**U.S. Department
of Transportation**
Federal Aviation
Administration

Advisory Circular

Subject: Communication and Coordination Between Flightcrew Members and Flight Attendants	**Date:** 1/27/20 **AC No:** 120-48A **Initiated by:** AFS-200 **Change:**

1 PURPOSE OF THIS ADVISORY CIRCULAR (AC).

1.1 This AC provides updated guidance for flight and cabin crews regarding communications during emergency and unusual situations. The guidance reflects current industry knowledge based on research and lessons learned from relevant accidents and incidents over the last 40 years. The guidance includes information for cabin operations (standard operating procedures (SOP)), crewmember training, and Safety Management System (SMS)/safety culture.

1.2 The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies.

2 AUDIENCE.
The primary audience for this AC is managers of flight operations training, in-flight managers, and air carrier curriculum designers who develop, implement, and revise SOPs and training programs on crew communication and coordination. This AC is intended for certificate holders who conduct operations under Title 14 of the Code of Federal Regulations (14 CFR) that include both flightcrew members and flight attendants. Principal Operations Inspectors (POI) and Aviation Safety Inspectors—Cabin Safety (ASI-CS) (where applicable) should also be familiar with the contents of this AC.

3 WHERE YOU CAN FIND THIS AC.
You can find this AC on the Federal Aviation Administration's (FAA) website at http://www.faa.gov/regulations_policies/advisory_circulars.

4 WHAT THIS AC CANCELS.
AC 120-48, Communication and Coordination Between Flight Crewmembers and Flight Attendants, dated July 13, 1988, is canceled.

5 RELATED REGULATIONS.
The following regulations are available at https://www.ecfr.gov. Title 14 CFR:

- Part 1, § 1.1.

- Part 91, §§ 91.3, 91.1067, 91.1073, 91.1097, and 91.1105.

- Part 121, §§ 121.131, 121.133, 121.135, 121.392, 121.397, 121.417, 121.421, 121.433, 121.533, 121.542, 121.571, and 121.805(b)(1).

- Part 125, §§ 125.73, 125.269, and 125.289.

- Part 135, §§ 135.23, 135.100, 135.123, 135.295, 135.329, 135.341, and 135.349.

6 RELATED READING MATERIAL.

6.1 Reports and Studies:

- "Both Sides of the Cockpit Door: A Global Study of Pilot/Flight Attendant Coordination and Communication," Lori J. Brown.

- "The Efficacy of Flight Attendant/Pilot Communication in a Post-9/11 Environment: Viewed from Both Sides of the Fortress Door," Lori J. Brown and William G. Rantz (refer to page 227 of the Summer 2010 International Journal of Applied Aviation Studies, Volume 10, Number 1 at https://www.faa.gov/about/office_org/headquarters _offices/arc/programs/academy/journal/pdf/Summer_2010.pdf).

- "Cockpit/Cabin Communication: I. A Tale of Two Cultures," Rebecca D. Chute and Earl L. Wiener (refer to the 1995 International Journal of Aviation Psychology, Volume 5, Issue 3 at https://human-factors.arc.nasa.gov/awards_pubs/publication_view.php?publication_id=565.

- "Cockpit/Cabin Communication: II. Shall We Tell the Pilots?" Rebecca D. Chute and Earl L. Wiener (refer to the 1996 International Journal of Aviation Psychology, Volume 6, Issue 3 at https://human-factors.arc.nasa.gov/awards_pubs/publication_view.php?publication_id=566).

- "The Pilot/Fight [sic] Attendant Communication and Joint Training Survey," Lori J. Brown and John Niehaus (refer to "The Efficacy of Flight Attendant/Pilot Communication in a Post-9/11 Environment: Viewed from Both Sides of the Fortress Door").

- The Airbus "Flight Operations Briefing Notes, Cabin Operations, Effective Briefings for Cabin Operations" (refer to https://www.cockpitseeker.com/wp-content/uploads/goodies/ac/a320/pdf/data/FLT_OPS-CAB_OPS-SEQ01.pdf).

- "Lithium Battery Fire Tests," Harry Webster of the FAA William J. Hughes Technical Center at https://www.fire.tc.faa.gov/pdf/systems/Lithium-ion_battery_04112006.pdf.

6.2 FAA Documents (current editions):

- AC 120-51, Crew Resource Management Training.

- AC 120-80, In-Flight Fires.

- AC 120-88, Preventing Injuries Caused by Turbulence.

- The Aeronautical Information Manual (AIM).

7 **BACKGROUND.** The FAA published AC 120-48, Communication and Coordination Between Flight Crewmembers and Flight Attendants, on July 13, 1988 to provide information and guidance on common problems associated with crew coordination and communication between the flightcrew and flight attendants. The AC was based on the Department of Transportation's (DOT) report, DOT/FAA/FS-88/1, Cockpit and Cabin Crew Coordination, which is available through the John A. Volpe National Transportation Systems Center in Cambridge, MA, or the National Transportation Library's (NTL) Repository and Open Science Access Portal (ROSAP) at https://rosap.ntl.bts.gov/view/dot/9786.

7.1 Crew communication and coordination are the foundation of safety during normal and emergency operations. Since AC 120-48's original publication in 1988, additional data has been collected through accident investigations and the FAA's SMS. On May 19, 2009, the FAA received the National Transportation Safety Board (NTSB) Safety Recommendation A-09-027, which identified a need to revise AC 120-48 to update guidance provided to cabin and flight crews regarding communications during emergency and unusual situations to reflect current industry knowledge based on research and lessons learned through relevant accidents and incidents over the last 20 to 40 years.

7.2 The lessons learned from aircraft accidents that happened more than 20 years ago still provide relevant information to today's aviation community. By learning from the past, aviation professionals can use that knowledge to recognize key factors, and potentially prevent another accident from occurring under similar circumstances or for similar reasons in the future. The FAA maintains a web page that catalogues civil aviation accidents and discusses accident causes and ways the accident could have been mitigated or prevented. Refer to the Lessons Learned From Transport Airplane Accidents web page at https://lessonslearned.faa.gov/transport.cfm.

7.3 AC 120-51 provides guidance for certificate holders on how to focus on communication skills, teamwork, task allocation, and risk-based decision making to increase the efficiency of a crewmember's performance. AC 120-51 and AC 120-48 complement each other and present guidelines for developing solid training for crewmembers and other personnel essential to flight safety.

7.4 To ensure that flightcrew and flight attendants understand the importance of crew communication and coordination, training should address the crucial skills to obtain the results necessary to meet the demands. Standardizing operating procedures and training/qualification programs that include joint training help accomplish those goals. Aligning flightcrew and flight attendant procedures to ensure a proper and complete interface is critical to control the risks associated with crew miscommunication and lack of crew coordination.

7.4.1 A prerequisite for crew coordination is effective communication between all crewmembers. Improving coordination between crewmembers lies not only in improving communication between them, but also in increasing their knowledge and awareness of each other's duties at each stage of the flight so they can be sensitive to the other's level of workload. This knowledge helps to avoid miscommunication, unrealistic expectations,

and inappropriate requests of each other. During emergencies, each crewmember should know what to expect from the other crewmembers so they can work together effectively (refer to "Cockpit/Cabin Communication: I. A Tale of Two Cultures").

7.5 On September 11, 2001, terrorist attacks changed the aviation world in many ways. The flight deck door became a reinforced barrier between the flightcrew and flight attendants, making the interphone the main vehicle for communication. Procedures were established to prohibit the opening of the door during flight, except for certain circumstances (e.g., physiological break). As a result of the events of September 11, 2001, AC 120-48 was revised to address the communication and coordination issues regarding an increased security in which crewmembers now work.

7.5.1 The 2009 study, "The Pilot/Fight [sic] Attendant Communication and Joint Training Survey," by Lori J. Brown and John Niehaus, sought to identify gaps that impede effective communication in a post-9/11 environment from a global prospective. Some of the same pre-9/11 issues were identified in the previous study completed by Rebecca D. Chute and Earl L. Wiener in 1995. Data from the "Pilot/Fight [sic] Attendant Communication and Joint Training Survey" shows many of these same issues exist globally today.

7.5.2 "Flight Attendant/Pilot Communications and Safety Issues in a Post 9/11 Environment," a 2009 study by Lori J. Brown, states, "A number of factors have influenced the quality of communication between the cockpit and cabin crews over the years. One factor is the growth of industry. Within small airlines, communication between the two crews is rarely a problem; the same cockpit and cabin crews fly together often and tend to know each other quite well. In today's world of acquisitions or mergers, unfamiliarity among crewmembers complicates the problem. Traditionally, the commercial airliner has been separated into two geographical and sociological environments: the cockpit and the cabin. Each environment has distinct boundaries, space constraints, technological differences, and cultures. Additionally, in most U.S. airlines, pilots and flight attendants are administratively separated into two departments that operate independently. This separation of the two departments can even lead to inconsistencies such as discrepancies in manuals and procedures. The fragmentation fosters the feeling that there are two crews rather than one."

7.5.3 "Cockpit/Cabin Communication: I. A Tale of Two Cultures," states, "It is these differences (and more) that contribute to misunderstandings and problems in coordination and communication on the part of airline crews in the performance of their duties. These issues can become even more apparent when, in abnormal situations, the two crews must unite and act as a cohesive team."

8 **AREAS TO CONSIDER.** The areas in paragraphs 8.1 through 8.12 below should be considered as air carriers develop training programs/scenarios for communication and coordination between crewmembers.

8.1 **SOPs.** Develop SOPs for crew communication and coordination. Aligning procedures in the flightcrew and flight attendant manual is necessary to achieve effective communication and coordination.

8.1.1 Flight attendants should provide pertinent information and updates to the captain to help in their decision making. Flight attendants are the eyes, noses, and ears for the flightcrew, and the information they relay is vital to ensure the safety of both passengers and crew.

8.1.2 It is vitally important that flight attendants are given adequate time to prepare the cabin and themselves for taxi, takeoff, and landing. SOPs will establish a procedure for the flightcrew to inform the flight attendants when takeoff or landing is imminent. In addition, an air carrier should establish procedures for a flight attendant to inform the flightcrew when the cabin is secure for pushback/door closure, takeoff, and landing.

8.1.3 Due to increased air traffic, taxi times can be extended and therefore require additional communication between the flightcrew, flight attendants, and passengers. It is important to establish procedures with standardized communication to avoid miscommunications when a flightcrew stops during taxi for an extended period. It is vital that flight attendants are given adequate time to prepare the cabin and themselves for takeoff and landing, especially since most accidents occur during these critical phases of flight.

8.1.4 The potential for problems is heightened when meal or beverage service is offered on very short flights and/or during extended tarmac delays (refer to the DOT Tarmac Delays web page at https://www.transportation.gov/individuals/aviation-consumer-protection/tarmac-delays).

8.1.5 The flightcrew should allow the flight attendants sufficient time to be seated with their seatbelts fastened, and flight attendants should notify the flightcrew when all pretakeoff and prelanding duties have been completed and the cabin has been secured. When flight attendants convey information to the flightcrew, the information should be timely and specific.

8.2 **Common Language.** Establish a common language for both normal and emergency operations. Crewmembers should understand the procedures to follow for a specific event and its severity, and should have a clear understanding of the duties and responsibilities performed by each crewmember.

8.3 **Threat and Error Management.** Incorporate threat and error management tools to ensure crewmembers actively assess their surroundings, communicate with other crewmembers, and verify the information to reduce the possibility of error.

1. Actively Assess—Standards to monitor the activity in the flight deck and the cabin prevent a crewmember from making a decision that could compromise the safety of the flight.

2. Communicate—Ensure both pilots and flight attendants are verbalizing events and concerns in a timely manner. Crew coordination can only occur if all parties are aware of the situation or concern.

3. Verify—Verifying the information will prevent miscommunication and provide additional understanding of the scope of the situation or concern.

4. Situational Awareness—A person's ability to identify process and comprehend the critical elements of information within their surroundings to determine options for the best outcome of an event.

8.4 **Crew Briefing.** Perhaps the single most important procedure for setting the stage for good coordination between flightcrew members and flight attendants is the preflight briefing, as it sets the expectations and tone for the flight. Conducting relevant and timely briefings, including feedback, supports effective communication. Most airlines consider the preflight briefing an SOP.

8.4.1 It is recommended that the captain, with all crewmembers present, conduct a preflight briefing before each flight. If all crewmembers cannot be present, a designated crewmember will ensure crewmembers not present are provided the information prior to departure.

8.4.2 The Airbus "Flight Operations Briefing Notes, Cabin Operations, Effective Briefings for Cabin Operations" state, "The aim of briefings is to establish a clear plan of action, communicate and exchange information, to ensure there is a common understanding between all crewmembers…. Although the work of the flight crew and cabin crew is very different in nature, the flight crew and the cabin crew work as one crew, with a common goal, the safe completion of the flight. The sharing of information from the cockpit to the cabin, and from the cabin to the cockpit is essential to the safety of the flight." See paragraph 7.4 for more information on improving coordination between crewmembers.

8.4.3 The preflight briefing should include the following topics, but are not limited to:

- Crew introductions/crew complement;
- Passenger count;
- Weather conditions;
- Security information;
- Aviation safety inspector (ASI), Federal Air Marshal (FAM), Federal Flight Deck Officer (FFDO), Law Enforcement Officer (LEO), or jump seat riders;
- Preflight inspections, writeups, or maintenance issues;
- Flight deck entry/exit procedures and jump seat and oxygen operation;
- Issues related to taxi, takeoff, and landing (e.g., short/long taxi); and
- Chimes used for normal and emergency signals.

8.4.3.1   Additional briefing topics include, but are not limited to:

1. Procedures for lithium battery overheating:

    - AC 120-80;

    - "Lithium Battery Fire Tests," by Harry Webster of the FAA William J. Hughes Technical Center; and

    - Notice N 8900.430, Procedures for Fighting In-Flight Fires Associated With Portable Electronic Devices and Lithium Batteries When Using Commercially Marketed Containment Products;

2. Passenger information (e.g., passengers with disabilities, prisoners, FAA inspectors); and

3. Aircraft configurations and equipment (familiarity of the variations within the fleet, i.e., door operation, public address (PA) system, inoperative (INOP) equipment reporting once in flight, etc.).

8.5   **Sterile Flight Deck Procedures.** Ensure both pilots and flight attendants have the same understanding of what "sterile flight deck" means and the risks associated with communication during this time. Section 121.542 requires compliance with sterile flight deck rules.

8.5.1   Section 121.542 prohibits flightcrews from performing nonessential activities during the following phases of flight: taxi, takeoff, landing, and all other flight operations conducted below 10,000 feet, except cruise flight. Compliance is vital, since sterile flight deck infractions have been identified in several accidents as a latent hazard.

8.5.2   Training and testing will improve flight attendant decision making regarding what warrants contacting the pilots during sterile flight deck. Serious repercussions could be the result of any hesitancy or reluctance on the part of the flight attendant to contact the flightcrew with important safety information (i.e., abnormal situations; passenger(s) not seated for takeoff or landing; medical emergency; fire, fumes, or smoke in the cabin; a security threat; unusual aircraft noises or smells; etc.) due to a misconception of the sterile flight deck rule.

8.6   **Turbulence.**

8.6.1   During turbulence, if the flightcrew has not notified the flight attendants to take their seats and it is too severe to continue the service, flight attendants should sit down immediately and fasten their restraint/seatbelt or sit in an empty passenger seat until it is safe to get up. If no seats are available, instruct a passenger to hold onto them until it is safe for them to return to their jump seat. If possible, notify the flightcrew, as they may be unaware of the intensity of turbulence experienced in the cabin. This will encourage the flightcrew to illuminate the "Fasten Seatbelt" sign and coordinate with air traffic control (ATC) for possible flight altitude level adjustments, if applicable.

8.6.2 Close coordination between cabin and flightcrew members can facilitate the timely completion of cabin services and preclude the exposure of flight attendants to potential injury during known or anticipated encounters with turbulence.

8.6.3 Communication between the flight deck and the cabin should include turbulence intensity. Using common language is encouraged because having too many types or levels of turbulence may cause interpretation issues based on a person's subjective understanding of turbulence levels. Developing common language in the manual system should assist both the pilot and the flight attendants in understanding the actions to be taken during the turbulence, and to identify the level of intensity (e.g., the turbulence levels described in the AIM). If there has not been communication from the flightcrew, and flight attendants feel that the turbulence poses a risk to be in the aisles (especially with carts), that information should be relayed to the pilots. This communication is necessary in determining the actions flight attendants will take (e.g., stowing carts, securing themselves in jump seats).

8.6.4 The flightcrew should inform the flight attendants of anticipated turbulence prior to flight (during the preflight crew briefing) because notification en route may come too late to prevent injury.

8.6.5 During flight, pilots should inform flight attendants of the immediacy and intensity of unexpected turbulence so they can secure the cabin or be seated immediately. Flight attendants should call the pilots when they feel there is a safety issue with moving throughout the cabin during turbulence.

> **Note:** Refer to AC 120-88.

8.7 Seatbelts. Flight attendants should inform the flightcrew when the "Fasten Seatbelt" sign has been left on for an extended period. The flightcrew and cabin crew are encouraged to keep the passengers updated during extremely long flights to prevent passengers from ignoring the "Fasten Seatbelt" sign due to physiological necessity.

> **Note:** Consider having periodic check-in calls on longer flights to ensure effective communication and to provide updates.

8.8 Emergency Operations. Threats to the safety of the flight increase during an emergency. When good crew communication and coordination are utilized, errors can be avoided or at least recognized quickly. It is essential that the procedures between the flightcrew and the flight attendants be aligned and properly and completely interface.

> **Note:** It is understood that preparation time and conditions could change without notification. Situational awareness is critical (refer to the FAA TV Human Factors: Situational Awareness video at https://www.faa.gov/tv/?mediaid=1150).

8.8.1 Due to the nature of an emergency, there is no way to create procedures for every possible scenario. Training programs should include (but are not limited to) procedures for the following:

- Unplanned/planned emergencies;

- Water/land evacuations;

- Medical emergencies;

- Decompression;

- Fire and smoke;

- Incapacitated crewmember(s); and

- Crew briefings/emergency.

8.8.2 During emergency conditions, the flightcrew is primarily responsible for maintaining control of the airplane. However, as conditions permit, it is critical that the flightcrew brief the flight attendants as soon as practical on:

- The nature of the emergency;

- Time available;

- Preparation for possible evacuation, if necessary;

- Special instructions (e.g., to use only one side of the aircraft for evacuation); and

- Brace signal.

Note: One example of a mnemonic device used in industry for emergency operations is the acronym, TESST:

T: Type of emergency.
E: Evacuation necessary?
S: Signal for brace position.
S: Special instructions.
T: Time available.

8.8.3 The quality and timing of the information given to the flight attendants is extremely important in an emergency. Communications from the flightcrew should be clear, precise, and instructional. This will enable the flight attendants to carry out their duties/procedures more effectively. This also applies to the flight attendants as they communicate with the flightcrew.

8.8.4 The study, "Cockpit/Cabin Communication: II. Shall We Tell the Pilots?" by Rebecca D. Chute and Earl L. Wiener states, "It is essential that cabin crews are knowledgeable concerning aircraft systems and basic components. Valuable time can be wasted in the inaccurate transfer of information, especially when pilots cannot leave the flight deck to validate the accuracy of the information. Nobody expects a flight attendant to possess a pilot's knowledge of an aircraft, but some basic knowledge of the parts and terminology is necessary in order to convey information in a timely and accurate manner. When the information is not correctly stated, misunderstanding, distrust, and possibly derision ensue."

8.9   Postflight Debriefing and Safety Reports.

8.9.1   At the conclusion of the trip, the flight attendant in charge (IC)[1] or the single flight attendant can utilize the postflight debriefing concept to enhance crew communication and coordination.

8.9.2   A debriefing provides an opportunity for the crew to provide timely feedback regarding the flight. This is especially helpful when there have been operational challenges with lengthy delays, excessive carry-on luggage, problems with child restraint devices, disruptive or disgruntled passengers, exit seating, and groups of passengers with special needs. Ensure crew coordination involving incidents that require the use of the company's safety reporting system (e.g., passenger smoking, tampering with or disabling a lavatory smoke detector, disturbances involving alcohol, or a passenger's serious illness or death) is documented.

8.10   Training. Crew coordination should include instructing flightcrew members and flight attendants on each other's emergency procedures, codes, signals, and safety-related duties. In an emergency, it is vital that each crewmember interpret emergency signals and codes in the same way. For example, code words or signals for hijacking or evacuation are useless unless each crewmember is aware of their meaning.

8.10.1   The FAA strongly endorses joint crewmember training, especially for emergency training and Crew Resource Management (CRM), to develop and practice skills and procedures as a team.

8.10.2   Emergency procedures for flightcrew members and flight attendants should be compatible, creating an understanding of what each one's duties and responsibilities are. The study, "Cockpit/Cabin Communication: I. A Tale of Two Cultures," states, "Segregated training compounds the problem by creating gaps in the instruction that crews receive. As an example, through personal observation in a recurrent training class at a major air carrier, we learned that flight attendants from one airline had been trained for nine years that in an emergency they could expect to receive four critical pieces of information from the cockpit crew: type of emergency, signal to brace, signal to evacuate, and time available to prepare. Not one of the pilots had ever heard of this and all had difficulty guessing what the four pieces of information might be."

8.10.3   Initial and recurrent training curriculum elements for crewmembers should include, but are not limited to, notification and communication procedures between the cabin and flight deck that consist of:

- Flight deck and cabin chimes, and interphone signals for routine situations;

- Flight attendant notification to the flightcrew that the aircraft is ready for movement on the surface;

- Flightcrew notification to the flight attendants to be seated prior to takeoff;

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[1] Flight attendant "in charge" may also be referred to as the "A," lead, Purser, or Senior Flight Attendant.

- Flight attendant recognition of the critical phases of flight;

- Crewmember coordination and notification regarding access to the flight deck;

- Notification to the flight attendants of turbulent air conditions;

- Notification between the flightcrew and the flight attendants of emergency or unusual situations;

- Notification between the flightcrew and the flight attendants of inoperative equipment that is pertinent to flight attendant duties and responsibilities;

- Normal and emergency communication procedures to be used in the event of inoperative communication equipment; and

- In-flight medical emergencies.

8.10.4 It is recommended that training involving crew coordination extensively utilize scenario-based training (SBT). Through SBT, a training organization can identify areas where the flightcrew or flight attendants are not performing at or above the margin of safety. The data collected through knowledge validations drives continuous improvement and a higher level of safety.

8.11 Crew Interference/Passenger Misconduct.

8.11.1 An incident that constitutes interference with a crewmember in the performance of his or her duties occurring during the time the aircraft is operational is a violation of Federal regulations and statutes and must be investigated and processed by a Federal officer.

8.11.2 Within the United States, the jurisdiction for investigation of criminal offenses aboard aircraft rests with the Federal Bureau of Investigation (FBI). In cases of aircraft arrivals at an airport where the agent has to drive from a downtown office or from his or her residence after normal duty hours, early notification and coordination with the company and pilots is essential. Local police and the FBI will provide mutual support for responses and the processing of cases that are criminal violations.

8.11.3 Regardless of the agency or department that provides the initial law enforcement response, the crew should be able to identify the suspect, the victim, and, if possible, several witnesses. The more information that can be obtained by the crew prior to landing, the faster processing will go after the aircraft lands.

8.11.4 The involvement of the crew supports the successful prosecution of the offense. If the crew does not have time to coordinate and provide written statements, law enforcement efforts are significantly hampered (refer to the FAA Passengers & Cargo: Unruly Passengers web page at https://www.faa.gov/data_research/passengers_cargo/unruly_passengers/).

8.12 Monitor and Measure. Monitor and measure the crew communication and coordination SOPs and training to evaluate their performance and effectiveness. Identify deficiencies to improve the level of safety. Through the collection, analysis, and assessment of the

information gathered, the organization can continuously improve the level of safety performance (i.e., SMS, Advanced Qualification Program (AQP), Aviation Safety Action Program (ASAP), Safety Assurance System (SAS), and Internal Evaluation Program (IEP)).

8.12.1 Continuing Qualification or Recurrent Training. Flightcrews and flight attendants work independently of supervision and may not interact with the organization for extended periods. Continuing qualification or recurrent SBT provides the crews the opportunity to practice (classroom and hands-on) scenarios that could become actual emergencies on board the aircraft.

> **Note:** The NTSB Aviation Accident Reports web page (https://www.ntsb.gov/investigations/AccidentReports/Pages/aviation.aspx) and the FAA Lessons Learned from Civil Aviation Accidents web page (https://lessonslearned.faa.gov/index.cfm) will assist in obtaining reports for training scenarios.

8.12.2 Computer-Based Training (CBT). CBT is also referred to as distance learning, electronic learning, and virtual training. This training can be utilized to validate a crewmember's knowledge of the crew communication and coordination procedures not covered during the scenario-based module, and serves as a data stream for crew understanding and knowledge retention. It will also identify areas in the data analysis for continued improvement. It is used only to supplement training.

8.12.3 Data Collection. The data acquired through monitoring the operation, training validations, employee reporting systems, and investigations will identify trends that may lead to an unsafe operating environment.

8.12.4 Analysis. Analysis of the data collected will determine if the procedures and/or associated training currently in use will or will not provide an acceptable level of safety. The organization utilizes the analysis to validate the crew communication, coordination procedures, and training or validate the need for change.

8.12.5 Evaluate Effectiveness. To encourage and support ongoing learning at a dynamic level, it is important that the training departments monitor and measure the effectiveness of the procedures and associated training once developed. The data collected provides a source of information to the organization regarding crew communication and coordination safety performance. This safety assurance process ensures the highest level of safety through continuous improvement.

9   AC FEEDBACK FORM. For your convenience, the AC Feedback Form is the last page of this AC. Note any deficiencies found, clarifications needed, or suggested improvements regarding the contents of this AC on the Feedback Form.

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APPENDIX A. LESSONS LEARNED THROUGH RELEVANT ACCIDENTS AND INCIDENTS

The following event summaries use information from the National Transportation Safety Board (NTSB) Aviation Accident Reports that document crewmember communication as a contributing factor in these accidents. The accident or incident is briefly summarized, the NTSB's identified contributing factors are listed, and the FAA's lessons learned are provided. Training programs that include scenario-based training (SBT) based from actual accidents may further the understanding and comprehension of crewmember procedures during such events. "Lessons Learned" will allow for a much broader knowledge base and responses that will result in a higher probability of an effective alignment of the flight deck or pilots' and the cabin or flight attendant's procedures.

EVENT — September 28, 2007:

A McDonnell Douglas DC-9-82 (MD-82) experienced an engine fire on climbout from Lambert-St. Louis International Airport.

The NTSB identified contributing factors that included crewmember communication were:

1. Two flight attendants seated in the aft cabin discussed hearing popping noises they thought could be associated with the left engine. Neither conveyed this information to the flight deck or the lead flight attendant.

2. After landing, the pilots did not seek information from the flight attendants because they believed the flight attendants would pass any significant information to them. However, long after the fuel spill, during the debriefing on the ground, a flight attendant stated she had smelled fuel earlier, but she did not pass this information to the flight deck when it happened.

LESSONS LEARNED:

To maintain readiness during unusual events that do not require an immediate evacuation, pilots and flight attendants should continually assess the situation for changes by actively exchanging information about conditions inside and outside of the airplane. For example, pilots should solicit information from available resources, including flight attendants, air traffic control (ATC), and Aircraft Rescue and Fire Fighting (ARFF) personnel. Flight attendants should determine the usability of emergency exits and provide this information to the flightcrew. Exchanging this type of information can help a crew maintain readiness to evacuate if necessary.

NOTE: The NTSB has had longstanding concerns about the need for effective communications between pilots and flight attendants. There have been numerous safety recommendations and reports on this subject.

REFERENCE(S):

NTSB Aircraft Accident Report NTSB/AAR-09-03 at
https://www.ntsb.gov/investigations/accidentreports/reports/aar0903.pdf.

EVENT — March 5, 2015:

A Boeing MD-88, on landing at LaGuardia Airport, departed the left side of the runway, made contact with the airport perimeter fence, and came to rest with the airplane's nose on an embankment next to Flushing Bay.

The NTSB identified contributing factors that included crewmember communication were:

1. The flight and cabin crews did not conduct a timely or an effective evacuation because of the flightcrew's lack of assertiveness, prompt decision making, and communication, and the flight attendants' failure to follow standard procedures once the captain commanded the evacuation.

2. The flight attendants were not adequately trained for an emergency or unusual event that involved a loss of communications after landing, and the flight attendants' decision to leave their assigned exits unattended after the airplane came to a stop resulted in reduced readiness for an evacuation.

3. ARFF personnel may have arrived at the accident scene sooner if they had received more timely and precise information about the accident and its location.

4. Even though the initial uncertainty regarding the total number of passengers aboard the accident flight, including lap-held children, did not lead to any adverse outcomes, such uncertainty could be detrimental under other accident circumstances, especially if search and rescue efforts are needed.

NTSB RECOMMENDATIONS:

- Flight attendant training programs that include scenarios requiring crew coordination regarding active monitoring of exit availability and evacuating after a significant event that involves a loss of communications.

- Develop best practices related to evacuation communication, coordination, and decision making during emergencies.

REFERENCE(S):

NTSB Aircraft Accident Report NTSB/AAR-16/02 at
https://www.ntsb.gov/investigations/AccidentReports/Reports/AAR1602.pdf.

EVENT — July 9, 1995:

An ATR 72-212 aft passenger door separated after takeoff from O'Hare International Airport at an altitude of 600 feet. The flight attendant at the door stated she did not think of calling the flight deck when she heard the sound of the door leak before it separated, because the aircraft was under sterile flight deck conditions. When asked as to what conditions she would call the flight deck during the sterile period, she responded she would for fire or a problem passenger.

According to the No. 1 flight attendant, she did not use the interphone to contact either the No. 2 flight attendant or the flight deck crew regarding the noise from the door. When asked to describe the procedure for closing the door, the No. 1 flight attendant twice stated that you pull the door up, disconnect the pin, and pull down on the handle to lock the door. After an Association of Flight Attendants-CWA (AFA-CWA), AFL-CIO union representative reminded her that this airplane had the new modified door, she corrected herself and said you "pull the handle up" to lock the door.

Confusion over the interpretation of the sterile flight deck rule is not unusual, as our studies have shown. The study, "Cockpit/Cabin Communication: II. Shall We Tell the Pilots?" by Rebecca D. Chute and Earl L. Wiener, states:

> "Flight attendants… are now expected to determine which situations are essential to the safe conduct of the flight [regarding sterile cockpit]. So consider… what we have called 'the flight attendant's dilemma.' [He/]She must not only be concerned about the reception [he/]she will receive [from] the cockpit, but must also pass judgment on whether the information [he/]she considers conveying to the captain is 'critical'... The scales appear to be tipped toward taking no action. Rather than take the chance of being wrong and thereby breaking the law, or at the least embarrassing themselves and perhaps subjecting themselves to a reprimand from the captain, they [may] likely opt not to communicate valuable, safety-related information to the pilots [due to the lack of training]. The puzzlement is that it is hard to say which choice is 'erring on the side of caution.' Whose caution? The flight attendant's caution over the possibility of violation and/or reprimand, or over a possible accident or unmanageable cabin situation? The Dryden accident is a tragic reminder of opportunities lost."

REFERENCE(S):

- "Cockpit/Cabin Communication: II. Shall We Tell the Pilots?" by Rebecca D. Chute and Earl L. Wiener from the 1996 International Journal of Aviation Psychology, Volume 6, Issue 3 at https://human-factors.arc.nasa.gov/awards_pubs/publication_view.php?publication_id=566.

- NTSB Identification: CHI95IA215 at https://www.ntsb.gov/_layouts/ntsb.aviation/brief2.aspx?ev_id=20001207X03883&ntsbno=CHI95IA215&akey=1.

EVENT — March 10, 1989:

A Fokker F28-1000 crashed on takeoff from Dryden Regional Airport.

During the stop in Dryden, heavy snow fell and ice accumulated on the wings. Passengers questioned the cabin crew about snow accumulations. However, these questions were not passed on to the flightcrew. The company's procedures, at the time of the accident, discouraged communication between the flightcrew and cabin crewmembers regarding operational issues. Relaying questions from the passenger cabin would have been considered outside the scope of cabin crew duties, and was therefore not conducted.

In a fully functional Crew Resource Management (CRM) environment, safety-related information from passengers or other crewmembers should be encouraged, as cabin crewmembers are considered to be a CRM resource, and within operational protocols (such as communicating during takeoff roll) should be expected to identify a potential safety issue to the flightcrew.

An off-duty pilot (passenger) was also concerned about the snow, but did not inform the cabin crew or flightcrew out of professional courtesy.

On the second rotation, the airplane lifted off the runway. No altitude was gained and the aircraft settled in a nose-high attitude, striking trees. The aircraft crashed, and came to rest in a wooded area and caught fire. The pilots, 1 flight attendant, and 21 passengers were killed. Forty-four passengers and one crewmember survived with injuries.

LESSONS LEARNED:

1. Flightcrew communications regarding safety issues should be open and effective.

2. Each crewmember must clearly give and receive communication in such a way that the flight safety decisions can be made appropriately.

REFERENCE(S):

- FAA Lessons Learned From Transport Airplane Accidents website at https://lessonslearned.faa.gov/ll_main.cfm?TabID=1&LLID=31.

- FAA Accident & Incident Data web page at https://www.faa.gov/data_research/accident_incident/.

EVENT — August 19, 1980:

A Lockheed L-1011, took off from Riyadh International Airport.

Seven minutes after takeoff, an aural warning indicated smoke in the aft cargo compartment. In response to information received from the flight attendants, the Flight Engineer (FE) went into the passenger cabin and reported there was fire and smoke in the aft area of the cabin. The captain decided to return to Riyadh.

During the return flight, the flight attendants attempted to fight the fire, which had burned through the cabin floor fire extinguishers. The aircraft landed back at Riyadh some 20 minutes later, and did not make an emergency stop, but instead taxied off the runway to a taxiway. It was several minutes after stopping before the engines were shut down. Following the landing, and prior to initiation of an evacuation, all of the occupants were incapacitated by the smoke and fire inside the airplane. An evacuation was never initiated. All 301 passengers and crew perished in the fire.

LESSONS LEARNED:

1. Having and using an emergency evacuation checklist would have enabled the crew's ability to properly configure the airplane and rapidly initiate an evacuation that could have saved lives.

2. The failure of the captain to prepare the cabin crew for immediate evacuation upon landing, and his failure in not making a maximum stop landing on the runway, with immediate evacuation.

3. The failure of the captain to properly utilize his flightcrew throughout the emergency.

4. The failure of headquarters management personnel to ensure that its personnel had adequate equipment and training to function as required during an emergency.

In "Communication from the Cabin Crew To the Cockpit Crew," by the editors of Japan Air Lines' Flight Safety Magazine state, "This incident illustrates that, just as with communication from the cockpit, information directed to the cockpit must not only be timely but must contain sufficient detail for an accurate assessment of the situation." Refer to the Flight Safety Foundation's January/February 1990 Cabin Crew Safety newsletter, Volume 25, Number 1, at https://flightsafety.org/ccs/ccs_jan-feb90.pdf.

The NTSB determined the most probable causes of the accident and contributors to its severity:

- A fire of undetermined origin,
- Underestimation of fire severity,
- Misleading fire progress information provided to the captain, and
- The time taken to evaluate the nature of the fire and to decide to initiate an emergency descent.

REFERENCE(S):

FAA Lessons Learned From Transport Airplane Accidents website at https://lessonslearned.faa.gov/ll_main.cfm?TabID=1&LLID=27.

EVENT — December 20, 1995:

A Boeing 747 veered off the left side of runway 4L during an attempted takeoff at John F. Kennedy International Airport. Of the 468 persons aboard (451 passengers, 12 cabin crewmembers, 3 flightcrew members, and 2 flight deck jump seat occupants), 24 passengers sustained minor injuries, and a flight attendant received serious injuries. The airplane sustained substantial damage. Communication was an issue in the cabin crew's actions immediately after the airplane came to a stop.

LESSONS LEARNED:

1. While the decision not to evacuate the airplane may have been appropriate, these decisions were made without adequate knowledge of the post-accident condition of the airplane. Flight attendants had vital information they did not relay to the purser or the flightcrew. For example, flight attendants 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 flight attendant.

2. Normally, the public address (PA) and interphone systems provide effective means of communication among flight attendants and between the cabin and flight deck. In this accident, the purser was unaware his PA announcements were only audible in the forward cabin, and thus passengers and flight attendants in the rear of the airplane did not receive any information about the decision not to evacuate. Further, the purser and three flight attendants attempted to use the interphone system without success.

3. Flight attendants did not use megaphones as an alternative to these communications systems.

4. The deadheading flight attendant 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 flight attendants.

5. Carriers need to have adequate procedures for flight attendant communications, including those for coordinating emergency commands to passengers, transmitting information to flightcrews and other flight attendants, and handling post-accident environments in which normal communications systems have been disrupted.

REFERENCE(S):

NTSB Aircraft Accident Report NTSB/AAR-96/04 at
https://www.ntsb.gov/investigations/AccidentReports/Reports/AAR9604.pdf.

EVENT — June 2, 1983:

A DC-9-32 cruising at 33,000 feet experienced a fire in the aft lavatory.

The cabin crew informed the captain of a fire. The captain contacted ATC and declared an emergency. The flightcrew made an emergency descent, and ATC vectored the aircraft to the Greater Cincinnati International Airport.

When the aircraft landed and stopped on the runway, the passengers began evacuating while fire department personnel began firefighting operations. About 60 to 90 seconds after the exits were opened, a flash fire enveloped the interior of the aircraft. Twenty-three of the 41 passengers were unable to exit the aircraft and died in the fire.

LESSONS LEARNED:

1. The captain misconstrued reports the fire was abating when he received conflicting fire progress reports from the cabin crew.

2. He landed at the Greater Cincinnati International Airport rather than at Louisville International Airport, which would have allowed him to land 3 to 5 minutes sooner.

3. Wet towels and breathing through clothing aided survival.

4. A flight attendant who saw the smoke tried to find the origin of the fire while fighting it. There was so much smoke she was not successful in locating the source. She closed the lavatory door and asked another flight attendant to notify the flight attendant in charge who then notified the flightcrew. No information was passed on to the flightcrew regarding the extent of the fire and smoke, or that the origin of the fire was unknown.

5. The captain did not question the flight attendant for this information and several critical minutes were wasted before the flightcrew put the aircraft into an emergency descent.

REFERENCE(S):

FAA Lessons Learned From Transport Airplane Accidents website at
https://lessonslearned.faa.gov/ll_main.cfm?TabID=1&LLID=26.

EVENT — January 8, 1989:

A Boeing 737-400 left Heathrow Airport for Belfast International Airport with 8 crewmembers and 118 passengers on board. As the aircraft was climbing, the outer panel of one blade in the fan of the No. 1 (left) engine detached.

During the descent while attempting to complete checklists, the crew was interrupted numerous times by air traffic communications, and did not complete an evaluation of their situation. A proper assessment of their flight situation may have resulted in discovering the wrong engine had been shut down and possibly avoiding the accident. Thirty-nine passengers died in the accident and a further eight died later from their injuries.

LESSONS LEARNED:

1. Three cabin crewmembers had observed flames coming from the No. 1 engine, but did not communicate this information to the flightcrew. In a fully functional CRM environment, safety-related information from passengers or other crewmembers should not be discouraged. Cabin crewmembers should be considered as a CRM resource, and within operational protocols (such as communicating during emergency situations), be expected to identify a potential safety issue to the flightcrew.

2. Adherence to rigorous flight deck discipline and operational procedures, including completion of checklists, is an essential component of effective CRM.

3. Flightcrew communications regarding airplane safety readiness should be open and effective. Each crewmember must clearly give and receive communication in such a way that the flight safety decisions represent the best product of this open, two-way communication.

NOTE: Joint training exercises were stressed by the Civil Aviation Authority (CAA) after this flight, stating such training would provide pilots with the knowledge that cabin crew are a source of information that should be considered in emergencies. Cabin crew could be trained to communicate with the pilots in a timely way of the sights and sounds witnessed in and from the cabin.

REFERENCE(S):

- The United Kingdom Air Accidents Investigation Branch's (AAIB) Aircraft Accident Report 4/90 at https://assets.publishing.service.gov.uk/media/5422fefeed915d13710009ed/4-1990_G-OBME.pdf.

- FAA Lessons Learned From Transport Airplane Accidents website at https://lessonslearned.faa.gov/ll_main.cfm?TabID=1&LLID=62.

EVENT — October 28, 2016:

A Boeing 767-323 sustained uncontained engine failure and a subsequent fire at Chicago O'Hare International Airport.

The lack of communication resulted in the flightcrew being unaware of the developing situation in the cabin and the flight attendants initiating an evacuation with the left engine still operating.

If the left engine had been shut down earlier, the 4L slide would have been available for evacuation sooner because the slide would not have been affected by the jet blast coming from the engine.

During a post-accident interview, one flight attendant stated his opinion that it was not a priority to be on the phone if an engine fire occurred. If that were the case, the flight attendants could have activated the evacuation signaling system located on the flight attendant jump seat control panels, which would have provided an aural and a visual alert in the flight deck. If any of the flight attendants had taken that action, the flightcrew members would immediately have known that an evacuation was underway, and they could have reacted accordingly.

The flight attendants were trained to use the signaling system for an evacuation, and evacuation procedures in the flight attendant manual stated, "on aircraft such equipped, turn on signaling system," so it is unknown why none of the flight attendants used the system to alert the flightcrew.

The captain (in a post-accident interview) stated that, if he had that awareness when he heard the commotion, he would have shut down the left engine sooner. The flight attendants had both the evacuation signaling system and the interphone system available to them to communicate with the flightcrew, but none of the flight attendants activated the signaling system, and the flight attendants who attempted communication using the interphone system were unsuccessful in reaching the flightcrew.

Flight attendant No. 3 tried to use the interphone to make an announcement in the cabin to calm the passengers but could not recall how to use the interphone.

Depending on their delivery date, Boeing 767-300-series airplanes have either a classic- or new-model interphone system. The new-model interphone, which was installed on the accident airplane, requires additional steps to operate compared with the classic-model interphone. During recurrent training, which the accident flight attendants received, the subject was presented via a web-based course and not through hands-on experience using an interphone during simulated emergencies.

At the time of the accident, the air carrier operated 13 different interphone systems across its airplane fleet, and the differences among interphone systems could affect evacuation communications during an emergency if company flight attendants were not familiar with and trained to proficiency on the various interphone system models.

REFERENCE(S):

NTSB Aircraft Accident Report NTSB/AAR-18/01 at
https://www.ntsb.gov/investigations/AccidentReports/Reports/AAR1801.pdf.

EVENT — June 26, 2016:

An Airbus A330-323 made an emergency evacuation at a parking stand after an auxiliary power unit (APU) failure filled the cabin with smoke at Heathrow Airport.

The AAIB investigation of the June 2016 incident at Heathrow Airport also demonstrated evacuation-related communication and coordination problems between flight and cabin crews.

The AAIB's report stated that the flight attendant who initiated the evacuation did not activate the evacuation signal (similar to the event of October 28, 2016). However, another flight attendant went to the flight deck to report that an evacuation was underway, and the captain saw (from a reflection in the terminal building) that an aft emergency slide had been deployed.

The captain then made an announcement to stop the evacuation because he thought that he had isolated the source of the smoke and wanted to prevent unnecessary injuries. However, the captain did not discuss the situation in the cabin with the flight attendants before making his announcement, which indicated "a breakdown in communication and co-operation between flight crew and cabin crew members."

The AAIB's report also indicated that the captain's announcement caused confusion. One of the flight attendants thought that the captain was not aware of the smoke in the cabin, so she shouted to the passengers to keep moving. Another flight attendant, who saw the captain standing in the flight deck, told the captain that the evacuation should continue because of "thick smoke" in the cabin, and the captain made a subsequent announcement indicating that the evacuation should continue via a jet bridge (which was in place before the evacuation).

The AAIB's report concluded that "prompt and effective communication between the cabin and the flight deck might have avoided an evacuation" and that one reason for the initiation of the evacuation was that the flight attendants "did not receive specific instructions from the flight crew."

REFERENCE(S):

AAIB Investigation to Airbus A330-323, at https://www.gov.uk/aaib-reports/aaib-investigation-to-airbus-a330-323-n276ay.

EVENT — September 8, 2015:

A Boeing 777-200 equipped with two GE90-85B engines experienced an uncontained left engine failure during the takeoff ground roll and caught fire at McCarran International Airport. The fire was extinguished by ARFF personnel. The 157 passengers and 13 crewmembers evacuated on the runway via emergency exit slides.

The NTSB Aviation Accident Final Report on British Airways Flight 2276 states, "When the relief pilot went into the cabin to assess the situation outside of the airplane, a flight attendant told him that she had been trying to call the flight crew. The CVR recorded a sound similar to an interphone call from the cabin to the flight deck, but the flight crewmembers most likely did not answer the call because they were focused on securing the left engine and deciding whether to evacuate."

REFERENCE(S):

NTSB Identification: DCA15FA185 at
https://www.ntsb.gov/_layouts/ntsb.aviation/brief.aspx?ev_id=20150908X35241.

EVENT — October 29, 2015:

The following accident is still under investigation at the publication of this AC, but the NTSB has cited that communication and coordination issues between the flight and cabin crews are contributing factors in the investigation.

A Boeing 767-200ER with 101 occupants aboard was taxiing for departure at Fort Lauderdale-Hollywood International Airport when fuel began leaking from the left engine, causing a fire.

REFERENCE(S):

NTSB News Release at https://www.ntsb.gov/news/press-releases/Pages/PR_20151103.aspx.

Advisory Circular Feedback Form

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by contacting the Air Transportation Division (AFS-200) at 9-AWA-AVS-AFS-200-Air-Transportation-Division@faa.gov or the Flight Standards Directives Management Officer at 9-AWA-AFB-120-Directives@faa.gov.

Subject: AC 120-48A, Communication and Coordination Between Flightcrew Members and Flight Attendants

Date: _____

Please check all appropriate line items:

An error (procedural or typographical) has been noted in paragraph _____ on page _____.

Recommend paragraph _____ on page _____ be changed as follows:

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In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

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I would like to discuss the above. Please contact me.

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