



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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Date: November 30, 1994

In reply refer to: A-94-191 through -204

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Federal Aviation Administration  
800 Independence Avenue, S.W.  
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The National Transportation Safety Board has had a longstanding interest in commuter airline safety and has issued safety recommendations in the past seeking various actions by government and industry to address needed safety improvements. The recommendations followed the Board's 1972 study of air taxi safety, its 1980 study of commuter airline safety, and investigations of accidents involving commuter airline operations. In response to the recommendations and through other initiatives taken by government and industry, regulatory revisions and other actions have resulted in a greatly improved safety record for scheduled passenger operations conducted under Title 14 Code of Federal Regulations (14 CFR) Part 135: the accident rate per 100,000 departures in 1993 was one-fourth the accident rate observed in 1980.

However, despite past efforts of government and industry to bring about safety improvements, accident rates for commuter airlines continue to be twice as high as the rates for domestic Part 121 airlines. The Safety Board recognizes that certain factors may contribute to the higher accident rate for commuter airlines. Commuter flights generally operate at lower altitudes and thus cannot always evade severe weather by flying over it. Further, facilities at many airports served by commuter airlines do not have sophisticated landing aids or are not as well-maintained as large airports served by major airlines. Nevertheless, the Board believes that additional safety improvements can be made that would have a positive impact on the safety record of commuter airlines.

Recent accidents have highlighted the need for these additional safety improvements, particularly in areas such as pilot training and experience, flightcrew coordination, maintenance and inspection, airline management oversight, and Federal Aviation Administration (FAA) surveillance. In a 26-month period from December 1991 to January 1994, there were 14 fatal accidents involving scheduled commuter flights and commuter airline training flights; 56 persons were killed.

6481

The consistently higher accident rate demonstrated by commuter airlines, the recent accidents involving commuter airlines, and the public's lack of awareness about the different regulatory standards in the commercial aviation industry (which are based, in part, on the seating capacity of aircraft), have raised concerns by government and industry about the continued safety of the commuter airline industry and the adequacy of the regulations that govern commuter airlines. A portion of the industry believes that, given the changes and dramatic growth observed in this segment of the airline industry over the past 14 years, commuter airlines should be governed by the same regulations that apply to major airlines. These issues and concerns prompted the Safety Board to initiate a safety study of the commuter airline industry in February 1994.<sup>1</sup> The purpose of the study was to examine the standards and practices of the commuter airline industry, with particular emphasis on areas where differences occur between the regulatory standards for Part 135 and Part 121 operations.

In the spring of 1994, the Safety Board conducted onsite interviews with airline management, pilots, flight attendants, and mechanics at 21 commuter airlines. In addition to the onsite survey, the Safety Board convened a public forum on commuter airline safety on June 14, 15, and 16, 1994, in Atlanta, Georgia. Thirty seven representatives from government, industry, airlines, trade groups, labor unions, aircraft manufacturers, and training centers participated in seven panel sessions convened to discuss issues and concerns in the following broad areas: (1) flightcrew scheduling and dispatching; (2) flightcrew training and qualifications; (3) aircraft maintenance and inspection; (4) cabin safety; (5) aircraft certification and design; (6) airline management oversight and safety programs; and (7) FAA surveillance and oversight. Using the results of the commuter airline survey, transcript of the public forum, and information from its previous studies and accident investigations, the Safety Board examined the current standards and practices of the commuter airline industry relevant to the safety issues and concerns in these seven areas.

### **Flightcrew Scheduling**

Under the current regulatory provisions, a Part 135 air carrier may reduce a pilot's required rest period to as little as 8 hours in a 24-hour period in exchange for an extended rest period later. Reduced rest periods are also allowed under Part 121. The intent of the reduced rest provisions was to provide carriers more flexibility with flightcrew schedules to accommodate extended duty days that result from unforeseen operational delays. However, the current reduced rest provisions allow carriers to establish schedules that result in reduced rest, and many airlines routinely take advantage of the provisions when scheduling their flightcrews rather than using the provisions for unforeseen circumstances, as originally intended.

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<sup>1</sup> National Transportation Safety Board. 1994. Commuter airline safety. Safety Study NTSB/SS-94/02. Washington, DC.

In 1992, the Safety Board addressed the practice of scheduling reduced flightcrew rest periods following its investigation of a commuter aircraft accident in Brunswick, Georgia.<sup>2</sup> In Safety Recommendation A-92-28, the Board asked the FAA to:

Issue an Air Carrier Operations Bulletin (ACOB) directing Principal Operations Inspectors to clarify with their operators that the intent of 14 CFR Section 135.265 is not to routinely schedule reduced rest, but to allow for unexpected operational delays, and to require compliance with the intent of the regulation.

In its 1992 response to the recommendation, the FAA indicated that it would present the issue of reduced rest to an Aviation Rulemaking Advisory Committee (ARAC) on flightcrew scheduling standards and practices. On October 6, 1992, the Safety Board classified Safety Recommendation A-92-28 "Open—Acceptable Response," pending the ARAC's recommendations on regulatory revisions.

In the Safety Board's opinion, rest should be defined as time available for restful sleep, and minimum rest periods should provide the opportunity for adequate sleep, taking into account time needed for travel to and from rest facilities and for attending to nourishment and personal hygiene. Because of its concern regarding this issue, the Board was interested in the revisions that might be proposed by the ARAC.

The FAA convened the ARAC in 1992 in response to industry concerns about flight and rest issues, and the group submitted its final report to the FAA Administrator in June 1994. Although the report has not been released by the FAA, comments made by ARAC members during the 1994 public forum suggest that the ARAC was unable to reach consensus on key issues necessary for regulatory revisions. The Safety Board is disappointed that important issues concerning flightcrew scheduling and rest remain unresolved after 2 years, despite the efforts of the ARAC; accordingly, the Board reclassifies Safety Recommendation A-92-28 "Open—Unacceptable Response."

With regard to flight time limitations, the Safety Board recognizes that carriers must conduct many of their nonrevenue operations at night when company airplanes are not being used for revenue operations. Nevertheless, the practice of scheduling pilots for training, check flights, and other company flight duties at the end of a full day of scheduled revenue flying increases the potential for fatigue-related accidents and raises questions about the effectiveness of training conducted in such a learning

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<sup>2</sup> National Transportation Safety Board. 1992. Atlantic Southeast Airlines, Inc., flight 2311, uncontrolled collision with terrain; an Embraer EMB-120, N270AS, Brunswick, Georgia, April 5, 1991. Aircraft Accident Report NTSB/AAR-92/03. Washington, DC.

environment. Scheduling allowances should be made to provide pilots with an adequate opportunity for rest before they perform nonrevenue flight duties.

The air carrier practice of assigning Part 121 flightcrews to company flights conducted under Part 91 at the end of commercial operations was addressed in the Safety Board's investigation of a recent accident involving a DC-8-61 freighter operating under regulations contained in 14 CFR Part 121, Supplemental Air Carrier.<sup>3</sup> The investigation revealed that the crew had been legally on duty for about 18 hours (with 9 hours of flight time) when the accident occurred, and was scheduled to ferry the airplane to Atlanta, Georgia, after the airplane was offloaded in Guantanamo Bay, which would have resulted in a total duty time of about 24 hours. In its letter of May 18, 1994, the Safety Board asked the FAA to:

Revise the Part 121 regulations such that flight time accrued in noncommercial "tail end" ferry flight conducted under 14 CFR Part 91, as a result of 14 CFR Part 121 revenue flights, be included in the flight crewmember's total flight and duty time accrued during those revenue operations. (A-94-105)

In its response letter of July 13, 1994, the FAA indicated that it was considering an NPRM to address the recommended action. Consequently, the Safety Board classified Safety Recommendation A-94-105 "Open—Acceptable Response" on August 11, 1994.

Likewise, the Safety Board believes that the FAA should revise the Federal Aviation Regulations contained in 14 CFR Part 135 to require that flight time accumulated in all company flying conducted after revenue operations—such as training and check flights, ferry flights and repositioning flights—be included in the crewmember's total flight time accrued during revenue operations.

During the public forum discussion, consensus was reached among panel members that any revisions to the current flightcrew duty and rest regulations should be based on objective, empirical support, not through "negotiation," which has been the approach taken in the past. The Safety Board agrees with the panel's position and has recently urged a systematic review of the regulations pertaining to flight and duty limitations that incorporates the current level of scientific knowledge of fatigue and its effects on performance. In its investigation of the Guantanamo Bay accident, the Safety Board cited "...the impaired judgment, decisionmaking, and flying abilities of the captain and flightcrew due to the effects of fatigue..." as a causal factor in the accident. As a result, the Board issued the following recommendation to the FAA:

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<sup>3</sup> National Transportation Safety Board. 1994. Uncontrolled collision with terrain, American International Airways flight 808, Douglas DC-8-61, N814CK, U.S. Naval Air Station, Guantanamo Bay, Cuba, August 18, 1993. Aircraft Accident Report NTSB/AAR-94/04. Washington, DC.

Expedite the review and upgrade of Flight/Duty Time Limitations of the Federal Aviation Regulations to ensure that they incorporate the results of the latest research on fatigue and sleep issues. (A-94-106)

In its initial response to this recommendation on July 13, 1994, the FAA indicated that it is considering the issuance of an NPRM to address flightcrew duty limits and rest requirements. The Safety Board classified this recommendation "Open—Acceptable Response," pending rulemaking action.

The Safety Board is aware that the FAA recently began research designed to provide objective, quantitative data on the current scheduling practices among Part 135 operators. The Board commends this initiative but is concerned about the time that may elapse—perhaps several months or more—before the results are available for use by those persons considering regulatory revisions. Had these data been collected prior to or in conjunction with the efforts of the ARAC on flightcrew scheduling, the committee would have benefited from the information.

The advantage of the ARAC approach, according to the FAA, is an anticipated reduction in the time interval from the release of an NPRM to the issuance of a final rule because industry has an opportunity early in the rulemaking process to offer substantive input that shapes the content of the proposed rule. The Safety Board supports the FAA's efforts to shorten the rulemaking process but believes that the ARAC process is not suitable for highly contentious issues, such as flight and duty regulations. In such cases, the rulemaking process may actually be lengthened by a series of ARAC meetings that result in little or no consensus among participants. The Safety Board encourages the FAA to conduct a review of the ARAC process with the purposes of assessing the effectiveness of the process and establishing criteria for determining when the ARAC process can be expected to expedite or delay rulemaking.

### **Flight Dispatchers**

One of the key distinctions between flight operations conducted under Part 135 and those conducted under domestic Part 121 concerns the use of licensed flight dispatchers for flight planning and operational control. There is no regulatory requirement for a licensed dispatcher for flights operated under Part 135. Part 135 requires only that the operator have procedures for locating each flight for which an FAA flight plan is not filed; there are no requirements for continuous flight monitoring by a licensed dispatcher. Under Part 121, no scheduled passenger flight may be operated without the authorization of a dispatcher who is licensed by the FAA.

Pilot responses to survey questions about dispatch services, and comments made during the public forum, reflect concerns about increased management pressure to shorten the amount of time on the ground between flights, which in turn increases

pilot workload. Some pilots indicated that it was extremely difficult for them to accomplish all of the necessary tasks and to verify that the tasks were done correctly in the amount of time that is made available to them. Pilots also reported that the pressure was more keenly felt by newly employed captains and first officers, who believe that their performance evaluations would suffer if they are responsible for flight delays. The pilots also reported that they would feel much more confident if their calculations of weight and balance or the amount of fuel required for the flight were verified by a trained and licensed dispatcher.

The Safety Board believes that airline management has a responsibility to provide pilots with adequate resources (such as qualified personnel and time) to accomplish required tasks during ground operations between flights, particularly when licensed dispatch services are not provided. Yet, the survey results suggest that commuter pilots are facing increasing pressures to accomplish several tasks during turnarounds in shorter periods of time. Because these pressures increase the risk of critical mistakes that could jeopardize the safety of flight, the Safety Board believes that principal operations inspectors of the FAA should periodically review commuter air carrier flight operations policies and practices concerning pilot tasks between flights to ensure that pilots are provided with adequate resources (such as time and personnel) to accomplish those tasks.

Considerable discussion during the public forum and during survey interviews with airline personnel centered on whether or not there is a need for licensed dispatch services for Part 135 operations. Those who support a requirement for licensed dispatch argue that dispatchers enhance safety through redundancy in providing and verifying information on fuel loads, weather, and weight and balance computations. Further, a trained dispatcher who provides pilots with necessary flight information substantially reduces the workload on pilots, particularly during quick turnarounds of 15 minutes or less when pilots must complete their on-ground operational duties and often oversee the offloading and then loading of baggage, and boarding of new passengers.

During the public forum, the FAA reported that it has established a working group to address the issue of dispatch services for Part 135 operations. The group began meeting in the spring of 1994 and is currently conducting a cost/benefit analysis on a requirement for licensed dispatchers for Part 135 operations. Although the group has not completed its efforts, preliminary information from FAA suggests that startup costs associated with such a requirement would be substantial.

The complexity of scheduled Part 135 operations places considerable burden on the pilots that could be reduced by use of a dispatch system. Thus, the Safety Board believes that any regulatory decision must consider the long-term operational benefits and safety enhancements to the flying public associated with providing dispatch services, not just the economic impact such a requirement may have on

airlines of various sizes. The Safety Board looks forward to reviewing the results of the working group's efforts.

### **Flightcrew Training**

One of the major changes in commercial pilot training over the past 15 years has been the emergence and development of CRM training programs. CRM has been defined as "using all available resources—information, equipment, and people—to achieve safe and efficient flight operations."<sup>4</sup> Originally called *cockpit* resource management because early programs focused almost exclusively on the use of resources inside the cockpit, *crew* resource management reflects a broadening of scope to include extra-cockpit resources such as flight attendants and maintenance, air traffic control, and dispatch personnel. The importance of CRM has been demonstrated repeatedly in the performance (both positive and negative) of flightcrews during accidents, and the Safety Board has been a vocal proponent of the need for formal, comprehensive training on CRM skills.<sup>5</sup>

The Safety Board first addressed the subject of CRM training for Part 135 operators in Safety Recommendation A-90-135, issued on November 21, 1990, in connection with its investigation of an accident involving an Aloha IslandAir DHC-6 that crashed in Hawaii on October 28, 1989.<sup>6</sup> The safety recommendation asked the FAA to:

Require that scheduled 14 CFR Part 135 operators develop and use Cockpit Resource Management programs in their training and methodology by a specified date. (A-90-135)

In its February 8, 1991, letter to the Safety Board, the FAA expressed plans to require Part 135 operators to follow Part 121 requirements for CRM training once the requirements are established. The FAA informed the Safety Board that an NPRM proposing revisions to the pilot training requirements contained in Part 121 and 135 would be released shortly, and that the proposed revisions would include a requirement for CRM training for pilots, flight dispatch personnel, and flight

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<sup>4</sup> Lauber, John K. 1984. Resource management in the cockpit. *Air Line Pilot*. 53: 20-23.

<sup>5</sup> A review of Safety Board findings and recommendations pertaining to CRM through 1990 is provided in the following publication: Kayten, Phyllis, J. 1993. The accident investigator's perspective. In: Weiner, Earl L.; Kanki, Barbara G.; Helmreich, Robert L., eds. *Cockpit resource management*. San Diego, CA: Academic Press: 283-314. Chapter 10.

<sup>6</sup> National Transportation Safety Board. 1990. Aloha IslandAir, Inc., flight 1712, DeHavilland Twin Otter, DHC-6-300,N707PV, Halawa Point, Molokai, Hawaii, October 28, 1989. Aircraft Accident Report NTSB/AAR-90/05. Washington, DC.

attendants. As a result, the Safety Board classified this safety recommendation "Open—Acceptable Response" pending adoption of the final rule.

The Safety Board reiterated Safety Recommendation A-90-135 following its investigation of the crash of a Beech C99, operated by GP Express Airlines, in Anniston, Alabama, on June 8, 1992.<sup>7</sup> The investigation revealed that a reversal of roles occurred during an unstabilized approach in which the first officer refused to take directions from the captain, and the captain was not assertive with the first officer.

The FAA addressed CRM training in Advisory Circular (AC) 120-51A, "Crew Resource Management Training," issued on February 10, 1992. The Safety Board supports the guidance provided by the AC (which is discussed in the following paragraphs) but is disappointed that the FAA has not mandated such training, as requested in Safety Recommendation A-90-135. Because the FAA has not required CRM training, and because of the amount of time that has elapsed, the Safety Board reclassifies the recommendation "Open—Unacceptable Response."

According to AC 120-51A, which provides nonregulatory guidance to Part 135 and 121 operators regarding the content of CRM training programs, a comprehensive CRM training program should include three components. First, *initial indoctrination and awareness* training introduces crewmembers to the concepts and skills of CRM through classroom discussion, videotape presentations, and role playing exercises or other methods through which crewmembers can actively practice CRM skills. Second, *recurrent practice and feedback* sessions reinforce CRM skills by placing flightcrews in realistic flight scenarios (using advanced training devices or simulators) and giving them feedback about their performance. A principal means through which recurrent practice is accomplished is through *line-oriented flight training (LOFT)*. According to Advisory Circular AC 120-35B, "Line Operational Simulations," issued by the FAA on September 6, 1990, LOFT is defined as "...training in a simulator with a complete crew using representative flight segments which contain normal, abnormal, and emergency procedures that may be expected in line operations." The circular advises air carriers to design LOFT scenarios that will provide crews with the opportunity to practice technical and CRM skills during routine and abnormal flight conditions. The third component of a comprehensive CRM training program involves the *continuing reinforcement* of CRM skills throughout training and line operations by check airmen, instructors, and managers who are supportive of CRM.

CRM training has been embraced by most, if not all, major U.S. airlines. However, there is little information available on the extent to which commuter airlines provide CRM training to their flightcrews. The Safety Board obtained some information on airlines' CRM training programs during the commuter airline surveys.

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<sup>7</sup> National Transportation Safety Board. 1993. Controlled collision with terrain, GP Express Airlines, Inc., flight 861, a Beechcraft C99, N118GP, Anniston, Alabama, June 8, 1992. Aircraft Accident Report NTSB/AAR-93/03. Washington, DC.



The survey results suggest that although most of the airlines in the sample provide some form of CRM training to their pilots, very few offer a fully integrated, comprehensive program, as is recommended in AC 120-51A.

The Safety Board remains concerned that many commuter air carriers still do not provide any formal CRM training to their flightcrews, and that other air carriers fail to provide comprehensive training that includes recurrent practice and feedback on the use of CRM skills. Research has demonstrated clearly that, in the absence of continuous reinforcement of CRM skills, pilot attitudes about the value and usefulness of CRM training and LOFT deteriorate.<sup>8</sup>

The absence of effective CRM training was discussed by the Safety Board in the investigations of two recent accidents: Hibbing, Minnesota (December 1, 1993), and Columbus, Ohio (January 8, 1994).<sup>9</sup> In both cases, the Safety Board found that the pilots had received limited CRM training consisting of handouts and some discussion of accidents involving other air carriers. The training also did not provide the pilots with the opportunity to practice CRM skills designed to improve crew coordination and teamwork. The pilots involved in the Hibbing, Minnesota, accident had received CRM training, but the majority of information was in the form of handout material intended for students to study independently.

The Safety Board believes that many carriers will continue to provide cursory CRM training that translates to minimal improvements in crew performance during line operations unless the FAA's anticipated revision to the Part 135 and Part 121 pilot training rules requires comprehensive CRM training, as outlined in AC 120-51A. The Safety Board therefore urges the FAA to incorporate the principal components of crew resource management training, as provided in AC 120-51A, in its revisions of Part 121 and Part 135 training requirements.

Another major change in commuter airline pilot training since the Safety Board's 1980 study is the increased availability of flight simulators and advanced training devices (ATDs). The Safety Board, and the aviation community in general, has long recognized the advantages of training and checking conducted in a simulator as opposed to an airplane. Simulator training is inherently safer; consequently, hazardous maneuvers that cannot be attempted in an airplane can be practiced safely

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<sup>8</sup> Helmreich, Robert L. 1991. The long and short term impact of crew resource management training. In: Challenges in aviation human factors; the national plan: Proceedings, AIAA/NASA/FAA/HFS conference; 1991 January; Vienna, VA.

<sup>9</sup> (a) National Transportation Safety Board. 1994. Controlled collision with terrain, Express II Airlines, Inc./Northwest Airlink flight 5719, Jetstream BA-3100, N334PX, Hibbing, Minnesota, December 1, 1993. Aircraft Accident Report NTSB/AAR-94/05. Washington, DC. (b) National Transportation Safety Board. 1994. Atlantic Coast Airlines d/b/a/ United Express, flight 6291, BAe Jetstream 4101, N304UE, Columbus, Ohio, January 7, 1994. Aircraft Accident Report NTSB/AAR/94-07. Washington, DC.

in a simulator. Also, as discussed in the section "Flightcrew Scheduling," pilot training conducted in company airplanes usually must take place at night, when the airplanes are not being used for revenue operations, so pilot and instructor fatigue can be a safety concern and reduce the value of the training.

Flight simulators have been developed for nearly all airplanes with 10 or more passenger seats that are currently used in commuter air operations. A notable exception to this is the Jetstream J-4101, the aircraft type involved in the 1994 fatal accident in Columbus, Ohio. The airplane, operated by Atlantic Coast Airlines (as United Express), crashed following an aerodynamic stall when the flightcrew failed to monitor airspeed and then improperly responded to a stall warning during a high-speed, instrument approach. At the time of the accident, Atlantic Coast Airlines was the only operator of the J-4101 in the United States, and no simulator had yet been approved for training purposes. The first training simulator is scheduled to become available in December 1994. In its probable cause statement, the Safety Board determined that the unavailability of suitable training simulators that precluded fully effective flightcrew training contributed, in part, to the accident.

The Safety Board is concerned that, unlike large transport airplanes used in Part 121 operations, new airplanes such as the Jetstream J-4101 continue to be introduced into commuter airline operations before simulators are made available for pilot training. The Board recognizes that economic considerations contribute toward the widespread use of training simulators among airlines that operate large transport airplanes: the cost of training in a simulator is usually less than the cost of training in an airplane. With smaller aircraft, however, the cost of training in an airplane may be comparable to, or lower than, the cost of conducting training in a simulator. Also, from an aircraft manufacturer's perspective, the high costs associated with designing and building a flight simulator suitable for training can be justified economically only after receiving assurances that a sufficient number of airplanes will be purchased and utilized by air carriers.

However, the Safety Board believes that the inherent advantages of conducting pilot training in a simulator warrant a reconsideration of the perspective that a training simulator is a luxury aid to flightcrew training programs that can be utilized when affordable. The use of simulators enables air carriers to conduct LOFT and to train pilots more effectively on hazardous maneuvers and emergency procedures such as windshear recovery, recovery from unusual attitudes, and low-altitude stall recovery. Further, the Board also believes that industry and government should consider a training simulator as a necessary component in the overall systems design, manufacture, and certification of a new airplane. Therefore, the Safety Board believes that the FAA should revise the certification standards for Part 25 (transport category) and for Part 23 (commuter category) aircraft to require that a flight simulator, suitable for flightcrew training under Appendix H of Part 121, be available concurrent with the certification of any new aircraft type.

The FAA has long recognized the value of simulator training and checking for Part 121 operations. In 1981, the FAA published Appendix H to Part 121, "Advanced Simulator Plan," to encourage the use of simulators in flightcrew training. Appendix H describes the simulator and visual system requirements necessary to conduct various types of training and checking in flight simulators. Currently, Appendix H applies only to Part 121; because there is no counterpart for Part 135, a Part 135 operator can conduct training in a simulator only if granted an exemption from the applicable Part 135 regulations, such as the exemption granted to Regional Airline Association (RAA) member airlines in 1987.

The Safety Board believes that training and checking in flight simulators, whether conducted under Part 121 or 135, should be the standard, where possible, not the exception. Consequently, the Safety Board urges the FAA to revise the pilot training regulations such that all pilot training for aircraft with 10 or more passenger seats be conducted under Subparts N and O of Part 121, which contain the flightcrew training and qualification standards for Part 121.

### **Flight Training Services**

In recent years, a growing number of companies have offered FAA-approved, professional flight training services. The use of this type of training service has become popular among commuter operators. The expense of sophisticated, high-fidelity flight simulators has prevented most commuter operators from purchasing their own simulators. As a result, many of these companies provide training facilities and services under contract to airlines. The services provided by these contract training centers include the screening and selection of pilot candidates; initial ground school and flight training of newly hired pilots; aircraft transition, captain upgrade, and recurrent training and check flights; and CRM training and LOFT.

The Safety Board believes that contracted training can provide many benefits to commuter airlines such as uniformity of instruction, access to flight simulators and more experienced instructors, and for smaller air carriers a reduction in workload for senior management and pilots who would otherwise be occupied with training and check flights in addition to their other responsibilities. Nevertheless, the Safety Board has, in past accident investigations, expressed concerns related to the quality of training provided by contract instructors, the ability of training centers to provide adequate instruction in company-specific policies and procedures, and the adequacy of FAA surveillance of training programs conducted at contract training centers. Concerns of the aviation community about contract instructor qualifications and the quality of training provided by contract training centers were also expressed to Safety Board staff at the 1994 public forum and during the commuter airline survey conducted in conjunction with this study.

In its investigation of the 1992 accident in Anniston, Alabama, involving GP Express Airlines, the Safety Board found that the captain had been hired and trained as a captain through a contract training company, had no commuter air carrier experience before his employment at GP Express, and was on his first day of unsupervised duty with the airline. As a result, the captain was unfamiliar with the company's aircraft, routes, and procedures; and was inexperienced as a captain on commuter air carrier operations. In its review of the contract training program, the Safety Board concluded that the contract instructor who provided training to the captain was insufficiently familiar with the specific line operations and procedures of GP Express Airlines to adequately prepare the captain for his role as pilot-in-command for GP Express. Upon completion of its investigation, the Safety Board issued the following safety recommendation to the FAA:

For airlines that utilize contracted flight and ground training programs, require that pilots hired directly to be captains receive additional flight instruction pertaining to the operating environment and procedures unique to the airline from an FAA-approved company check airman or instructor, rather than only from the contractor instructor. (A-93-38)

In its June 16, 1993, response to the recommendation, the FAA stated that:

The source of training, whether operator or contractor, is irrelevant. The pilot who is hired as a captain or who is upgraded must meet the pilot-in-command qualification requirements of 14 CFR Part 135, Subpart E, Flight Crewmember Requirements. Section 135.244 requires experience in 14 CFR Part 135 operations prior to serving as a pilot-in-command.

Based on the FAA's response, the Safety Board classified Safety Recommendation A-93-38 "Closed—Reconsidered" on November 19, 1993.

Safety Recommendation A-93-38 and the FAA's response both addressed the qualification requirements of pilots-in-command (PICs) under Part 135. Section 135.244 outlines the Part 135 initial operating experience (IOE) requirements for a PIC. These requirements state that no pilot may serve as PIC unless the pilot has completed a specified number of hours of supervised line operating experience that is acquired during revenue passenger operations. One purpose of IOE is to ensure that a PIC is proficient in the knowledge and demonstration of company policies and procedures during line operations. Under Part 121, there are IOE requirements for both PICs and second-in-command (SIC) crewmembers; however, there are no IOE requirements for SICs under Part 135. Thus, there is no requirement for evaluating the proficiency of SICs on company-specific policies and procedures.

The Safety Board believes that IOE is a necessary component of the overall training and evaluation program for every crewmember who flies commuter

operations. An air carrier that contracts out its training program needs to evaluate the ability of each pilot to demonstrate adequate knowledge and use of the air carrier's specific procedures upon completion of training, whether the pilot is serving as PIC or SIC. Not only does IOE provide the air carrier with a means of assessing the performance of its newly trained pilots, closely-monitored IOE can provide insights regarding the strengths and weaknesses of the air carrier's training program. This is especially valuable information when the training is not being administered by company personnel. Thus, the Safety Board believes that the FAA should revise 14 CFR 135.244 to require that all commuter airline pilots complete the initial operating experience currently required of Part 135 pilots-in-command.

### **Certification of Training Centers**

On August 11, 1992, the FAA issued proposed rulemaking (NPRM 92-10) that would establish certification and operating rules for training centers under a newly created 14 CFR Part 142. Under the proposed rules, training center certification would be required of any organization that provides training under contract to a Part 121 or Part 135 certificate holder. Consequently, Part 142 training centers would include current contract training companies that operate under exemptions from the FAA (such as Flight Safety International or Reflectone Training Center), as well as aircraft manufacturers and air carriers that provide training services to personnel of other certificate holders.

The Safety Board supports the intent of the proposed rulemaking and believes that the proposed requirements under Part 142 will improve the quality of contract training services, and the ability of the FAA to more effectively monitor such programs, through increased operational standardization. Further, by standardizing and centralizing the training center certification process, the proposed requirements under Part 142 likely will further encourage the establishment of training centers that utilize flight simulators and advanced training devices in their pilot training programs. Because the rulemaking has been proposed for 2 years, the Safety Board believes that the FAA should complete the rulemaking process and issue within 6 months a final rule for 14 CFR Part 142 concerning the certification and operation of training centers.

Accident investigations and information obtained through the airline survey highlight several deficiencies in the training programs of commuter air carriers. The FAA's regulatory initiatives currently underway address some of the problem areas; most notably, the anticipated issuance of proposed rulemaking that would minimize the differences in pilot qualification and training requirements for Parts 121 and 135 is expected to enhance the quality of training provided to commuter air carrier pilots. However, this major revision to the training requirements must first proceed through a complex process that includes a period of public comment before a final rule is

issued; consequently, it will likely be several months, perhaps years, before any major revisions to Part 135 training requirements become effective.

The Safety Board concurs with the FAA's initiative toward uniformity in pilot training requirements for Parts 121 and 135, but urges the FAA to proceed with action on other initiatives, such as a requirement for mandatory CRM training programs, the continued promotion and development of the AQP, the certification and operation of Part 142 training centers, and the release of a final rule that addresses pilot operating experience.

### **Flight Attendant Hands-On Emergency Training**

Flight attendant training should ensure that flight attendants are well trained and skilled in the procedures needed to perform effectively during emergency situations. Under Parts 121 and 135, flight attendants (and cockpit crews) are required to complete training on emergency procedures during both initial and annual recurrent training.

Under Part 135, flight attendants and pilots must perform emergency drills such as emergency evacuations, fire extinguishing, the operation and use of emergency exits, the use of crew and passenger oxygen, ditching (if applicable), the donning and inflation of life vests (if applicable), and the removal and inflation of life rafts (if applicable). These drills are intended to provide crewmembers with the opportunity to practice using emergency equipment and to acquire hands-on experience with opening emergency exits. Part 135 regulations also state that flight attendants and pilots need not perform the drills if the air carrier can demonstrate that the skills can be adequately trained by demonstration (that is, no hands-on use of the emergency equipment). However, some procedures—such as opening exit doors—are difficult to adequately train through demonstration, and the FAA is unlikely to grant an exemption from hands-on performance of those drills. All six airlines that participated in the survey and that employ flight attendants require their flight attendants to practice opening exit doors during initial and recurrent training.

Concern was expressed by some participants at the public forum that crewmembers (both flight attendants and pilots) do not receive sufficient hands-on training to enable them to perform adequately in the event of an emergency. They commented that the FAA allows airlines to substitute demonstrations for participatory drills without showing that there is no degradation in the quality of

instruction. In 1992, the Safety Board completed a special investigation of flight attendant training programs at Part 121 airlines.<sup>10</sup> The report concluded that many airlines do not perform evacuation drills during recurrent training.<sup>11</sup> The investigation also examined the performance of flight attendants during actual emergencies and linked deficiencies in performance to inadequacies in the emergency training received by the flight attendants. The report stated the following:

The Safety Board believes that some flight attendants may not have been given enough information about and/or practice with equipment and situations to master the skills they need in an emergency. Or conversely, they may be given so much information, such as multiple locations of equipment on several types of airplanes, that these locations cannot readily be recalled during an emergency.

As a result of its findings from the special investigation, the Safety Board issued the following recommendation to the FAA:

Require flight attendant hands-on proficiency drills for each type of airplane exit, and ensure that flight attendants are evaluated individually by an instructor and that a record is kept that they have performed and successfully completed such drills. (A-92-70)

In its 1992 response to the recommendation, the FAA indicated that it did not agree with the recommendation and believed that the current requirements concerning flight attendant training were adequate. In January 1993, the Safety Board classified this recommendation, "Open—Unacceptable Response" and asked the FAA to reconsider its position on the issue. The FAA's position remains unchanged; thus, the Safety Board reclassifies Safety Recommendation A-92-70 "Closed—Unacceptable Action."

The Safety Board believes that, whether conducted under Part 121 or Part 135, hands-on emergency drills are a necessary part of the overall training curriculum for all crewmembers, and that substituting visual information and demonstration for actual practice can lead to a degradation in performance during actual emergencies. Such degradation is recognized in flightcrew training, where the need to practice emergency procedures through active participation is the principle that underlies the requirements for recurrent flight training by pilots. Also, because the occasions when flight attendants need to call on emergency training are rare, flight attendants need to be provided with the opportunity to practice the necessary skills more frequently

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<sup>10</sup> National Transportation Safety Board. 1992. Flight attendant training and performance during emergency situations. Special Investigative Report NTSB/SIR-92/02. Washington, DC.

<sup>11</sup> Under Part 121, air carriers are required to conduct some hands-on drills once every 24 months rather than annually.

than every 24 months, as is required under Part 121. Therefore, the Safety Board believes that all flight attendants should be required, during recurrent training, to participate in drills that allow them the opportunity to use emergency equipment and to practice procedures under simulated emergency conditions.

### **Cockpit/Cabin Crew Resource Management Training**

Timely, accurate, and effective communication between flight attendants and cockpit crews during an emergency is necessary to ensure the safety of passengers.

In 1994, the Safety Board investigated a nonfatal accident involving a SAAB 340B, operated under Part 121 by Simmons Airlines (as American Eagle).<sup>12</sup> The pilots of the aircraft performed an emergency landing following the in-flight loss of power to both engines. In its investigation, the Safety Board found that, as a result of a breakdown in communications between the flightcrew and the flight attendant, the passengers were not prepared for the emergency landing. Instructions from the cockpit crew intended for the flight attendant were inadvertently broadcast over an air traffic control channel by the first officer and were never received by the flight attendant. Nevertheless, the Safety Board found that there were sufficient cues for the flight attendant to have recognized that the flight was experiencing an emergency, and the attendant should have prepared the passengers for an emergency landing.

The Safety Board believes that effective communications and teamwork between cockpit and cabin crews are necessary, and that combined CRM training for flightcrews and flight attendants can teach the necessary skills for effective teamwork during an emergency. Information gathered during the commuter airline survey revealed that three of the six airlines that employ flight attendants conduct joint cockpit/cabin CRM training. The Safety Board believes that flight attendants and pilots at the other airlines would also benefit from such training.

The Safety Board has previously addressed joint cockpit/cabin CRM training. Most recently, as a result of its 1992 special investigation of flight attendant training, the Safety Board issued the following safety recommendation to the FAA:

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<sup>12</sup> National Transportation Safety Board. 1994. Simmons Airlines, d/b/a American Eagle flight 3641, SAAB 340B, N349SB, occurring at False River Air Park, New Roads, Louisiana, February 1, 1994. Aircraft Accident Report NTSB/AAR-94/06. Washington, DC.



Amend 14 CFR Part 121.417 to require evacuation and/or wet ditching drill group exercise during recurrent training. Ensure that all reasonable attempts are made to conduct joint flightcrew/flight attendant drills, especially for crewmembers operating on airplanes with two-pilot cockpit crews. (A-92-74)

In its 1992 response to the recommendation, the FAA indicated that it would ask the ARAC on training and qualifications to examine the possibility of improving training in this area. As a result of the FAA's response, Safety Recommendation A-92-74 was classified "Open—Acceptable Alternate Response."

Information provided to the Safety Board by FAA staff indicates that a proposed revision to flightcrew training rules is expected in the near future from the FAA and will include a requirement for joint CRM training for pilots and flight attendants. The proposed training requirements will apply to both Parts 121 and 135. The Safety Board acknowledges that the FAA is taking action to address the need for joint CRM training for pilots and flight attendants but is disappointed that considerable time has passed and additional time will elapse for rulemaking before the needed improvements are made in the joint CRM training requirements. Consequently, the Board reclassifies Safety Recommendation A-92-74 "Open—Unacceptable Response."

### **Airport Certification**

The Safety Board is concerned that many community airports served by commuter airlines are not certificated in accordance with Part 139 because of the seating capacity of the aircraft serving those airports. Consequently, passengers flying into and out of those airports may not be provided adequate airport safety or emergency response resources.

In its November 1987 aviation safety report on the exclusion of commuter airports in the FAA Airport Certification Program,<sup>13</sup> the General Accounting Office (GAO) found that:

Airports receiving their only scheduled service from commuter airlines cannot acquire certification regardless of their level of passenger activity because the airport does not meet the participation requirement of receiving service from planes with 31 or more passenger seats. In addition, many currently certified airports no longer meet the participation requirements and could have their certification downgraded or withdrawn.

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<sup>13</sup> General Accounting Office. 1987. Commuter airports should participate in the Airport Certification Program. GAO/RCED-8841. Washington, DC.

The program results in a higher level of airport safety by reducing the risk of accidents and enhancing an airport's ability to deal with an accident if one occurs. Participating in the program can increase an airport's capital and operating costs; however, grants authorized by the Airport and Airway Improvement Act can cover most of the capital costs.

Alternative participation requirements could be implemented that would increase the number of certified commuter airports.

The GAO concluded, "We believe the best alternative for enhancing airport safety is to extend the participation requirements to include all airports receiving regularly scheduled service," and recommended that the Secretary of Transportation direct the FAA Administrator to do the following:

Change the participation requirements for the airport certification program to require certification for all airports that receive regularly scheduled service. If the Secretary deems it necessary to resolve uncertainty over his authority to certify commuter airports, he should seek specific authority from the Congress.

Develop a new category of certification for low-activity airports that would require full implementation of the risk reduction features of the airport certification program and allow the use of alternatives for CFR [crash-fire-rescue].

In a memorandum dated March 25, 1988, to the Manager, FAA Safety and Compliance Division, the FAA Assistant Chief Counsel, General Legal Services Division, stated:

The statutory authority applicable to the present FAR Part 139 airport certification program appears in Section 612(a) of the Federal Aviation Act (49 U.S.C. 1432(a)). It is limited to "airports that serve any scheduled or unscheduled passenger operation of air carrier aircraft designed for more than 30 passenger seats".

The memorandum concluded:

A statutory amendment removing the words "designed for more than 30 passenger seats" will be necessary before the certification program becomes applicable to all airports regardless of the size of passenger aircraft using the airport.

As a result of the GAO report and the legal opinion of the FAA legal counsel, the FAA submitted a proposal to the Secretary of Transportation that included a

request for FAA authority from Congress to expand 14 CFR Part 39 to include commuter airports serving scheduled air carriers.

The Secretary of Transportation approved a proposal for inclusion in the FAA Reauthorization Proposal for FY 1993-1997, to:

Expand the airports certificated by the FAA to include commuter airports serving scheduled air carriers with aircraft designed for 10 or more seats (adding about 175 airports) because of the safety benefits that accrue from having crash, fire, and rescue equipment.

According to the FAA, legislation on the proposal was submitted by the U.S. Department of Transportation (DOT) to Congress, and it was introduced in 1992 as one measure of a bill. However, the measure was not enacted.

The FAA estimates that about 175 additional airports would come under the airport certification program if such expanded authority were given. In addition to aircraft rescue and firefighting (ARFF) equipment and improved airport guidance signs, the newly certificated airports for commuter airlines would be required to upgrade in the following areas: (a) airfield inspection procedures; (b) staff training; (c) airfield discrepancy reporting (Notices to Airmen); (d) more stringent airfield pavement maintenance standards; (e) requirements for emergency plans and snow/ice control plans; and (f) improved runway/taxiway safety area criteria. Some of the certification standards contained in Part 139, such as equipment requirements for ARFF, are indexed according to the size and type of aircraft that serve the airport. Thus, the amount of firefighting equipment, for example, required at an airport served by small aircraft is less than the amount required at an airport served by large transport aircraft.

The FAA concluded that the impact on the Airport Improvement Program (AIP) would be minimal even though each airport would be required to purchase ARFF equipment and signs and make other improvements. The new AIP costs were undetermined because the amount or quality of rescue equipment and signs would vary from airport to airport; however, the funds necessary for many of the new requirements could be obtained through AIP funding, with the exception of staffing costs and salaries. Also, the additional FAA airport certification inspection requirements would probably require additional staffing for FAA airport safety and certification specialists.

Thus, the Board believes that the FAA should seek legislative action within 6 months to include in the airport certification program all airports served by air carriers that provide scheduled passenger service. Further, following the enactment of such legislation, the FAA should revise and expand 14 CFR 135 to permit scheduled passenger operation only into airports certificated under the standards

contained in Part 139, "Certification and Operations: Land Airports Serving Certain Air Carriers."

### **Airline Management Oversight**

Inadequate management safety philosophy and oversight of operations have been cited as factors in several commuter airline accidents. In its investigation of the Continental Express flight that crashed in 1991 following the loss of the left horizontal stabilizer leading edge,<sup>14</sup> the Safety Board concluded that deficiencies in the maintenance department indicated that the company had not instilled an adequate safety orientation in its maintenance personnel. The Safety Board also cited "the failure of the Continental Express management to ensure compliance with the approved maintenance procedures" as contributing to the cause of the accident.

In its determination of the probable cause of a flight training accident in 1991, the Safety Board found that company management lacked involvement in and oversight of its Beechcraft 1900 flight training program.<sup>15</sup> As a result, the Board issued the following recommendation to the FAA:

Require principal operations inspectors of commuter airlines to verify that appropriate and qualified levels of airline management are actively involved in the airline's flight training programs. (A-93-70)

The FAA agreed with the intent of the recommendation and in its response of September 1, 1993, indicated plans to take action:

The FAA will issue an air carrier operations bulletin...to address this recommendation. The FAA agrees that appropriate and qualified levels of airline management must be involved in flight and ground training programs. However, the quality and sufficiency of training is best evaluated by direct observation of training and testing or checking in progress and by examination of surveillance and investigation reports.

Based on the FAA's response, Safety Recommendation A-93-70 was classified "Open—Acceptable Alternate Response" in December 1993. According to FAA personnel, an ACOB has not yet been issued; consequently, the Safety Board reclassifies the recommendation "Open—Unacceptable Response."

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<sup>14</sup> National Transportation Safety Board. 1992. Britt Airways, Inc., d/b/a Continental Express flight 2574, in-flight structural breakup, EMB-120RT, N33701, Eagle Lake, Texas, September 11, 1991. Aircraft Accident Report NTSB/AAR-92/04. Washington, DC.

<sup>15</sup> National Transportation Safety Board. 1993. Loss of control, Business Express, Inc., Beechcraft 1900C, N811BE, near Block Island, Rhode Island, December 28, 1991. Aircraft Accident Report NTSB/AAR-93/01/SUM. Washington, DC.

## Air Carrier Safety Programs

Regulations contained in Parts 135 and 121 do not require air carriers to establish an independent safety position or department (that is, one with responsibilities limited solely to safety concerns). Because only 5 of the 21 commuter airlines surveyed (24 percent) have an independent safety function, the Safety Board is concerned that airline management may not adequately address safety concerns, particularly where safety enhancements compete with operational concerns and where regulatory compliance is not an issue. The survey results suggest that the person most likely approached by pilots with safety concerns is the chief pilot or director of operations, the persons also responsible for the operation of the flight department. Although these management personnel should be informed and aware of safety concerns, the Safety Board believes that a safety officer can be most effective when functioning independently of the day-to-day management of line operations.

The Safety Board previously addressed the need for an independent safety program at airlines conducting operations under Part 121. As a result of its investigation of an accident involving a major air carrier in 1988,<sup>16</sup> the Board issued the following safety recommendation to the FAA:

Initiate a joint airline industry task force to develop a directed approach to the structure, functions, and responsibilities of airline flight safety programs with the view toward advisory and regulatory provisions for such programs at all Part 121 airlines. (A-89-130)

In response to the recommendation, the FAA Administrator cited the release of an advisory circular (AC 120-56) that provided guidelines for the establishment and use of voluntary disclosure programs at airlines conducting operations under Parts 121 or 135:

On March 27, 1990, I announced a national policy intended to encourage more self-policing by airlines and to give new information about what is happening in the industry. An operator who discovers inadvertent non-compliance must promptly correct it and disclose it to the FAA, as well as take necessary corrective actions satisfactory to the FAA that precludes recurrence of similar non-compliance.

The Safety Board replied to the FAA that the voluntary disclosure programs described in AC 120-56 are concerned with the self-disclosure of instances of regulatory noncompliance, whereas the recommendation sought action to develop safety programs that address "nonregulatory" safety concerns. Because FAA's action

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<sup>16</sup> National Transportation Safety Board. 1988. Delta Airlines, Inc., Boeing 727-232, N473DA, Dallas-Fort Worth International Airport, Texas, August 31, 1988. Aircraft Accident Report NTSB/AAR-89/04. Washington, DC.

did not directly address the recommendation, the Board classified Safety Recommendation A-89-130 "Open—Unacceptable Response."

On October 26, 1992, the FAA issued AC 120-59, "Air Carrier Internal Evaluation Programs," which outlined voluntary means for airlines operating under Parts 121 or 135 to monitor the safety and regulatory compliance of their operations on a continual basis through a process of internal audits and inspections. Participants at the 1994 public forum commented that the FAA-sponsored internal evaluation programs are intended to go beyond the self-disclosure programs described in AC 120-56 in that they address both regulatory noncompliance and nonregulatory concerns (such as company policies and practices). In developing their program, air carriers are encouraged to establish an independent evaluation process that reports directly to senior management, to conduct internal surveillance on a regularly scheduled basis, and to share the findings of the internal evaluation with the FAA principal inspectors.

The Safety Board supports the intent of self-disclosure and internal evaluation programs but is concerned that both programs rely on the voluntary participation of airlines, especially considering the results of the air carrier survey, which suggest that commuter carriers generally have not developed safety programs voluntarily that meet the intent of AC 120-59. Further, although the guidelines contained in AC 120-59 recommend that internal evaluation programs include an independent function with direct access to top management, no such function is required.

A mandatory airline safety program would greatly enhance a commuter air carrier's ability to identify and correct safety problems before they lead to an accident. An independent safety function with direct access to upper level management would provide a formal means for communicating safety concerns and for coordinating actions to address those concerns. The Safety Board believes that AC 120-59, "Air Carrier Internal Evaluation Programs," provides a comprehensive framework that includes the necessary elements for an effective safety function. Consequently, the Safety Board believes that the FAA should revise the Federal Aviation Regulations to require that all air carriers operating under Parts 121 and 135 establish a safety function, such as outlined in AC 120-59. The Board also reclassifies Safety Recommendation A-89-130 "Closed—Unacceptable Action/Superseded" by this new recommendation.

### **Oversight of Commuter Airlines By Code-Sharing Partners**

Code-sharing arrangements between commuter airlines and major airlines vary from simply marketing agreements to full ownership of a commuter airline by its code-sharing partner. A commuter airline's association with its code-sharing partner is often reflected by a company name and color scheme that are similar to those of

the major airline, ticketing and baggage handling for connecting passengers, integrated listings in published flight schedules, and referral of passengers by major airlines to affiliated commuter airlines. Thus, code-sharing arrangements have created and fostered a public perception that a commuter airline is fully owned by the major airline, and the traveling public holds the major airline accountable for the safe operation of the commuter airline. Therefore, there is an obligation on the part of each code-sharer to act accordingly through establishment of a safety program that incorporates communication and coordination between the major airline and the code-sharing commuter airline to provide the traveling public with a level of safety concern commensurate with the public's expectations.

The Safety Board believes that code-sharing arrangements between major airlines and commuter airlines generally represent a positive development in commercial aviation. These arrangements potentially increase access for commuter airlines to technology and resources, such as training simulators, that otherwise would not be available or that would be cost-prohibitive. The Board recognizes that the safety of commuter air carrier operations does not depend on establishing a code-sharing arrangement, nor does the establishment of a code-sharing arrangement guarantee the highest level of safety necessary for a commuter airline operating passenger service. A commuter airline that combines a corporate philosophy in which safety is paramount with a commitment to provide the necessary resources to achieve the highest level of safety may do so without a code-sharing arrangement.

Nevertheless, the Safety Board believes that a major airline participating in a code-sharing arrangement with a commuter airline has a responsibility for operational oversight of its partner that includes a program of regular safety audits of flight operations, training programs, and maintenance and inspection. Thus, the Safety Board believes that the U.S. Department of Transportation should require U.S. domestic air carriers certificated under 14 CFR Part 121, when involved in a code-sharing arrangement with commuter airlines, to establish a program of operational oversight of their code-sharing partners that (a) includes periodic safety audits of flight operations, training programs, and maintenance and inspection; and (b) emphasizes the exchange of information and resources that will enhance the safety of flight operations.

Considerable time may elapse before such a requirement is adopted and implemented. In the interim, the Safety Board believes that the major airlines should take action to establish such a program of operational oversight. Further, the Board believes that the Regional Airline Association should encourage its member airlines to assist U.S. domestic air carriers with which they have a code-sharing arrangement to establish a program of operational oversight by the air carrier.

## FAA Surveillance

Several survey questions asked the airlines about their perceptions of their principal inspectors (principal operations inspector, principal maintenance inspector, and principal avionics inspector), and of the FAA. The airlines that participated in the survey were generally pleased with the quality of the relationship between their company and its principal inspectors. With few exceptions, airline officials believed that their principal inspectors were sufficiently familiar with the Federal regulations that affect the airline's operations. They also reported that their inspectors generally responded to requests in a timely manner and usually provided explanations for required operational changes.

Overall, the survey results suggest that the airlines are generally pleased with the level of assistance provided by the FAA, and believe they have a positive working relationship with their principal inspectors. Nevertheless, comments made to Safety Board staff during the airline surveys, issues raised in discussion during the public forum, and recurrent inadequacies in surveillance revealed in accident investigations point to persistent areas of concern with regard to FAA surveillance: inspector qualifications and training; staffing levels and inspector workload; and standardization of surveillance.

*Inspector Qualifications And Training.*—Public forum participants and officials of airlines that participated in the Safety Board's survey reported that they remain concerned that much of the surveillance of commuter airlines continues to be conducted by FAA inspectors with little or no air carrier experience and with little or no supervision by someone who does have such experience.

An inspector who is assigned to a particular airline might never have flown any of the aircraft types operated by the airline, served as an air carrier crewmember, or worked as a mechanic at an air carrier prior to the inspector's assignment. Also, the airline might have positions for which the inspector has surveillance/certification responsibility but no previous experience and little formal training (for example, flight dispatchers and flight attendants).

The consensus among airline officials during the site visits by Safety Board staff and at the public forum was that each principal inspector should possess extensive background knowledge of the operations, training programs, maintenance, and avionics areas specific to the air carrier to which the inspector is assigned. In addition, the principal inspectors assigned to commuter airlines would also benefit from indoctrination training at the airline that provides exposure to the company's actual training programs.

According to information presented at the public forum by the Air Line Pilots Association (ALPA), 71 percent of the air carriers that have ALPA representation operate aircraft for which the FAA certificate-holding office does not provide an



inspector who is qualified. Airline officials stated that an inspector who has experience in the type(s) of aircraft operated by the airline is better able to evaluate manuals, procedures, and training programs than an inspector who is not familiar with the aircraft type(s). The airline officials acknowledged that familiarity with the type of aircraft operated by a company is especially critical during the initial air carrier certification process or when the airline is preparing for the acquisition of a new aircraft type because operating procedures and manuals are being developed and approved at these times. Inspector experience in specific aircraft types is not as critical once the initial approval process is completed; however, a commuter airline participant in the public forum described his company's effort to qualify its principal operations inspector on its aircraft, and indicated that once qualified, the inspector was better able to assist the company.

Airline officials are also concerned that some inspectors who conduct surveillance are not adequately familiar with their company's policies and procedures. They further indicated that it would be beneficial for inspectors to attend the airline's training programs. By doing so, inspectors would gain firsthand knowledge of a company's training programs that could help them evaluate company procedures regarding, for example, whether procedures are being followed during operations, whether airline employees are receiving adequate training in the procedures, or whether the procedures are suitable for the particular operating environment.

***Staffing Levels And Inspector Workload.***—Unless assigned exclusively to one air carrier, a principal inspector continues to be assigned numerous duties pertaining to general aviation. In addition, inspectors are involved in tasks related to keeping the inspector's handbook current and other administrative duties that require several hours per week of their planned surveillance schedule.

A common concern raised by commuter airline officials during the public forum is that inspectors spend too much of their available time doing administrative paperwork and too little time actually doing inspections. An FAA representative at the forum acknowledged the problem and reported on a new FAA initiative that utilizes pen-based computer technology to provide inspectors with data entry tools that can be used in the field. The benefit of this new technology is that it allows inspectors to enter data directly into the FAA's Program Tracking and Information Subsystem (PTRS) during the inspection rather than having to return to the office to record the information.

During interviews for the site surveys, officials of several commuter airlines remarked that principal inspectors should be assigned exclusively, in a manner comparable to Part 121 inspector assignments. Commuter air carriers who had exclusively assigned principal inspectors believed that FAA surveillance was continuous and thorough. They further indicated that those inspectors were available to facilitate their expansion at times when the company was adding new aircraft.

**Standardization Of FAA Surveillance.**—Officials reported that it is not uncommon to receive inconsistent or conflicting inspection reports from geographical inspectors who have little or no familiarization with company procedures approved by the principal inspectors.

An FAA representative at the public forum acknowledged problems concerning standardization in the interpretation and enforcement of regulations from inspector to inspector and stated that the problems are recognized by the FAA. According to the representative, the FAA held a meeting to address communication and coordination problems between certificate management offices and geographic inspection offices. As a result of that meeting, recommendations to improve networking and communications between FSDOs, certificate management offices, and geographic inspection offices were forwarded to the Director of Flight Standards at the FAA for consideration.

**Action Needed To Enhance Surveillance.**—The results of this study indicate that many of the FAA surveillance problems identified in the Safety Board's 1980 study continue to be areas of concern. FAA inspector qualifications and workload, and lack of standardization in the interpretation and enforcement of regulations continue to be recurrent issues addressed in accident investigations, and are concerns that were expressed by airline officials and industry experts during the site visits to commuter airlines and in discussions at the public forum.

Initiatives such as the Air Carrier Internal Evaluation Programs and Air Carrier Voluntary Disclosure Reporting Procedures are positive steps toward enhanced self-policing by air carriers. The Safety Board believes that the use of internal evaluation programs by the air carriers must be subject to regulatory review and enforcement to be effective. As discussed earlier, the Safety Board believes that the advisory circular on internal evaluation programs (AC 120-59) provides a comprehensive framework from which mandatory safety functions could be developed.

The Safety Board recognizes that the FAA has undertaken new initiatives to better utilize the resources available for surveillance of Part 135 operations. New programs such as the Commuter Survey Report (COMSUR) and Safety Performance Analysis System (SPAS) are designed to target resources to air carrier problem areas. The Safety Board supports these initiatives and encourages the FAA to accelerate the development of SPAS.

At the root of efforts toward more effective surveillance is the technical knowledge and experience of FAA inspectors in air carrier operations. Currently, inspector comments recorded on PTRS are the primary sources of information used in deciding where to place surveillance resources. Thus, the effectiveness of surveillance ultimately depends on the ability of the inspectors to thoroughly and accurately assess air carrier operations. The Safety Board is concerned that inspections continue to be conducted by personnel with no experience in air carrier

operations or familiarity with the specific aircraft types operated by the air carriers they oversee. The Safety Board believes that the FAA should establish a joint industry/government task force, such as an aviation rulemaking advisory committee (ARAC), comprising representatives from the FAA, air carriers, and aircraft manufacturers to review the qualification standards and training curriculum of air carrier inspectors. To lend expertise regarding the development of curricula, the task force should also include representation from the academic community. The intent of the ARAC should be the development of revisions to the qualifying and training standards for air carrier inspectors that will (a) increase their familiarity with air carrier operations and maintenance in general, as well as the specific operations of the air carriers they inspect, and (b) enhance their knowledge of the Federal regulations and provide for more standardized interpretation and enforcement of regulations.

### **Aligning Regulations With Operating Characteristics**

The Federal regulations that govern the safety of flight represent the minimum acceptable standard of safety by which all airlines must operate. The Safety Board believes that the standards for safety should be based on the characteristics of the flight operations, not the seating capacity of the aircraft, and that passengers on commuter airlines should be afforded the same regulatory safety protections granted to passengers flying on Part 121 airlines. In this regard, the Board believes that the regulations contained in 14 CFR Part 135 have not kept pace with changes in the commuter airline industry. The commuter airline segment of commercial aviation can no longer be viewed as an industry primarily comprising small air carriers that operate small, 10-seat airplanes to provide essential air service to remote communities. Today, many commuter airlines operate extensive route systems, and use highly sophisticated transport category aircraft, the safe operation of which depends upon crewmembers who should be qualified and trained to the same standards as are required of crewmembers who fly Part 121 operations. Further, the proliferation of code-sharing arrangements has given rise to coordinated air service between commuter airlines and major air carriers that should be governed by a single regulatory standard, wherever possible.

However, the Safety Board recognizes that the commuter airline industry is diverse, and that some requirements necessary to improve the standard of safety in one aspect of the industry, may be impractical in other aspects. The Board believes that scheduled Part 135 air service that uses high performance, transport category aircraft should be operated under the same regulatory standards that govern the Part 121 air carriers. Consequently, the Safety Board believes that the FAA should revise the Federal Aviation Regulations such that all scheduled passenger service conducted in aircraft with 20 or more passenger seats be conducted according to the provisions of 14 CFR Part 121. Additionally, scheduled passenger service conducted in aircraft with 10 to 19 passenger seats should be conducted in accordance with 14 CFR Part

121, or its functional equivalent, wherever possible. The Board believes that these regulatory changes, in combination with the FAA's anticipated revisions to the flightcrew training requirements that will create a single training standard for flightcrews, will enhance the safety of commuter airline operations to a level that is equivalent to current operations conducted under Part 121.

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

Revise the Federal Aviation Regulations such that:

- All scheduled passenger service conducted in aircraft with 20 or more passenger seats be conducted in accordance with the provisions of 14 CFR Part 121. (Class II, Priority Action) (A-94-191)
- All scheduled passenger service conducted in aircraft with 10 to 19 passenger seats be conducted in accordance with 14 CFR Part 121, or its functional equivalent, wherever possible. (Class II, Priority Action) (A-94-192)

Require principal operations inspectors to periodically review air carrier flight operations policies and practices concerning pilot tasks performed between flights to ensure that carriers provide pilots with adequate resources (such as time and personnel) to accomplish those tasks. (Class II, Priority Action) (A-94-193)

Revise the Federal Aviation Regulations contained in 14 CFR Part 135 to require that pilot flight time accumulated in all company flying conducted after revenue operations—such as training and check flights, ferry flights and repositioning flights—be included in the crewmember's total flight time accrued during revenue operations. (Class II, Priority Action) (A-94-194)

Revise within 1 year the pilot training requirements for scheduled Part 135 operators such that:

- All pilot training for aircraft with 10 or more passenger seats be conducted in accordance with Subparts N and O of 14 CFR Part 121. (Class II, Priority Action) (A-94-195)

- All pilots are provided mandatory crew resource management training that incorporates the principal components of effective CRM training, as outlined in Advisory Circular AC 120-51A, "Crew Resource Management Training." (Class II, Priority Action) (A-94-196)
- All flightcrew members complete the initial operating experience currently required only of pilots-in-command under Part 135.244. (Class II, Priority Action) (A-94-197)

Issue within 6 months a final rule for 14 CFR Part 142 concerning the certification and operation of training centers. (Class II, Priority Action) (A-94-198)

Revise the certification standards for Part 25 and for Part 23 (commuter category) aircraft to require that a flight simulator, suitable for flightcrew training under Appendix H of Part 121, be available concurrent with the certification of any new aircraft type. (Class II, Priority Action) (A-94-199)

Revise the Federal Aviation Regulations to require all flight attendants to participate, during recurrent training, in emergency drills that allow them the opportunity to use emergency equipment and to practice procedures under simulated emergency conditions. (Class II, Priority Action) (A-94-200)

Revise the Federal Aviation Regulations to require that all air carriers operating under Parts 121 and 135 establish a safety function, such as outlined in Advisory Circular AC 120-59, "Air Carrier Internal Evaluation Programs." (Class II, Priority Action) (A-94-201) (Supersedes A-89-130)

Establish a joint industry/government task force, such as an Aviation Rulemaking Advisory Committee (ARAC), comprising representatives from the FAA, air carriers, aircraft manufacturers, and the academic community to review the qualification standards and training curriculum for air carrier inspectors. The intent of the task force should be revisions to the qualifying and training standards for air carrier inspectors that will (a) increase their familiarity with air carrier operations and maintenance in general, as well as the specific operations of the air carriers they inspect; and (b) enhance their knowledge of the Federal Aviation Regulations and provide for more standardized interpretation and enforcement of the regulations. (Class II, Priority Action) (A-94-202)

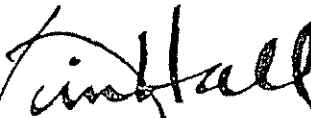
Enhance the level of safety at airports served by commuter airlines by:

- Seeking legislative action within 6 months to include in the Airport Certification Program all airports served by air carriers that provide scheduled passenger service. (Class II, Priority Action) (A-94-203)
- Revising and expanding 14 CFR 135, following enactment of the legislative action described in Safety Recommendation A-94-203, to permit scheduled passenger operation only at airports certificated under the standards contained in Part 139, "Certification and Operations: Land Airports Serving Certain Air Carriers." (Class II, Priority Action) (A-94-204)

Also as a result of the study, the Safety Board issued safety recommendations to the U.S. Department of Transportation, the U.S. domestic air carriers, and the Regional Airline Association.

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

By:

  
Jim Hall  
Chairman