accident.

METEOROLOGICAL INFORMATION

The Fort Lauderdale Executive Airport, 2353 surface weather observation was wind 110

degrees at 5 knots, visibility 10 statute miles, sky clear, temperature 83 degrees F, dew point temperature 75 degrees F, altimeter 30.12 in. Hg. At the time of the accident there was no visible moon or sun.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest east of the "G" taxiway and to the north of runway 8. Examination of the runway showed tire marks from the airplane were first visible about the 2,000-foot mark on runway 8. The marks are to the left of the runway centerline with the right wheel marks being seen almost on the centerline. Initially there are heavier tire marks from the left main gear tires, and about 160 feet further, heavy marks from the right main gear tires. Both sets of marks show alternating dark and light shades. There were no marks evident on the runway from the nose landing gear. The marks show the aircraft went off the left side of the runway just before the "G" taxiway, crossed the "G" taxiway, and that the nose landing gear struck the concrete base of a taxiway sign, located about 30 feet east of the "G" taxiway. The nose landing gear collapsed aft into the bottom of the airplane at this point and the airplane came to rest.

Examination of the nose landing gear tires from the airplane after the accident showed the left nose landing gear tire had a large cut and the wheel rim was damaged. Both nose tires had rubbing marks on the left sidewall. The nose tires had no flat spots or damage from sideways skidding. The nose tire pressures as measured with the airplane on jacks after the accident were left 141 and right 143 psi. The maintenance manual calls for 141 psi.

Examination of the main landing gear tires showed each tire had some rubber reversion consistent with higher than normal brake energy stops. There were no flat spots on the main tires. Tire pressures measured between 187-190 psi, with the airplane on jacks. The maintenance manual calls for 191 psi.

Examination of the brakes after the accident showed each main landing gear brake was released, and each tire and wheel turned freely. There was no evidence of brake overheating. The brake wear indicator for each brake was measured to be between .40 to .55 inches, which is within allowable limits.

The brake anti-skid system tested normally after the accident. Tire marks on the runway from the airplane showed an alternating light and dark shade, consistent with normal anti-skid operation.

Examination of the flight control system after the accident showed the elevator, aileron, rudder, elevator trim, rudder trim, aileron trim, and the ground and flight spoilers operated normally. The flight spoilers were found extended after the accident and the ground spoilers were found retracted. Representatives of Bombardier attributed the ground spoilers being retracted to loss of the weight on wheel system when the nose landing gear collapsed.

Examination of the engine thrust reverser system after the accident showed both engine thrust reversers operated normally when activated.

Examination of the nose landing gear and nose landing gear steering system after the accident showed no evidence of precrash failure or malfunction.

Testing of the weight on wheels system showed the system operated normally except for the nose landing gear target, which was damaged during the accident.

MEDICAL AND PATHOLOGICAL INFORMATION

The captain, first officer, and flight attendant were not injured. No post accident toxicology testing was performed on specimens from the captain, first officer, and flight attendant.

ADDITIONAL INFORMATION

The NTSB released the airplane on August 19, 1999, to Barry Ellis, President, Hop-A-Jet, Inc. Components retained by the NTSB for further testing were released to Hop-A-Jet, Inc.

Additional parties to the NTSB investigation were David George and Christopher Richard, Bombardier, and Curtis Yeagle and David Donovan, Hop-A-Jet, Inc. The Canadian Transportation Safety Board assigned an accredited representative to the investigation.

Pilot Information

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| Certificate: | Airline Transport | Age: | 43, Male |
| Airplane Rating(s): | Multi-engine Land; Single-engine Land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | Seatbelt, Shoulder harness |
| Instrument Rating(s): | Airplane | Second Pilot Present: | Yes |
| Instructor Rating(s): | None | Toxicology Performed: | No |
| Medical Certification: | Class 1 Valid Medical--no waivers/lim. | Last FAA Medical Exam: | 07/01/1999 |
| Occupational Pilot: | | Last Flight Review or Equivalent: | |
| Flight Time: | 10162 hours (Total, all aircraft), 540 hours (Total, this make and model), 8097 hours (Pilot In Command, all aircraft), 274 hours (Last 90 days, all aircraft), 95 hours (Last 30 days, all aircraft), 10 hours (Last 24 hours, all aircraft) | | |

Aircraft and Owner/Operator Information

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|-------------------------------|--------------------------------------|--------------------------------|--------------------------|
| Aircraft Make: | Canadair | Registration: | N63HJ |
| Model/Series: | CL-600 CL-600 | Aircraft Category: | Airplane |
| Year of Manufacture: | | Amateur Built: | No |
| Airworthiness Certificate: | Transport | Serial Number: | 1021 |
| Landing Gear Type: | Retractable - Tricycle | Seats: | 17 |
| Date/Type of Last Inspection: | 07/01/1999, Continuous Airworthiness | Certified Max Gross Wt.: | 41250 lbs |
| Time Since Last Inspection: | 123 Hours | Engines: | 2 Turbo Fan |
| Airframe Total Time: | 9503 Hours | Engine Manufacturer: | Lycoming |
| ELT: | Not installed | Engine Model/Series: | AL502 L2C |
| Registered Owner: | CHALJET 1021 HOLDINGS | Rated Power: | 7500 lbs |
| Operator: | HOP-A-JET. INC. | Operating Certificate(s) Held: | On-demand Air Taxi (135) |
| Operator Does Business As: | | Operator Designator Code: | EXOA |

Meteorological Information and Flight Plan

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|----------------------------------|-------------------|--------------------------------------|------------------|
| Conditions at Accident Site: | Visual Conditions | Condition of Light: | Night/Dark |
| Observation Facility, Elevation: | FXE, 14 ft msl | Distance from Accident Site: | 1 Nautical Miles |
| Observation Time: | 2353 EDT | Direction from Accident Site: | 270° |
| Lowest Cloud Condition: | Clear / 0 ft agl | Visibility | 10 Miles |
| Lowest Ceiling: | None / 0 ft agl | Visibility (RVR): | 0 ft |
| Wind Speed/Gusts: | 5 knots / | Turbulence Type Forecast/Actual: | / |
| Wind Direction: | 110° | Turbulence Severity Forecast/Actual: | / |
| Altimeter Setting: | 30 inches Hg | Temperature/Dew Point: | 28° C / 24° C |
| Precipitation and Obscuration: | | | |
| Departure Point: | PUEBLO, CO (PUB) | Type of Flight Plan Filed: | IFR |
| Destination: | (FXE) | Type of Clearance: | IFR |
| Departure Time: | 1818 MDT | Type of Airspace: | Class D |

Airport Information

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|----------------------|---------------------------------|---------------------------|-------------|
| Airport: | FORT LAUDERDALE EXECUTIVE (FXE) | Runway Surface Type: | Asphalt |
| Airport Elevation: | 14 ft | Runway Surface Condition: | Dry |
| Runway Used: | 8 | IFR Approach: | ILS |
| Runway Length/Width: | 6001 ft / 100 ft | VFR Approach/Landing: | Straight-in |

Wreckage and Impact Information

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|---------------------|--------|----------------------|-------------|
| Crew Injuries: | 3 None | Aircraft Damage: | Substantial |
| Passenger Injuries: | N/A | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 3 None | Latitude, Longitude: | |

Administrative Information

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|-----------------------------------|---|--------------|------------|
| Investigator In Charge (IIC): | JEFFREY L KENNEDY | Report Date: | 05/16/2001 |
| Additional Participating Persons: | RAY BAHAMONDE; FORT LAUDERDALE, FL JEAN FERRARA; FORT LAUDERDALE, FL LORENDA WARD; WASHINGTON, DC ANNA W CUSHMAN; WASHINGTON, DC | | |
| Publish Date: | | | |
| Investigation Docket: | NTSB accident and incident docket serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ . | | |

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).