

VOLUME 3 GENERAL TECHNICAL ADMINISTRATION**CHAPTER 23 FLIGHT ATTENDANT TRAINING AND QUALIFICATION PROGRAMS****Section 6 Cabin Safety and Flight Attendant Training**

3-1851 FIRE PREVENTION. This section addresses the need for certificate holders to review their approved training programs and Flight Attendant (F/A) manuals to ensure that the procedures used by air carriers properly address the concerns expressed in this section.

A. Crewmember emergency training requires certificate holders to give instruction in the handling of emergency situations, which include potential fire problems related to electrical equipment and circuit breakers.

1) On some aircraft, electrical equipment and related circuit breakers are located in cabin areas including all galleys, service centers, lifts, lavatories, and movie/video centers.

2) Training on the location, function, and related safety procedures for electrical equipment and circuit breakers should focus on eliminating a problem before it becomes a safety hazard.

B. Some reported in-flight fire incidents involved the storage of paper products, napkins, plastic or Styrofoam cups, plastic stir sticks, or manuals in galley ovens. In addition, other incidents have been reported involving an aerosol can and a heated can of soup exploding, which injured crewmembers. Using galley ovens for anything other than designated purposes poses a potential safety hazard.

1) Paper, plastic, or cloth products stored in ovens may easily ignite and are difficult to extinguish. Galley ovens used in this manner have been turned on, causing a fire with dense smoke.

2) Many types of plastic or Styrofoam cups and glasses are virtually fireproof. However, some are easily ignited and difficult to extinguish. Since many certificate holders serve beverages in throwaway plastic or Styrofoam cups and glasses, in-flight fire hazards can be reduced by discouraging use of the highly flammable types.

3) Only food that is heated can be stored in ovens. To prevent fires, do not store galley equipment or any other items in ovens. Check ovens and remove any paper products, dry ice, or other materials before heating. Ensure ovens are off for taxi, takeoff, and landing. Turn off ovens before opening oven doors.

C. The use of galley ovens as heaters has been reported and one incident resulted in a wide-body aircraft diversion due to a flight deck indication of a lower lobe galley fire. Post landing inspection by maintenance personnel revealed no evidence of a fire and no malfunction of the smoke detection system. Further investigation indicated that all ovens were on and that the oven doors were open in an attempt to heat the lower lobe galley area. Some food particles that had been left in one of the ovens started to smoke and activated the alarm in the flight deck. In

addition to the unnecessary diversion, schedule disruption, and consequent public inconvenience, the open oven doors and exposed hot ovens presented unnecessary safety hazards.

D. People dropping smoking materials into lavatory waste containers have caused a number of in-flight fires and smoke detector activations. Title 14 of the Code of Federal Regulations (14 CFR) parts 121 and 135 were amended in 2000, affecting smoking aboard aircraft. Some of the changes to these rules are:

- 1) Smoking is prohibited in any aircraft lavatory at all times.
- 2) Aircraft lavatories must have placards that notify passengers that public law prohibits tampering with smoke detectors.
- 3) The required passenger briefing must include detailed instructions on smoking bans.
- 4) Certificate holders should have procedures in their crewmember manuals and training programs to ensure that all crewmembers are aware of the requirements and of what actions to take regarding the smoking ban regulations.
- 5) Certificate holders should have procedures in their crewmember manuals and training programs to ensure that the trash bin flapper door and waste bin access door are securely closed. Aircraft cleaners sometimes do not close the access door tightly after they empty the trash bin. If the access door is not closed tightly and a trash bin fire were to ignite, air could feed into the trash bin, lessening the effectiveness of the fire extinguisher in the waste bin. If the access door will not close, it must be properly recorded for corrective action.

E. An air carrier's F/As must receive practical training in firefighting techniques and the air carrier's manuals should contain adequate procedures for these subjects.

3-1852 CABIN FLUORESCENT LIGHT BALLAST FIRES. An overweight landing of a wide-body aircraft fueled for a trans-Pacific flight was narrowly averted following successful handling of a cabin fluorescent light ballast fire which occurred immediately after lift-off.

A. An interview of the crew indicated that none had ever heard of a fluorescent light ballast fire and, thus, were totally unfamiliar with its relatively nonhazardous characteristics. This lack of knowledge nearly caused a greater emergency, which could have progressed to a disaster of unknown proportions because the captain was placed in a situation that required a decision to make an emergency return and landing, in spite of the inability to dump fuel and thus reduce weight much below the maximum authorized for landing.

B. Ballast fires, though spectacular, are understood to be brief and, for all practical purposes, self-extinguishing. While new ballasts all but eliminate the problem, it is unlikely that older aircraft will be retrofitted in view of the considerable expense involved. Since these conditions may therefore be expected to exist for some time, and since such incidents may become more numerous commensurate with aging of the aircraft fleet, the principal operations inspectors (POI) should take the following steps:

1) Recommend that ground training and/or operations bulletins be initiated to inform flight deck crews and F/As of the causes, characteristics, and degree of hazard associated with fluorescent light ballast fires.

2) Recommend that aircraft Weight and Balance (W&B) data available to the flightcrew be sufficient to provide accurate approach and landing speeds following immediate turnback when an overweight landing is necessary.

3-1853 PROCEDURES AND TRAINING FOR EMERGENCY EVACUATIONS.

A. There have been several instances where the emergency slide girt bar attachment was hindered due to mechanical interferences. Girt bar attachment points can accumulate ice or obstructions such as plastic forks, pencils, etc.

B. These instances indicate a possible deficiency in F/A training, which should be remedied by renewed emphasis in certain areas. Air carrier's training programs should ensure that:

1) F/As are fully aware that manual inflation of escape slides should be attempted if auto-deployment fails.

2) Prior to closing any door, girt bar attachment points are inspected to ensure that they are free from ice or other obstructions that might interfere with engagement of the automatic slide deployment feature.

3-1854 TRAINING ON CONDITIONS OF AIRCRAFT FOLLOWING AN ACCIDENT.

In several accident investigations, the National Transportation Safety Board (NTSB) found that although F/As provided valuable assistance to passengers during emergency situations, they did not always follow their air carrier's approved emergency procedures or perform their duties in accordance with training. The Safety Board reviewed its investigations of accidents and incidents where information was available on F/A performance during emergency situations. The report, titled Flight Attendant Training and Performance During Emergency Situations, NTSB/SIR-92/02, resulted in recommendations to the Federal Aviation Administration (FAA). They included recommendation A-92-69: "Ensure that flight attendant training programs provide detailed guidance on the relative probability of hazards associated with emergency situations such as fire, toxic smoke, and explosion."

A. As the result of accident interviews with F/As, the NTSB concluded that F/A training courses need to emphasize the conditions of the aircraft following an impact. While most F/A training curriculums contain information about this subject, the NTSB believes that training should emphasize the following post-crash topics:

- Fire,
- Debris,
- Toxic fumes, and
- Low probability of explosion.

B. Air carriers could show F/As visual presentations of aircraft cabins following a crash. They should emphasize the possibility of cabin floor and aircraft fuselage distortions and breaks. For example, in one accident, part of the cabin was upside down while another fuselage section was relatively level. The level fuselage section's floor had a large break. In addition, debris in the form of carry-on baggage, galley supplies, and other items may dislodge and clutter the aisles. Survivors of accidents have reported climbing over debris and standing on "something" in order to climb out the top of the fuselage.

C. Training courses should also address the presence of fire and toxic fumes during and following a crash. The training curriculum should address fire dynamics, including flashovers, other heat patterns associated with super heated air, and the probability of explosion. There is also the problem of toxic fumes. Research and accident histories indicate that when toxic fumes and/or smoke are present, the "quality air" is about armrest level. Most air carriers use a diminished light environment coupled with simulated smoke when conducting evacuation drills, which is a good method for bringing crewmembers' attention to the crash environment. This is especially true when it is followed by a discussion of accidents and incidents.

D. Additional post-crash topics should include passenger management procedures immediately following an accident, such as gathering passengers together upwind of smoke/fire out of the path of emergency vehicles approaching the accident, trying to obtain a passenger count, and initially assessing passenger injuries.

3-1855 AVAILABILITY, CAPABILITIES, AND USE OF EMERGENCY FLOTATION EQUIPMENT. As a result of an accident that involved a B-727 making an unscheduled landing in water during an approach, survivors experienced difficulties with the location and use of emergency flotation equipment during the aircraft evacuation.

A. This particular airplane was equipped with life vests and not flotation-type seat cushions. However, some passengers either used or attempted to use the seat cushions for flotation. The passenger briefing cards in use at the time of the accident depicted the location and use of life vests. During the postcrash investigation, two crewmembers stated that they assumed the seat cushions were approved flotation devices. Two other crewmembers were not sure if the seat cushions were approved flotation devices.

B. The survivors experienced numerous difficulties with the location, removal, donning, and inflation of their life vests.

1) Some passengers had difficulty removing the life vest from the fabric pouches beneath the seats.

2) Others had difficulty in unpacking the life vest from the sealed plastic bag.

3) Many had difficulty inflating the life vest. Some life vests recovered after the accident only had one of the two chambers inflated.

C. During the postcrash investigation, the NTSB queried several air carriers as to the type of flotation equipment on their airplanes. Some air carriers had airplanes with only flotation-type seat cushions and no life vests. Some had airplanes with only life vests and no

flotation-type seat cushions. Others had a mixed fleet with some airplanes having flotation-type seat cushions and some having life vests.

D. This accident indicates possible deficiencies in F/A and flightcrew member training, programs, and pretakeoff passenger briefing procedures. Air carriers should ensure that:

- Flight and cabin crewmember initial and recurrent training programs include detailed information regarding the location, function, and operation of the emergency flotation equipment installed in the aircraft each crewmember operates;
- If an air carrier has a mixed fleet of airplanes (i.e., some having flotation-type seat cushions and some having life vests), flight and cabin crew are aware of the type of equipment available on each airplane during operations; and
- F/As or other appropriate crewmembers must brief passengers on the type, location, and use of required flotation equipment. This briefing must include the type of equipment available at the individual passenger's seat and the method of use in the water, such as putting the arms through the straps and resting the torso on the cushion. When the aircraft is equipped with life preservers, the briefing must include instructions about the location and removal of life preservers from stowage areas, including pouches, and the donning and inflation of the life preservers. If the aircraft is equipped with both flotation cushions and life preservers, F/As should brief passengers on both types of equipment and must brief passengers on the required flotation equipment.

3-1856 TRAINING ON THE CHEMICALLY GENERATED SUPPLEMENTAL OXYGEN SYSTEM. In several accident investigations, the NTSB found that although F/As provided valuable assistance to passengers during emergency situations, they did not always follow their air carrier's approved emergency procedures or perform their duties in accordance with training. The NTSB reviewed its investigations of accidents and incidents where information was available on F/A performance during emergency situations. The report, titled Flight Attendant Training and Performance During Emergency Situations, NTSB/SIR-92/02, resulted in recommendations to the FAA. They included recommendation A-92-76: "Update and reissue ACOB 76-4 regarding the operational characteristics of chemically generated passenger supplemental oxygen systems."

A. Air carriers should ensure that crewmember training programs and appropriate manuals include detailed information regarding the operational characteristics of the chemically generated passenger supplemental oxygen system. That information should include:

- Canister,
- Lanyard/safety pin,
- Flow initiation mechanism,
- Reservoir bag,
- Oxygen mask,
- Hose,
- Heat shield,

- Heat generation, and
- Oxygen outlets.

B. Passenger briefings and demonstrations describe the specific oxygen system used on a flight. Briefings should emphasize the location of passenger oxygen (e.g., overhead units, seat backs, and bulkheads), proper placing of mask on the face, use of adjustment straps, and indications of oxygen flow (reservoir bag).

C. Printed instructions on the passenger briefing cards for the use of the passenger chemical supplemental oxygen system should be factual and contain sufficient information for proper use. These instructions should include donning techniques, adjustment requirements, and any action necessary to initiate oxygen flow. In addition, instructions should be provided that direct passengers to secure their own masks before assisting others.

3-1857 F/A TRAINING ON THE USE OF FLIGHT DECK EMERGENCY

EQUIPMENT. Air carriers should ensure that F/As are familiar with flight deck emergency equipment. Information about the location and operation of the following flight deck emergency equipment should be included in the air carrier's F/A manuals:

- Flight deck door access,
- Flight deck exits,
- Emergency supplemental oxygen,
- Fire extinguishers,
- Crash axes,
- Protective Breathing Equipment (PBE),
- Any other emergency equipment located in the flight deck, and
- Operation of flight deck seats.

A. During initial and transition training, F/As should receive familiarization training on flight deck emergency equipment. Air carriers do not have to require F/As to physically operate the flight deck emergency equipment. Training in flight deck emergency equipment may be accomplished through audiovisual presentations, computer-based instruction, or other instructional media.

B. Air carriers should include appropriate procedures regarding flight deck emergency equipment in their manuals and training programs.

3-1858 TRAINING IN FIRE CONTROL EQUIPMENT AND RELATED TRAINING

DRILLS. Present regulations require that air carrier training programs include individual instruction in the location, function, and operation of portable fire extinguishers that emphasizes the type of extinguishers used to fight fires of different classes.

A. Air carriers should provide instruction to crewmembers in the handling of in-flight fires, fires that occur on the ground, and smoke control procedures, emphasizing electrical equipment and related circuit breakers.

B. The following two drills are associated with fire control.

1) Fire Extinguisher Drill. A fire extinguisher drill is required every 24 months. During this drill, each crewmember must operate each type of hand-held fire extinguisher installed on the air carrier's airplanes.

2) PBE/Firefighting Drill. A PBE/firefighting drill is a one-time requirement consisting of two exercises. Exercise one requires crewmembers to operate the PBE while fighting an actual or simulated fire. Exercise two requires crewmembers to discharge a fire extinguisher and fight an actual fire. The exercises of this PBE/firefighting drill may be combined. When the air carrier combines the exercises of the PBE/firefighting drill, the crewmember discharges a fire extinguisher while fighting an actual fire and while wearing PBE.

NOTE: Some air carriers have elected to use an installed fire extinguisher when accomplishing the PBE/firefighting drill. This could allow the air carrier to simultaneously meet the requirements of the fire extinguishing drill required for the 24-month period.

C. Inspectors and members of the air carrier industry asked for clarification about the use of fire extinguishers.

1) During the fire extinguisher drill required every 24 months, crewmembers should use each type of fire extinguisher installed on the air carrier's airplanes.

2) The POI may approve the use of fire extinguishers that closely simulate the ones installed on the airplane.

3) Crewmembers should remove each type of fire extinguisher from its brackets. The brackets should be the same as those on the airplane.

4) Crewmembers should demonstrate the proper operation of the fire extinguisher including pulling the trigger. The fire extinguisher does not have to be charged. Nevertheless, it is desirable to have it charged with the appropriate agent or with a material that simulates that agent.

5) Crewmembers may use any fire extinguisher when they fight an actual fire as long as each crewmember performs an additional fire extinguisher drill using a handheld fire extinguisher of the type installed by the air carrier. The purpose of fighting an actual fire is to provide crewmembers with the opportunity to experience the effects of facing an actual fire. Of course, air carriers may elect to use an installed fire extinguisher for the actual firefighting drill.

6) There is no requirement that a crewmember discharge a halon fire extinguisher during the firefighting drill required by parts 121 and 135. The discharge of halon for training purposes is not appropriate unless the air carrier uses a training facility that is specifically designed to prevent harm to the environment from the discharged halon. When such facilities are not used, other fire extinguishing agents, which are not damaging to the environment, should be used.

D. PBE training should include:

1) Accurate simulation of PBE installed on the aircraft. POIs and/or cabin safety inspectors (CSI), if applicable, should ensure that PBE used in training properly simulate the weight, method of donning, method of activation, and appearance of the actual PBE.

2) Removing PBE from its stowage area and container/pouch. F/As and pilots have been surprised by the forces necessary to remove PBE from the pouches used in training. The forces necessary to open the actual PBE storage units on aircraft was greater than the forces necessary to open the pouches used in training. Therefore, it is important that the pouches used to store the training PBE accurately replicate the actual forces necessary to open the storage units on aircraft. For example, if the PBE on the aircraft is kept in stapled pouches, which could require as much as 28 pounds of force to open, the forces necessary to open these pouches should be simulated when opening the “training pouch.”

3) Donning the PBE, activating it, and other actions necessary to use the installed equipment.

E. The nature and value of combating an actual fire.

1) Many people confuse meeting training objectives of fighting an actual fire with the psychological benefits that one can gain through experiencing an actual fire. The psychological effect of facing an actual fire cannot be achieved through simulation. The National Fire Protection Association’s (NFPA) Bulletin No. 406, Aircraft Hand Fire Extinguishers, states that live fire training provides crewmembers with psychological conditioning, firefighting techniques, and knowledge of extinguishing agent capabilities and limitations under actual fire situations. The bulletin also recommends that firefighting training with an actual fire be reinforced by classroom instruction using manipulative skills training (simulation). The recommended fire simulation scenarios include:

- Galley fires,
- Lavatory fires,
- Flight deck fires,
- Closed compartment fires, and
- Flammable liquid fires.

2) An actual fire means an ignited combustible material, in controlled conditions of a sufficient magnitude and duration to accomplish the training objectives set forth in the rule.

3) Industry practice shows that air carriers frequently contact local or airport fire departments. In some cases, fire department personnel are present during training. Many local fire departments provide training course outlines on the use of small, hand-held fire extinguishers, and they also typically provide training on the operation of hand-held fire extinguishers to employees of local businesses and organizations. Under fire department supervision, these employees are given the opportunity to extinguish an actual fire.

4) When creating actual fires, fire departments and air carriers often use, among other materials, kerosene or diesel fuel floating on water in a metal pan or drum. These fires are ignited outdoors in an open area. Some air carriers and fire departments have constructed indoor

fire rooms or fire pits in which they ignite materials such as seat cushions and use exhaust fans to eliminate smoke following the firefighting training.

F. Simulation.

1) A simulated fire is an artificial replication of a fire used to create the various firefighting situations that could occur on an aircraft. For example, electric lights that the instructor controls by turning them on and off to show that the crewmember has extinguished the fire correctly.

2) Smoke simulation is a component of the fire simulation described in the guidance material. Artificial smoke may be used to simulate smoke coming from a galley oven, under a lavatory door, or under a passenger seat.

G. Crewmembers would not necessarily use PBE every time there is a fire. Crewmembers should use PBE whenever they determine that dense smoke and/or fumes are present that do not permit effective firefighting at close range or when the fire is of unknown origin. There is some debate about crewmembers donning PBE when there is a fire on the ground and when an immediate evacuation is conducted. The most important variable in a successful evacuation is speed. If a crewmember is at a door, the need to don PBE may not be great unless the crewmember is going back into the cabin. Air carrier manuals and training programs should contain procedures indicating the proper use of PBE.

H. POIs and other inspectors have requested information about verification that a crewmember has accomplished the firefighting exercise in PBE drill with another air carrier. The regulation allows credit to be given toward the completion of the PBE drill including fighting an actual fire during an approved training program. This verification is accomplished by obtaining a written copy of official training records. The records should include the information that the crewmember accomplished the PBE/firefighting drill on a given date. This record should be accompanied by a signed copy of that portion of the approved training program that addresses the PBE/firefighting drill. Upon review of this information, inspectors should be able to verify that the crewmember has completed all parts of the PBE/firefighting drill, including fighting an actual fire. Unless documents clearly state that the crewmember fought an actual fire, the crewmember must perform the firefighting drill again.

3-1859 PROCEDURES AND TRAINING FOR POTENTIAL DECOMPRESSION EMERGENCIES.

A. Accident investigators, inspectors, and crewmembers have reported that F/As failed to know and/or follow the FAA-recommended procedures during aircraft cabin decompressions. These procedures have been discussed with the industry during Civil Aerospace Medical Institute (CAMI) cabin safety workshops and are contained in FAA guidance material. With few exceptions, air carriers have adopted the FAA-recommended procedures.

B. The FAA-recommended procedures for F/As to follow during a decompression:

1) Immediately don the nearest oxygen mask.

- 2) Sit down or grasp a fixed object.
- 3) Hold on in order to brace against possible decompression forces until given clearance to move about the cabin by a flightcrew member.

C. These recommended F/A actions are based on CAMI research, which indicates that physical activity, such as that performed by a F/A, will significantly shorten the time of useful consciousness (TUC) during an aircraft decompression.

D. Certificate holders should have these procedures included in the appropriate manuals and incorporated in F/A training programs.

3-1860 TRAINING ON OPERATION OF DC-10 DOORS. On March 1, 1978, a DC-10 aircraft in scheduled passenger service aborted takeoff and departed the runway. The gear collapsed and in the subsequent fire the aircraft was destroyed. Two passengers were killed. On June 27, 1985, a DC-10 aircraft in scheduled passenger service aborted takeoff and departed the runway. Three passengers suffered serious injuries. During these accidents, crewmembers inadvertently opened doors with the slides disconnected.

A. The NTSB reviewed its investigations of accidents and incidents, including these two accidents, where information was available on F/A performance during emergency situations. The report, titled Flight Attendant Training and Performance During Emergency Situations, NTSB/SIR-92/02, resulted in recommendations to the FAA. They included recommendation A-92-78: "Amend the Federal aviation regulations to include ergonomic design requirements for cabin safety equipment, including emergency exits."

B. The arm/disarm lever and the door control handle on several aircraft types are adjacent to each other. Upward movement on the arm/disarm lever disarms the exit and upward movement on the door control handle opens the door. F/As do not normally have the opportunity to develop strong habit patterns associated with operating the door control handle. The doors are usually opened by ground service personnel from outside the airplane. However, F/As do develop strong habit patterns associated with the arm/disarm lever at the gates. For example, F/As use the arm/disarm lever to deactivate the slide in preparation for ground service personnel to open the door after arrival. Further, they use the arm/disarm lever to arm or activate the slide in preparation for movement on the surface. Emphasis should be placed on the proper operations of these types of doors, as improper operating procedures can result in inadvertent slide deployments and potential injury. Since the operating systems on some doors may be predisposed to human error, crewmember training should reinforce the correct actions associated with doors and their operating mechanisms.

C. The absence of reports of similar occurrences since 1985 indicates that air carriers have made effective adjustments in training on these types of doors. Nevertheless, during the training required by part 121 regarding opening the doors in the normal and emergency modes, air carriers should still emphasize the use of the arm/disarm and door control levers.

D. POIs and/or CSIs (if applicable) assigned to air carriers operating aircraft with this unique design should ensure that:

1) Their assigned certificate holders are aware of the possible problems with the operation of DC-10 and similar doors.

2) Adequate emphasis is placed on the operation of these doors during required training.

3-1861 UNWARRANTED EVACUATIONS. Reports concerning warranted and unwarranted emergency evacuations reveal that there is a need for improvement in procedures and training.

A. There have been several cases of passenger-initiated evacuations associated with the B-727 auxiliary power unit (APU) torching starts. Some of these evacuations present significant potential for injury to participants. The Boeing Commercial Airplane Group (BCAG) has released a videotape, 727 APU Torching, and a Boeing Flight Operations Review Bulletin to all B-727 operators, which contain suggested air carrier actions to avoid APU torching incidents. (See Volume 3, Chapter 19, Section 5.)

B. Certificate holders should ensure their emergency evacuation procedures and training programs address the following:

1) Flightcrews and F/As are trained to recognize and act promptly in situations requiring an emergency evacuation.

2) F/As are trained to carry out an emergency evacuation on their own initiative in the event that the flightcrew is incapacitated or otherwise prevented from participating.

3) F/As are trained to recognize when evacuation equipment is inoperative or faulty, act promptly in preventing the use of such equipment, and quickly divert evacuating passengers to usable exits.

4) Flightcrew and F/A training emphasizes the ability to recognize the need to terminate an evacuation if conditions change and permit such action. F/As should be trained to immediately command passengers to stop the (unwarranted) passenger evacuation and immediately notify the flight deck of the situation. F/As should be made aware of the urgency to notify the flight deck so that the aircraft may be stopped, the engines shut down, the tower contacted (as necessary), etc.

5) Emergency alarm signal units, if installed in the cabin, are properly located and guarded to preclude inadvertent activation.

C. The FAA recommends that operators of B-727 aircraft:

1) Review their training programs and emergency evacuation procedures to assure that the flightcrew and F/As are aware that B-727 APU starts can result in a momentary orange flash from the vicinity of the APU exhaust near the right wing root.

2) Develop procedures that include an announcement from the flight deck before starting the APU on the B-727.

- 3) Include and emphasize this topic as part of their recurrent training programs.

3-1862 EMERGENCY EVACUATION AND DITCHING DRILLS. The NTSB investigated 46 evacuations of commercial aircraft that occurred between September 1997 and June 1999. These evacuations involved 2,651 passengers and 18 different aircraft types. The study, Emergency Evacuation of Commercial Airplanes, NTSB/SS-00/01, can be obtained online at www.nts.gov/Publictn/A_Stu.htm. The NTSB investigation resulted in recommendations to the FAA, including recommendation A-00-85: "Require air carriers to conduct periodic joint evacuation exercises involving flightcrews and flight attendants."

A. This investigation revealed a potential problem regarding crew performance during aircraft evacuations. In some cases, crew coordination was not as good as it could have been. Since many of the aspects of ditching are the same as an evacuation, the NTSB recommended that flightcrew members and F/As perform the required aircraft evacuation and ditching drills together.

B. Giving crewmembers the opportunity to experience crew coordination and teamwork during required training drills is highly desirable. This is not always possible because of the difference in the number, domicile location, and scheduling of F/As and flightcrew members. Nevertheless, air carriers have used a variety of methods to ensure that crewmembers understand the procedures and actions of each other during emergency situations. These methods have included the use of videos that show the actions of crewmembers during a simulated emergency situation. The simulation is especially helpful when followed by a discussion in which crewmembers are encouraged to discuss the role of fellow crewmembers.

C. Certificate holders should be aware of the desirability of flightcrew and F/As performing emergency evacuation and ditching drills together. Further, certificate holders should be aware that when this is not possible, training programs should address the roles of other crewmembers during an emergency evacuation and/or ditching.

3-1863 GUIDELINES FOR CREWMEMBER TRAINING ON AIRCRAFT TAILCONES AND APPROVAL OF TAILCONE TRAINING DEVICES.

A. Background. On February 19, 1996, a DC-9-32 landed wheels-up. The airplane slid 6,850 feet before coming to rest in the grass about 140 feet left of the runway centerline. The cabin began to fill with smoke and the captain ordered the evacuation of the airplane. There were 82 passengers, 2 flightcrew members, and 3 F/As aboard the airplane. The NTSB investigation resulted in recommendations to the FAA, including recommendation A-97-10: "Amend Flight Standards Handbook Bulletin 96-02, Guidelines for Crewmember Training on Aircraft Tailcones and Approval of Tailcone Training Devices, to include a requirement that if any portion of a restraint system is attached to the tailcone access plug door in the aircraft that might interfere with the opening of the door, the plug door training device must be equipped with the entire restraint system." The report is available online at www.nts.gov/Recs/letters/letters.htm.

1) Section 121.417 requires that each crewmember, during initial training and every 24 months, operate each type of emergency exit in the normal and emergency modes. This

demonstration must include the actions and forces required in the opening of all exits including tailcones.

2) In addition, the NTSB determined that during the accident referenced above the F/A seated on the aft jump seat was unable to completely remove the tailcone access plug door because one of the aft jump seat shoulder harness straps was buckled to the lap belt, which tied the plug door to the aft bulkhead. Fortunately, the lack of availability of the tailcone exit did not preclude a timely and successful evacuation.

3) Further, NTSB safety recommendation A-97-10 requested that Flight Standards (AFS) amend Order 8400.10 to include a requirement that if any portion of a restraint system is attached to the tailcone access plug door in the aircraft that might interfere with the opening of the door, the plug door training device must be equipped with the entire restraint system. When the NTSB investigators examined the DC-9 plug door training device at the air carrier's F/A training facility, they found that seatbelts and shoulder harnesses were not installed in the trainer. Therefore, it was not possible for F/As to train for the removal of the plug door with the shoulder harness straps buckled to the seatbelt and gain hands-on experience with the problem this creates.

4) In addition, the air carrier's F/A manual, current at the time of the accident, did not mention the need to ensure that the jump seat shoulder harness straps are unbuckled from the lap belts before attempting to remove the plug door. The NTSB concludes that the F/As received inadequate information and training on the operation of the DC-9 tailcone access plug door.

5) Service Bulletin (SB) 53-257 required a modification to the assembly release handle, which resulted in a change to F/A evacuation procedures of the tailcone. A forward tailcone assembly release handle was installed and is located immediately to the F/A's right-hand side (aircraft left) when opening the pressure bulkhead or plug hatch. Once the pressure bulkhead or plug hatch has been opened from inside the cabin, the F/A will pull the forward tailcone release handle located at the forward end of the catwalk (aircraft left) to jettison the tailcone and trigger slide inflation. If the tailcone jettisons and the slide inflates, the F/A may conduct the evacuation at the end of the catwalk. If the tailcone fails to jettison, the F/A must redirect the passengers to other usable exits.. If passengers are unable to use other exits for evacuation, the F/A may use the aft tailcone release handle, but this is only as a last resort.

B. Tailcone Training Device. Any tailcone training device should meet the following criteria:

1) The training device should replicate the dimension of the physical space a person must occupy to operate the mechanism for opening the tailcone. It shall provide simulation of all obstacles that hinder free movement such as overhanging bulkheads, intruding cables, etc. The various locations of the tailcone release handle for different models of the same aircraft shall be covered in differences training. Either the use of pictorial or audiovisual training aids, or a visual inspection of the aircraft, is an acceptable training method for these differences.

2) The ventral or plug door training device simulating the door at the pressure bulkhead leading to the tailcone should approximate the size and shape of the door on the actual

aircraft. A door training device should approximate, within 10 percent, the weight of the actual door. If any portion of a restraint system is attached to the tailcone access plug door or any other exit in the aircraft that might interfere with the opening of the door, the door/plug/tailcone training device must be equipped with the entire restraint system. Crewmembers shall be trained to know what to do if the restraint system interferes with the opening of the door.

3) The operation of the ventral or plug door handle or other mechanism used to activate the door should look and operate in the tailcone training device exactly as it does on the aircraft. Other hardware, such as door hinges, should approximate the hardware in respect to size and shape. In addition, forces required to operate the manual release handle should be the same as those on the aircraft.

4) The walkway or catwalk leading from the pressure bulkhead to the tailcone should approximate the actual width and length of the aircraft. If the trainer walkway differs by 10 percent or more from the dimensions of the actual aircraft, then training on the differences should provide information regarding this fact. This can be accomplished through pictorial or audiovisual training aids. The FAA strongly recommends pointing out this difference during a visual inspection of the actual aircraft.

5) The emergency lighting available in the tailcone area of certain types of aircraft provides a low level of illumination. During crewmember training, the illumination of the tailcone training device should be maintained at a comparable low level.

6) It is essential to maintain a training device in the same condition in which it was originally approved by the FAA. POIs and/or CSIs (if applicable) should ensure that the air carrier's training program provides the name of the person responsible for training device integrity. A person specifically assigned to maintain training devices or a training instructor supervisor may have that responsibility. In addition, POIs and/or CSIs (if applicable) should ensure that air carriers test the accuracy of the operating forces of manual release handles on tailcone and ventral door training devices. Such testing should be performed and logged on a yearly basis.

C. Aircraft Familiarization Tours. An air carrier may use a tailcone exit training device of such high fidelity and/ or conduct differences training using pictorial or audiovisual aids of such quality that no further training benefit would result from a familiarization tour of the aircraft. In such cases, the POI and/or CSI (if applicable) may permit the air carrier to meet the entire training requirement of a particular aircraft without using the actual aircraft.

1) Air carriers that have a ventral (or plug) door training device, but not a tailcone training device, must conduct an aircraft familiarization tour of the tailcone area for initial and recurrent training. Each trainee will walk through the tailcone area. Instructors will ensure trainees are aware of the placement of the tailcone manual release handle on the aircraft and, as appropriate, other variant aircraft. When the air carrier has a method to operate the tailcone release handle without actually deploying the tailcone, then each trainee should operate the tailcone release handle. When the operation of the tailcone release handle releases the tailcone, then either the instructor or a trainee should operate the tailcone release handle while the other

trainees observe. The instructor should ensure that each trainee understands the operation of the tailcone manual release handles.

2) Air carriers that have neither a tailcone training device nor a door training device will conduct an aircraft familiarization tour as described in subparagraph 3-1863C1). In addition, for air carriers not possessing a door training device, instructors must conduct plug and/or ventral door training using an actual aircraft. Instructors will ensure that each trainee operates the plug and/or ventral door and each trainee operates all handles, switches, knobs, or other mechanisms necessary to ready the equipment for emergency evacuation. Air carriers may not want to drop the tailcone mechanism; however, the air carriers may wish to “catch the tailcone” so that it does not fall. Or the air carrier might ensure each trainee operates the mechanism that drops the tailcone that is installed in a simulated device. Regardless of the method used each trainee must actually operate the appropriate mechanisms to ensure evacuation through the tailcone exit.

3-1864 USE OF MOCKUPS IN CREWMEMBER EMERGENCY TRAINING. Mockups provide realism during training in emergency situations. Cabin mockups and cabin door training devices are part of FAA-approved training programs for F/As. The POI assigned to a certificate holder is responsible for the approval of these training devices. Approval of a training device(s) is concurrent with approval of the entire training program. The device is only one part of any training program.

A. The following provides guidance for approval of training devices:

1) The POI and/or CSI (if applicable) should review the procedures contained in any training module that incorporates the use of a training device(s). The training device must realistically simulate the exit that it represents.

2) Whenever possible, before the onsite inspection of the device, the POI and/or CSI (if applicable) should operate the actual aircraft exit represented by the device. By opening the actual door in the normal mode, the inspector will be able to determine the force needed to operate the device. Additional information regarding the normal forces may be obtained from the aircraft manufacturer. The normal forces needed to open any given type of door may have a wide range. In some cases, the range could be as much as 20 pounds. POIs and/or CSIs (if applicable) should experience the forces using an actual door to determine what the opening of the door “feels like.” In the case of tailcone devices, the inspector should perform a walk-through in order to become familiar with its dimensions.

B. During the onsite inspection of the training device, the POI and/or CSI (if applicable) should ensure that the device:

1) Accurately represents the position and operation of the handles and hardware of the actual aircraft door,

2) Simulates both the normal and emergency modes,

3) Incorporates the actions required to operate the exit in the same manner as the actual door in both the normal and emergency modes of operation,

- 4) Requires representative forces to open the door in the emergency mode, and
- 5) Is equipped with a manual inflation handle, if applicable. The training program should address the fact that the inflation handle may not always be in the same location on similar aircraft.

C. During the onsite inspection and using the air carrier's procedures, the POI and/or CSI (if applicable) should have a qualified instructor demonstrate the operation of the device in the normal and emergency modes.

D. The POI and/or CSI (if applicable) should then operate the training device in the normal and emergency modes, using the provided instruction, to determine that the device and the training provide realistic simulation of the corresponding exit.

E. The POI and/or CSI (if applicable) should ensure that the air carrier has an established maintenance program for training devices. This program should ensure that each device maintains the appearance, functions, and forces existing during original approval. The FAA-approved training program should list by name and title the person responsible for the maintenance of each training device.

F. Exit differences should be highlighted in the training program whenever a single training device is used to represent more than one exit. Examples include differences between Type I, Type A, and Type III exits or in size and appearance among similarly operating exits. Other training aids may include, but are not limited to:

- Aircraft study guides,
- Videotape presentations,
- Slide presentations, and
- Aircraft familiarization walkaround.

G. Whenever the motions needed to operate an emergency exit training device are different from those actually required on the aircraft, the training requirements must be met by using another true-to-life training device or the aircraft itself. The following are examples:

- The different methods of operation for the 2L/2R and 3L/3R doors on the A-321 such as the 4–6 second delay between activation of the opening mechanism and full opening of the aircraft door and the different procedures regarding the use, as well as the actual placement, of the manual inflation handle; and
- The differences between any aircraft trainer and the actual aircraft with a tailcone exit, such as the B-717, including a tailcone environment that accurately represents the equipment and the environment on the airplane to ensure that F/As are able to use proper door opening technique, proper use of assist space, and proper methods to manually deploy and activate the emergency slide.

3-1865 CREWMEMBER SURVIVAL TRAINING.

A. Aircraft accidents illustrate the importance of having crewmembers trained in survival techniques so that they may be able to assist passengers in surviving severe environmental conditions following an accident. The NTSB recommended that certain regulatory amendments be made to require each certificate holder to provide survival training for its crewmembers. This survival training would include instruction in survival techniques at sea, in desert areas, in mountainous regions, and in winter conditions.

B. Parts 121 and 135 require each certificate holder to provide emergency training for its crewmembers.

1) These training requirements include:

- Training in the operation of emergency equipment;
- The proper use of first aid equipment; and
- Instruction in handling illness, injury, or other abnormal situations involving passengers or crewmembers.

2) Since much of the training recommended by the NTSB is currently being given to crewmembers, the FAA believes that any additional training needed in this area can be provided to crewmembers during their normal recurrent training periods. The air carrier needs only to add the training appropriate to the climatic conditions and geographic area associated with the air carrier's route structure not presently in the crewmember's training program.

NOTE: The training listed need not be repeated if that type of training was previously accomplished during another phase of training. POIs and/or CSIs (if applicable) should ensure that their assigned certificate holders accomplish survival training, as appropriate, for that air carrier's areas of operation.

3-1866 CREWMEMBER INDOCTRINATION TRAINING AND REDUCTION OF PROGRAMMED HOURS. The Flight Standards Service (AFS) has reviewed the flightcrew member and F/A training curricula of major air carriers. This review of FAA-required crewmember indoctrination course curricula showed that some curricula included material not pertinent to 14 CFR, to flight conduct, or to aviation safety. It also highlighted the importance of managing the reduction of programmed hours during labor disputes.

A. Indoctrination Training.

1) It is important that the required 40 programmed hours of indoctrination training contain only subjects that are pertinent to the safety assignments of crewmembers. Specifically, indoctrination training should include the following:

- Duties and responsibilities of crewmembers,
- Appropriate provisions of 14 CFR, and
- Contents of the certificate holder's operating certificate and operations specifications (OpSpecs).

2) Any review of these requirements should ensure that subjects are related to the safety responsibilities of the crewmembers. Subject areas such as company history, company organization, and scheduling may be credited toward programmed hours if they show a direct relationship to 14 CFR, to flight operations, or to flight safety. Employee compensation/benefits and contracts, grooming, uniform regulations, pass benefits, and other similar subjects are not appropriate in the 40 programmed hours of FAA-approved indoctrination training.

B. Curriculum Subjects. Subjects such as company organization and description should be changed to company organization and operating philosophy as it relates to the way the company controls its flight operations and the crewmembers' role in those operations. An example is provided by the subject of general forms, records, and administrative procedures. This subject should be part of the 40 hours of indoctrination training only if the records are related to the operation of the flight. For example, mechanical discrepancy forms would be related to the operation of the flight and could be included in the course. Employee standards and rules of conduct should be part of the 40 programmed hours only as this discussion relates to safety.

C. Daily Training Hours. To ensure that students have adequate time to assimilate subject material, attend to personal needs, and receive adequate rest, the daily hours of training activity should be limited to 10 consecutive hours in any 24-hour period. Each hour of training normally contains a reasonable "break time" of 10 minutes. Lunch hour, or other extended breaks, may not be considered as part of programmed hours.

D. Reduction of Training Hours. Many air carrier training program indoctrination courses may be reduced if the subject matter can be covered more effectively in accordance with § 121.405. (Section 121.405 states, in part, that the Administrator should consider the training aids, devices, methods, and procedures listed in the certificate holder's curriculum as stipulated in § 121.403 that increase the quality and effectiveness of the teaching/learning process.) However, the programmed hours for indoctrination training should not be reduced below 32 hours. These 32 hours should contain subjects listed in 14 CFR and follow the policy as outlined above.

E. Revisions After Final Approval. In accordance with § 121.405(e), the FAA may require revisions, including additional hours, to a training program that has been granted final approval. POIs and/or CSIs (if applicable) should work with their assigned certificate holders to identify any areas, including number of programmed hours, that need to be changed and to obtain a firm schedule for the completion of these changes.

F. Credit should be given regarding only those subjects that are easily transferred from one air carrier to another. Typically, this would include knowledge of 14 CFR, but very little else. Additional credit could be given for the quality of the training, including instructor-to-student ratio, teaching aids, size of class, and other factors, as listed in §§ 121.401(d) and 121.405(d). Subjects covered in indoctrination training shall pertain to the safety duties of all crewmembers.

G. POIs and/or CSIs (if applicable) should be aware of the national attention usually focused on an air carrier during a period of labor unrest, bankruptcy, or other newsworthy

periods of stress for the air carrier. FAA approval for changes during these periods may give the impression of bias toward the air carrier. Therefore, any such credit or reduction in training programs should be coordinated with the Air Transportation Division (AFS-200). See Volume 6, Chapter 2, Section 18 for more information on air carriers experiencing significant change.

H. POIs and/or CSIs (if applicable) should recommend that their assigned certificate holders' crewmember (both flightcrew and F/As) indoctrination training includes the following:

- Only appropriate subjects during the credited programmed hours, and
- At least 32 programmed hours, even if hours were reduced in accordance with the standard specified in § 121.405(d).

NOTE: Any special training program adjustments that may be considered for approval during a labor dispute are to be brought to the attention of the AFS-200 before initial or final approval is granted.

3-1867 GUIDELINES FOR EVALUATING HOME STUDY AS A SUBSTITUTE FOR CLASSROOM GROUND TRAINING.

A. Since the primary focus of aviation safety is the prevention of accidents, a well-trained crew is essential. Home study has a legitimate place in crew training.

1) Some air carriers request that POIs approve substitutions of home study modules for some classroom training modules. This paragraph provides information to assist POIs and/or CSIs (if applicable) as they respond to these requests.

2) Home study is one alternative to traditional classroom instruction. Quantifiable baseline standards for knowledge must first be developed and evaluated. Home study and evaluation methods must meet or exceed the established baseline standards.

B. Definition.

1) Home study may refer to a range of activities, from reading a book to using the newest computerized multimedia program. Home study may occur anywhere adequate facilities and equipment are available, in any setting conducive to learning. Terms such as individualized instruction, student-centered learning, prescriptive learning, self-directed learning, even computer-based training, are often considered synonymous with home study.

2) Home study is defined here as a process in which a trainee works at his or her own pace, without the aid of an instructor, to master specified material. Decisions about what material needs to be learned or when the training will be available are made by others, not the trainee.

C. Discussion.

1) Any request will be submitted in writing and include justification for the substitution as well as an implementation and evaluation plan. All training materials and study

materials, in order to include training objectives and examinations, will be provided with the request.

2) The air carrier's program must include procedures to collect data related to the home study module for the purposes of verifying home study effectiveness. Records must identify the test version taken as well as documentation of student responses. This is a procedural administrative record that is kept during the grading period. Other evaluation data documenting that the home study module is as effective as the air carrier's previously used classroom training module must also be presented to the POI and/or CSI (if applicable).

3) When a request is received from an air carrier, the POI and/or CSI (if applicable) will observe the classroom module(s) for which the air carrier has requested a home study substitution. The purpose of this observation is to determine both the quality and quantity of the current training. Based on personal observations and training materials, the inspector can more accurately ensure that the proposed home study will effectively duplicate the classroom training, which it will replace.

4) No substitutions will be considered for basic indoctrination, initial, or transition ground training. Requests for substitutions to recurrent and requalification ground training will be considered.

5) Only cognitive or knowledge-based training is eligible for consideration for home study.

6) No more than 50 percent, not to exceed 8 hours of the air carrier's approved training program's ground training hours, can be initially accomplished through home study. After the home study module has been in place for a period of 24 months, the air carrier may request additional hours of home study, not to exceed 50 percent of the required ground training. The air carrier is responsible for providing valid written justification, using data based on student records and training evaluations, for the home study for additional credit. POIs and/or CSIs (if applicable) will take into consideration presently approved classroom content and training hours when evaluating an air carrier's home study request.

a) Example one: An air carrier makes a home study substitution request for 50 percent of the 18 hours of ground training. This request cannot be approved. Fifty percent of the 18 hours of ground training is 9 hours and exceeds the 8 hour maximum substitution rate. In this case, a maximum of 8 hours may be offered through home study.

b) Example two: An air carrier conducts ground training that is 8 hours in length and requests that the entire program be conducted via home study. This request cannot be granted for the entire 8 hours. In this case, only 50 percent or 4 hours of home study training may be approved.

7) Proctored and other POI-approved testing methods are required. Examinations are required to document the acquisition of the knowledge presented through the home study module. These examinations must be valid and reliable as well as monitored and graded by someone other than the student. When testing is computer generated, administered, and graded, the computer-managed instructional testing program will immediately provide students with

correct responses to all incorrectly answered items. A combination of multiple choice, fill-in-the-blank, short answer, essay, and matching test items is acceptable. True/false questions are discouraged. No take home examinations may be used.

8) The air carrier's program must have procedures for collecting training data to include identifiable student results and test scores, a variety of tests, and direct feedback to the student on incorrect test responses. POIs and/or CSIs (if applicable) may require the air carrier to provide additional data to ensure that the overall quality of the air carrier's training program is maintained.

9) When the testing is computer generated and administered, correct responses for incorrect test responses must immediately be provided by the computer testing program. This feedback must include corrections of any misconceptions that the student may have acquired during home study.

10) Hazardous material (hazmat) training requests for a home study module must be coordinated with the regional hazmat branch manager.

11) This information does not apply to Advanced Qualification Program (AQP) applicants or participants.

3-1868 TRAINING, QUALIFICATIONS, AND OPERATIONAL CONTROL OF F/As WHO HAVE SERVED OR MAY BE SERVING AT MORE THAN ONE AIR CARRIER.

This paragraph provides information regarding the approval of F/A training programs and other procedures for F/As who have had experience with another air carrier or are presently employed by another air carrier.

A. There are no explicit regulatory provisions for one air carrier to credit training previously conducted by another air carrier. In the past, certain certificated air carriers have requested credit toward the number of programmed hours of F/A training based on the fact that F/As had already served with another air carrier. This practice is no longer acceptable.

B. Learning interference is increased when the F/As are assigned to duties on one type of airplane that is operated differently by two or more air carriers. Therefore, in some cases, it is possible that F/As experienced with one air carrier may actually need more training instead of less.

C. The F/As used by an air carrier should all complete the same training program. This training program should be sufficient for F/As to be fully qualified to operate on the aircraft for which they are to serve as an F/A in that certificated air carrier's part 121 operation. Additional training may be needed for reasons such as:

- 1) Qualification on another aircraft;
- 2) Qualification to operate in extended overwater operations;
- 3) Additional security training; and

4) Equipment differences.

D. POIs should not approve any F/A training programs or reductions in programmed hours to F/A training programs that differ from the F/A training program and programmed hours that are currently used for new hire F/As.

E. Certificated air carriers conducting operations under part 121 should have only one approved F/A training program for all F/As who will be used by air carriers holding certificates under part 121.

F. POIs and/or CSIs (if applicable) assigned to certificate holders operating under part 121 should ensure:

1) That their assigned certificate holders have one FAA-approved training program which all new F/As (regardless of experience level or present state of employment) complete before they serve as crewmembers in that air carrier's operations.

2) That additional training is provided if the POI and/or CSI (if applicable) finds it is necessary for F/As who have experience with another air carrier to receive additional training to satisfy the performance of their assigned duties.

3) That indoctrination training for F/As should contain 40 hours of training, which can be reduced to not less than 32 hours if the Administrator finds the required subject areas are adequately covered. The subjects covered should be related to safety and not include such areas as company history and company organization. Credit for programmed hours will show a direct relationship to 14 CFR, to flight operations, or to flight safety. Employee compensation/benefits and contracts, grooming, uniform dress codes, pass benefits, and other similar subjects are not appropriate for training credit toward the 40 programmed hours of FAA-approved indoctrination training.

4) That the air carrier, the pilot in command (PIC), and the F/As understand that the F/As, including those employed by another air carrier, are under the operational control of the certificated air carrier and the authority of the PIC if they are used as crewmembers in that certificated air carrier's operations conducted under part 121.

5) That all F/As, including those employed by someone other than the air carrier, use only the procedures that are contained in the air carrier's FAA accepted F/A manual.

3-1869 EVACUATION SLIDE DRILL. This paragraph addresses the application of § 121.417(c)(1)(iii). This regulation requires crewmembers to perform a one-time emergency evacuation drill with each person egressing the airplane or approved training device using at least one type of installed emergency evacuation slide. This regulation does not apply to airplanes that are not equipped with slides. This pertinent subparagraph (§ 121.417(c)(1)(iii)) affords crewmembers experience with evacuation slides on those airplanes for which evacuation slides are required. Section 121.417(c)(1)(iii) does not apply to those airplanes for which evacuation slides are not required.

3-1870 APPROVAL OF F/A TRAINING PROGRAMS AND ACCEPTANCE OF F/A

MANUALS. On June 8, 1995, a DC-9-32 was operated as a scheduled, domestic passenger flight under the provision of part 121. The flight was cleared for takeoff on runway 27R. Five crewmembers and 57 passengers were onboard. As the airplane began its takeoff roll, the airplane occupants and air traffic control (ATC) personnel heard a “loud bang.” The right engine fire warning light illuminated, the flightcrew of the following airplane reported to the crew that the right engine was on fire, and the takeoff was rejected. Shrapnel from the right engine penetrated the fuselage and the right main fuel line, and a cabin fire erupted. The airplane was stopped on the runway, and the captain ordered the evacuation of the airplane.

A. The F/A seated in the aft F/A jump seat received serious puncture wounds from shrapnel and thermal injuries. Another F/A and five passengers received minor injuries. The pilots, the third F/A, and 52 passengers were not injured. The airplane’s fuselage was destroyed.

B. The NTSB investigation of this accident resulted in recommendations to the FAA. These recommendations included A-96-83: “Emphasize to principal operations inspectors the importance of thoroughly reviewing flight attendant training programs before approving them and flight attendant manuals before accepting them.”

C. The NTSB’s investigation disclosed deficiencies in F/A training, including emergency drill training. Specifically, the training syllabus did not include hands-on operation of a tailcone release handle. While this and other deficiencies were subsequently addressed by the air carrier, the NTSB believes that the FAA should emphasize the importance of thoroughly reviewing F/A training programs before approving them, and manuals before accepting them.

D. POIs and/or CSIs should use the guidance provided in Volume 3, Chapter 23, Section 2 in approving training programs and accepting manuals. The job aid for F/A training, conducted under part 121, found in Volume 3, Chapter 23, Section 2, should be especially helpful in approving or checking F/A training programs. In addition, the job aid, Preparation of Flight Attendant Manual, found in Volume 3, Chapter 32, Section 13, provides guidance to inspectors accepting or checking F/A manuals.

E. The FAA emphasizes to POIs and/or CSIs (if applicable) the importance of thoroughly reviewing F/A training programs before approving them and F/A manuals before accepting them.

3-1871 NEED FOR F/As TO BE AGGRESSIVE IN INITIATING AIRCRAFT

EVACUATIONS. At about 1638 eastern daylight time, on October 19, 1996, an MD-88 struck the approach light structure at the end of the runway during an approach. The airplane sustained substantial damage to the lower fuselage, wings, main landing gear, and both engines. There were 58 passengers and 3 F/As onboard. Three passengers reported minor injuries. The NTSB investigation resulted in recommendations to the FAA. They included recommendation A-97-95: “Require all 14 CFR part 121 and 135 operators to review their F/A training programs and emphasize the need for flight attendants to aggressively initiate their evacuation procedures when an evacuation order has been given.” The report is available online at www.nts.gov/Recs/letters/letters.htm.

A. In general, the NTSB considers the crewmembers' responses after the airplane came to a stop as commensurate with the circumstances of this accident. First, the crewmembers assessed the condition of the airplane and reviewed their options. The captain was then informed of jet fuel fumes in the passenger cabin, at which point he promptly ordered an emergency evacuation. The NTSB concluded that the flightcrew coordination appeared adequate, and the decision to evacuate the airplane was appropriate and timely. Furthermore, the NTSB concluded that the F/A in charge reacted to the evacuation command promptly and assertively, in accordance with the air carrier's F/A manuals and training. All passengers were successfully evacuated through the L-1 door, with minimal evacuation-related injuries. Although under other circumstances, the NTSB believes that the decision to use only one exit might have had critical, negative consequences, in this case the decision to use only the L-1 door had favorable results.

B. The flight deck voice recorder transcript indicated that during the evacuation, two F/As remained in the aft cabin on the interphone trying to obtain additional evacuation instructions at least 38 seconds after the captain issued the evacuation order. About 40 seconds after the evacuation was commanded, the first officer (who had been assisting with the evacuation at the L-1 door) responded on the interphone to the aft F/As' inquiry, with instructions to evacuate "forward." The aft F/As began to participate in the evacuation. The airplane was carrying a light passenger load, with most of the passengers seated in the front half of the cabin. By the time the aft F/As began evacuation actions, most of the passengers had exited or moved toward the first-class cabin area.

C. The aft F/As stated that they sought further instructions before taking action because they were concerned that the damage to the airplane and the possibility of spilled fuel might affect the usability of their exits. According to the guidance contained in the F/A manual, when an evacuation is ordered, F/As should promptly assess the condition of their assigned exits, activate exits as appropriate, and issue guidance to passengers. The manual further states that if a F/A judges that his or her assigned exit is not usable, the F/A should redirect passengers towards an appropriate exit. The NTSB notes that it was appropriate for the aft F/As to evaluate and make a decision regarding the usability of their exits. However, a 38-second delay before beginning evacuation actions might have had adverse results under more hazardous conditions (e.g., fire).

D. The F/A manual also indicates that once an evacuation is ordered, F/As should begin the evacuation promptly, and "without further communication from the cockpit." The NTSB concluded that the two aft F/As did not react promptly or demonstrate assertive leadership, as specified in their F/A manuals and training. Therefore, the NTSB believes that the FAA should require air carriers to review their F/A training programs and emphasize the need for F/As to aggressively initiate their evacuation procedures when an evacuation order has been given.

3-1872 NTSB RECOMMENDATIONS FROM THE TOWER AIR ACCIDENT. On December 20, 1995, at 1136 eastern standard time, a Boeing 747-136, N605FF, sustained substantial damage during a rejected takeoff at John F. Kennedy International Airport, Jamaica, New York. There were 23 minor injuries and 1 serious injury among the 15 crewmembers, 462 passengers, and 6 lap children onboard. Instrument meteorological conditions (IMC) including blowing and drifting snow prevailed, and an instrument flight rules (IFR) plan had been filed. This flight was being conducted under the provisions of part 121 as a domestic, scheduled passenger/cargo flight. The subsequent NTSB investigation of this accident resulted in the

recommendations in subparagraphs 3-1872A through D. Subparagraph 3-1872E contains F/A narrative accounts of the accident. Subparagraph 3-1872F is a discussion of the galley equipment.

A. NTSB Recommendation A-96-140.

1) **Background.** According to the NTSB report accompanying this recommendation, during a recent aircraft evacuation, passengers were instructed to remove their shoes. Therefore, the NTSB issued recommendation A-96-140, asking the FAA to develop a uniform policy regarding the wearing or not wearing of shoes during an aircraft evacuation. Many safety experts believe that shoes provide protection from debris and fuel following an accident and that shoes should be worn during an aircraft evacuation. The only problem with shoes appears to be the wearing of high-heeled shoes down the slide. It is unlikely they could damage a slide; however, that possibility does exist. There is the more likely possibility that high heels could hit another person or could become wedged in various places, thus resulting in injury.

2) **FAA Policy.** The FAA believes that the proper procedure regarding shoes during an aircraft evacuation is to leave them on. In the case of a forewarned evacuation it is desirable to remove high-heeled shoes and stow them in an approved stowage area such as an overhead bin. They should not be placed in the seat pocket.

B. NTSB Recommendation A-96-156.

1) **Background.** During a recent NTSB accident investigation regarding a B-747, the NTSB report states that the NTSB determined that only 3 of the 12 F/As shouted the appropriate commands as soon as the impact sequence started. However, several of the F/As acknowledged seeing or hearing things not associated with normal operations, such as crunching and tearing noises, engine separation, and significant spillage of carry-on baggage during the airplane's off-runway excursion. The NTSB recognized that in the large cabin of a B-747, not all F/As had access to the same information about the event; therefore, F/As might have formed different opinions about the gravity of the situation. However, the Safety Board concludes that during this accident sequence, despite some ambiguity about the situation, there were ample indications in most parts of the passenger cabin to have caused a greater number of F/As to shout brace commands before the airplane came to a stop.

2) **FAA Policy.** F/As should be trained to give brace-for-impact instructions to passengers when they first suspect there is a problem that could lead to impact and/or aircraft evacuation. This training should be included in evacuation drills, door operations drills, and in classroom discussions.

C. NTSB Recommendation A-96-157.

1) **Background.** According to the NTSB report accompanying this recommendation, during the investigation of a recent accident, the NTSB determined that there was a lack of communication and coordination, which was evidenced by an inconsistent pattern of the F/A's emergency commands before the airplane came to a stop. The large cabin layout of the B-747, and the large size of its cabin was an issue in the cabin crew's communication, coordination, and actions immediately after the airplane came to a stop. While the decision not to evacuate the

airplane (made independently by the F/As and the flightcrew) may have been appropriate, these decisions were made without adequate knowledge of the post accident condition of the airplane. The F/As had vital information that they did not relay to the purser or the flightcrew. For example, F/As did not provide information to the flightcrew about the separation of the No. 4 engine, the severe floor disruption in the forward cabin, the smell of smoke and kerosene in the cabin, or the condition of the injured F/A.

a) Normally, the public address (PA) and interphone systems provide effective means of communications among F/As, and between the cabin and flight deck. In this accident, the purser was unaware that his PA announcements were only audible in the forward cabin, and thus passengers and F/As in the rear of the airplane did not receive any information about the decisions not to evacuate. Further, the purser and three F/As did not use megaphones as an alternative to these communication systems. The deadheading F/A went forward in the cabin to find out what was planned, but he did not return to the aft cabin to share the information with the other F/As.

b) The NTSB's review of F/A procedures revealed that no backup procedures had been established for communicating or assessing conditions in the post-accident contingency of inoperative or unpowered PA and interphone systems. However, the likelihood of impact damage to PA and interphone equipment, as demonstrated in this accident, indicated that such backup procedures are essential.

c) The NTSB concluded that existing F/A procedures provided inadequate guidance to F/As on how to communicate and to coordinate their actions during and after the impact sequence.

2) FAA Policy. Section 121.417 requires crewmember training on emergency equipment, including megaphones. Therefore, when crewmembers receive training conducted as part of this requirement, they should be trained on the location, function, and operation of emergency equipment, including the megaphone. In addition, crewmembers should be trained to follow specified procedures in the event that the PA system or the interphone does not work. This is especially important in large airplanes where crewmembers may need to communicate with each other without the aid of the interphone. In addition, § 121.417 requires training on crew communication and coordination during emergencies. Both emergency training and indoctrination training should include training on individual crewmember responsibilities. The individual responsibilities for F/As must be listed in the appropriate parts of the required F/A manual. Failure to include a list of the duties and responsibilities of each crewmember could be a violation of § 121.135(b)(2).

D. NTSB Recommendation A-96-158.

1) Background. According to the NTSB report accompanying this recommendation, "the NTSB concluded that the circumstances of this accident imply that F/As (particularly those assigned to wide-body aircraft) would benefit from the opportunity to practice communications procedures and coordination skills. CRM training can provide this opportunity." In addition, the NTSB decided that the "communication and coordination issues raised by this accident, both

among F/As and between F/As and flightcrew would be appropriate to be addressed in joint CRM training by providing experience and practice in a realistic, line-oriented setting.”

2) FAA Policy. Section 121.417 stipulates that a review of previous accidents and incidents should be part of the emergency training conducted under this part. The Tower Air accident that is referenced in this paragraph is a good example of the type of accident that could be used in ground emergency training and/or Crew Resource Management (CRM) training.

E. F/A Interviews. The following are the narrative accounts of the accident from each of the F/As. None of the F/As reported using any of the emergency equipment stored in the cabin.

1) F/A/Purser Seated at 1L. He was an assistant purser who was working the purser position because there was no purser on the crew.

a) He described the takeoff roll as “it felt like you weren’t going fast,” and then the airplane was “sliding a bit.” The “captain put on the brakes” and the “rumbling” felt like they were going over potholes. He saw the top drawer of the ice module come out of the galley and fall on the floor. (There was no “lever” above the ice cart in the galley.) When the airplane stopped he looked out the window and saw snow. He called the cockpit on the interphone but there was no answer. (He heard the interphone tone when he called.) He saw the disruption of the floor and he noted that some passengers in the A Zone were crying.

b) He ran upstairs to the cockpit and asked the captain what was going on. The captain said there was no indication of fire or danger and to keep the passengers in their seats. The captain also said something about keeping the passengers out of the weather. The captain told him that emergency personnel would come to the 1L door. He did not tell the captain anything about the condition of the cabin. He stated that a “retired FAA guy” was an observer in the cockpit.

c) The upper deck F/A told him that something hit her in the head during the accident. He returned to the 1L jump seat and made a PA announcement instructing passengers to remain seated. A man from 13C ran upstairs to check on “the Rabbi.”

d) A deadheading F/A came up and asked if he had talked to the captain and did they need help. The purser instructed him to “just keep people seated.” The deadheading F/A made an announcement about staying seated.

e) When the rescue personnel arrived, he tried to disarm the 1L exit. He was unable to place the mode selector in manual. He told the L1A F/A to stay at the 1L door and he went to the 1R exit where the R1 F/A placed the mode selector in manual. The purser got down on the floor to verify that the girt bar was disengaged and determined that the girt bar was still engaged. They did not attempt to open the door. He went to the 2L door and placed it in manual and the rescue personnel opened the door. The rescue personnel wanted an orderly evacuation and he made an announcement from the 2L door about how they were going to deplane.

f) The purser did not, at any time, think that they would evacuate the airplane.

g) When he made his PA announcements he thought that the entire cabin had heard the announcements. He did not believe that he made an “All Call” to communicate with the other F/As, nor did he receive any calls on the interphone. He did not use “PP” (pilot priority) when he called the cockpit. During deplaning he learned that a cart had hit an F/A.

h) The halon fire extinguisher at his station was secured in its brackets before the accident, and it was on the floor following the accident. During the accident he heard the upper deck F/A and the R1 F/A shouting commands to passengers to get their heads down. He did not shout commands. It seemed to him that the airplane was still level when it stopped. None of the F/As reported problems securing carts before departure.

2) F/A Seated at L2.

a) During takeoff she felt a “bump” and then the airplane stopped and she waited for an announcement from the captain. She smelled smoke when they stopped and she thought that the airplane was at an unusual attitude, but she did not think there was “imminent danger.” When she got up from the jump seat and looked out, all she saw was snow. She did not try to contact anyone. The R2 F/A went forward to get the purser but when he returned to the R2 door, he had not learned anything. She heard the pilots make an announcement that there was no threat of fire, that they intended to “hold off” on an evacuation in order to prevent injuries, and the Aircraft Rescue and Fire Fighting (ARFF) personnel would help them off the airplane.

b) Passengers in the C Zone could not hear the announcements and questioned her about what was happening. She said that the passenger listened to the F/As, and that no overhead bins on the left side of the C Zone opened up. She remained at her door and eventually the 2L door was opened from the outside and the ARFF personnel ordered the passengers to deplane.

c) The L2 F/A is responsible for securing the mid galley. She checked that latches were set over containers and carts and that the brakes (two pedals) on the carts were set. She was asked about the airplanes that had mushrooms in the galleys and she said the mushrooms still require that the latches be set and the brakes applied. She did not think that the accident airplane had mushrooms. She determined if a cart was secure by checking that the cart fit snugly into the storage area.

3) F/A Seated at R2.

a) During takeoff he noticed that the “power [had] come back” and he thought that they were having an aborted takeoff. He saw the No. 4 engine separate from the airplane. He monitored the passengers and the other F/As. He smelled an odor and tried to call the purser but did not get an answer. He walked forward to the middle of the B Zone and talked to the R-1 F/A. He told the R-1 F/A about the odor and the R2 F/A said he would relay it to the purser. A lot of passengers got up to get their luggage when the airplane stopped. Before the airplane came to a complete stop a bin located next to the oven in the mid galley popped out about 2–3 inches, and the L2 F/A got out of her seat to secure it. He thought that the L2 F/A was standing while the airplane was still sliding. He thought that the reason the bin came out was because the bin was smaller than the opening and the latch did not catch the top of the bin.

b) He saw one or two sidewall overhead bins open on the right side of the airplane but he did not remember luggage “flying around.” A garment bag that was stowed under a seat in the row in front of him “jumped the restraining bar under the seats” and came to rest in front of the R2 exit. A few oxygen masks fell in the C Zone. There were no lap babies on the right side of the C Zone. He did not use the interphone system following the accident. He did not receive any calls nor did he make any calls. He heard the captain make a PA announcement that said something about the pilots had done an “emergency check” and that they would wait for busses to come to the airplane to take passengers to the terminal. He thought that the PA at R2 sounded “lower than normal” after the accident.

c) When the airplane stopped he did not think that they would evacuate because he did not see evidence of fire and the captain’s announcement said that they would deplane using stairs. When they began to deplane passengers, the R1 F/A deplaned with the unaccompanied minors and the R2 F/A watched both R1 and R2 doors. He helped some of the passengers over “the bump” in the A Zone.

4) F/A Seated on Upper Deck.

a) The airplane built up speed for takeoff and then she heard a loud bang; the airplane tilted to one side and then there was another loud bang. She shouted commands, “Grab ankles,” and “Heads down.” She could hear another F/A on the main deck also shouting commands. She could only see two passengers in the upper deck and they followed her commands. During the time that she shouted commands to passengers, she attempted to bend over, but her shoulder harness straps were “really tight” and restricted her movement.

b) She followed the purser into the cockpit and heard the captain tell him to keep the passengers seated. When the purser left the cockpit he told her to keep everyone seated. She could not remember if she heard the captain give those instructions over the PA. She did not recall hearing any PA announcements nor did she speak with anyone on the interphone.

c) During the accident the “doors to the bins (in the galley) flew open and items flew out of the compartments.” The items that came out included a coffee pot and her makeup and shoes that she had stowed before takeoff. She did not remember any problems securing the galley and it was secured for takeoff. She could not remember which bins opened.

5) F/A Seated at R4.

a) She heard the engines “run up” for takeoff and after a few seconds the airplane skidded to the right on the runway. She did not hear the engines any longer and she heard a “crunching or tearing” noise and she saw the No. 4 engine “skidding down the runway.” The airplane began going up and down (about twice) and it felt like the airplane was hitting something. They stopped abruptly. While they were still moving a large number of overhead bins opened and spilled their contents. The larger, side bins spilled the greatest number of items.

b) While the airplane was going “up and down,” she heard a “metal sound” in the galley and an ice cart and a beverage cart, that was next to (aircraft left side) the ice cart came loose in the “E” galley. The ice cart hit her shoulder and then came around in front of her and stopped and remained upright in front of the unoccupied passenger seats across from her.

The beverage cart came right behind it and ended up tilted against the seats. She was tightly strapped into her jump seat and there was no way that she could get out of the way of the carts. A deadheading F/A, the L4 F/A, and a passenger pulled the carts away from her and restowed them in the galley.

c) She smelled kerosene, as did the passengers. Some of the passengers “became hysterical,” and were concerned about the smell of kerosene, the angle of the airplane, and the fact that ARFF equipment was around the airplane. If a cart had not injured her, she would have evacuated. She did not hear any PA announcements and the deadheading F/A went forward to talk to the purser. She eventually learned that they were to keep the passengers seated. She walked the aisles to check on passengers and in-lap infants. She did not use the interphone or the PA system.

d) During the accident she shouted the commands “Grab ankles, stay down” to passengers. She stated that it was “pretty loud back there” but that two to three people obeyed her commands. She noted that a woman behind the galley obeyed the commands.

e) Prior to departure she “iced down her beverage cart,” and noted that the “ice cart had a swing brake.” The ice cart was not secured to the mushroom when she obtained ice. She tried to lock it but could not. She told the L4 F/A that the cart was not secure and she asked the R5 F/A if he could secure the cart. She stated that the type of “side locks” used on the ice carts are difficult to operate. She did not double-check the galley security before takeoff because she was so busy stowing carry-on luggage. She stated that the caterers are supposed to secure the carts, but that when she works the galley she verifies cart security by “pulling on the carts very hard.”

f) She was diagnosed with a possible hairline fracture of the shoulder, a rotator cuff tear, and tissue damage in her right shoulder.

6) F/A Seated at R5.

a) He did not remember seeing any handicapped passengers or in-lap infants. He recalled that the weather was not good and the ground was covered with snow. He heard the engines start up and then die down again. The engines started up for a second time and they began the takeoff roll. He thought that the takeoff roll “felt weird” and that the speed seemed “constant for too long.” It got very, very bumpy and bouncy and he actually thought that they were off the ground. Some overhead bins opened and luggage fell out.

b) He thought that the passengers in the rear cabin stayed pretty calm. He never felt a need for an evacuation. He got out of his seat but stayed by his exit. He did not hear any announcements and he did not use the interphone to call other F/As for information. About 5 to 10 minutes later, the interphone rang and the purser instructed him to keep people seated. He went through the E Zone to see if anyone needed anything.

c) He did not notice if the emergency lights came on. He did not recall anyone speaking to him about the security of the ice module. He never works the galley and was not sure about the ice cart brakes. With other types of carts, the carts are secured by the cart’s brake and the latches mounted on the galley. He was unfamiliar with the “mushroom” restraint for the

carts. He would ensure that carts were secure by putting on the brake and putting down the latches. He assumed that he gave the cart a tug to check it, but did not count it as a step in the process because giving the cart a tug was a “habit.” He had not experienced problems securing carts—he had experienced problems getting them out from stowage. If a cart was not secure he would tell the assistant purser or get a mechanic to help him secure it.

d) On a previous flight, a senior F/A told him not to put the heavier beverage carts next to the garbage bin because the securing latch was mounted on the garbage bin door. He also recalled that carts “came out” even when latches were in place.

7) F/A Seated at L4 (Assistant Purser Position).

a) The captain made an announcement when they were deiced, and the emergency lights came on when they were deiced. It was a normal takeoff and then the airplane started sliding. The airplane stopped abruptly and the overhead bins in the E Zone opened and spilled their contents. “There was luggage all over the place.” She released her restraints and got up and looked out the window. She could see that they were off the runway and that the wing was “close to a pole.” She tried to call the purser on the interphone but was unable to reach him. She communicated with the L3 F/A who came back to the L4 position.

b) This was her first trip working the galley. She secured the galley and everything seemed normal—she did not have trouble securing anything. She said that the L4 F/A “double checked” that the latches were secured. After the accident, the secondary securing latch for the ice cart in the E Galley was “bent upwards.”

8) F/A Seated at L5.

a) The airplane stopped to deice and the emergency lights came on. During takeoff she noticed the airplane vibrating and it veered to the right and then veered to the left. She did not think that the engines “sounded right.” She did not shout commands during the event. When the airplane stopped she got up and looked out and saw transformers to the left of her exit; however, they were not blocking her exit. She did not believe that she needed to evacuate the airplane, but if one had been ordered, should would not have used the L5 exit because it was too far from the ground. She knew that the airplane was not in its “normal position and it was in a tail-high attitude.” She did not see emergency personnel outside the airplane when she first looked outside.

b) All of the overhead bins on the left side of the E Zone and the baggage spilled into the cabin. After the airplane stopped, she and the L4 F/A rested all of the luggage that spilled into the E Zone.

c) There were no announcements after the airplane stopped and she tried to call the purser on the interphone but no one answered. About 20 minutes after the accident, she heard the L4 F/A shout instructions to the passengers in the E Zone that the emergency personnel had instructed them to “release people by row.” She repeated these instructions to the passengers in the aft cabin. She attempted to call the L1 F/A, but the call was unanswered. No F/A came to the L5 door but she communicated with, or received information from, the R5, R4 and L4 F/As.

9) F/A Seated at R1.

a) The airplane began to accelerate and the engines got louder. He felt “a little movement” and the engines were reversed. The plane began “really shaking, there was a big bang that was like a crushing sound.” He heard people screaming and he began to yell commands, “Grab ankles, stay down.” The airplane came to a full stop and he stood up. He did not see any immediate danger near him or toward the back of the cabin. If he had seen anything dangerous he would have initiated an evacuation. Two seats in the middle of the A Zone (occupied by children) were unusually high above the floor. He did not hear instructions to evacuate. He looked out the window and saw snow.

b) A couple of seconds later, the purser positioned the L1A F/A at the L1 door and went to the cockpit. He heard an announcement from the cockpit to “please remain seated” and told the passengers that there was no “imminent danger” and that they would wait for the rescue personnel to get to the airplane and tell them how they would deplane. At the same time that the captain made his announcement, passengers were getting their bags down from the overhead racks. The passengers had begun to calm down although there were still some passengers who were crying. The purser returned to L1 and made a PA announcement instructing passenger to please remain seated. The captain’s announcement was much louder than the announcement made from L1.

c) The purser tried to place the 1L door’s mode selector lever to the manual position but he could not do so. The captain instructed the purser to open the 1R door. The purser had the same problem at 1R as he had at 1L. The purser then went to 2L and opened that exit. The police and an FAA official boarded the airplane and the police instructed them to deplane Zones A, B, and the upper deck, and then Zones C, D, and E.

d) The R1 F/A took charge of about five unaccompanied minors who were seated in the A and B zones and deplaned. They were transported to the gate using “people movers” and he released the unaccompanied minors to a gate agent.

e) The R1 F/A did not use the interphone after the accident; however, he used it successfully prior to departure. He secured the forward galley but the top small drawer of the ice cart came out during the impact and hit the spiral staircase and landed on the floor. The overhead bins in Zone A remained closed during the accident.

10) Deadheading F/A.

a) He was traveling in uniform and was seated in the “A” passenger seat at the L4 exit. He remembered that the engines were powered up and the runway was very bumpy. The airplane decelerated and he sensed that they had run off the runway because the airplane was going “up and down” and “side to side.” He looked around and saw a few (about 6 to 10) overhead bins that opened and spilled their contents into E Zone. Most of the bins that opened were sidewall bins on the right side of the Zone E. He said that one or two bins open during a “normal landing.”

b) When the airplane stopped, a cart came out of the forward-facing galley, hit the counter opposite it, and then hit the R4 F/A. He did not notice the attitude of the airplane

until he stood up; then he realized that the airplane was in a nose down attitude. He crossed over to R4 and pulled the carts off the R4 F/A and placed them against the galley counter. When the airplane stopped he did not have a sense of catastrophe. He did not see smoke or fire and therefore there was “never a question” of whether to evacuate.

c) He instructed passengers to remain seated. Some passengers pointed out that there were wires dangling from the right wing. He saw that a right-side engine was missing but did not see any smoke. There were no announcements and after a few minutes he walked to the front of the cabin. He saw the damage in the A Zone and asked the purser why there had been no announcements. The purser told him that there had been an announcement.

d) The R1 F/A told him that he though he smelled something unusual. They heard the captain make an announcement that the situation was manageable and that everything was okay. He walked back into the C Zone and tried to calm passengers and answer their questions. He told passengers that they were waiting for the port authority to help them deplane. He did not walk back to L4, nor did he communicate with F/As aft of the L3/R3 exits.

e) He made a PA announcement from the L2 station and explained how the port authority wanted the passengers to deplane. Passengers in the B and C zones heard the announcement because they reacted to the directions that were given.

f) The red securing latch was bent “straight out” in the space where the ice cart had come loose in the E galley. He did not notice the securing latches of the other carts. He did not remember whether the beverage cart’s brake was engaged when he pulled from the R4 exit.

F. Tower Air Galley Equipment.

1) The air carrier operated airplanes with three types of service carts. The carts are referred to by the name of the airline that previously owned the airplane. Thus, carts are referred to as Atlas carts, TWA carts, and Pan Am carts, and can only be used in the galleys of the appropriately corresponding airplanes. A brief summary of the cart’s securing devices are listed below:

- Atlas Carts: Foot pedal brake activation; are not used with mushrooms.
- TWA Carts: Foot pedal brake activation; are secured on mushrooms in galley.
- Pan Am Carts: Hand lever brake activation; secured on mushrooms in galley.

2) F/As received instruction during initial training about cart operation. A single cart is brought to the classroom and students are shown how the brakes operate and are given a chance to maneuver the cart. The demonstration cart could be any one of the three types of moveable carts that are found on their airplanes. Students are shown the galleys when they do a “walk around” on the airplane; however, no carts are in the galley during the walk around. Students are instructed to ensure that the cart is secure on the floor retainer mushrooms by pulling and shaking the cart to ensure that it will not come loose. Then they are instructed to place the secondary levers down.

3) There are no galley mockups used during classroom training. Slides and/or photographs of carts are not part of initial F/A training. Students receive a “Galley & Service Equipment” handbook during initial training that includes a diagram showing an “Atlas” cart. The booklet also describes preflight procedures for the galley. The preflight check of carts “includes testing of brakes, primary and secondary locking mechanism.”

4) The TWA-type galley includes an ice cart that differs from the other TWA carts in size and mushroom latching. The cart is larger than the other carts and only fits in one location in each galley. The ice cart remains in the galley and is not meant to be moved during the service. The ice cart locks onto a retaining tongue with a lever located on the bottom of the cart. The lever movement inserts a pin through a circular opening in the middle of the retaining tongue on the floor of the galley.

5) After the accident, the investigation team went on another airplane that had been catered and reviewed the locking mechanism of an ice cart in the aft galley complex. The lever at the bottom of the cart was difficult to move to the locked/secured position but the lever was successfully placed in the secured position by moving the lever to the full left position. Confirmation that the cart was secure was assured by pulling on the cart and determining that the cart did not move. The lever could also be moved into a secured position (full left) if the cart was positioned forward of the retaining tongue in its storage area. However, when the cart was forward of the retaining tongue, it was not possible to move the red secondary securing lever to the down position because the cart was forward of the leading edge of the galley counter.

Table 3-101. Summary of Flight Attendant Training

TYPES OF TRAINING AND QUALIFICATION	PROGRAMMED HOURS	WHEN CONDUCTED	INCLUDES	14 CFR SECTION
INDOCTRINATION	40 hrs may be reduced to 32 hrs.		Only safety-related subjects.	§ 121.415
INITIAL GROUND	16 hrs may be reduced (in addition to indoctrination training for new hires).	Before serving on aircraft of that type.	Emergency training plus competency check.	§ 121.421 § 121.433(a) § 121.417
TRANSITIONAL GROUND	No hours stipulated.	Before serving on aircraft of that type.	Emergency training plus competency check.	§ 121.421 § 121.417
DIFFERENCES*	No hours stipulated.	Before serving on aircraft with those variations.		§ 121.418(a) § 121.433(b)
RECURRENT	12 hours.*	Every 12 months (hands-on must be given every 24 months)	Emergency training plus competency check.	§ 121.427 § 121.433(c) § 121.417
EMERGENCY	No hours stipulated.	During initial, transition, and recurrent training.	Methods include: 1) Drills. 2) Actual operational. 3) Individual instruction. 4) Overall instruction.	§ 121.417
OPERATING EXPERIENCE (OE)	Five hours may be reduced to 2.5 hours.	When initial is completed and before transition.		§ 121.434

* Differences training may be included in initial, transition, and recurrent training, if applicable.

NOTE: There are usually two methods of aircraft training for new-hire F/As:

- Method 1: Initial training on each new aircraft type, followed by OE.
- Method 2: Initial training on one aircraft type followed by OE, and then transition training to the air carriers's other aircraft in that group.

Table 3-102. Crewmember Survival Training

TYPES OF TRAINING	SUBJECT AREAS	
STANDARD FIRST AID	Introduction to first aid. Mouth-to-mouth breathing. Direct pressure, elevation, and pressure points. Wounds. Burns. Head and internal injuries. Effects of heat and cold. Obtaining help in an emergency.	Respiratory emergencies. Heart attack and stroke. Tourniquets. Shock. Bandaging. Fractures, sprains, and strains. Escaping from fire. Emergency rescue.
THE WILL TO SURVIVE	Mental attitude required for successful survival. Priorities of life and their significance in survival. Actual examples of the will to survive being a factor.	The possibility of a survival situation occurring. Environmental conditions for consideration. Stresses that may be encountered. Enemies that must be overcome.
SURVIVAL SKILLS	Fire-building.	Navigation in survival.
SURVIVAL AID	Forms of artificial respiration. Treatment of fractures, dislocations, and sprains. Snake bite. Bleeding control and improvising in various environments.	Environmental problems. Shock and mandatory actions. Infections, treatment, and prevention. Significance of hygiene in survival.
AIRCRAFT ESCAPE	Location and use of emergency exits. Passenger management outside the aircraft.	Availability and use of emergency equipment.
SURVIVAL EQUIPMENT	Minimum survival gear. Life preserver operation. Water survival kits. Flotation type cushions/life vests.	First aid kit. Rafts. Operation of radios.
SIGNALING AND RECOVERY OPERATIONS	Recovery operations. Recovery devices.	Emergency signaling. Recovery techniques.
OPERATIONAL USE OF EQUIPMENT	Demonstration on use of all available survival equipment.	
DESERT SURVIVAL	Signaling techniques peculiar to deserts. Body dehydration problems. Clothing requirements. Characteristics of deserts in applicable geographic area.	Travel considerations. Water procurement in deserts. Shelter requirements. Special medical problems encountered in deserts.
ARCTIC SURVIVAL	Hypothermia. Clothing required. Travel considerations.	Hazardous conditions. Signaling techniques.
DITCHING AND	Preparation for ditching phase.	Alert phase.

WATER SURVIVAL	Ditching phase. Raft actions. Water-connected medical problems. Recovery operations.	Rescue phase. Survival needs. Signaling techniques.
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RESERVED. Paragraphs 3-1873 through 3-1890.