



Log 2504

# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** June 13, 1994

**In reply refer to:** A-94-113 through -117

Honorable David R. Hinson  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

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On December 1, 1993, Express II flight 5719, a Jetstream BA-3100, registration N334PX, was operating as a regularly scheduled flight under 14 Code of Federal Regulations (CFR), Part 135, from Minneapolis/St. Paul International Airport, St. Paul, Minnesota, to International Falls, Minnesota, with an en route stop at Hibbing, Minnesota (HIB). The flight was operated by Express Airlines II, Inc., under the terms of a marketing agreement with Northwest Airlines, Inc., as Northwest Airlink. About 1950 central standard time, the airplane collided with terrain while on the localizer back course approach to runway 13 at HIB. The 2 flightcrew members and all 16 passengers were fatally injured in the accident. The airplane was destroyed.<sup>1</sup>

The National Transportation Safety Board has determined that the probable causes of this accident were the captain's actions that led to a breakdown in crew coordination and the loss of altitude awareness by the flightcrew during an unstabilized approach in night instrument meteorological conditions. Contributing to the accident were: The failure of the company management to adequately address the previously identified deficiencies in airmanship and crew resource management of the captain; the failure of the company to identify and correct a

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<sup>1</sup>For more detailed information, read Aircraft Accident Report--"Controlled Collision With Terrain, Express II Airlines, Inc./Northwest Airlink Flight 5719, Jetstream BA-3100, N334PX, Hibbing, Minnesota, December 1, 1993" (NTSB/AAR-94/05)

widespread, unapproved practice during instrument approach procedures; and the Federal Aviation Administration's (FAA's) inadequate surveillance and oversight of the air carrier.

The investigation of this accident revealed several deficiencies that the FAA should take action to correct. These deficiencies pertain to pilot training and procedures, FAA surveillance and oversight, and the need for wing observation lights on both sides of an airplane. Additionally, the investigation revealed that the pilots were provided only one set of instrument approach charts, which is a subject that has been addressed by the Safety Board in previous accident reports and safety recommendations.

### Pilot Training and Procedures

Express II Airlines uses a contract pilot training facility in lieu of having its own training department. The current FAA Air Transportation Inspector's Handbook, FAA Order 8400.10, contains only one paragraph on the evaluation of an operator's training program, and that provides little qualitative information. There is no guidance whatsoever for FAA inspectors or principal operations inspectors (POIs) about surveillance of contract training of 14 CFR Part 135 flightcrews who are not employed by the air carrier until they pass their check rides. Therefore, the Safety Board believes that specific guidance for such programs should be developed and incorporated into FAA Order 8400.10.

The "Climb and Descent Crew Coordination" guidance, contained in Express II's manual, progressively describes the duties of the flying and nonflying pilots from the top of the descent to the runway-in-sight or missed approach point. It states that during descents, the pilot not flying (PNF) will call out 1,000 feet and 300 feet above all assigned altitudes. This guidance further states: "Sink rate should be called out any time it exceeds 1,000 fpm [feet per minute] after reaching the initial approach fix altitude."

The guidance further requires the PNF to call out 500 feet and 100 feet above decision height (DH) or minimum descent altitude (MDA). The MDA for the approach was 1,780 feet, although at the position where the airplane struck the ground, the minimum altitude was 2,040 feet. When they were interviewed, Express II pilots expressed some confusion concerning callouts for this approach because an intermediate step down altitude inside the final approach fix (FAF) is not addressed in the "Descent Crew Coordination" section of the guidance. They were

unsure whether the PNF should have called 500 feet and 100 feet, or 300 feet, above the 2,040-foot step down altitude, or above the MDA. In this accident, however, the PNF made none of these calls. Nor did he call out the MDA when the airplane passed through it.

The Climb and Descent Crew Coordination section clearly states:

1,000 feet per minute will be considered the maximum usable rate of descent inside the final approach fix. Excessive rates of descent shall be cause to abandon the approach.

However, the guidance that Express Airlines provided to its pilots in the "Nonprecision Straight In Two Engine Approach" section of the Standard Operating Procedures and the FAA-approved training program conflicts with the above statement. It states:

During descents, the power should be reduced to maintain a descent rate of at least 1,000 fpm...(emphasis added).

Since the accident, Express Airlines has revised this guidance by deleting the words "at least."

The Safety Board believes that the guidance to maintain at least 1,000 fpm was probably intended to permit pilots to expedite their descents during progressive, step down nonprecision approaches so that they would reach the MDA in a position to ensure visual acquisition of the airport environment while at a distance from which a normal final approach path could be established. However, the Safety Board notes that a rate of descent in excess of 1,000 fpm is not necessary in order to adhere to the step down profile for the HIB back course runway 13 approach. Additionally, the use of an excessive descent rate increases the pilots' workload and increases the possibility that a momentary diversion of attention will result in a flightcrew failure to note a descent below minimum altitude.

In this accident, the Safety Board believes that the captain was not confident that the airplane could safely encounter icing conditions and that he and other pilots have developed their own procedure to minimize the time in icing conditions by flying at an excessive descent rate. The evidence indicates that reports of light-to-moderate icing conditions around HIB might have influenced the captain to stay

above the clouds, and above icing conditions, until he was closer to the airport. The captain's probable intention was to descend at higher than normal rates of speed to minimize the time in icing conditions. The investigation revealed that this inappropriate practice was widely used within the airline and probably at other airlines.

The captain failed to consider the consequences of such actions and did not take appropriate precautions during the descent. Once the decision was made to fly at the excessive descent rate, the flightcrew should have carefully and consistently monitored the altitude. The investigation found that there were serious deficiencies in the flightcrew's operating practices, and their failure to monitor altitude was a primary reason for the accident. Consequently, the Safety Board believes that the FAA should direct its POIs to reemphasize the need to adhere to proper descent rates during instrument approaches; specifically, to restrict the descent rate to a maximum of 1,000 fpm inside the final approach fix.

#### FAA Surveillance and Oversight

The evidence in this accident showed that while FAA inspectors were performing geographic en route surveillance and training surveillance, FAA oversight of the Director of Operations (DO) and the Chief Pilot (CP) in the accomplishment of their duties and responsibilities, as identified in the FAA-approved general operations manual, was nonexistent. The POI was located in Des Moines, Iowa, but Express II did not fly to Des Moines. Although the POI had been responsible for its certificate for 6 months at the time of the accident, he had not visited its principal base of operations in Minneapolis. The POI had telephone contact with the DO but had never met him.

At the time of the accident, the Minneapolis FAA certificate management office (CMO) managed Northwest Airlines and two other Part 121 air carriers, and the Minneapolis flight standards district office (FSDO) oversaw all other flight standards responsibilities in the area. When Express II management personnel approached the Minneapolis CMO for the certification, the CMO declined to certificate Express II in June 1992, citing difficulties anticipated in surveillance of remote operations and management. The letter in which the CMO denied the certification indicated that the principal base of operation requested by Express II at that time was Memphis. According to the guidance in the FAA Handbook, this is a legitimate reason for the Minneapolis CMO to deny certificate-holding responsibility. However, when certification of Express II was accomplished in early

1993, as a result of efforts by the Memphis and the Des Moines FSDOs, the principal base of operations approved for Express II was Minneapolis.

FAA Order 8400.10 states, "Regional Flight Standards Divisions must be responsible for assigning certification projects and certificate holding responsibilities to district offices... The district office having responsibility for the geographic area in which the principal base of operations is located shall be assigned certificate holding district office (CHDO) responsibilities." The Safety Board believes that since Express II's principle base of operations was Minneapolis, the certificate-holding office should have been one of the Minneapolis FAA offices.

Safety Board investigators asked the Central, Southern, and Great Lakes Regional Flight Standards Divisions about their respective decisionmaking roles concerning the oversight of Express II.

The Southern Flight Standards Division replied that it had reviewed FAA Order 8400.10 and had determined that Express II's certificate should not be held in its region. The division indicated further that it was aware that the Minneapolis CMO had declined the certificate but that the Des Moines FSDO wanted the Express II certificate responsibility.

The Central Flight Standards Division's reply showed no indication that FAA Order 8400.10 criteria were considered, except that it acknowledged that a large part of Express II's flying was in Iowa. The division further indicated that coordination had taken place between the Central and Southern Divisions in the assignment of the certificate.

While the Southern Division's reply noted the Minneapolis CMO's denial of Express II certification, neither the Central nor Southern Division indicated that the Great Lakes Region's Flight Standards Division had participated in the determination of where the certificate was to be held.

The Great Lakes Region's initial response to the Safety Board's inquiry concerning participation by its Flight Standards Division management was a copy of the Minneapolis CMO manager's letter denying Express II certification. Later, the Safety Board received a letter from the Great Lakes Regional Manager indicating that Regional management's participation consisted of coordination between the Minneapolis CMO and the Southern Region's Flight Standards Division.

In view of the above, the Safety Board believes that all three Regional Flight Standards Divisions failed to follow FAA Order 8400.10 requiring that the FAA certificate-holding office be *geographically responsible* for the location in which the principal base of operations is designated. Southern and Central Regions designated Minneapolis as Express II's principal base of operations, but neither of these regions was geographically responsible for Minneapolis.

The Safety Board recognizes that the effectiveness of the FAA's "Geographical Concept," as applied to operator certification and surveillance, is limited by personnel and financial resources. The distances between Des Moines, Minneapolis, and Memphis placed an additional financial burden on the FAA FSDOs. Nonetheless, the findings of this accident indicate a need for the development of more realistic procedures and guidance because the continued growth of the commuter industry will undoubtedly increase the need to rely on geographic surveillance. Further, the Safety Board believes that the FAA should maintain a higher minimum level of surveillance of the principal base of operations and familiarity with management personnel. The number of certificates a principal inspector is required to hold, his training and experience with respect to these certificates, and the required level of staffing to execute such a program should also be identified.

The Safety Board has addressed the subject of inadequate FAA oversight and surveillance in numerous accident reports and safety recommendations over the past 10 years. As the result of many of those recommendations, the FAA has implemented new programs, policies, and procedures, and it has published considerable guidance to inspectors to enhance surveillance of air carriers. However, in this case, the inadequacy of the FAA surveillance of Express II does not necessarily involve lack of established guidelines; rather, it reflects a failure to follow such guidelines.

Thus, the Safety Board believes that the FAA should take specific actions to bring the circumstances and findings of this investigation to the attention of all flight standards inspectors and managers by means of a directive that emphasizes the need for close adherence to existing criteria for certification and surveillance of air carriers.

#### Wing Ice Observation Light

The airplane involved in this accident had one wing ice observation light on

the captain's side. The one light configuration makes it necessary for a captain to perform ice accumulation inspections. In this accident, the captain was the flying pilot for a nonprecision, instrument landing system back course approach, at night, in instrument meteorological conditions with reported light-to-moderate icing. The Safety Board believes that the captain probably observed the wing during the descent, an action that would have diverted his attention from flying the airplane. The condition of the ice light bulb suggested that the light was on at impact. Although it was not apparent exactly when the light was turned on, it was probably at the beginning of the descent from 8,000 feet.

The Safety Board believes that if a wing ice observation light had been installed on the right side of the airplane, it would have allowed the first officer to perform ice accumulation inspections while the captain remained focused on his flying duties. The Safety Board has previously addressed the subject of wing ice observation lights on Jetstream model 3100/3200 airplanes. In the January 20, 1991, Jetstream model 3101 airplane accident in Beckley, West Virginia, that the Safety Board investigated, the airplane hit the runway on its final approach after a steep descent and was destroyed.<sup>2</sup> The 2 crewmembers and 17 passengers survived, but some of them sustained serious injuries. As a result of this investigation, the Safety Board issued the following recommendation to the FAA:

A-92-65

Issue an Airworthiness Directive applicable to two-pilot airplanes operating under the provisions of 14 CFR Part 135 that use leading edge ice detection lights, such as the BA-3100 and BA-3200, requiring that leading edge ice detection lights be installed to illuminate both wings. Require that models of these airplanes requiring two pilots be retrofitted with this modification.

The FAA responded on October 16, 1992, stating that an additional wing leading edge ice observation light would not have altered the course of events and saw no justification to mandate this action. The Safety Board classified this recommendation "Open--Unacceptable Response" and requested that the FAA reconsider its position. No further response from the FAA has been received.

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<sup>2</sup>CC Air British Aerospace BA-3101 Jetstream, N167PC, Beckley, West Virginia, January 20, 1991.

In view of the circumstances of this investigation, the Safety Board is reclassifying the status of recommendation A-92-65 from "Open--Unacceptable Response" to "Closed--Unacceptable Action/Superseded," and again urges the FAA to require ice detection lights on both wings of aircraft operated by two pilots under the provisions of 14 CFR Part 135. The Safety Board believes that a retrofit program for such airplanes should be required and that the applicable certification regulations should be modified for new airplanes.

### Instrument Approach Charts

According to the evidence obtained in this accident, Express Airlines provides approach charts to captains only. After briefing the approach, the captain of flight 5719 told the first officer to place the approach plate on his clip board and to furnish him with information when he needed it. When the first officer called "one to go" the captain questioned "to what alt[itude]?-to twenty forty ...okay." The question indicated that he may have been confused about the airplane's altitude. Additionally, the question indicated that the captain did not have the approach chart in front of him. He needed the first officer to guide him through the approach.

The Safety Board believes that the practice of having only one set of approach charts available in an airplane is not in the best interests of flight safety. The Safety Board addressed this issue in its investigation of the accident involving Bar Harbor Airlines flight 1808.<sup>3</sup> As a result of that investigation, on October 9, 1986, the Safety Board issued Safety Recommendation A-86-106, which asked the FAA to:

Amend 14 CFR 135.83 to require that all required crewmembers have access to and use their own set of pertinent instrument approach charts.

In its reply of September 15, 1987, the FAA stated that it believed a second set of charts would not serve to improve cockpit efficiency. In response to the recommendation, the FAA issued a bulletin that directed all POIs to ensure that flight crewmembers receive initial and recurrent training on the crew concept with respect to the use of pertinent instrument approach charts and crew briefings prior to all approaches. The Safety Board found that there was considerable merit in the

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<sup>3</sup>See Aircraft Accident Report--"Bar Harbor Airlines, Flight 1808, Beechcraft B-99, N30WP, Auburn-Lewiston Airport, Auburn, Maine, August 25, 1985" (NTSB/AAR 86/06)

FAA's bulletin to improve crew coordination during instrument approaches. However, the Safety Board found that such a bulletin would not provide the same safety benefits as each pilot having access to and use of his own set of approach charts. Therefore, on November 27, 1987, the Safety Board classified Safety Recommendation A-86-106 "Closed--Unacceptable Action."

The Safety Board addressed this issue again in its investigation of the accident involving GP Express Airlines flight 861.<sup>4</sup> As a result of that investigation, on April 2, 1993, the Safety Board issued Safety Recommendation A-93-35, which asked the FAA to:

Require that all pilots operating aircraft under 14 CFR 135 have access to their own set of instrument approach charts.

In its reply of June 16, 1993, the FAA agreed that both pilots should have access to an approach chart during the instrument approach, but that this could be accomplished either by both pilots having their own set of approach charts or by both pilots having immediate access to and use of a shared approach chart. The Safety Board continues to believe that the FAA is not addressing the intent of this safety recommendation, and that the practice of having only one set of approach charts available in the airplane is not in the best interests of aviation safety. Therefore, on November 19, 1993, the Safety Board classified Safety Recommendation A-93-35 "Open--Unacceptable Response" and asked the FAA to reconsider its position.

Based on the events that led to the accident involving Express Airlines II, flight 5719, the Safety Board reiterates Safety Recommendation A-93-35.

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

Develop specific guidance for the evaluation and oversight of contract training programs used by air carriers and incorporate such guidance into FAA Order 8400.10 for FAA principal inspectors to use in approving training programs. (Class II, Priority Action) (A-94-113)

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<sup>4</sup>See Aircraft Accident Report--"GP Express Airlines, Inc., Flight 861, Beechcraft C99, N118GP, Anniston, Alabama, June 8, 1992" (NTSB/AAR-93/03)

Issue an Air Carrier Operations Bulletin directing principal operations inspectors to advise air carriers to reemphasize in pilot training materials the necessity for adhering to the maximum descent rate of 1,000 feet per minute after passing the final approach fix, regardless of the existence of icing conditions. (Class II, Priority Action) (A-94-114)

Based on the circumstances and findings of the investigation of the Express II Airlines accident at Hibbing, Minnesota, on December 1, 1993, develop a clear and specific directive to Flight Standards inspectors and managers that emphasizes the need for compliance with existing FAA Orders, Directives, and other guidance material during the certification and surveillance of commuter air carriers. (Class II, Priority Action) (A-94-115)

Issue an Airworthiness Directive requiring operators of two pilot airplanes, including the Jetstream 3100/3200, presently equipped with only the left wing ice observation light to install a right wing ice observation light. (Class II, Priority Action) (A-94-116)

Amend 14 CFR Part 23.1419, Section (d), to require that airplanes certificated for two-pilot operation be configured with ice observation lights illuminating both wings. (Class II, Priority Action) (A-94-117)

Also, as a result of the investigation of this accident, the Safety Board reiterates Safety Recommendation A-93-35, as follows:

Require that all pilots operating aircraft under 14 CFR 135 have access to their own set of instrument approach charts.

Chairman VOGT, Vice Chairman HALL, and Members LAUBER and HAMMERSCHMIDT concurred in these recommendations.

By:   
Carl W. Vogt  
Chairman