

Docket No. SA-533

Exhibit No. 14-A

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

HUMAN PERFORMANCE SPECIALIST'S FACTUAL REPORT

(8 Pages)

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

September 8, 2009

Specialist's Factual Report

HUMAN PERFORMANCE

CEN09MA142

A. ACCIDENT

Operator: Empire Airlines, d.b.a. FedEx
Location: Lubbock, Texas
Date: January 27, 2009
Time: 0437 central standard time
Aircraft: ATR-42-320, N902FX

B. HUMAN PERFORMANCE SPECIALIST

Katherine Wilson
Human Performance Investigator
National Transportation Safety Board

C. SUMMARY

On January 27, 2008, at approximately 0437 central standard time (CST)¹, N902FX, an Aerospatiale Alenia ATR-42-320, operating as Empire Airlines flight 8284, sustained substantial damage when it collided with terrain short of the runway while executing the Instrument Landing System (ILS) RWY 17R approach at Lubbock Preston Smith International Airport (LBB), Lubbock, Texas. The airplane was registered to Federal Express Corporation, Memphis, Tennessee, and was operated by Empire Airlines, Hayden, Idaho. The airline transport pilot rated captain was seriously injured and the commercial rated first officer sustained minor injuries. An instrument flight rules flight plan was filed for the flight that departed Fort Worth Alliance Airport (AFW), Fort Worth, Texas, at approximately 0319 CST. Instrument meteorological conditions (IMC) prevailed for the supplemental cargo flight operated under 14 Code of Federal Regulations (CFR) Part 121.

¹ All times are central standard time unless otherwise stated.

D. DETAILS OF THE INVESTIGATION

The Human Performance Specialist joined the accident investigation on June 18, 2009 in support of the Operations Group, and participated in the following activities:

- a. interviews with five flight crew members who had flown with the accident crew (July 14, 16, 23 and 27, 2009);
- b. interviews at Empire Airlines Headquarters in Coeur d'Alene, Idaho, of the accident flight crew and Empire Airlines Director of Safety and Compliance (August 11-12, 2009);
- c. interviews at Flight Safety International in Houston, Texas, of six ATR ground and simulator instructors and the ATR Program Manager (August 19-20, 2009).

This report summarizes evidence obtained from these interviews and related documents.

E. FACTUAL INFORMATION

1.0 Flight Crew Information

1.1 The Captain

The captain lived in Portland, Oregon. He was hired by Empire Airlines in 1988. He had more than 13,000 flight hours in various aircraft including the BE-18, Cessna Caravan, F-27, and the ATR. He stated he had about 1,500 hours as pilot in command (PIC) on the ATR, over 6,000 hours as PIC in the Caravan, and about 600 hours as a first officer in the F-27. The captain had extensive experience flying in icing conditions in the Pacific Northwest and Alaska, and had encountered moderate to severe icing previously.

Interviews with flight crew members who had previously flown with the captain stated that his greatest strength as a pilot was his experience level.² One pilot indicated that the captain occasionally cut corners, seemed rushed and was less thorough on briefings than other captains. He also said the captain became easily agitated when both flying and driving.

The captain received initial and recurrent training at Flight Safety International (FSI) in Houston, Texas, and indoctrination training at Empire Airlines. Initial training at FSI included two days of crew resource management (CRM) training.

The captain said he was “big into napping” and when he was scheduled for night trips, he would swing the clock around 12 hours to prepare for the trip.³ He needed about 6-8 hours of sleep when he was not working to feel rested and his sleep schedule depended on where he was at that time. He considered himself more of a late night person although he said it also depended on what activities he was involved in.

² See Attachment 1 – Empire Airlines Personnel Interviews

³ See Operations Group Attachments 5 and 6 – Interview Summaries of Captain Rodney Holberton and Interview Summaries of First Officer Heather Cornell, respectively

In the year prior to the accident, he did not have any major changes to his health, good or bad. He did have a negative change to his household financial situation in the year prior to the accident but did not think that it affected his performance on the day of the accident. With respect to changes in his personal life, during the year prior to the accident, his wife became ill, however, he was not certain of the exact time of year that this occurred. His pet also died about a year before the accident.

The captain characterized his health as “excellent” at the time of the accident. His most recent FAA medical certificate prior to the accident, dated September 19, 2008, included a limitation that he “possess glasses for near/intermediate vision”. He was wearing reading glasses at the time of the accident. He did not smoke or use illicit drugs. He also stated he had some high and low frequency hearing loss but he did not wear a hearing aid. He stated he received a Class I medical since the accident, on March 11, 2009, at which time he received a spoken word hearing test by the AME. He never saw an independent physician for his hearing loss.

He was not taking any prescription medications at the time of the accident and he did not take any non-prescription medications in the 72 hours prior to the accident that might have affected his performance. He recalled having 1-2 beers the night before (Sunday) the accident.

In his interview, the captain stated that his workload on the day of the accident was normal overall, but during the approach it was high. He said takeoffs and landings were high workload situations, and the icing conditions and flap anomaly elevated it.

The captain was current and qualified under Empire Airlines and FAA requirements.

On the morning of January 27, 2009, the captain participated in a Breathalyzer test and provided a urine specimen for company drug testing. Empire Airlines reported that these tests yielded no evidence of alcohol or drug use.⁴

1.1.1 The Captain’s Activities Before the Accident

On Saturday, January 24, 2009, the captain awoke about 0600 PST. He departed on Southwest Airlines flight 2535 for Midland, Texas (MAF), via Las Vegas, Nevada, about 0815 PST and arrived at MAF about 1535 CST⁵. He ate dinner in his hotel room and went to bed about 2300.

On Sunday, January 25, 2009, the captain awoke about 0800. During the day, he ate breakfast, went to the hotel gym, read the newspaper, called a friend, did some light shopping and had dinner with the first officer at a co-worker’s house about 1730. He arrived back at the hotel about 2130 and went to bed about 2200.

On Monday, January 26, 2009, the captain awoke about 0400 and watched TV, ate a small snack and read a book. He ate breakfast about 0600, worked out at the hotel gym and sat in the spa. He took a nap about 1100 and awoke about 1630. He ate and got ready for work. He arrived at the airport about 1845 for the accident trip and began his flight crew duties. The captain said he felt rested on

⁴ Empire Airlines tested for the following drugs: marijuana, cocaine, amphetamines, opiates, and phencyclidine.

⁵ All times herein after are central standard time.

the evening of the accident flight. Due to poor weather at LBB, the flight was re-dispatched to El Paso International Airport (ELP). The flight crew departed MAF for ELP about 1945 and landed about 2115. The airplane was unloaded and the flight crew flew empty from ELP to AFW. The flight crew departed ELP for AFW about 2230.

On Tuesday, January 27, 2009, the flight arrived at AFW about 0030. The captain closed out the flight with dispatch, ate 'lunch' and watched TV. At 0230, he arrived back at the aircraft and resumed his flight crew duties. The flight crew departed AFW for LBB about 0313. The accident occurred about 0437.

1.2 The First Officer

The first officer was based in Salt Lake City, Utah, referred to as a "floater" base. She was hired by Empire Airlines in 2008 as a first officer on the ATR. She had about 2,000 hours total flight time, about 100 of which were in the ATR.

Interviews with flight crew members who had previously flown with the first officer stated that her flying skills "at par" or "average" with other first officers at her same level, and another said her greatest strength as a pilot was that she was "non-confrontational". In areas that she could improve upon, crewmembers stated "she could employ the skills she already knew without asking so many questions" and another said "more hands on flying of the airplane".

Regarding the first officer's CRM skills, one captain who flew with the first officer stated that she did not seem to have a problem with standing up for something in the cockpit and another said they were "good". It was also stated that the first officer was methodical about using checklists.

The first officer stated in her interview that she had only experienced icing conditions a few times during cruise altitudes, but it had not been moderate to severe.

The first officer received indoctrination training at Empire Airlines in July 2008, and initial training at Flight Safety International (FSI) in Houston, Texas, in August 2008. Initial training at FSI included two days of crew resource management (CRM) training.

Due to a trip pairing during the week before the accident, in which the first officer flew during the night, she shifted her sleep schedule to sleep during the day and be awake during the night. She maintained this sleep pattern though the accident trip pairing. When not working, her normal sleep schedule was to go to bed around 2200-2300 and wake about 0800-0900, give or take a few hours on each end. She said she needed about 7 hours of sleep per night, when not working, to feel rested. She considered herself an evening person.

The first officer had not experienced any major changes to her health, financial situation or personal life, good or bad, in the year prior to the accident. She characterized her health at the time of the accident as "healthy". She did not have any visual or hearing problems, and no limitations were listed on her most recent FAA medical prior to the accident, dated December 4, 2008. She was not on any prescription medications at the time of the accident and had not taken

any non-prescription medications in the 72 hours prior to the accident flight that may have affected her performance. She last drank an alcoholic beverage about 2 weeks before the accident flight and did not smoke or use illicit drugs.

The first officer said the workload on the day of the accident was pretty normal and she saw the workload on the flight change from normal to high about the time they realized the flaps did not come down. She said the workload on approach was high but it was something that she felt that they could handle.

The first officer was current and qualified under Empire Airlines and FAA requirements.

On the morning of January 27, 2009, the first officer also participated in a Breathalyzer test and provided a urine specimen for company drug testing. Empire Airlines reported that these tests yielded no evidence of alcohol or drug use.

1.2.1 The First Officer's Activities Before the Accident

On Saturday, January 24, 2009, the first officer went to bed about 0600 and awoke about 1430. She picked up the captain at the airport about 1600 and worked out for about an hour at the hotel at about 1700. She went to the store about 1900 and stayed up the remainder of the evening.

On Sunday, January 25, 2009, the first officer went to bed about 0600. She awoke about 1400 and had dinner with the captain at a co-worker's house from about 1900 to 2200. She relaxed at the hotel for the remainder of the evening.

On Monday, January 26, 2009, the first officer went to bed about 0600 and awoke about 1500 and got ready for work. She indicated that she felt rested on the day of the accident flight. She arrived at the airport about 18:45 for the accident trip. Her schedule for the accident flight was the same as that of the captain. After the break at AFW, the first officer arrived back at the airplane about 0220.

2.0 Training/Performance on Issues Related to the Flight

Empire Airlines was authorized by FAA Operations Specifications paragraph A031, to conduct training, testing, and checking under agreement with the Flight Safety International (FSI) Learning Center in Houston, Texas. FSI was permitted to conduct ATR 42/72 initial, recurrent, upgrade and transition training for Empire Airlines crewmembers.

2.1 Flap Anomaly In-flight

Page 2.21 of the Quick Reference Handbook (QRH) stated the procedures for flight crews to follow in the event of a flap anomaly. Procedures were available for Flaps UNLK, Flaps Jam/Uncoupled/ASYM, and Reduced Flaps Landing.⁶

⁶ See Operations Group Attachment 25 - Excerpts from Empire ATR 42 Quick Reference Handbook (QRH)

About 90 seconds before impact, the captain indicated to the first officer that the airplane was experiencing a flap problem. After the comment was made, no further discussion occurs between crewmembers as to what actions should be taken and no reference was made to the QRH. According to ATR instructors at FSI, crewmembers were trained to reference the QRH if a flap problem occurred during flight. The captain confirmed this and stated he was trained to determine what the anomaly was and handle it via the checklist.

In an interview with the captain, he stated he would have referenced the QRH if he had known what the malfunction was. In addition, he stated the flap handle was at 15 and the indicator read zero.

The first officer stated if she was faced with the situation again and was PIC, she would have gone around because they had no flaps and they had to figure out their landing speeds and distances, and get themselves readjusted.

2.2 Reset of Circuit Breakers In-flight

According to the General Operations Manual, Chapter 6 “General Procedures”, Section “Circuit Breakers Resetting”, page 6-4: “Tripped circuit breakers should not be reset in flight unless, in the judgment of the PIC, it is necessary for the safe completion of the flight.”

The captain stated that he repositioned the flap handle several times and checked the circuit breakers with a flashlight when they were descending on the approach. He said he was prompted to take the flashlight and look at the circuit breakers because the flap handle was at 15 and the indicator was at zero. He said “he had to start somewhere”. According to ATR instructors at FSI, they did not train crewmembers to troubleshoot a problem via the circuit breakers nor had they observed a crewmember troubleshoot with the circuit breakers.

2.3 Stabilized Approach Criteria

According to the Empire Airlines ATR 42 Pilot Handbook,⁷ stabilized approach criteria were:

- A. Approaches will be stabilized by 1000’ height above touchdown (HAT) in IMC and by 500’ HAT in VMC. An approach is considered stabilized when all of the following criteria are met:
 - (1) The aircraft is on the correct track (correct track is one for which the correct localizer, radial, or other track guidance has been set, tuned, and identified, and is being followed by the flight crew);
 - (2) Only small changes in heading and pitch are required to maintain the correct track;
 - (a) Bank angle – not more than 30°
 - (b) Rate of descent \pm 300 fpm deviation from target.
 - (3) The aircraft speed is not more than $V_{APP} + 20$ knots and not less than V_{APP} ;
 - (4) The aircraft is in the proper approach configuration;

⁷ Empire Airlines ATR 42 Pilot Handbook, Chapter 2.02 “Procedures and Techniques”, Sub Section 10 “Flight Profiles & Briefings”, page 6

- (5) Sink rate is maximum 1000 FPM. If an approach requires a sink rate greater than 1000 FPM, a special briefing should be performed;
- (6) Power setting appropriate for configuration, and
- (7) All briefings and checklists have been performed.

According to the CVR and interviews with the accident crew, the stick shaker activated twice on approach while the first officer was at the controls and once while the captain was at the controls prior to a call out being made for maximum power. Although not specifically stated in the stabilized approach criteria, interviews with the accident crew and FSI ATR instructors indicated that stick shaker activation would meet the criteria for an unstable approach. Specifically, the first officer indicated that stick shaker activation “would be a go around situation”. An ATR instructor at FSI stated the procedure for a stick shaker on approach was “max power, flaps 15, and go around”. He said a stick shaker was not normal on any approach and he would go missed and find out why he got the shaker. The captain stated that he was trained to go around if a problem occurred on approach.

2.4 Crew Resource Management

2.4.1 Training

Crew resource management (CRM) is the effective use of all available resources, people, information and equipment, to achieve safe and efficient flight operations.⁸ CRM involves crewmembers incorporating and synchronizing the tasks required of them in a correct and timely manner,⁹ and communicating and coordinating effectively.

CRM training was provided to all Empire Airlines crewmembers during initial training at FSI and consisted of 2 days (16 hours) in the classroom. Training included PowerPoint lectures, review of case studies, and breakout/team building sessions with crewmembers. According to Empire Airlines Flight Training Manual, the CRM concepts to be covered were situational awareness and the error chain, stress, communications, synergy and crew concept, workload management, decision-making, and advanced/automated cockpit. The ATR Program Manager at FSI said Empire Airlines’ CRM training program did not include any role playing exercises in which crewmembers could practice their CRM skills prior to the simulator. CRM topics covered in the PowerPoint presentations included command and leadership, situational awareness, communication, decision making, error management, teamwork and synergy, fatigue, risk assessment, and automation management.

The Empire Airlines Flight Training Manual stated, “Applied CRM is monitored/practiced in each System Integration/Flight Simulator/Aircraft Module”.¹⁰ A FSI instructor acknowledged that CRM was woven through all of the training because the ATR was a two pilot airplane. Trainees were evaluated on CRM and one instructor said he would point out CRM issues in real-time if he felt strongly enough about it. Instructors had tools and techniques to teach CRM during the prebrief, in the simulator and during the debrief.

⁸ Lauber, J. (1984). Resource management in the cockpit. *Air Line Pilot*, 53, 20-23.

⁹ J.A. Cannon-Bowers, S.I. Tannenbaum, E. Salas, and C.E. Volpe, “Defining Team Competencies and Establishing Team Training Requirements,” in R. Guzzo, E. Salas, & Associates, eds., *Team Effectiveness and Decision Making in Organizations* (San Francisco: Jossey-Bass, 1995), pp. 333-380.

¹⁰ Empire Airlines Flight Training Manual, chapter 8 “ATR Ground Training”, page 8-1-6.

CRM was also reviewed during recurrent training within the “Crew Duties and Responsibilities” module¹¹ and “Flight Module 1”.¹² In an interview with the captain, he did not recall receiving CRM training during recurrent training.

Most instructors indicated if they could change anything about the Empire Airlines training program, it would be to add more time for training. One instructor said it was a lot of material to cover during the 2 days.

FSI instructors learned CRM as a part of their training, they observed other instructors, and practiced instructing before being considered qualified to instruct. According to the ATR Program Manager at FSI, instructors attended CRM training on an annual basis.

2.4.2 Performance

The first officer described the captain as someone she felt comfortable speaking up to and stated at the beginning of their trip in MAF, he told her to tell him if she saw him do anything wrong. She also said that the captain asked her opinion about things and tried to get her input.

Captains who flew with the first officer stated that her CRM skills were good, and although she was quiet, one captain believed she would speak up if necessary.

Following activation of the stick shaker below 1000’ on approach, the first officer asked the captain if she should go around, to which he responded no. In an interview, the first officer stated she asked if she should go around because they got a stick shaker and that the policy following stick shaker was to perform a go around. She said it was her way of saying she wanted to perform a go around “without stepping on toes”. The first officer did not challenge the captain’s decision. She felt that he had good reason for not wanting to go around and she trusted that he was making the right decisions. She also indicated that after the captain took the controls, she should have suggested again that they go around but did not know why she did not.

Submitted by:

Katherine Wilson
Human Performance Investigator
September 8, 2009

¹¹ Empire Airlines Flight Training Manual, chapter 11 “Aircrew Recurrent Ground Training, page 11-3-3.

¹² Empire Airlines Flight Training Manual, chapter 13 “Aircrew Recurrent Flight”, page 13-3-1.