L-98-2584

National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: October 24, 1994

In reply refer to: A-94-173 through -175

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

On January 7, 1994, about 2321 eastern standard time, a Jetstream 4101, registration N304UE, operated by Atlantic Coast Airlines (ACA), Sterling, Virginia, and doing business as United Express flight 6291, crashed 1.2 nautical miles east of runway 28L at Port Columbus International Airport, Columbus, Ohio. The airplane was being operated as a regularly scheduled commuter flight under 14 Code of Federal Regulations (CFR), Part 135, from Washington Dulles International Airport, Chantilly, Virginia, to Columbus, Ohio. The flight had been cleared for an instrument landing system approach to runway 28L and was in contact with the local tower controller when it crashed into a storage warehouse. The pilot, copilot, flight attendant, and two passengers were fatally injured. Two of the other three passengers received minor injuries, while the third was not injured. The airplane was destroyed. Instrument meteorological conditions prevailed at the time, and the flight was on an instrument flight rules flight plan.[1]

The National Transportation Safety Board determines the probable causes of this accident to be:

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[1]For more detailed information, read Aircraft Accident Report--"Stall and Loss of Control on Final Approach, Atlantic Coast Airlines, Inc./United Express Flight 6291, Jetstream 4101, N304UE, Columbus, Ohio, January 7, 1994" (NTSB/AAR-94/07)

(1) An aerodynamic stall that occurred when the flightcrew allowed the airspeed to decay to stall speed following a very poorly planned and executed approach characterized by an absence of procedural discipline;

(2) Improper pilot response to the stall warning, including failure to advance the power levers to maximum, and inappropriately raising the flaps;

(3) Flightcrew inexperience in "glass cockpit" automated aircraft, aircraft type, and in seat position, a situation exacerbated by a side letter of agreement between the company and its pilots; and

(4) The company's failure to provide adequate stabilized approach criteria, and the Federal Aviation Administration's (FAA's) failure to require such criteria.

Member Vogt concluded that the last factor was contributory but not causal to the accident. Additionally, for the following two factors, Chairman Hall and Member Lauber concluded that they were causal to the accident, while Members Vogt and Hammerschmidt concluded that they were contributory to the accident:

(5) The company's failure to provide adequate crew resource management training, and the FAA's failure to require such training; and

(6) The unavailability of suitable training simulators that precluded fully effective flightcrew training.

At the time of the accident, there was no J-4101 simulator available for training anywhere in the world, and all training was accomplished in the airplane. The first simulator is scheduled for operation in December 1994. The company check airmen stated that the transition during initial operating experience was easier since pilots had actually flown the airplane. None of the pilots stated that abnormal or emergency procedures that were simulated in the airplane resulted in a poor learning situation or lack of knowledge transfer. Nevertheless, the Safety Board believes that the lack of a simulator, specifically designed for the J-4101 airplane, limits a pilot's training and subsequent ability to perform certain procedures that can

only be safely practiced in a simulator. For example, stick shaker activation during instrument approaches would not be a safe practice during training flights in the actual airplane.

During the investigation, Safety Board investigators reviewed the training received by both the captain and the first officer, and they determined that the ground training and flight training requirements met or exceeded the minimum requirements established in Federal Aviation Regulations. In addition, ACA pilots and FAA personnel revealed that the airline's training contractor, Reflectone Training Center (RTC), had well-qualified, experienced flight and ground instructors. However, several personnel who were interviewed said that some training, such as stall procedures, varied somewhat among instructors. For example, some of them allowed students to proceed past the stick shaker to the stick pusher, while other instructors demonstrated to the stick shaker only. In either case, students had to demonstrate stall recovery knowledge and competence, both to the instructor and the FAA. The stall training had to be conducted at a safe altitude and not during actual instrument approach conditions, as could have been demonstrated in a simulator. Nevertheless, the Safety Board believes that additional emphasis and training should be placed on stall recognition and recovery techniques, to include stick shaker and stick pusher during training.

Autopilot-coupled approaches were listed as part of the flight training requirements for some of ACA's airplanes (DHC-8s and EMB-120s), and the ACA training manual covered the J-4101 autopilot as a subject in ground training. However, the investigation revealed that autopilot-coupled approaches were not listed as a specific training event in the ACA J-4101 flight training manual or on the flight evaluation form. For standardization, a revised flight training evaluation form was printed to include all the airplane types operated by ACA. An item printed on the form, which had a revision date of July 15, 1993, was autopilot-coupled approaches. Although training was accomplished by both crewmembers after that date, an earlier form was used that did not list autopilot-coupled approaches.

The former principal operations inspector (POI), a J-4101 type-rated FAA inspector who gave the captain his type rating, stated that he preferred to see a candidate demonstrate ability in using the autopilot during checkrides, since many of the pilots had no autopilot experience prior to the J-4101. During the qualification checkride, the former POI required the captain to demonstrate satisfactory autopilot knowledge while flying a coupled approach. The general consensus of RTC instructors and the FAA was that many pilots hired by ACA had aviation

backgrounds that did not include the use of an autopilot. Because of this, it was necessary to train and check the use of the autopilot.

The Safety Board believes that although adequate autopilot training was accomplished by the RTC and that it was adequately addressed by the FAA during checkrides, the incorporation of an autopilot-coupled approach training item in the ACA flight training manual and the RTC syllabus would preclude the possibility of coupled approaches being overlooked. Further, to include autopilot-coupled approaches as an item on the ACA pilot proficiency check form would ensure that pilot knowledge and use of the autopilot during coupled approaches was reviewed.

The investigation determined that the captain expressed concern, prior to departure, about the en route weather, turbulence, and related icing conditions in the vicinity of the airport at Columbus. The cockpit voice recorder indicated that the captain adequately addressed these conditions during the course of the flight. An interview with another ACA copilot, who had flown with the captain for 15 days in December 1993, indicated that the captain frequently liked to couple the airplane to the autopilot, on approach, rather than to fly the airplane manually. A review of the captain's records indicated that the two failed checkrides (second-in-command on the J-3201 and as pilot-in-command on the J-4101) were, in part, due to unsatisfactory performance on approaches. On subsequent rechecks, he demonstrated satisfactory proficiency after retraining. The Safety Board believes that the captain was inexperienced and lacked confidence in his ability to fly the J-4101 but that he was aware of his weaknesses. As a result, he may have relied on the autopilot to supplement his flying abilities and to enhance the approach stability of the airplane in less than optimum weather conditions.

The Safety Board acknowledges the value of an autopilot to reduce pilot workload during instrument approaches and encourages its use. However, the Safety Board is concerned that some pilots might accept autopilot performance as infallible and become complacent in their monitoring function. The Safety Board believes that training programs must stress the need for pilots to stay alert and remain in the loop during coupled approaches.

Although the company met or exceeded the ground and flight training requirements and regulations, the operational oversight and monitoring of the pilots by company managers appeared to have been reduced. The lack of adequate supervision and guidance may have led flightcrews to develop poor flight procedures and habits. An example was the procedure of flying high speed

approaches to assist air traffic control. The nonstandardization of operations between airplanes was recognized by management and was being addressed by the company through the development of a flight standards manual. At the time of the accident, the manual had not been approved by the FAA. While the captain had more flight experience than the first officer, he had recently been promoted from a first officer on a J-3101 to a captain of a J-4101 on a scheduled air carrier. If standardization of approach procedures between airplanes had been established, the captain might have been better prepared to carry out proper approach procedures, and the first officer might have been more knowledgeable and trained for the event.

As a result of the Safety Board's investigation of the GP Express accident in Anniston, Alabama, on April 12, 1993, the following recommendation to the FAA was issued:[2]

> A-93-36
> Require that scheduled air carriers operating under 14 CFR Part 135 develop, and include in their flight operation manuals and training programs, stabilized approach criteria. The criteria should include specific rates of descent, etc., near the airport, beyond which initiation of an immediate missed approach would be required.

In a letter dated June 16, 1993, the FAA advised that it would issue an air carrier operations bulletin (ACOB) emphasizing stabilized approach criteria information and associated training issues, and referencing guidance material currently available on this subject. Based on this information, on November 19, 1993, the Safety Board classified A-93-36 "Open--Acceptable Alternate Response."

The Safety Board cannot understand why the FAA has not yet completed these actions and issued the applicable ACOB. In any event, the Safety Board now believes that the ACOB route to address this issue is not appropriate. If a stabilized approach procedure had been developed and required to be adhered to by all pilots for night approaches in instrument meteorological conditions, perhaps this accident would have been prevented. Therefore, the Safety Board classifies A-93-36 "Open-

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[2]See Aviation Accident Report--"Controlled Collision With Terrain, GP Express Airlines, Inc., Flight 861, A Beechcraft C99, N118GP, Anniston, Alabama, June 8, 1992" (NTSB/AAR-93/03)

-Unacceptable Response" and reiterates A-93-36. Further, the Safety Board urges the FAA to review its position on the need for regulatory action and to move expeditiously toward requiring Part 135 operators to include in their flight operations manuals and training programs stabilized approach criteria.

The Safety Board is currently conducting a safety study of the standards and practices in the commuter airline industry. Several broad issues are being addressed in the study, including: flightcrew training (including the availability and use of flight simulators); flightcrew scheduling and crew pairing policies; crew resource management (CRM) training; the certification and design of commuter airplanes; management oversight; and FAA surveillance. This study was initiated in the spring of 1994, and the final report is scheduled to be presented to the Board in November 1994.

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

> Ensure that the training programs for 14 Code of Federal Regulations Part 135 pilots place an increased emphasis on stall warning recognition and recovery techniques, to include stick shaker and stick pusher, during training. (Class II, Priority Action) (A-94-173)
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> Ensure that all Part 135 operators that incorporate both a high speed approach profile and a coupled approach profile in the training manual for all airplanes train pilots to proficiency for those approach profiles. (Class II, Priority Action) (A-94-174)
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> Ensure that Atlantic Coast Airlines trains its flightcrews in approved high speed approach techniques, similar to the manufacturer's airplane flight manual. The present procedures show a normal stabilized approach procedure, but the pilots typically fly faster to keep up with jet traffic and therefore do not follow their own procedures. (Class II, Priority Action) (A-94-175)

Also, as the result of this investigation, the Safety Board reiterates Safety Recommendation:

A-93-36

Require that scheduled air carriers operating under 14 CFR Part 135 develop, and include in their flight operation manuals and training programs, stabilized approach criteria. The criteria should include specific limits of localizer, glideslope and VOR needle deflections and rates of descent, etc., near the airport, beyond which initiation of an immediate missed approach would be required.

In addition, based on evidence stemming from this investigation, the Safety Board is in the process of drafting a recommendation concerning passenger use of seat belts.

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

By: Jim Hall
Chairman