# National Transportation Safety Board
# Aviation Accident Final Report

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| **Location:** | Atlantic City, NJ | **Accident Number:** | NYC08FA022 |
| **Date & Time:** | 10/27/2007, 1110 EDT | **Registration:** | N697MC |
| **Aircraft:** | Cessna 650 | **Aircraft Damage:** | Substantial |
| **Defining Event:** | | **Injuries:** | 4 None |
| **Flight Conducted Under:** | Part 91: General Aviation - Personal | | |

## Analysis

The first officer was flying the Area Navigation, Global Positioning System, approach to runway 22. During the approach, the airplane was initially fast as the first officer had increased engine power to compensate for wind conditions. Descending below the minimum descent altitude (MDA), the first officer momentarily deployed the speed brakes, but stowed them about 200 feet above ground level (agl), and reduced the engine power to flight idle. The airplane became low and slow, and developed an excessive sink rate. The airplane subsequently landed hard on runway 22, which drove the right main landing gear into the right wing, resulting in substantial damage to the right wing spar. The first officer reported intermittent airspeed fluctuations between his airspeed indicator and the captain's airspeed indicator; however, a subsequent check of the pitot-static system did not reveal any anomalies that would have precluded normal operation of the airspeed indicators. About the time of the accident, the recorded wind was from 190 degrees at 11 knots, gusting to 24 knots; and the captain believed that the airplane had encountered windshear near the MDA, with the flaps fully extended. Review of air traffic control data revealed that no windshear advisories were contained in the automated terminal information system broadcasts. Although the local controller provided windshear advisories to prior landing aircraft, he did not provide one to the accident aircraft. Review of the airplane flight manual (AFM) revealed that deploying the speed brakes below 500 feet agl, with the flaps in any position other than the retracted position, was prohibited.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The first officer's failure to maintain airspeed during approach, and the captain's inadequate remedial action. Contributing to the accident was the first officer's failure to comply with procedures, windshear, and the lack of windshear warning from air traffic control.

## Findings

Occurrence #1: HARD LANDING
Phase of Operation: LANDING

Findings
1. (F) WEATHER CONDITION - WINDSHEAR
2. (C) AIRSPEED - NOT MAINTAINED - OTHER CREWMEMBER
3. (C) REMEDIAL ACTION - INADEQUATE - PILOT IN COMMAND
4. (F) HAZARDOUS WEATHER ADVISORY - NOT ISSUED - ATC PERSONNEL(LCL/GND/CLNC)
5. (F) PROCEDURES/DIRECTIVES - NOT COMPLIED WITH - OTHER CREWMEMBER

## Factual Information

HISTORY OF FLIGHT

On October 27, 2007, at 1110 eastern daylight time, a Cessna 650, N697MC, was substantially damaged while landing at Atlantic City International Airport (ACY), Atlantic City, New Jersey. The two certificated airline transport pilots and the two passengers were not injured. Instrument meteorological conditions prevailed for the flight that departed Republic Airport (FRG), Farmingdale, New York, about 1040. An instrument flight rules (IFR) flight plan was filed for the personal flight conducted under 14 Code of Federal Regulations (CFR) Part 91.

The captain reported that they were flying the Area Navigation, Global Positioning System, approach to runway 22 (RNAV [GPS] RWY 22) at ACY. Specifically, the first officer was the pilot flying (PF), and the captain was the pilot not flying (PNF). The captain added that automated terminal information system (ATIS) "Charlie" was current at the time of the approach, and included reported winds from 210 degrees at 15 knots, gusting to 22 knots. The ATIS information did not include any low-level windshear advisory, nor did the ACY air traffic control tower (ATCT) report any.

The first officer reported that as the airplane neared the minimum descent altitude (MDA), about 300 feet above ground level (agl), he observed intermittent airspeed fluctuations. The approach speed (Vref) for the accident landing was 130 knots, and the first officer increased engine power to compensate for wind conditions. The captain initiated callouts beginning with "Ref + 10," and the first officer noted that his airspeed indicator displayed airspeeds that were 5 to 10 knots greater than what the captain was saying. The first officer then saw the runway threshold, and as he descended below the MDA, the airplane was high and indicating an airspeed of 150 knots. The first officer momentarily deployed the speed brakes, but stowed them about 200 feet agl, and reduced the engine power to flight idle. About 20 feet agl, the airplane descended at an excessive rate and impacted the runway. The airplane drifted right, bounced, and the first officer initiated a go-around.

The captain further stated that after he initiated callouts beginning with "Ref + 10," the airplane was getting "low and slow" on the approach. The captain instructed the first officer to increase engine power; however, the first officer seemed confused due to conflicting readings between the airspeed instruments on different sides of the cockpit. The captain stated, "...In the very short time of the apparent confusion, the situation went from a controlled condition to an abnormal sink rate condition. The first officer applied power to the spooled down engines, but the aircraft impacted the runway hard at about the same time the engines were again generating thrust...." The captain added that the flaps were fully extended during the landing, and he believed the airplane experienced a probable windshear condition near the MDA.

During the go-around, the captain observed multiple cockpit warnings, including loss of hydraulic pressure, and he planned for a subsequent emergency landing without brakes or thrust reversers. The airplane's second landing was on runway 31, a 10,000-foot-long, 150-foot wide, asphalt runway. During the rollout, the airplane traveled off the end of the runway at a speed of approximately 40 knots, and came to rest upright about 100 feet beyond the runway, and 100 feet right of the extended runway centerline. Neither the captain, nor the first officer, reported any airspeed indicator fluctuations during the second landing.

Review of radar data provided by the Federal Aviation Administration (FAA), revealed that the

airplane descended on the instrument approach, and was level at 200 feet, about 1/2-mile, and 16 seconds from the runway 22 threshold. During that time, three radar targets recorded the airplane's altitude at 200 feet, and a fourth radar target recorded the airplane's altitude at 0 feet, on the runway. Nine seconds elapsed between the last target recorded at 200 feet, and the subsequent target at 0 feet.

## PILOT INFORMATION

The captain, age 62, held an airline transport pilot certificate, with a rating for airplane multiengine land. He also held a commercial pilot certificate, with a rating for airplane single engine land, and a flight engineer certificate. The captain's most recent FAA first class medical certificate was issued on June 1, 2007. The captain reported a total flight experience of 9,472 hours; of which, 199 hours were in the same make and model as the accident airplane. The captain flew the make and model accident airplane 43 hours and 21 hours during the 90-day period and 30-day period preceding the accident, respectively.

The first officer, age 26, held an airline transport pilot certificate, with a rating for airplane multiengine land. He also held a commercial pilot certificate, with a rating for airplane single engine land. In addition, the first officer held a certified flight instructor certificate, with ratings for airplane single engine and instrument airplane. The first officer's most recent FAA first class medical certificate was issued on April 19, 2007. The first officer reported a total flight experience of 2,535 hours; of which, 120 hours were in the same make and model as the accident airplane. The first officer flew the make and model accident airplane 112 hours and 38 hours during the 90-day period and 30-day period preceding the accident, respectively.

## AIRCRAFT INFORMATION

The airplane was manufactured in 1985. It was also used by the operator for on-demand air taxi under the provisions of CFR Part 135, and it was maintained under a continuous airworthiness program. The airplane's most recent inspection was completed two days prior to the accident. At that time, the airplane had accumulated 7,052 total hours of operation.

Additionally, the first officer reported that approximately 1 month prior to the accident, the accident airplane had suffered damage to its reduced vertical separation minimums (RVSM) critical area. Specifically, jet blast from another airplane blew a toolbox into the parked accident airplane. The RVSM critical area was subsequently repaired at a manufacturer service center.

## METEOROLOGICAL INFORMATION

The reported weather at ACY, at 1054, was: wind 190 degrees at 11 knots, gusting to 24 knots; visibility 7 miles in light rain; broken ceiling at 800 feet, overcast ceiling at 3,500 feet; temperature 21 degrees Celsius (C); dew point 20 degrees C; altimeter 30.04 inches of mercury.

ACY ATIS Charlie, valid at 0954, included: wind 210 degrees at 15 knots, gusting to 22 knots; visibility 6 miles in light rain and mist; broken ceiling at 600 feet; overcast ceiling at 1,000 feet; temperature 22 degrees C, dew point 21 degrees C, altimeter 30.06 inches of mercury.

ACY ATIS Delta, valid at 1054, included: wind 210 degrees at 15 knots, gusting to 24 knots; visibility 6 miles in light rain and mist; broken ceiling at 800 feet; overcast ceiling at 3,500

feet; temperature 21 degrees C, dew point 20 degrees C, altimeter 30.04 inches of mercury.

The ATIS broadcasts did not contain any warnings regarding windshear.

FLIGHT RECORDERS

The airplane was equipped with an L3 (Loral) GA100 cockpit voice recorder (CVR). Examination of the unit by the National Transportation Safety Board Vehicle Recorders Laboratory, Washington, D.C., revealed that the CVR was not operating at the time of the accident, and had not been operating for some time.

Further examination of the CVR at the manufacturer's facility revealed two burn circuit traces on the power supply card, which would have precluded all recording functions. The CVR was equipped with a test feature, which would allow it to be functionally checked prior to every flight.

Review of federal aviation regulation (FAR) 135.151 revealed that the accident airplane was required to have a CVR installed, and that it "Is operated continuously from the use of the check list before the flight to completion of the final check list at the end of the flight."

The airplane was not equipped with a flight data recorder (FDR), nor was it required to be under the provisions of FAR 135.152.

WRECKAGE INFORMATION

An FAA inspector reported that the hard landing drove the right main landing gear into the right wing, resulting in substantial damage to the right wing spar. In addition, the right main landing gear, at the point where the strut attached to the wing, separated during the second landing on runway 31. The right main landing gear was later recovered off the right side of runway 31. The initial hard landing also resulted in a fuel leak and loss of hydraulic power. Due to the loss of hydraulic power, the airplane made its second landing with inoperative brakes and thrust reversers.

TESTS AND RESEARCH

On March 13, 2008, a Safety Board investigator witnessed a pitot-static check of the accident airplane. No anomalies were discovered that would have precluded normal operation of the flight instruments. A minor leak was detected on the first officer's side of the cockpit; however, the leak was within tolerances and had also been documented during recent maintenance at a manufacturer facility.

According to the engine manufacturer, digital electronic engine controls (DEECs) did contain non-volatile memory, but electronic engine controls (EECs) did not contain non-volatile memory. The accident airplane was equipped with EECs, and was not equipped with an enhanced ground proximity warning system (EPGWS); therefore, no non-volatile memory was recovered from the accident airplane.

Review of a Cessna 650 airplane flight manual (AFM), Section III, Operating Limitations, revealed, "Extension of the speedbrakes with the flaps in any position other than the UP position is prohibited below 500 feet AGL..."

AIR TRAFFIC CONTROL

Review of FAA air traffic control (ATC) data revealed that the accident flightcrew established radio contact with the Atlantic City south arrival (approach) controller about 1101. At that time,

the captain announced that he had ATIS information "Charlie," but the captain's transmission was partially blocked. Information "Delta" was current at the time, and the south arrival controller did not note the error or provide the updated information; however, the wind information between the two ATIS broadcasts were identical, except for an additional 2 knots to the wind gusts with respect to "Delta."

At 1102, the accident flight was cleared for the RNAV (GPS) RWY 22 approach.

At 1105, the accident flight was instructed to contact the Atlantic City tower, and the instruction was acknowledged. During the initial transmission to the Atlantic City local controller (tower), the local controller cleared the flight to land on runway 22.

Although the local controller had provided windshear advisories to previous flights, he did not provide one to the accident flight.

At 1110, the local controller advised the arrival controller that the flight had "...crashed...landed really really hard..."

## Pilot Information

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| **Certificate:** | Airline Transport; Commercial | **Age:** | 62, 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 With Waivers/Limitations | **Last FAA Medical Exam:** | 06/01/2007 |
| **Occupational Pilot:** | | **Last Flight Review or Equivalent:** | 05/01/2007 |
| **Flight Time:** | 9472 hours (Total, all aircraft), 199 hours (Total, this make and model), 6350 hours (Pilot In Command, all aircraft), 90 hours (Last 90 days, all aircraft), 24 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft) | | |

## Co-Pilot Information

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| **Certificate:** | Airline Transport; Flight Instructor; Commercial | **Age:** | 26, Male |
| **Airplane Rating(s):** | Multi-engine Land; Single-engine Land | **Seat Occupied:** | Right |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | Seatbelt, Shoulder harness |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | Yes |
| **Instructor Rating(s):** | Airplane Single-engine; Instrument Airplane | **Toxicology Performed:** | No |
| **Medical Certification:** | Class 1 Without Waivers/Limitations | **Last FAA Medical Exam:** | 05/01/2007 |
| **Occupational Pilot:** | | **Last Flight Review or Equivalent:** | 05/01/2007 |
| **Flight Time:** | 2535 hours (Total, all aircraft), 120 hours (Total, this make and model), 1300 hours (Pilot In Command, all aircraft), 112 hours (Last 90 days, all aircraft), 38 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

| | | | |
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| **Aircraft Make:** | Cessna | **Registration:** | N697MC |
| **Model/Series:** | 650 | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | No |
| **Airworthiness Certificate:** | Transport | **Serial Number:** | 650-0097 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | 10 |
| **Date/Type of Last Inspection:** | 10/01/2007, Continuous Airworthiness | **Certified Max Gross Wt.:** | 22000 lbs |
| **Time Since Last Inspection:** | | **Engines:** | 2 Turbo Fan |
| **Airframe Total Time:** | 7052 Hours as of last inspection | **Engine Manufacturer:** | Garrett |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | TFE-731 |
| **Registered Owner:** | Northeast Air and Sea Services Llc. | **Rated Power:** | 3650 lbs |
| **Operator:** | EMPIRE AIRWAYS INC | **Operating Certificate(s) Held:** | On-demand Air Taxi (135) |
| **Operator Does Business As:** | | **Operator Designator Code:** | E9LA |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Instrument Conditions | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | ACY, 75 ft msl | **Distance from Accident Site:** | 0 Nautical Miles |
| **Observation Time:** | 1054 EDT | **Direction from Accident Site:** | 0° |
| **Lowest Cloud Condition:** | | **Visibility** | 7 Miles |
| **Lowest Ceiling:** | Broken / 800 ft agl | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 11 knots / 24 knots | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 190° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 30.04 inches Hg | **Temperature/Dew Point:** | 21°C / 20°C |
| **Precipitation and Obscuration:** | Light - Rain | | |
| **Departure Point:** | Farmingdale, NY (FRG) | **Type of Flight Plan Filed:** | IFR |
| **Destination:** | Atlantic City, NJ (ACY) | **Type of Clearance:** | IFR |
| **Departure Time:** | 1038 EDT | **Type of Airspace:** | |

## Airport Information

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| **Airport:** | Atlantic City International (ACY) | **Runway Surface Type:** | Asphalt |
| **Airport Elevation:** | 75 ft | **Runway Surface Condition:** | Wet |
| **Runway Used:** | 22 | **IFR Approach:** | Global Positioning System; RNAV |
| **Runway Length/Width:** | 6144 ft / 150 ft | **VFR Approach/Landing:** | Straight-in |

## Wreckage and Impact Information

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| **Crew Injuries:** | 2 None | **Aircraft Damage:** | Substantial |
| **Passenger Injuries:** | 2 None | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 4 None | **Latitude, Longitude:** | 39.457500, -74.577222 |

## Administrative Information

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| **Investigator In Charge (IIC):** | Robert J Gretz | **Report Date:** | 06/30/2008 |
| **Additional Participating Persons:** | Kirk Jaeger; FAA/FSDO; Philadelphia, PA<br>Andrew Hall; Cessna Aircraft; Wichita, KS<br>Jim Allen; Honeywell; Phoenix, AZ | | |
| **Publish Date:** | | | |
| **Investigation Docket:** | NTSB accident and incident dockets 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.ntsb.gov/pubdms/. | | |