



U.S. House of Representatives
Committee on Transportation and Infrastructure

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June 10, 2009

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Aviation
FROM: Subcommittee on Aviation Staff
SUBJECT: Hearing on "Regional Air Carriers and Pilot Workforce Issues"

PURPOSE OF HEARING

The Subcommittee on Aviation will meet on Thursday, June 11, 2009, at 10:00 a.m., in room 2167 of the Rayburn House Office Building to receive testimony regarding regional air carriers¹ and pilot workforce issues.

BACKGROUND

On February 12, 2009, at about 10:17 p.m., a Colgan Air Inc., Bombardier Dash 8-Q400, N200WQ, d.b.a. Continental Connection Flight 3407, crashed during an instrument approach to runway 23 at the Buffalo-Niagara International Airport, Buffalo, New York (Flight 3407 was en route from Newark Liberty International Airport (EWR), New Jersey).

As the flight crew approached the Buffalo airport, they discussed the build-up of ice on the windshield. The flight was cleared to 2,300 feet, and two minutes later, the airplane reached this assigned altitude. Over the next two minutes, power was reduced to near flight idle, the airspeed rapidly slowed from about 180 knots to about 135 knots, the autopilot was active in altitude hold mode, and the engine torque was at minimum thrust. The crew lowered the landing gear and about 20 seconds later, the first officer moved the flaps from five to ten degrees. Shortly afterward, the

¹ Regional air carriers provide short- and medium-haul scheduled service generally connecting smaller communities with larger cities and hub airports. They typically operate turboprops and jets with between 9 to 110 seats and partner with mainline air carriers for contract or pro-rate flying.

stick shaker² activated, and the autopilot disengaged. The flight data recorder information indicates that the crew added power to about 75 percent torque and that the captain moved that control column aft, increasing the aircraft's pitch attitude.³ This action was accompanied by the airplane pitching up, rolling to the left, then rolling to the right, during which the stick pusher⁴ automatically activated and the flaps were retracted. The airspeed continued to decrease and, after further pitch and roll excursions, the airplane pitched down, entering a steep descent from which it did not recover.⁵

The crash site was approximately five nautical miles northeast of the airport in Clarence Center, New York, and mostly confined to one residential house. The four crew members and 45 passengers were killed and the airplane was destroyed by impact forces and post crash fire. There was one ground fatality. The captain was Marvin Renslow and the first officer was Rebecca Shaw.

The National Transportation Safety Board (NTSB) held a 3-day public hearing on Flight 3407 from May 12-14, 2009. The investigation is ongoing, and while the NTSB has not yet made any conclusions or determined the probable cause of the accident, the investigation is focusing on a number of areas including: 1) flight crew experience and training; 2) remedial training programs; 3) commuting policies and practices; 4) fatigue management; and 5) violations of sterile cockpit and the impact on situational awareness.

The NTSB hearing identified the need to closely examine the regulations governing pilot training and rest requirements and the oversight necessary to ensure their compliance. This is a particular concern at regional carriers since the last six fatal part 121⁶ accidents involved regional air carriers; part 121 operators include major commercial air carriers flying under the strictest set of Federal Aviation Administration (FAA) operating regulations. The NTSB has cited pilot performance as a potential contributory factor in three of those accidents.

As the major airlines continue to cut their capacity in response to the current economic downturn, regional airline operations constitute an increasingly important proportion of operations. Today, regional flights represent one half of the total scheduled flights across the country, and regional airlines provide the only scheduled airline service to more than 450 communities. Additionally, regional airlines provide passenger air service to communities without sufficient demand to attract mainline service.

² A stick shaker is a stall warning system supplies the flight crew with warnings of an impending stall (i.e., a sudden reduction in lift forces generated by the airflow over an aircraft wing, usually occurs when forward speed is low and/pitch attitude is high) through an audio warning and a mechanical shaking of the control column.

³ It should be noted that the appropriate response to a stall warning or stick shaker is to increase airspeed by decreasing the aircraft's pitch attitude and increasing engine power.

⁴ At stall, the stick pusher applies a nose down pitch force to push the control columns to decrease the airplane's angle of attack to prevent further degradation into stall and to begin recovery to normal flight.

⁵ Hearing Officer Lorenda Ward, NTSB, Public Hearing in the Matter of the Colgan Air, Inc. Flight 3407, Bombardier DHC8-400, N200WQ Clarence Center, New York, February 12, 2009 at 15 (May 12, 2009) (DCA-09-MA-027).

⁶ Part 121 is the rules that scheduled commercial air carriers fly under.

I. Training-related Issues

A. FAA Certification Requirements, Airline Training programs and Flight Crew Experience

To fly for an airline, a pilot must have a commercial pilot's license, at a minimum. To obtain a commercial pilot's license, a candidate must have at least 250 hours of flight time. Some airlines may also require an a pilot applicant to obtain an Airline Transport Pilot's (ATP) certificate to be hired, which enables a pilot to act as pilot in command of an air carrier aircraft, and requires a minimum of 1,500 flight hours. Further, for airline pilots to be a pilot in command of aircraft larger than 12,500 pounds, or any jet aircraft, they must complete specialized training for the specific aircraft and test for a type rating in that aircraft (there is no minimum hour requirement associated with this rating).

Minimum Regulatory Requirements for Pilot Certification⁷

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| <p>1. Private Pilot (Minimum of 40 hours at certification)</p> | <p>a. Aeronautical knowledge</p> <p>b. Flight proficiency</p> | <p>Complete a comprehensive ground school and pass a written test composed of at least the following: aircraft systems, weight and balance, aeronautical charts, Federal Aviation Regulations (FAR), airport operations, national air space, emergency procedures, communications, and navigation requirements. The ground school must be conducted by an authorized instructor.</p> <p>Minimum 40 hours: composed of at least 20 hours from an approved instructor, 10 hours of solo, 3 hours of night time, and 5 solo hours of cross country. Must then pass a flight check administrated by the FAA or designated evaluator.</p> |
| <p>2. Commercial Pilot (Minimum of 250 Hours)</p> | <p>a. Aeronautical knowledge</p> <p>b. Flight proficiency</p> | <p>FARs, accident reporting procedures, aerodynamics, meteorology, weather reports and forecast, safe operations of the aircraft, weight and balance, performance charts, aircraft limitations, aeronautical charts, navigation, aeronautical decision making, aircraft systems, maneuvers procedures and emergency operations, night and high altitude operations, and operations in the national airspace system.</p> <p>Minimum of 250 hours to include day, night and flight by reference to aircraft instruments. Pass a flight check administrated by the FAA or designated evaluator.</p> |
| <p>3. Instrument Pilot</p> | <p>a. Aeronautical knowledge</p> <p>b. Flight proficiency</p> | <p>Must complete ground training on instrument flight conditions and procedures. Pass an aeronautical test composed of the following: FARs, air traffic control system, instrument procedures, instrument flight rules (IFR) navigation, instrument approach procedures, use of IFR charts, weather reports and for casts, recognition of critical weather situations, aeronautical decision making, and crew resource management.</p> <p>Minimum of 50 hours cross country as pilot in charge. Forty hours of actual or simulated flight time, 15 hours with an authorized instrument instructor. Pass a flight check administrated by the FAA or designated evaluator.</p> |

⁷ Each of the listed ratings requires the satisfactory completion of the previous rating. In other words, it is not permissible for an individual to receive a commercial certificate without first completing the requirements of the Private Pilot Certificate outlined in paragraph 1.

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| 4. Airline Transport Pilot (Minimum of 1,500 Hours) | a. Aeronautical knowledge | FARs, meteorology, knowledge of effects of weather, general weather and Notices to Airmen (NOTAM) use, interpretation of weather charts, maps and forecasts, operations in the national airspace system, wind sheer and micro burst awareness, air navigation, air traffic control procedures, instrument departure and approach procedures, enroute operations, airport operations, weight and balance, aircraft loading, aerodynamics, aircraft performance, human factors, aeronautical decision making, and crew resource management (CRM). Must pass an FAA test on these subjects. |
| | b. Flight proficiency | 1,500 hours total time. 500 hours cross country, 400 hours night time. Pass a flight check administrated by the FAA or designated evaluator on the maneuvers required by the FAA's ATP Practical Test Standards. |

Source: FAA

Once a pilot has been hired by an airline, he or she is required to undergo training provided by the airline that has been approved by the FAA, and must meet certain minimum requirements. An airline's training program is divided into several categories of training that are specific to the airline, and which may include initial training for new hires, initial training on equipment, transition training, upgrade training, recurrent training, and requalification training.

FAA regulations also provide different instructional minimum hour requirements for aircraft with different engine types. For example, pilots of piston engine aircraft are only required to have 64 hours of initial ground training, and those flying turbo-propeller powered aircraft must have 80 hours.

Airline Training Minimum Hour Requirements

| Training Type | Piston Engine | Turboprop | Turbojet |
|--|---------------|-----------|----------|
| Initial Ground Training | 64 | 80 | 120 |
| Pilot-In-Command Initial In-Flight Training & Practice | 10 | 15 | 20 |
| Recurrent Ground Training | 16 | 20 | 25 |

Source: DOT IG

While airline training programs must be approved by the carrier's FAA inspector, the Department of Transportation Inspector General (DOT IG) has noted that the lack of more specific requirements in the regulations may hinder an FAA inspector's ability to determine whether air carriers' established programs will ensure crewmembers are "adequately" trained. The DOT IG intends to analyze the degree of variance of air carrier training programs in upcoming work for the House Transportation and Infrastructure Committee.

With respect to the Colgan crash, the May NTSB hearing revealed that Captain Renslow obtained his private pilot license in June 1990, and his commercial pilot license 12 years later in June 2002. He was hired by Colgan in September 2005. He also held an ATP and ratings in both the Saab 340 and Bombardier Dash 8-Q400. He received his type rating in the Dash 8 in November 2008. Captain Renslow had a total flight time of 3,379 hours, with 1,030 as Pilot in Command and 110.7 in the Dash 8.⁸

⁸ NTSB, *supra* note 4, at 19.

In addition, the NTSB hearing also revealed that First Officer Shaw obtained her private pilot license in December 2003, and her commercial license in September 2005. She was hired by Colgan in January 2008. She received Second in Command privileges on the Dash 8 in March 2008. She reported 2,244 hours total pilot time, with 774 hours in the Dash 8.⁹

According to Colgan, when Captain Renslow was hired, the airline required a minimum flying time of 600 hours total and 100 hours multi-engine. Colgan witnesses testified last month that Colgan now requires a minimum of 1,000 hours total and 100 hours multi-engine to be hired.¹⁰

While both major and regional airlines must meet the same FAA minimum safety and flight hour requirements, it has been reported that major airlines generally require pilot applicants to have more flight time and experience than applicants for regional airlines. According to the Regional Airline Association (RAA), the average minimum hours required for hiring across the regional airline sector is 1,305. One media report suggests that, on average, major airlines require pilot applicants to have around 4,000 hours.¹¹ According to the Air Transport Association (ATA), ATA carriers require for a minimum of 1,000 to 1,500 hours total time, ATP, or Commercial/Instrument/Airplane Multi-engine rating. However, over the last few years, ATA notes that its members have actually been hiring pilots with about 4000 hours, which is far above their own minimum requirements.

B. Stall Recognition and Recovery (including stick shaker and stick pusher training)

FAA regulations require airline pilots to receive both academic ground training and hands-on flight training in the operation of stall warning systems, which includes a stick shaker. In addition, FAA regulations require pilots to receive hands-on flight training and to demonstrate proficiency in executing “approach to stall” (i.e., when the aircraft is on the verge of stalling) recovery procedures. According to Colgan, Captain Renslow and First Officer Shaw received both academic and flight simulator training on stick shaker operation and approach to stall recovery.

While FAA regulations require pilots to be trained in approach to stall recovery procedures, they do not require training to recover from a full aerodynamic stall. FAA officials maintain that training “approach to stall” recovery procedures teaches pilots to react to an impending stall before the aircraft enters a full stall; in other words, training a pilot to react to a potentially hazardous situation before it becomes more hazardous. However, some airline pilots groups have stated that limiting pilot training to “approach to stall” could leave a pilot with nothing to fall back on (no redundancy) in the event that approach to stall recovery attempts, for whatever reason, fail. For several years, the NTSB has advocated that stall recovery training be expanded to include recovery from a fully stalled condition.¹²

⁹ *Id.*

¹⁰ Mary Finnigan, Colgan Air, Inc., VP of Administration, NTSB, Public Hearing in the Matter of the Colgan Air, Inc. Flight 3407, Bombardier DHC8-400, N200WQ Clarence Center, New York, February 12, 2009 at 311 (May 13, 2009) (DCA-09-MA-027).

¹¹ Bill Anderson, *Regional Err-Lines – Big Company Logos Disguise Little Carriers*, N.Y. Post, May 18, 2009, at 10.

¹² Comment of Mark V. Rosenker, Acting Chairman of the NTSB, for the FAA Notice of Proposed Rulemaking (NPRM) titled, “Qualification, Service and Use of Crewmembers and Aircraft Dispatchers” (May 7, 2009) (Doc. ID FAA-2008-0677-0067.1).

In response to the NTSB, the FAA states that it will review the “Recognition of and Recovery from Approach to Stall” training requirement to include training where each pilot would, at least once, delay the recovery from the approach to stall warning until either the aerodynamic stall occurs, or when appropriate, until the “stick pusher” activates and releases.

There is currently no explicit FAA training requirement regarding the proper reaction to stick pusher activation. In 2007, the NTSB recommended that the FAA convene a multidisciplinary panel of operational, training, and human factors specialists to study and submit a report on methods to improve familiarity with, and response to, stick pusher systems and, if warranted, establish training requirements for stick pusher-equipped aircraft. According to Colgan, Captain Renslow and First Officer Shaw received academic stick pusher training, but not simulator training. Colgan states that stick pusher simulator training is not a standard practice in the airline industry. Since the Flight 3407 crash, Colgan has incorporated stick pusher familiarization in its simulator training.

C. The January FAA Crew Training NPRM and Upset Recognition and Recovery

On January 12, 2009, FAA issued an NPRM to overhaul specific crew training requirements.¹³ According to the FAA, the January 2009 NPRM is the first comprehensive upgrade of training requirements in the past 15 years. This proposal will establish new requirements for traditional air carrier training programs to ensure that safety-critical training is included. The rulemaking is part of the FAA’s efforts to reduce fatal accidents in which human error is a major contributing cause. Some of the training requirements proposed are to require: training and evaluating flight crewmembers in a complete flight crew environment; the use of flight simulation training devices (FSTD) for training, testing, and checking flight crewmembers; additional training and practice in the use of crew resource management (CRM)¹⁴ principles; training in an FSTD with a complete flight crew.

FAA’s regulations do not require specific training for recovery from upset conditions (i.e., when an airplane in flight unintentionally exceeds the parameters normally experienced in line operations or training).¹⁵ However, the FAA commissioned the development of an Airplane Upset Recovery Training Aid (Aid), which the FAA first published in 1998. This Aid was updated in August 2004, and again in October and November 2008. The Aid is a comprehensive document that includes definitions, characteristics, techniques, considerations, and exercises, all focused on academic understanding and practical simulation that provide individual pilots with the knowledge and tools necessary to recover should an upset situation occur.

In addition, the FAA’s January 2009 NPRM strengthens upset recovery training requirements by adding an “Upset Recognition and Recovery” section that sets out the awareness

¹³ Qualification, Service and Use of Crewmembers and Aircraft Dispatchers, 74 Fed. Reg. 1280 (proposed Jan. 12, 2009) (to be codified at 14 C.F.R. pts. 65, 119,121 et al.).

¹⁴ CRM focuses on improving communications between the pilots and crew, while taking into account human factors, hardware, and information. CRM also focuses on situation awareness, communication skills, teamwork, task allocation, and decision making within a comprehensive framework of standard operating procedures with the goal of preventing accidents and dealing with stressful situations by improving performance through enhanced coordination.

¹⁵ More specifically: (1) pitch attitude greater than 25 degree, nose up; (2) pitch attitude greater than 10 degree, nose down; (3) bank angle greater than 45 degree; and (4) within the prior parameters, but flying at airspeeds inappropriate for the conditions.

expected of each pilot and what actions each pilot will be expected to learn and be able to perform should an upset occur. This training would be required for each pilot completing initial, transition, conversion, upgrade training, and at each level of requalification training at an airline. Each pilot would be exposed to this training again on each recurrent training cycle.

D. FAA Disapprovals

Part of a pilot's training includes "check rides." A checkride is a portion of an aircraft pilot's certification examination, or an endorsement for additional flight privileges, where the candidate being examined flies an aircraft with a FAA Designated Pilot Examiner to demonstrate expertise in the skills that are required for the certification. At the end of the check ride, the pilot either passes or fails. Last month's NTSB hearings revealed that Captain Renslow had four FAA certificate disapprovals due to failed checkrides during his career. Three occurred before he was hired at Colgan, and included failed checkrides for his private pilot instrument, his commercial pilot and his commercial multi-engine certificates. At Colgan, when he was upgrading to captain on the Saab 340, and which included evaluation for obtaining his ATP certificate, Captain Renslow was initially disapproved.¹⁶

Although the FAA does not require it, Colgan's employment application requires applicants to disclose all checkride failures. According to Colgan, Captain Renslow disclosed only his instrument checkride failure, but not his commercial pilot or multi-engine failures. Colgan notes that Captain Renslow passed six checkrides in the sixteen months prior to February 12, 2009. First Officer Shaw failed her initial certified flight instructor checkride before joining Colgan.¹⁷ According to Colgan, she disclosed this information and did not fail any checkrides while at Colgan.

Under the Pilot Records Improvement Act of 1996 (PRIA) (P.L. 104-264), air carriers must obtain the last five years' performance and disciplinary records for a prospective pilot from their previous employer. These records include information regarding initial and recurrent training, qualifications, proficiency, or professional competence including comments and evaluations made by a check airman (i.e., a person qualified and permitted to conduct flight checks).

PRIA also requires carriers to obtain records for a pilot from the FAA. FAA records regarding pilot certification are protected by the Privacy Act of 1974. However, PRIA requires carriers to obtain a limited waiver from prospective pilots allowing for the release of information concerning their current airman certificate and associated type ratings and limitations, current airman medical certificates, including any limitations, and summaries of closed FAA legal enforcement actions resulting in a finding by the FAA Administrator of a violation that was not subsequently overturned.

Although PRIA does not require carriers to obtain a release from prospective pilots for the entirety of the pilot's airman certification file, including Notices of Disapproval for flight checks for certificates and ratings, FAA guidance suggests to potential employers that they may find this additional information helpful in evaluating the pilot. To obtain this additional information, a carrier must obtain a Privacy Act waiver from the pilot-applicant.

¹⁶ NTSB, *supra* note 4 at 19.

¹⁷*Id.* at 20.

Requirements of the Pilot Records Improvement Act of 1996

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| <p>Air carriers must obtain from the FAA, records concerning:</p> | <ul style="list-style-type: none"> ➤ Current airman certificates (including airman medical certificates) and associated type ratings, including any limitations to those certificates and ratings; and ➤ Summaries of legal enforcement actions resulting in a finding by the Administrator of a regulatory or statutory violation that was not subsequently overturned. |
| <p>Air carriers must obtain from any air carrier that has employed the individual as a pilot in the last five years, records on the applicant pertaining to:</p> | <ul style="list-style-type: none"> ➤ Compliance with applicable training and checking requirements; ➤ Drug and alcohol testing; ➤ The individual's performance as a pilot that are maintained by the air carrier concerning the training, qualifications, proficiency, or professional competence of the individual, including comments and evaluations made by a check airman; ➤ Any disciplinary action taken with respect to the individual that was not subsequently overturned; and ➤ Any release from employment or resignation, termination, or disqualification with respect to employment. |
| <p>Air Carriers must obtain from the National Driver Registry (from the chief driver licensing official of a State):</p> | <ul style="list-style-type: none"> ➤ Information concerning the motor vehicle driving record of the Individual. |

(Source: FAA)

In 2005, the NTSB recommended requiring airlines to obtain any Notices of Disapproval for checkrides for certificates and ratings for all pilot applicants, and evaluate this information before making a hiring decision. Some have suggested that the FAA maintain a centralized electronic database that enables airlines to view a pilot applicant's entire airman certification file, however doing so may require additional statutory authority.

In 2005, the NTSB also recommended that the FAA conduct a study to determine whether the number of checkrides a pilot can fail should be limited. The FAA states that it conducted a study in 2004 to determine if there is a correlation between flight test failures and the airman being cited in an FAA enforcement action. According to the FAA, a review of a total of 15,024 disapprovals against the FAA Enforcement Information System showed a very low correlation, less than one percent. According to the FAA, while any single case may have little significance, multiple cases may be an indicator of a lack of the required skills, knowledge, or compliance disposition to be a safe pilot.

According to the FAA, another concern that has been raised by training experts and FAA inspectors about establishing a hard limit on the number of test failures is that, as this limit is approached, examiners will be extremely reluctant to find an applicant unsatisfactory. This could result in applicants passing flight checks who otherwise would not, with net negative safety consequences.

E. Remedial Training Programs

As a result of a December 2003 Federal Express crash at Memphis involving a pilot that failed numerous proficiency checks, the NTSB recommended requiring all part 121 air carriers to establish programs for flight crewmembers who have demonstrated performance deficiencies or experienced failures in the training environment. These programs require a review of the

crewmembers performance history at the company and administer additional oversight and training to ensure that performance deficiencies are addressed and corrected.

In 2006, the FAA responded by issuing Safety Alert for Operators (SAFO) 06-015, which recommended that all part 121 carriers identify pilots with training deficiencies, such as multiple failed checkrides, and implement remedial monitoring and training programs.

Many air carriers have voluntarily incorporated remedial training modules to supplement their approved training programs. These modules have been developed through close collaboration between pilot groups and managers. They are carefully designed and implemented in ways that are mutually desirable, and have proven to be effective in addressing and correcting below-standard pilot performance. Colgan's FAA Principal Operations Inspector (POI) testified before NTSB in May that Colgan had made partial progress in this area.¹⁸

F. Flight Schools

There are different types of flight schools that offer pilot certification that fall under three separate FAA regulations: (1) part 61 schools,¹⁹ where flight instructors at the school must be FAA-certified and end-of-course evaluations are typically provided by FAA-designated examiners, the curriculum is usually based on a manufacturer's recommended curriculum, and the school itself is not FAA-certified; (2) part 141 pilot schools, which require the instructors, school and curriculum to be FAA-approved; and (3) part 142 training centers, which are typically part of a part 121 airline, are used to train the airline's employees; the curriculum, instructors and evaluators must be FAA-approved. A part 142 training center also offers additional training for pilots employed by the airline to prepare them to test for certificates and ratings.²⁰ A few examples different types of flight schools include:

- Offering commercial pilot certification in 120 days in a full-time program. A few airline pilot groups have criticized these schools as "pilot factories" and claim that students are instructed to the level of being able to pass a certification test. According to FAA, these programs are not the "norm" and it would be virtually impossible for someone to obtain a commercial certificate in 120 days with zero prior experience.
- Universities and colleges, offering associate, bachelors, masters, and even doctoral degrees in a variety of aviation subjects. A four-year bachelors degree program offers both flight training and a great amount of academic coursework in aeronautical science, in subjects such as engine function and design, aerodynamics, meteorology, and CRM. Many believe that these programs produce a better-rounded pilot that develops strong decision-making and leadership skills, in addition to "stick and rudder" skills. A four-year degree program costs

¹⁸Douglas Lundgren, FAA, POI for Colgan Air, Inc., NTSB, Public Hearing in the Matter of the Colgan Air, Inc. Flight 3407, Bombardier DHIC8-400, N200WQ Clarence Center, New York, February 12, 2009 at 481 (May 13, 2009) (DCA-09-MA-027).

¹⁹ Entities that hold a part 61 certificate can range from a single flight instructor with a single aircraft to a large, multi-aircraft, with multi-instructor operation. FAA does not keep a record of part 61 flight schools. Most student pilots begin training at a part 61 flight school since it is less expensive.

²⁰ Part 142 training centers are required to incorporate advanced training devices and simulators in their training programs; this is not a regulatory requirement for part 141 flight schools, however, many do use these devices.

upwards of \$35,000 per year. According to the FAA, the graduates of these universities and colleges finish with about 210 flight hours.²¹

- Another model is that of Gulfstream Airlines and its Training Academy. Under this program, a pilot must enroll already certified with private, instrument, commercial, and multiengine ratings. The course offers advanced training, the opportunity to build the pilot's flight hours, and the possibility of becoming a first officer with Gulfstream Airlines. The cost of this program is about \$30,000 and the pilot is paid an hourly rate (about \$8 an hour) to fly 250 hours with the airline.²²

European flight training programs offer a different model than U.S. flight schools. The European model provides more robust academic instruction and written examination during flight training and certification. Pilots in the United States typically start their training on small, single-engine airplanes in visual conditions, and then progress to instrument training and multi-engine airplanes before being hired by an airline. Many European airlines and some Asian countries use a model called "ab initio training" (i.e., starting from the beginning). Under this model, a potential pilot applies to the airline with no previous flying experience or training. The applicant undergoes a series of mental and psychological testing, and if they pass they are hired and "apprenticed" by that airline. The training may be completed by the airline itself or at a number of ab initio training schools in the United States, Europe and Asia. The trainee pilot is trained for only one type and model of aircraft.

II. Fatigue

Under current FAA rules, pilots and airlines are responsible for ensuring that pilot flight time limitations are not exceeded. FAA regulations impose an eight-hour limit for a pilot flight time during a 24-hour period, provided the pilot has had at least eight continuous hours of rest during the 24-hour period. If a pilot's actual rest is less than nine hours in the 24-hour period, the next rest period must be lengthened to provide for the appropriate compensatory rest. Pilots must be relieved of duty for at least 24 consecutive hours during any seven consecutive days. The rules do not address the amount of time pilots can be on duty (standby time) or flight time that results from operational delays.²³

- Pilots flying domestic 14 C.F.R. part 121²⁴ operations may fly up to 30 hours in any seven consecutive days (actual flight time), 100 hours per calendar month (actual flight time), and 1,000 hours per calendar year (actual flight time).

²¹ Embry-Riddle Aeronautical University, a four-year institution, reports that of its 2006 graduates, 90 percent went onto employment and, of that, 41 percent worked as a commercial pilot for an airline one year following graduation. The University reports that the majority of its Aeronautical Science students that go into airline employment as a pilot begin at a regional airline.

²² Lance Wallace, *Gulfstream Training Academy Provides Alternative*, *Flying Magazine* (April 2009).

²³ Airline rules may be stricter than FAA regulations if the issue is part of a collective bargaining agreement.

²⁴ 14 C.F.R. § 121 refers to aircraft having a passenger-seat configuration of more than 9 passenger seats (excluding crew) or having a payload capacity more than 7,500 pounds.

- Pilots flying domestic 14 C.F.R. part 135²⁵ operations may fly up to 34 hours in any seven consecutive days (actual flight time), 120 hours per calendar month (actual flight time), and 1,200 hours per calendar year (actual flight time).

The NTSB has long been concerned about operator fatigue, and placed it on its Most Wanted list in 1990. According to the NTSB, over the past 15 years, it has linked fatigue to more than 250 fatalities in aviation accidents. There are currently two open aviation recommendations concerning pilot fatigue. The NTSB has recommended that FAA revise current flight and duty limitations to take into consideration the latest research findings in fatigue and sleep issues, as well as length of duty day, starting time, workload, and other factors; and develop and use a methodology that will continually assess the effectiveness of fatigue management systems implemented by operators.

In 1995, the FAA proposed to amend existing regulations to establish new duty period and flight time limitations, and rest requirements for flight crewmembers in parts 121 and 135. This rulemaking was based on recommendations from an Aviation Rulemaking Committee (ARC). It included a 14-hour duty period, 10 hours of rest, increased flight time to 10 hours, and addressed other related issues. According to the FAA, the pilots commented that 10 hours of flight time was too long, and the operators believed 14 hours of duty time was too short. To date, the regulations have not been revised. However, in 2000, FAA issued an interpretation of the flight and rest rules for domestic operations, which clarified that a flight cannot be started if the pilot has not had a minimum of eight hours of rest in the 24 hours preceding the end of the flight.²⁶

In 2008, the FAA held a Symposium on Aviation Fatigue Management to discuss the latest in fatigue science and management. Dr. John A. Caldwell, a fatigue management consultant for the U.S. Air Force and Army, reported that his research found that 80 percent of regional pilots surveyed said that they had nodded off during a flight, and that scheduling factors such as multiple take-offs and landings every day were top contributors to operational fatigue.²⁷ The FAA is currently looking to incorporate information on fatigue from the Symposium into an Advisory Circular.

Concerns have been raised regarding pilot fatigue leading up to the Flight 3407 accident. According to the NTSB, Captain Renslow flew to EWR on February 9th from his home in Lutz, Florida. He began a two-day trip the next morning and First Officer Shaw commuted overnight via two flights from her home near Seattle, Washington. At the time of the accident, Colgan had provided its pilots with fatigue policy information. According to Colgan, there were eleven standby pilots available at EWR to fly if either pilot was fatigued. The FAA POI for Colgan was aware of

²⁵ 14 C.F.R. § 135 refers to aircraft having a passenger-seat configuration of up to 9 passenger seats (excluding crew) or having a payload capacity of up to 7,500 pounds.

²⁶ The FAA notes that it is also working with the International Civil Aviation Organization (ICAO) to develop a Fatigue Risk Management System (FRMS) to regulate flight and duty time. FRMS would provide an alternative to existing flight and duty limitations, and would move towards a risk based approach to improve flight crew alertness. FRMS would require the company to manage fatigue with input from all company personnel, including management, flight crewmembers, maintenance personnel, schedulers, and dispatchers.

²⁷ Dr. John A. Caldwell, *Effects of Fatigue on Operational Performance*, Archinoetics, LLC, presented at the FAA Fatigue Management Symposium: Partnerships for Solutions (June 17, 2008).

the company's fatigue policy, and was generally concerned about fatigue in similar regional airlines, but could not identify any specific concerns at Colgan.²⁸

An issue that has also been raised is commuting. Many pilots across the country commute to their base of operations to begin flying sometimes taking multiple legs to arrive in time for their flight. There are no FAA restrictions placed on pilots regarding the popular practice of commuting but pilots must meet schedule requirements of the flights they bid to fly. According to FAA, it is the responsibility of the pilot to report to work well-rested and to report fatigue.

With respect to Colgan, the Colgan EWR regional chief pilot said there were no restrictions placed on pilots regarding commuting, but pilots have to meet schedule requirements.²⁹ The company has a commuting policy in its Flight Crewmember Policy Handbook. The policy states that "a commuting pilot is expected to report for duty in a timely manner."³⁰ The policy protects pilots from disciplinary action if they are unable to report for duty due to unforeseen flight schedule disruptions up to two times in any 12 month period.³¹

III. Relationship between Legacy and Regional Air Carriers

Media sources speculate that legacy air carriers are shifting aircraft to international routes and relying on regional air carriers for more domestic flying.³² Regionals are operating in bigger markets, not just from small cities to larger hubs, and moving away from smaller aircraft with 50 or fewer seats. In the last few years, the legacy air carrier and regional air carrier relationship has shifted from a partnership to more of a client/vendor relationship.³³

According to RAA, approximately 90 percent of regional airline passengers travel on regional airline flights that are scheduled, processed, marketed, ticketed, and handled by the mainline airline partner through marketing partnerships called code-sharing. Under this scenario, the mainline airline partner enters into a contract of carriage with the passenger for a flight operated by a code-sharing regional partner. There are two basic types of compensation for such service. The first, prevalent among larger regional airlines, occurs when a mainline and regional airline enter into a "fee for departure" or "capacity buy" agreement, where the mainline receives 100 percent of the revenue from flights and compensates the regional airline according to a predetermined rate for flying a specific schedule.

A second arrangement, common to smaller operators, occurs when mainline airlines pay regional airlines a portion of passenger ticket revenue. This is referred to as "pro-rate" or "shared

²⁸ NTSB, Human Performance Group Chairman's Factual Report (April 23, 2009) at 32.

²⁹ *Id.*, at 26.

³⁰ Information is contained in chapter 1, "Human Resources Procedures," under a section titled "Commuting Policy" on pages 1-5 and 1-6. The revision current at the time of the accident was dated March 2008.

³¹ According to NTSB's investigation, 93 of the 137 Colgan pilots based at Newark, then commuted from other areas of the country due in part to the high cost of living in the area.

³² Andrew Compart, *Regionals Reconsidered: U.S. Providers Change Course, While Trying to Keep the Fundamentals Intact*, Aviation Week & Space Technology, May 18, 2009, at 47.

³³ *Id.*

revenue” flying. Both arrangements include operational standards as well as incentives rewarding excellent performance, but all of these agreements are unique to the individual contracts between regional and mainline air carrier contracts. Compensation rates and revenue shares are likewise unique to individual contracts and differ from partnership to partnership.

According to the Air Transport Association (ATA), codesharing arrangements are typically entered into to create new service, improve existing service, and increase efficiencies, which may benefit the participating airlines and passengers. ATA maintains that the airline performing the air transportation is the FAA certificate holder that is ultimately responsible for safety. In 1995, the FAA issued regulations that the same level of safety be used for all air carriers with 10 or more passenger seats and all turbojets operated in scheduled passenger service must operate under FAA’s part 121 regulations.

With respect to Colgan,³⁴ it operates under two types of agreements with its partners: “pro-rate” code share agreements that provide for a sharing of passenger fares between Colgan and the major carrier, and capacity purchase agreements whereby the major carrier contracts with Colgan to operate in certain markets within the major carrier’s network for a fixed fee. The pro-rate code share agreements are essentially joint marketing agreements whereby the major carrier allows Colgan to operate in certain markets under the major carrier’s brand. Colgan, in turn, operates in smaller markets that cannot be economically served by a major carrier with larger aircraft, and provides a connection for local passengers into the major carrier’s network. Colgan retains the fares of all of the local passengers in these small markets, and Colgan and the major carrier “pro-rate” the revenue for all passengers that connect between Colgan’s operations and that of the major carrier. Passenger tickets for all of Colgan’s flights are sold through its major partner’s ticketing and distribution systems. Colgan receives its share of revenue from its partners at least once a month through the Airline Clearing House, although some of its partners provide estimated advance payments throughout the month. Colgan is responsible for all of its operating costs and all aspects of its operation under these pro-rate code share agreements.³⁵

Colgan operates the Q400 aircraft as a Continental Connection carrier under a capacity purchase agreement with Continental Airlines. Under this operating contract, Colgan is responsible for acquiring and financing the Q400 aircraft and operating the aircraft within the Continental network at the direction of Continental Airlines. Continental selects the markets and provides an operating schedule to Colgan Air. Colgan is responsible for hiring and training all flight crews, for maintaining the aircraft, and for operating the schedule provided by Continental. Continental Airlines markets the flights under its brand name and retains all passenger revenue. Continental pays Colgan contractual amounts based on the level of activity that Colgan completes (i.e., number of departures, number of hours operated each day, number of aircraft covered under the agreement). Colgan receives weekly estimated payments from Continental, and the two parties reconcile to the actual amounts due under the contract once per month. Continental also provides fuel to Colgan at no expense under the capacity purchase agreement and reimburses Colgan for certain market-based expenses such as landing fees and airport facility charges.

³⁴ Colgan Airline provided the information in this section regarding its agreements with mainline carriers as a case study of such agreements.

³⁵ Colgan has pro-rate code share agreements with Continental Airlines in Houston, United Airlines at Washington, D.C.’s Dulles International Airport, and US Airways in the Northeastern United States.

All of Colgan's agreements provide extensive rights to its partners to inspect and review all aspects of Colgan's operations to ensure that they meet the major carrier's standards for safety and operating performance. Colgan regularly communicates with its partners to discuss its operating performance, safety programs and initiatives, the performance characteristics and maintenance requirements of Colgan's aircraft, and other business aspects of the relationship. Colgan's operating agreements with its partners also require Colgan to comply with all federal aviation regulations and operating requirements promulgated by the FAA, the DOT, and any other regulatory authority in the United States.

In addition, Colgan completes (and in some instances, is required to complete) operational safety audits conducted by third parties and reports the results of all such audits to its partners. For instance, upon agreement with Continental Airlines to operate the Q400 aircraft, Colgan underwent an extensive operational safety audit by the International Air Transport Association. This is a bi-annual audit conducted by the largest airline industry organization in the world. This operational safety audit must be completed by all IATA members, which include all major airlines in the United States. Colgan successfully completed its audit last year and is on registry with IATA until its next review.

IV. Airline Pilot Pay and Workforce Issues

Pilots are paid at an hourly rate, which varies among airlines, and is based upon the size and type of aircraft, whether the pilot is captain or first officer, and seniority. On average, pilots at regional airlines are paid at lower rates than pilots at major airlines. At Colgan, Captain Renslow, 47, made about \$65,500 per year and First Officer Shaw, 24, made \$23,900 per year.³⁶ It is reported that pilots working for major carriers flying large jets earn, on average, about \$125,000 per year;³⁷ whereas Colgan Air states that its captains and first officers earn about \$67,000 and \$24,000 respectively, to fly the Bombardier Dash 8-Q400,³⁸ a narrow body turboprop. According to the RAA, salaries per year for a captain range from \$70,000-\$82,000 and the first officer salary range from \$26,000-\$39,000 per year based on an informal survey of 14 regional airlines. Under FAA regulations, pilots may not fly as a crewmember for more than 1,000 hours in a year.³⁹

Many pilots with fewer flight hours (i.e., closer to FAA minimum requirements) begin their careers as flight instructors, or at a regional airline or cargo airline to build their flight hours so that they can accumulate enough to apply for a job at a major carrier.

Pilot groups have expressed concern that pay and benefits have declined over years based on concessions made to keep airlines afloat during difficult economic circumstances. Over the years, airlines and their employees have been adversely affected by economic stresses, including bankruptcies, mergers and acquisitions, high oil prices, acts of terrorism, deteriorating

³⁶ Initial reports of the pilots' pay were based on a statement by Mary Finnigan, VP of Administration for Colgan Air at the NTSB hearing on May 13, 2009. Colgan has subsequently said that those numbers were incorrect and it provided corrected information for the NTSB hearing record, which reflects the numbers cited above.

³⁷ Sholnn Freeman, *Panel on Fatal Crash Looks at Pilots' Pay, Commutes*, Wash. Post, May 14, 2009, at A02.

³⁸ Q400 pilots at Colgan Air receive per diem amounts averaging approximately \$3,000 annually to compensate them for additional expenses when they are traveling.

³⁹ 14 C.F.R. § 121.481-121.485 (2008).

management/labor negotiations, and furloughs. Pilot groups have raised concern that this combination of factors will hinder the industry from attracting the “best and brightest” professionals.⁴⁰ Since airline deregulation in 1978, more than 20 airlines have filed for Chapter 11 bankruptcy protection.⁴¹ According to ALPA, 3,800 ALPA pilots are currently on furlough with an additional 1,000 to 1,500 anticipated by the first quarter of 2010.⁴² Airline traffic is expected to rebound with the overall economy, so it is likely that demand for airline pilots will also increase in the future.

V. Other Issues

One issue that has been raised is the discussion that took place between the pilots prior to the Colgan crash. Commonly known as the “sterile cockpit rule,” FAA regulations require flight crewmembers to refrain from nonessential activities during critical phases of flight,⁴³ all ground operations involving taxi, takeoff, and landing, and all other flight operations below 10,000 feet except cruise flight.

According to the NTSB, Colgan’s sterile cockpit procedures are covered during ground school indoctrination training. However, investigators reviewed the slides presented during this training and could not find any that specifically referenced sterile cockpit.⁴⁴ The cockpit voice recorder (CVR) transcript of the last minutes of the Colgan flight documents non-essential conversation between the accident flight crew when sterile cockpit procedures should have been in effect. For example, there was a three minute discussion on the crew’s experience in icing conditions and training; this conversation occurred just a few minutes before the stick shaker activated and while the crew was executing the approach checklist.⁴⁵

In 2007, NTSB recommended that FAA work with pilot associations to develop a specific program of education for air carrier pilots that addresses professional standards and their role in ensuring safety of flight, including associated guidance information and references to recent accidents involving pilots acting unprofessionally or not following standard operating procedures.

In response to this recommendation, the FAA notes that CRM training is currently required by FAA for all pilots. Enhancing crew performance is the objective of CRM, and professional standards and their role in ensuring safety of flight is central in the CRM training message. Recent accidents and failures to follow standard operating procedures are two of the most persistent sources of content in CRM training practiced today. Additional training and practice in the use of CRM principles is a component of the FAA’s January 2009 NPRM.

⁴⁰ See *US Airways Flight 1549 Accident: Hearing Before the Subcomm. on Aviation*, 111th Cong. (2009) (Statements of Captain Chesley B. Sullenberger, III and First Officer Jeffrey Skiles).

⁴¹ Sam Wilson, *US airlines hit turbulence – again*, MoneyWeek, <http://www.moneyweek.com/investment-advice/us-airlines-hit-turbulence---again.aspx>

⁴² ALPA reports that their pilots are predominately furloughed from carriers like UAL, NWA, AAL, American Eagle, and cargo carriers Atlas, DHL, Airborne. This does not include pilots on military leave, pilots of airlines that are not members of ALPA (e.g., US Airways), or the airlines that have recently ceased operations, such as ATA and Aloha. ALPA estimates that if those numbers were added, there are approximately an additional 2,800 unemployed pilots.

⁴³ 14 C.F.R. § 121.542 (2008).

⁴⁴ NTSB, *supra* note 4, at 22.

⁴⁵ *Id.* at 23.

WITNESSES

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