Survival Factors Investigations

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Overview

• Who we are
• Platinum Jet - Teterboro, NJ 2/2/05
• Inflight fires – Accidents & recommendations
• USAirways flight 1549 1/15/09
• An independent Federal agency charged by Congress with investigating transportation accidents in the United States
• Conducts investigations
• Determines “probable” cause
• Publishes accident/incident reports
• Conducts special studies
• Issues safety recommendations
The NTSB Does Not:

- Create regulations
- Enforce regulations
- Conduct surveillance
Survival Factors and Human Performance Division (AS-60)

- 4 SF investigators and 3 HP investigators
- Mainly focus on air carrier accidents/incidents
  - Also support regional investigators
Platinum Jet – Teterboro, NJ

- On-demand charter flight
- Teterboro to Chicago/Midway
- Rejected takeoff from runway 6 at 160 knots
- Departed runway at 110 knots
- Crossed road, impacted cars and brick building
- 4 serious injuries (flight crew, two vehicle occupants)
- 10 minor injuries (cabin aide, eight passengers, one building occupant)
Takeoff

• Loaded fuel and passengers
• Normal acceleration
• Video and witnesses indicated no rotation
• Rejected takeoff about 160 knots
• Pilot reported “no lift” “she wouldn’t rotate” but later said column “stuck”
Evacuation

• Immediate post-crash fire, but fire did not enter cabin
• Both pilots trapped in seats
• Cabin aide attempted to open main cabin door, but failed
  • Passengers rotated handle and kicked door open, some reported cabin aide evacuated before them
• Captain eventually freed first officer and himself
  • Evacuated through main cabin door
Pre-flight Activities

- Passengers reported either receiving no safety briefing or a short briefing from captain
- Cabin aide served beverages in glasses and china cups
  - Were not collected prior to takeoff, caused at least one injury
- 4 of 8 passengers fastened seatbelts prior to takeoff roll
- 2 fastened seatbelts during takeoff roll
- 2 passengers seated on divan attempted to, but could not locate seatbelts
  - Both sustained minor injuries when thrown to the floor during impacts
Cabin Aides

- Primarily served as customer service representative
- FAA-qualified flight attendant not required due to seating capacity
- No FAA safety training requirements for cabin aides
FAA-Qualified Flight Attendants

- Must receive annual recurrent training:
  - Crewmember assignments, functions, and responsibilities
  - Passenger briefings
  - Location and operation of emergency equipment
  - Location and operation of all exits
- Platinum Jet did provide some safety training
Safety Board Concerns

• Part 135 operators may delegate safety functions to cabin aides who are not properly trained
• Passengers may believe a cabin aide has received safety training equivalent to a Part 121 flight attendant
• Part 135 operators may routinely “hide” seatbelts to present a tidier cabin
STANDARD OPERATING GUIDE

CABIN AIDES

Prior to accepting aircraft, ensure aircraft is properly stocked and ready for service. No aircraft is to leave without the required stores onboard.

Uniforms:

1) Black/Dark business type suits
2) Button down, collar, undershirt
3) A colorful scarf
4) When wearing skirts. Must be at least 2 inches above the knee or longer. Stockings must be worn if skirts are worn.
5) Black shoes/boots (no additional color)
6) Stockings must be either black or skin color
7) Wing is to worn on left breast jacket lapel

On arrival at Aircraft:

1) Aircraft is clean (check)
2) Lav is serviced (no odor)
3) Seatbelts, chairs, tables are set up for passengers arrival
4) Aircraft is properly stocked- beverages/alcohol/snacks/linens/pillows and cases/ clean blankets/head sets/tissue/single ply toilet paper/ Turn on Airshow and music.
5) Coffee and hot water onboard
6) Ice is onboard
7) *Fresh milk/lemons/limes
8) Entrance to Aircraft is clean.

Cabin Aide 10,000 FT Rules:

Cabin aides must be seated in Jump seat below 10,000 FT, no speaking unless Aircraft related. PIC will advise when safe to move from the jump seat/ Cabin Aide must check with Flight crew before leaving jump seat after take off.
CABIN AIDE PROCEDURES

Please ensure the following procedures are met by the crew members (Pilots) (Remind them)

1) Seat Belts: Ensure each passenger is clear on the use of the seat belt and has it secured. Also remind them this is to be worn at all times not forgetting to observe the cabin signs. Ensure Briefed positions and headrest settings are followed including seat back positions.

2) Smoking: No smoking is permitted on company aircraft unless specifically authorized by a company management official.

3) Remember all tables and luggage must be stowed and secured prior to taxi and take off.

4) In the event oxygen masks are deployed ensure passengers put their mask on before an infant and also ensure the pin is pulled to start flow of oxygen.

5) Remember in the event of a forced landing the correct brace positions are followed. (See briefing card for each position)

6) After a forced landing if an emergency evacuation is required, first with the crew, if the crew is incapacitated follow instructions on the briefing cards. Look for the best exit, i.e. fire obstruction etc. then direct the passengers to the nearest, safest exit. At all times keep the passengers informed of what you want them to do. Keep head count at all times and lead the passengers away from the aircraft to a safe area. Call the company, as soon as possible.

7) Forced Landing over water (Crew Incapacitated): Ensure you assist each passenger with their life jacket prior to water landing, ask for assistance with the emergency window exit after aircraft comes to rest. The life raft under the couch is heavy, you may also require assistance with this. Remember to tie this to a “fastened” seat belt then push the raft out onto the wing. Inflate both the raft and the life jackets outside the aircraft. Put your and adult jackets on before infants are assisted.
When Main Door is Closed.

Please remember at all times there is to be no cell phone usage, no GPS receivers, no remote controlled cars/toys, no portable radios or CD players and no smoking in the lavatory.

Please remind pilots to always check flashlight batteries and also check your own cabin aide flash light.

If passengers become unruly or give you a difficult time with your duty, report this to the captain or use the air phone to call the company.

Remember you are a part of the crew and we expect you to be treated with the same respect.

Ensure a phone call is made to the office prior to each taxi out and after each landing; any difficulty encountered during the flight should be reported.

Management PJM
Safety Board Recommendations

• Require all Part 135 certificate holders to ensure seatbelts at all seat positions are visible and accessible before each flight.

• Require any cabin personnel on board Part 135 flights who could be perceived by passengers as a F/A receive basic FAA-approved safety training in at least:
  • Preflight briefings and safety checks
  • Emergency exit operation
  • Emergency equipment usage
In the Federal Aviation Administration's letter dated April 3, 2009, we notified the Board that we published Safety Alert for Operators (SAFO) 08010, Accomplishing safety-related functions in part 135 operations (previously provided). This SAFO stresses the importance of the following pilot flight crew operating procedures: 1) Clearly identifying to passengers those crewmembers who are safety-qualified and those who are not; and 2) Accomplishing all functions related to passenger safety when no safety-qualified flight attendant is onboard. In our letter dated June 22, 2010, we indicated that we revised the guidance on the use of non-flight attendant personnel in FAA Order 8900.1, Flight Standards Information Management System, volume 3, chapter 33, section 4, paragraph 3514. Use of Non-Flight Attendant Personnel in Aircraft Cabins (enclosed). Non-flight attendant personnel should not operate any equipment or systems for which specific training is required by part 135. If cabin personnel are designated by the certificate holder to provide required safety information, they are subject to the crewmember training and qualification requirements. This guidance also suggests that air carriers should consider distinguishing non-flight attendant personnel from flight attendant personnel.
In previous responses to the Board, we indicated that we would conduct rulemaking to address this safety recommendation. However, the Qualification, Service, and Use of Crewmembers and Aircraft Dispatchers Supplemental Notice of Proposed Rulemaking, mentioned in our June 22, 2010 response, solely addresses part 121 operators and therefore was an erroneous response to this safety recommendation, which addresses part 135 operators. Please accept our apologies. In recent rulemaking actions, we have encountered significant challenges in establishing a positive benefit-cost case. Additionally, H.R. 5900, the Airline Safety and Federal Aviation Administration Extension Act of 2010, has mandated a number of safety rulemaking initiatives which are absorbing a great part of our rulemaking resources. This has required the FAA to take a very strict risk-based approach to the rulemaking actions we can currently support. Therefore, the FAA does not intend to pursue rulemaking for part 135 operators as a response to this safety recommendation. I believe that the FAA has effectively addressed this safety recommendation with the issuance of SAFO 08010 and the revision to FAA Order 8900.I, and I consider our actions complete.
Transportation Crime Investigations

Special Agents Help Convict Illegal Luxury Air Charter Operators

Also:
- Jail for Highway Construction Contractor in $136 Million DBE Fraud
- Trucker Convicted of Logbook Fraud Following Traffic Death
- OIG Agents Shut Down Fraudulent Household Goods Mover
Investigations Involving Inflight Fires

- Delta Air Lines 2030, Covington, KY, September 17, 1999
- AirTran 913, Greensboro, NC, August 8, 1999
- American Airlines 1683, Dulles, VA, November 29, 2000
- AirTran 392, Richmond, VA, June 27, 2001
FAA Video #1
MD-88 with 113 passengers and 5 crew and 3 off-duty flight attendants onboard

Shortly after takeoff, flight attendants noticed a “lit match” smell and smoke in the forward cabin

Carry-on bag next to right sidewall vent was scorched

Flight attendant saw a flickering orange glow beneath the vent
• Lead flight attendant went to cockpit to inform them
• Captain told lead flight attendant *not* to use Halon in the cabin
• Meanwhile, another flight attendant discharged Halon extinguisher into the vent, and the orange glow disappeared
• No injuries to passengers or crew
AirTran 913 - Greensboro, NC

- DC-9 with 57 passengers and 5 crew
- Smoke in the cockpit prompted the flight crew to don their oxygen masks and return to Greensboro for an emergency landing.
- Shortly after takeoff lead flight attendant smelled smoke and went to the cockpit where she saw smoke and noticed that the flight crew had donned their oxygen masks.
AirTran 913 - Greensboro, NC

• F/As reseated themselves in 1st row of business class with portable oxygen bottles
• Smoke became so dense in the cabin that the flight attendants could not see the forward galley
• Neither flight attendant made an effort to locate the source of the smoke or to use any fire-fighting equipment
• One flight attendant considered using a Halon extinguisher, but was unsure where to aim it since there were no visible flames
AirTran 913 - Greensboro, NC

- Off-duty pilot in first class decided against using Halon, as it might “take away more oxygen”
- 3 crewmembers and 2 passengers sustained minor injuries
NTSB Findings

- Smoke in the forward cabin was caused by electrical arcing in the bulkhead behind the captain’s seat.
- The arcing ignited interior panels which continued burning after the airplane landed and passengers evacuated the airplane.
- The fire was extinguished by airport rescue and firefighting personnel.
AAL 1683 – Dulles, VA

- MD-82 with 61 passengers and 5 crew
- After takeoff, flight attendants saw a flash of light and heard a “boom”
- Lead flight attendant saw smoke coming from fluorescent light fixture, and pulled the breaker
- Another flight attendant saw dark, dense smoke coming from ceiling panels above rows 7 and 8.
- Ceiling panels began to blister and turn yellow
Flight attendant began spraying Halon at the affected panels.

The lead flight attendant asked passengers for a knife to cut an access hole in ceiling.

Passenger cut circular hole in ceiling, and the flight attendant fully discharged extinguisher into hole.

Smoke diminished.
AAL 1683 - Dulles, VA

- Flight diverted to IAD
- Flight attendant gave another extinguisher to passenger for landing, told him to “use it if needed”
- No injuries to passengers or crew
AirTran 392 - Richmond, VA

- DC-9 with 95 passengers and 5 crew
- Inflight, lead FA heard a “boom” and saw black smoke coming from bulkhead near forward jumpseat headrest
- “Blow torch” of flame came out of area between jumpseat and cockpit door frame
- Shot Halon at flame and “backed it” into bulkhead
- Put nozzle in hole and applied agent
AirTran 392 - Richmond, VA

- Entered cockpit, discharged Halon on electrical panel behind captain’s seat
- F/As retrieved additional Halon and PBE
- Continued spraying Halon at seams around electrical panel and into hole where fire was first seen
- Airplane diverted to Richmond
- Passengers deplaned normally
Previous NTSB Recommendation

• A-84-76 – POI’s review training programs and emphasize requirements: 1) to ensure flight crews take immediate aggressive action to determine the source and severity of the fire and begin an emergency decent to land; 2) for flight attendants to recognize the urgency and inform flight crews of fire; 3) that all crewmembers be knowledgeable of proper methods of aggressively attacking cabin fires through hands on training in the use of fire axes, PBE, and the discharge of the appropriate fire extinguisher on an actual fire.
Recommendation A-84-76

- FAA Response (11-2-84): 14 CFR 121.417 crewmember training for fire emergencies, emergency drills, and the operation of emergency equipment “is adequate.”

- NTSB Response (4-12-85): Current firefighting training is for exposed fires, not hidden fires.
Recommendation A-84-76

• FAA Response (3-7-86): 14 CFR 121.417 combined with existing ACOBs “is adequate - Further action unwarranted.”

• NTSB Response (5-12-86): Closed – Unacceptable action. “Safety Board will continue to voice concern on this issue.”
Recommendations A-01-83 through A-01-87

- Issue an AC about in-flight firefighting (including the use of Halon fire extinguishers), amend the required emergency training for firefighting, and conduct research on the most effective methods to deal with hidden fires
FAA Responses

• Issued AC 120-80 *Inflight Fires* and required POIs to include content in training programs
• Potential changes to recurrent training programs for more realistic training
• Modifications to some airplanes to ease hidden firefighting would not be effective
FAA Video #3
USAirways Flight 1549
Details

- January 15, 2009 3:27 p.m.
- Airbus A320-214, N106US
- 150 passengers, 5 crew members
- LGA-CLT
- Struck flock of geese at 2800 ft. agl
- Lost thrust in both engines; ditched in Hudson River
- 4 passengers and 1 flight attendant seriously injured
59th St. Video
The Evacuation of Flight 1549
Extended Overwater Equipment

• EOW-equipped but not required for flight
• EOW airplanes must have life vests and slide/rafts or life rafts
• After ditching, only 2 slide/rafts available with 110 occupant capacity
7 passengers (six from the left wing and one from door 1L) intentionally jumped into the water during the evacuation. Five of the six from the left wing swam to and boarded the 1L slide/raft. The other two passengers swam to the left wing.

11 passengers unintentionally fell into the water from the wing (9) or slide/raft (2).

18 passengers intentionally jumped into the water to board or swim to a raft or ferry.

8 passengers reentered the airplane from one of the wings and exited via a second exit.

32 occupants (29 passengers and 3 crewmembers) were rescued from the 1L raft.

[Note: this is more than the number of passengers shown exiting from door 1L in figure 5. This is due to post-evacuation passenger movement.]

32 occupants (30 passengers and 2 crewmembers) were rescued from the 1R raft.

36 passengers were rescued from the left wing.

8 passengers were rescued from the left offwing slide.

22 passengers were rescued from the right wing.

21 passengers (including lap child) were rescued from the right offwing slide.

96 passengers and crew were transported to the NY side of the river.

55 passengers were transported to the NJ side of the river.
Life Vests and Flotation Seat Cushions

- Accident airplane equipped with life vests and flotation seat cushions
- 1988 FAA NPRM proposed requiring life vests and flotation seat cushions on all flights, regardless of route
- NPRM was withdrawn in 2003 due to cost concerns
Life Vest Demonstrations

• F/As required to *brief* passengers on both life vests and flotation seat cushions

• Life vest *demonstration* not required because flight was not EOW

• 1985 NTSB recommendation to require predeparture briefings to include demonstration
  • FAA proposed recommended action in 1988 NPRM
  • NPRM withdrawn in 2003 with no action
Life Vest Stowage and Retrieval

• No pre-impact commands to don life vests
• Immediate concern for most passengers after impact was to evacuate quickly
• 19 passengers attempted to retrieve a life vest; 10 reported difficulties
  • Only 3/10 persistent enough to retrieve life vest
• 2003 CAMI testing indicated retrieval time averaged about 7 to 8 seconds
Life Vest Donning

- 33 passengers reported having a life vest; only 4 confirmed donning completion
  - Most struggled with waist strap or chose not to secure it

- 1983 CAMI donning test results
  - Only 4/100 successfully donned within 15 seconds
  - 21/100 did not don correctly within 2 minutes

- “Angler’s vest” results
  - 29/50 donned correctly within 15 seconds
  - Unaware of further development activity
Life Lines

- Intended for use on wings to prevent passengers from falling into water
- Equipped with 4 life lines near overwing exits; none deployed
- F/As trained on use but located at front and rear of airplane
- No information provided to passengers on safety information card or during briefings
Outcome

- Very few serious injuries and no fatalities
- Successful outcome mostly resulted from series of fortuitous circumstances
  - Good visibility, calm water
  - Very experienced flight crew
  - Extended overwater (EOW)-equipped
  - Vessels immediately available for rescue
Upcoming NTSB Courses

• AS101 – Basic Accident Investigation
  • September 16-27, 2013

• AS302 – Survival Factors Investigation
  • Spring 2014

• http://www.ntsb.gov/trainingcenter/TrainingCenter.htm