



Wind Shear Sends Commuter Aircraft Plunging Out of Control

When the captain elected to continue the approach through known thunderstorm activity, tragedy was only minutes away.

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Editorial Staff Report

While on an instrument landing approach to Birmingham Airport in Birmingham, Alabama, U.S., the crew of a twin-engine Beechcraft C99 turboprop commuter with 13 passengers on board decided to continue on final despite the presence of thunderstorms in the area.

After a relatively uneventful approach punctuated with intermittent heavy rain, the aircraft suddenly lurched left toward a 45 degree roll. After the two-man crew returned the aircraft to level flight, it abruptly pitched up so violently that the C99 became nearly inverted. Despite application of full climb power, the crew was unable to regain control of the aircraft as it lost airspeed and altitude. The commuter crashed into a residential area and caught fire, destroying two homes. The captain and one passenger survived the crash. The copilot and 12 passengers were killed.

The U.S National Transportation Safety Board (NTSB), in a recently released report, concluded that wind shear was the likely cause of the July 1991 crash, but cited the crew for a series of miscalculations and poor judgment in attempting to continue the approach.

“Around the time of the accident (1812 local), flight crews of four other aircraft (three small general aviation airplanes and a Learjet) elected to delay their approaches

... or to divert to alternate landing sites,” the NTSB report said.

The report said evidence indicated that the flight “encountered a thunderstorm cell ... containing very strong vertical air shafts and associated turbulence as the airplane approached the airport at about 1,600 feet above the ground.”

The NTSB blamed the captain for the decision “to initiate and continue an instrument approach into clearly identified thunderstorm activity.”

In addition, the NTSB noted that the sequence of events leading to the accident underscored several additional flight safety issues, including lack of unusual attitude recovery training and inadequate airborne radar instruction.

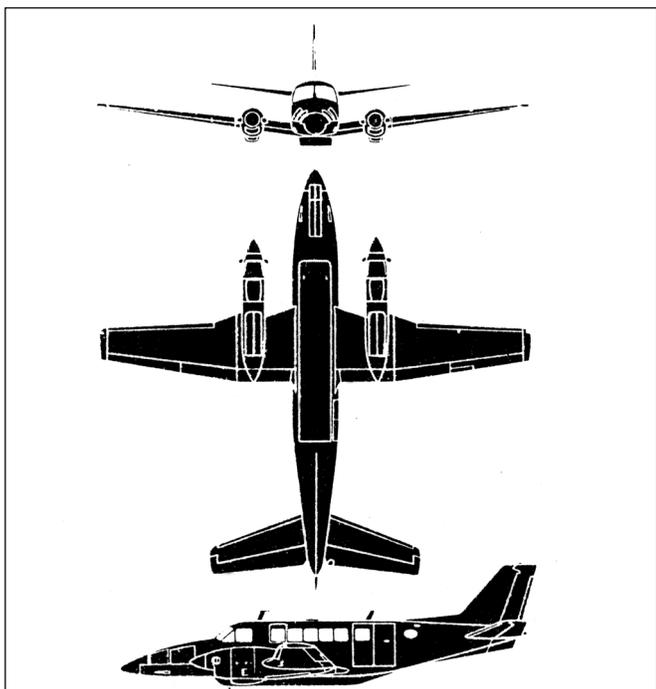
L'Express Flight 508 originated at New Orleans International Airport and had one intermediate stop before its scheduled arrival in Birmingham. The flight crew involved in the crash assumed command of the aircraft in New Orleans.

The captain, 54, held an airline transport pilot's certificate with a total flight time of 4,141 hours, of which 553

were as pilot-in-command of a C99. He had flown a total of 30.8 hours in July 1991, of which 1.3 were recorded as under actual instrument conditions. He had no record of regulation violations and there was no record of accident history with the U.S. Federal Aviation Administration (FAA).

According to company records, the captain had completed initial ground and flight training for the C99 with L'Express in 1989. From September 1990 to May 15, 1991, the captain was on a military leave of absence and on active duty in the Middle East serving as an aircraft maintenance officer during the Persian Gulf War.

Before resuming his duties at L'Express, the captain completed recurrent ground and flight training with the airline. However, the captain failed an instrument



Beechcraft C99 Airliner

The B99, the predecessor of the C99, first flew in 1966 and deliveries began in 1968. A large main cargo door allows the aircraft to be used for either all-cargo or cargo/passenger operations. The C99, with increased power and systems refinements, was first delivered in 1981.

The C99 was certified for operation with one pilot, but federal regulations require two pilots in commuter air carrier operations. There are about 23 C99s in operation in the United States and about 52 operating outside the United States.

The crash aircraft was certified in 1984. It was equipped with two Pratt & Whitney of Canada PT6A-36 engines.

proficiency check ride on June 17, 1991.

The NTSB, summarizing comments entered in an FAA airman competency form, noted: "The captain's performance was deemed unsatisfactory on landings from circling approaches, holding, localizer back course approaches, circling approaches and judgment."

On another check ride two days later, the captain was found to be unsatisfactory in very high frequency omnidirectional range (VOR) approaches. After additional training in these areas, he completed a check ride satisfactorily on June 25, the NTSB said. The check rides were administered by the airline's chief pilot, who was also an FAA-designated check airman.

The FAA check airman said the captain did not use good judgment on the first check ride when he overbanked the airplane to avoid overshooting an approach. However, neither the chief pilot nor an FAA principal operations inspector assigned to the airline "believed that the captain demonstrated any dangerous propensities or faulty decision-making characteristics.

"The chief pilot attributed the captain's performance on the check rides to being somewhat 'rusty' on these maneuvers as a result of his extended military leave and to the natural tendency to be nervous because an FAA representative was monitoring the check ride," the NTSB said.

The chief pilot characterized the captain as "very dedicated to absorbing more knowledge." Others described him as an "experienced, stable and good pilot," an assessment the NTSB said it could not share based on his performance on the day of the accident.

The copilot, 30, had logged a total of 1,545 hours, with 650 hours in multi-engine aircraft and 170 hours in the C99. According to the NTSB, he had no record of violations or previous aviation accidents.

Both the pilot and the copilot tested negative for drugs and alcohol.

While the pilots were properly certified and qualified for the flight, the NTSB said "radar training provided by L'Express did not adequately address the specific operating characteristics and procedures of the Bendix RDR-160," the radar unit installed on the aircraft.

"The check airman/ground instructor for the airline, who taught the radar portion of the ground school, did not possess an operations manual for the RDR-160," the NTSB said.

The C99 captain said he had not received specific training on the RDR-160 and that his skill and knowledge in

operating it were acquired by the “learning-by-doing” method. [The board subsequently recommended that the FAA require radar training programs to include information on the specific radar a flight crew will be using and information on limitations and operating procedures provided by the manufacturer.]

In addition, the NTSB said it was “concerned that the flight crew had not received (sufficient) unusual attitude recognition and recovery training and that current federal regulations do not specifically require flight crews to receive recurrent training in these subjects.

“If the flight crew had been trained and proficient in the recognition and recovery techniques for an unusual attitude situation, they would most likely have been better able to cope with the attitudes that were experienced.”

Investigators said that given the difficulty the crew experienced in controlling the aircraft, the flight had encountered severe turbulence associated with a level three or level four thunderstorm.

The NTSB devoted extensive analysis and discussion to the crew’s awareness of weather hazards during the approach. A review of company ground school curriculum indicated that the crew had received adequate training in weather hazards and avoidance, including written admonitions to avoid takeoffs and landings in thunderstorms.

The captain was interviewed on three occasions following his recovery from injuries sustained in the accident. According to testimony given to the NTSB, the captain stated that the weather encounter and loss of control caught him by surprise and that he had not seen a storm cell in front of the airplane either visually or on radar. He said that shortly before the onset of turbulence he had transferred control of the aircraft to the copilot so he could review the instrument approach chart.

“This explanation, however, is not supported by the available evidence,” the NTSB said.

Just before the crash, a Learjet crew reported observing significant cell activity on radar and also reported seeing cells and visible lightning on approach, which they subsequently broke off. The surviving passenger said he observed “an incredibly black cloud” ahead of the aircraft.

According to the cockpit voice recorder (CVR) transcript, the captain’s decision to continue the approach was made after he received a “ride report” from a Piper

Aerostar pilot on final approach ahead of him. Once the decision was made to continue the approach, the CVR indicates that the captain told the copilot to “watch out for wind shear” and a few moments later added “if you don’t feel comfortable about this, let me know.”

“None of these conditions and statements was consistent with a pilot who anticipated an approach with no weather hazards present,” the NTSB said. “Contrary to the captain’s later statements, the available evidence suggests that the flight crew was aware of the thunderstorm conditions and elected to continue the approach.”

There was no evidence of negligence on the part of air traffic control, and weather briefings were judged to be adequate considering the changing weather patterns around the airport, the NTSB said.

The report went on to conclude that statements made by the captain about the location and intensity of thunderstorm cells were inconsistent with other pilot reports and weather radar photographs.

“The captain stated that the airborne radar indicated that the thunderstorm cells were well to the north and west of the airport and the intended approach path,” the report said. “The thunderstorm location described by other pilots and ground radar photo analysis were quite different. Both showed multiple level three and possibly level four thunderstorm cells either directly on or very near the final approach course to the runway.”

There was no indication of a radar malfunction, the report said. The NTSB noted that the absence of cockpit discussion about the radar indicated that the radar was depicting cell echoes in about the same location as those noted by visual observations.

The captain’s comments to the copilot, the report said, “strongly suggest that the flight was closer to thunderstorm cells than he (the captain) indicated during his interviews with investigators.”

The decision to continue the approach based on the Aerostar pilot’s report was also deeply flawed, the NTSB said. The Aerostar report indicated little turbulence but “visibility down to just about zero” because of heavy rain. Just before the Aerostar report, the Learjet crew had aborted their approach after reporting that “it looks pretty bad on the radar.”

Rather than indicating improving weather conditions ahead, the Aerostar report foretold the presence of a potentially hazardous situation, the report said.

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“The (Aerostar) pilot’s comment ... should have alerted the flight crew to the existence of the mature-stage thunderstorm and to the high potential for encountering severe vertical turbulence.”

The report added: “The fact that the Aerostar did not encounter the extreme weather situation experienced by LEX 508 was a matter of chance.”

The flight crew’s decision to continue the approach could have been caused, in part, by complacency, the NTSB said. Thunderstorms at Birmingham are a typical afternoon phenomenon.

“The board is concerned that the frequency with which both pilots and air traffic control personnel are subjected to thunderstorms may lead to a complacent attitude and a diminished level of respect for their potential destructiveness.

“Pilots who have experience flying in areas of thunderstorm activity learn that the possibility exists of encountering a hazard due to a thunderstorm. Most of the time, however, a pilot will encounter nothing more intimidating than heavy rain and lightning, as was experienced by the Aerostar,” the NTSB said.

The report said the risks are made worse by the tendency to believe that the existing storm situation is identical to

previous encounters where the flight was uneventful.

“The fact is, while thunderstorms may appear to be the same, they may present vastly different levels of hazard,” the NTSB said.

Less than two minutes before the crash, the LEX 508 pilot told Birmingham tower that they were experiencing moderate rain and that the “ride is good so far.”

On the basis of the reports from the Aerostar and LEX 508 pilots, the Learjet crew decided to try again and followed the C99 on its approach path.

The Lear made it to about five miles outside the outer marker when airborne radar displayed heavy thunderstorm cells along and to the sides of the final approach path. The crew elected to break off the approach behind LEX 508.

About 10 minutes later, the weather had improved and the Lear completed a visual approach without encountering turbulence or rain.

“This accident underscores the rapidly changing nature of thunderstorms and the importance of clarifying information about the safety of flight near areas of convective activity,” the report concluded. ♦

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