

Log 2357



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: April 29, 1992

In reply refer to: A-92-18 through -20

Honorable Barry L. Harris
Acting Administrator
Federal Aviation Administration
Washington, D.C. 20591

On July 10, 1991, at approximately 1812 central daylight time, L'Express Flight 508 (LEX508) crashed while conducting an instrument landing system approach to runway 5 at the Birmingham Airport (BHM), Birmingham, Alabama. The airplane was a Beech C99 on an instrument flight rules flight plan. It was operating under the provisions of 14 Code of Federal Regulations (CFR) Part 135. The captain of the flight and one passenger survived the crash in Ensley, a residential area in southwest Birmingham. The first officer and the remaining 12 passengers aboard the flight were fatally injured. The airplane was destroyed by the impact and postcrash fire. Two homes and two automobiles were also destroyed.¹

The National Transportation Safety Board determines that the probable cause of this accident was the decision of the captain to initiate and continue an instrument approach into clearly identified thunderstorm activity, resulting in a loss of control of the airplane from which the flightcrew was unable to recover and subsequent collision with obstacles and the terrain.

¹For more detailed information, read Aircraft Accident Report--"L'Express Airlines, Inc., Flight 508, Weather Encounter and Crash Near Birmingham, Alabama, July 10, 1991" (NTSB/AAR-92/01)

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The L'Express Operations Manual stipulated that "flight in turbulence and thunderstorms is extremely hazardous, obviously to be avoided if possible." The L'Express pilot training program discussed delaying takeoffs or landings in the face of an approaching thunderstorm. However, this information was apparently insufficient to deter the captain of LEX508 from penetrating the thunderstorm.

This accident underscores the rapidly changing nature of thunderstorms, and the importance of clarifying information about flight safety near areas of convective activity. For example, only about 10 minutes elapsed from the time that the flightcrew of Learjet N45ZP aborted their second approach and the point at which they could conduct a safe and successful visual approach to runway 5.

In several accident and incident reports, the Safety Board has cited the failure of pilots to properly assess information concerning convective activity. Specifically, the Safety Board has been critical of the training that flightcrews received on hazardous weather avoidance and windshear recognition and recovery. A large number of these cases involved highly experienced, professional pilots who had reportedly received the finest training offered by their respective training programs. Yet, these reports reveal that in most of these cases, the pilot/flightcrew displayed imprudent action concerning thunderstorms and relied on radar as the primary navigation tool when ample information was available from visual observations and other resources. The collective use and interpretation of this information would have provided evidence of hazardous weather to the flightcrew, permitting them to avoid it.

Through the concerted efforts of government and industry, comprehensive windshear training programs have been developed and used by the airlines. The facts of this accident indicate that despite the efforts of the Federal Aviation Administration (FAA) to implement and monitor air carriers and their training programs and the aviation industry's attempts to establish policies and procedures for the avoidance of thunderstorms, more effective efforts in this area are needed. Pilots must exercise conservative judgment when they are confronted with hazardous weather conditions, especially in the terminal environment. They must be able to recognize and accurately interpret conditions within or near rapidly developing thunderstorms. In addition, they must understand that thunderstorms can be highly dynamic, changing significantly within a short period of time. In particular, they must recognize and avoid low-altitude hazards associated with thunderstorms along or near approach paths. More emphasis is needed in training to help pilots evaluate the characteristics and dynamics of thunderstorms.

The Safety Board believes that the FAA should continue emphasizing to principal operations inspectors the importance of requiring that pilots demonstrate, during initial and recurrent training, knowledge of the conditions associated with mature thunderstorms and the potential effects such thunderstorms have on aircraft. This training could be based upon the windshear training aid developed by the FAA for CFR Part 121 operators and the windshear training aid currently under development for CFR Part 135 operators. In addition, the Safety Board believes that the FAA should take the lead in a joint government/industry effort to develop and institute criteria that can be used by flightcrews to evaluate or index the extent of thunderstorm hazards present to assist them in the go/no go decision-making process.

Neither of the flight crewmembers had received formal, standardized training from L'Express Airlines on the use and operation of the Bendix RDR-160 radar, or training in recognizing and recovering from unusual attitudes.

The radar training provided by L'Express did not adequately address the specific operating characteristics and procedures of the Bendix RDR-160 radar. Also, the ground school reference library did not include a copy of the RDR-160 Weathervision Pilot's Manual. Moreover, 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 Safety Board believes that in order for any training program on a system or component to be truly effective, it should incorporate the limitations, operating guidelines, and thoughts and viewpoints published by the manufacturer of that device. A C99 first officer advised that his training on the RDR-160 radar consisted of "trial and error experience and information from other pilots." Such "learn as you go" training can lead to improper operating procedures and techniques and a false sense of system capability. The Safety Board believes that the FAA should require that radar training programs include information on the specific radar that the flightcrew will be using and reference the information provided by the manufacturer concerning its limitations and recommended operating procedures.

The Safety Board is also concerned that the flightcrew had not received unusual attitude recognition and recovery training and that current Federal regulations do not specifically require flightcrews to receive recurrent training in these subjects. The captain described the initial upsetting event as a steep roll to the left followed by an abrupt pitch up. He lost sight of the horizon, and at times he was unaware of the attitude of the airplane. Additionally, he could not ascertain whether the airplane entered a stall or experienced a prestall buffet. The Safety Board was unable to

determine the exact magnitude of the vertical and horizontal winds that LEX508 encountered. Moreover, it could not objectively assess the actions of the flightcrew following the upset. Given the difficulty the captain experienced in controlling the airplane, the Safety Board believes that the flight encountered severe turbulence and that the airplane was probably in a level 3 or 4 thunderstorm.

The Safety Board believes that the thunderstorms and turbulent winds in the BHM area on the evening of the accident were extremely localized and relatively short lived. If the flightcrew had been trained and proficient in techniques for recognizing and recovering from unusual attitudes, they would most likely have been better able to cope with the attitudes they experienced. Consequently, the Safety Board believes that the FAA should require that recurrent training and proficiency programs for instrument-rated pilots include techniques for recognizing and recovering from unusual attitudes.

The Safety Board has twice before addressed the issue of pilot training for recovery from unusual attitudes. As a result of its investigation of a November 16, 1968, incident involving a Boeing 727 departing Detroit, the Safety Board issued Safety Recommendation A-69-115 to the FAA. This recommendation asked that the FAA:

Require airlines to provide additional flightcrew training, whereby pilots would be required to demonstrate periodically, proficiency in the area of recovery from unusual attitudes. It is suggested that a simulator be utilized to provide flightcrew familiarization in the following areas: A. the various instrument displays associated with and resulting from encounters with unusual meteorological conditions; B. the proper flightcrew response to the various displays; C. demonstration of and recovery from possible ensuing unusual attitudes.

As a result of its investigation of a March 31, 1971, accident involving an out-of-control Boeing 707/720B on a proficiency check flight out of Ontario, California, the Safety Board issued Safety Recommendation A-72-152 asking that the FAA:

Amend 14 CFR 61, Appendix A, and CFR 121, Appendices E and F to include a requirement for pilots to demonstrate their ability to recover from abnormal regimes of flight and unusual attitudes solely by reference to flight instruments. For maximum safety, these demonstrations should be conducted in an appropriate flight simulator. Should existing or proposed simulators be incapable of realistically duplicating aircraft performance in

the regimes of flight beyond normal operation, it is further recommended that the FAA take appropriate measures to require that such existing or proposed simulators be replaced or modified to include such a capability.

The FAA declined to implement these safety recommendations pointing out that out-of-trim upset accidents were very rare and that a requirement for unusual attitude recovery maneuvers was deleted from the pilot proficiency checks in August 1965 because such maneuvers had "...little or no training value..." Further, the FAA stated that since simulators were not required, the agency could not require that specific maneuvers be placed in the programming. Safety Recommendation A-69-115 was classified as "Closed--Unacceptable Action" on August 17, 1972; Safety Recommendation A-72-152 was classified as "Closed--Unacceptable Action" on January 16, 1973.

In its investigation of a midair collision involving a Piper Aerostar and a Bell 412 helicopter in Merion, Pennsylvania, on April 4, 1991, the Safety Board addressed the initial development of training projects in the area of aeronautical decision making.² Because of evidence of poor judgment and poor decision making by pilots in many accidents, the Safety Board made the following recommendation to the FAA:

Disseminate more aggressively available information and materials pertaining to Aeronautical Decision Making training and actively promote its implementation among all categories of pilots in the civil aviation community. (Class II, Priority Action) (A-91-93)

On December 27, 1991, the FAA responded to this safety recommendation listing a number of actions taken to satisfy the intent. The FAA response included a reference to Advisory Circular 60-22, "Aeronautical Decision Making," which provides a systematic approach to risk assessment and stress management in aviation, and illustrates how personal attitudes can influence decision making and how those attitudes can be modified to enhance safety in the cockpit. Further, the FAA's Accident Prevention Program has been actively disseminating information and materials pertaining to aeronautical decision making, including slide presentations, videotapes, and pamphlets on the subject, to all Flight Safety District Offices. The FAA pointed out that during practical testing, all airmen are evaluated on sound judgment in decision making at each level of pilot certification. The FAA

²"Midair Collision Involving Lycoming Air Services Piper Aerostar PA-60 and Sun Company Aviation Department Bell 412, Merion, Pennsylvania, April 4, 1991" (NTSB/AAR-91/01/SUM)

committed to adding aeronautical decision making publications to the list of publications in each edition of the Practical Test Standards.

The Safety Board is evaluating the information supplied by the FAA and will assign a status in the near future. In the meantime, the Safety Board reiterates this safety recommendation and urges the FAA to continue providing pilots with information and materials on aeronautical decision making.

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Develop and institute criteria through a joint government/industry effort that can be used by flightcrews to evaluate or index the extent of thunderstorm hazards present to assist them in the go/no go decision-making process. (Class II, Priority Action) (A-92-18)

Require that airline airborne weather radar training programs include information on the specific types of radar that the flightcrew will be using and require that information on the limitations and recommended operating procedures for the radar be referenced during the training from information provided by the manufacturer of the radar. (Class II, Priority Action) (A-92-19)

Require that recurrent training and proficiency programs for instrument-rated pilots include techniques for recognizing and recovering from unusual attitudes. (Class II, Priority Action) (A-92-20)

In addition, the National Transportation Safety Board reiterates the following recommendation to the Federal Aviation Administration:

A-91-93

Disseminate more aggressively available information and materials pertaining to Aeronautical Decision Making training and actively promote its implementation among all categories of pilots in the civil aviation community. (Class II, Priority Action)

Acting Chairman, COUGHLIN, and Members LAUBER, HART, HAMMERSCHMIDT, and KOLSTAD concurred in these recommendations.

A handwritten signature in black ink, appearing to read "Susan M. Coughlin". The signature is written in a cursive style with a large initial 'S'.

By: Susan M. Coughlin
Acting Chairman