

Amtrak Intercity Passenger Train Crew Staffing

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13. ABSTRACT (Maximum 200 words) A primary goal of the Federal Railroad Administration (FRA), United States Department of Transportation (USDOT), is to ensure that passengers traveling on intercity and commuter trains are protected from avoidable safety hazards and reach their destinations in a safe manner. Accordingly, FRA manages a comprehensive regulatory program that is designed to provide an environment for the safe movement of passenger trains. In response to a Congressional inquiry, FRA directed that a study be performed by the John A. Volpe National Transportation Systems Center (Volpe Center) to evaluate safety, emergency preparedness, and security considerations, as they pertain to Amtrak intercity passenger train crew staffing levels. This report presents the results of the Volpe Center study.				
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PREFACE

In response to an Amtrak strategic reform initiative, the issue of Amtrak intercity passenger train operating crew staff levels was raised by a Congressional inquiry to the Secretary of Transportation. The inquiry requested that “FRA be directed to conduct an investigation and issue a report analyzing the number of conductors and assistant conductors necessary to ensure the safety and security of intercity train passengers.”

In a letter in response to the Congressional inquiry, the Secretary stated his belief: “after a review of the issue that the staffing levels of Amtrak intercity trains are currently sufficient to provide for the safety of passengers and passenger train operations.” The Secretary’s letter noted that: “to date, FRA is unaware of any crew consist issues that involve passenger safety.” The Secretary’s letter also stated that: “FRA believes it is worthwhile to conduct a study on this issue. Therefore, FRA will contract with DOT’s Volpe Center to conduct the appropriate study.”

Accordingly, this report describes the results of the FRA-directed study by the John A. Volpe National Transportation Systems Center (Volpe Center) to review safety and security issues related to Amtrak intercity train passenger train crew staffing.

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Dr. Raslear; Mr. Martinez; Mr. Conklin, Mark McKeon, Brenda Moscoso, and Daniel Knotte, all of the FRA Office of Safety; and Dr. Stephen Popkin, Chief, Human Factors Division, John A. Volpe National Transportation Systems Center (Volpe Center), Research and Innovative Technology Administration (RITA) / USDOT; provided important review and comment of the draft report. Daniel Alpert of the Office of Chief Counsel, FRA; and David Kasminoff of the Transportation Security Administration (TSA), Department of Homeland Security; provided review of certain sections of the draft report pertaining to FRA and TSA legal requirements for passenger train operating crews.

Stephen Strachan, Chief Operating Officer; Douglas Herman, (?); Stephanie Pavlakis, Senior Director, Employment Development; Tim Howey (?); and Patricia King (?); all of Amtrak; provided extensive information relating to train operating crew and on-board service crew, including: position descriptions, numerous types of operating and other types of rule books, and various types of training, as well as review of certain sections of the draft report pertaining to those items. In addition, Al Suozzo, General Chairman, and David Brooks, Amtrak Conductor (retired), of the United Transportation Union; and X, Association of Professional Flight Attendants; provided extensive information and review of selected chapters of the draft report.

Thomas Nesthus, of the Human Factors Research Laboratory, Civil Aerospace Medical Institute, Federal Aviation Administration (FAA) /USDOT; and Larry Youngblut, and Jodi Baker, both Aviation Safety Inspectors (Cabin Safety), Air Carrier Training Branch, FAA; and Diane Damos, Damos Aviation Services, Inc.; provided important information and review of the chapter pertaining to flight attendant responsibilities, duties and training.

In addition to the authors, John Zolock, formerly of the Volpe Center, provided important preliminary research support.

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1. INTRODUCTION

A primary goal of the Federal Railroad Administration (FRA), United States Department of Transportation (USDOT), is to ensure that passengers traveling on intercity and commuter trains are protected from avoidable safety hazards and reach their destinations in a safe manner. Accordingly, FRA manages a comprehensive regulatory program that is designed to provide an environment for the safe movement of passenger trains.

In response to a Congressional inquiry, FRA directed that a study be performed by the John A. Volpe National Transportation Systems Center (Volpe Center) to evaluate safety, emergency preparedness, and security considerations pertaining to Amtrak intercity passenger train on-board operating crew staffing levels. This report presents the results of the Volpe Center study.

1.1 BACKGROUND

The National Railroad Passenger Corporation (Amtrak) provides a wide range of intercity train service to a diverse clientele of rail passengers. Amtrak operates trains over a nation-wide 21,000-mile rail network, which consists of 42 routes, to 500 destinations located in 46 states (and certain Canadian cities). In addition to providing daily high-speed Northeast Corridor (NEC) passenger train service between Boston, MA and Washington, DC, Amtrak operates intercity train service daily along a variety of short- and medium-distance corridors and frequently over 14 long-distance routes. In FY 2007, Amtrak operated almost 300 daily trains, which carried an average of nearly 70,000 passengers per day and nearly 26 million annual passengers [1].

In 2005, Amtrak proposed changes in train operating crewmember staffing requirements for its intercity passenger trains, with the intention to reduce the number of Assistant Conductors assigned to trains operated throughout its system [2]. That proposal resulted in a bargaining dispute between Amtrak and the United Transportation Union (UTU) that was taken to mediation with the National Mediation Board, in accordance with the rules of the Railroad Labor Act (RLA).

Later in 2005, safety issues related to Amtrak passenger train operating crew staffing levels were raised by a Congressional inquiry to the Secretary of Transportation, which requested that “FRA be directed to conduct an investigation and issue a report analyzing the number of Conductors and Assistant Conductors necessary to ensure the safety and security of intercity train passengers” [3]. Appendix A contains a copy of the Congressional inquiry letter.

FRA obtained and reviewed information from Amtrak regarding its existing on-board crewmember assignment policy [4] (see Appendix B). In an early 2006 letter response to the Congressional inquiry, the Secretary noted his belief “that the staffing levels of Amtrak intercity trains are currently sufficient to provide for the safety of passengers and passenger train operations [5].” In addition, he stated that: “The FRA has taken steps to ensure safety of rail passengers by implementing 49 CFR *Part 239*, Passenger Train Emergency Preparedness [6]. The purpose of this regulation is to reduce the magnitude and severity of casualties in railroad operations by ensuring that railroads involved in passenger train operations can effectively and efficiently manage passenger train emergencies.” Finally, the Secretary noted that “to date, FRA is unaware of any crew consist issues that involve passenger safety” but added, “FRA believes it is worthwhile to conduct a study on this issue. Therefore, FRA will contract with DOT’s Volpe Center to conduct the appropriate study.” Appendix C contains a copy of the Secretary’s letter.

Volpe Center staff initiated the study, in mid-2006. However, the study completion was delayed due to need to obtain and review a considerable volume of information provided by Amtrak and other parties. In addition, Amtrak and the UTU reached a contract agreement in March 2008, which maintained the same operating train crew consist rules until the end of 2009. However, FRA directed that the Volpe Center complete this study to assist in the safety-related evaluation of Amtrak train operating crew functions. This information was considered to be beneficial since the Rail Safety Improvement Act of 2008 (2008 Rail Safety Act) [7] directed that FRA establish certification of all train Conductor and Assistant Conductors, in 2009, including those employed by Amtrak. Accordingly, this report presents the results of the Volpe Center study.

1.2 AMTRAK OPERATIONAL ENVIRONMENT SAFETY-RELATED-ELEMENTS

Amtrak intercity passenger train travel under normal conditions is usually uneventful, in terms of safety. However, the Amtrak intercity passenger train system operational environment has a unique safety impact on passengers and on-board train crew during normal operations and unusual / adverse conditions, such as service disruptions, and emergency and security situations.

The Amtrak train operational environment includes:

- Train route, including location and distance;
- Physical right-of-way infrastructure and train movement operations;
- On-board train crewmembers;
- Passengers; and
- Rolling stock equipment.

This operational environment differs significantly from other types of common carrier passenger transportation operations, such as those provided by airlines, passenger ships, intercity buses, and commuter rail.

During normal operations, under unusual / adverse conditions, such as service disruptions, or if an emergency or security situation occurs, the safety of Amtrak passengers relies on knowledgeable, trained, and experienced on-board operating train crew members who are familiar with the physical characteristics of the route, train movement operations, and rolling stock equipment, which all interact to play an instrumental role in ensuring passenger and crew safety. The Amtrak train operating crew, specifically the Conductor, is also responsible for deciding whether or not passenger train evacuation is necessary (it is usually safer for passengers to remain on the train rather than evacuate).

1.3 OBJECTIVE

The objective of this study was to provide information to FRA for its further evaluation of Amtrak intercity passenger train on-board crewmember functions, as impacting on the safety of passengers and crew under normal and unusual / adverse conditions, with additional focus on emergency preparedness and security.

1.4 SCOPE AND APPROACH

This study is directed at the safety-related functions of Amtrak intercity passenger train crewmembers, including train operating crew and onboard service (OBS) attendants.

The following tasks were performed in support of this study:

- Review existing applicable FRA and other government agency regulations for Amtrak train operating and other onboard crewmember safety-security and emergency preparedness job functions, as well as qualification and training
- Review system elements of the Amtrak operational environment that impact on Amtrak passenger and crew safety;
- Review the historical and current basis for Amtrak intercity passenger train operating crew and on-board service (OBS) crew member staffing levels;
- Review safety-related job functions of Amtrak intercity passenger train operating crew and OBS crew members, as well as related qualifications and training;
- Review specific emergency preparedness- and security-related job functions of Amtrak intercity passenger train operating and OBS crew members, as well as related training;

- Review Amtrak passenger intercity train operational environmental emergency response factors;
- Review National Transportation Safety Board (NTSB) accident reports and other available information pertaining to train operating and OBS crew member actions during Amtrak accidents and other emergency situations;
- Review Federal Aviation Administration (FAA) regulations relating to commercial passenger aircraft Flight Attendant assignment, and safety-related functions and training;
- Review United States Coast Guard (USCG) regulations relating to commercial passenger ship employee assignment and safety-related functions and training;
- Review available information for passenger train crewmember assignment policies for U.S. commuter rail, as well as for Canadian and European railroad systems; and
- Analyze all information listed in the previous task and prepare a report containing findings, conclusions, and recommendations.

Chapter 2 reviews existing FRA safety-related regulations applicable to passenger train crew. In addition, specific FRA requirements for passenger train crew emergency preparedness and Transportation Security Administration (TSA) security requirements are reviewed.

Chapter 3 provides a summary of the following Amtrak intercity passenger train system operational environment elements: routes, right-of-way infrastructure and train movement operations; on-board train crewmember functions; passenger characteristics, categories of service / ticketing, and equipment configuration and capacity.

Chapter 4 provides historical background for passenger training crew staffing and a summary of existing Amtrak and UTU and other union agreements, as well as Amtrak train crew assignment policies.

Chapter 5 extensively reviews the safety-related functions of Amtrak intercity passenger train onboard crewmembers, related to normal operations, as well their functions during unusual / abnormal situations, such as service disruptions and security and emergency situations. Training requirements are also reviewed.

Chapter 6 reviews Amtrak passenger intercity train operational environmental emergency response factors and summarizes passenger train accidents / incidents that highlight the safety role and actions of various Amtrak on-board train crewmembers during unusual, emergency, and security situations.

Chapter 7 reviews U.S. commuter rail and Canadian passenger train crewmember job functions and training requirements.

Chapter 8 summarizes U.S. passenger aircraft flight attendant crewmember job functions and training requirements.

Chapter 9 summarizes U.S. Coast Guard passenger ship crewmember job functions and training requirements.

Chapter 10 contains the results of the Volpe Center evaluation of the information presented in Chapters 2 through 9.

Chapter 11 contains a summary of the report.

Appendices [REDACTED] provide additional supporting information.

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2. PASSENGER TRAIN CREW FEDERAL SAFETY-RELATED REQUIREMENTS

This chapter provides a summary of Federal regulations for railroad employees, including Amtrak intercity passenger train staff.

2.1 TRAIN OPERATING CREW

The operating crew of an Amtrak intercity passenger train normally consists of the Engineer, the Conductor, and depending on the number of revenue passenger cars, one or more Assistant Conductors (the latter, per the UTU collective bargaining agreement. (In addition, an Assistant Engineer or a relief Engineer may be operating the motive power unit (locomotive or cab car) of a particular Amtrak train, depending on the length of time of the particular passenger train operation (per collective bargaining agreement). (Chapter 4 extensively discusses Amtrak train operating crew assignment policy and procedures and the collective bargaining agreements.).

2.1.1 Regulations Applicable to All Train Operating Crews

All Amtrak passenger train operating crew are considered to be “safety-sensitive” railroad employees and thus must comply with applicable FRA regulation requirements in *CFR Parts 200-240*, as they relate to actual movement of the train.

The Federal Railroad Safety Act of 1970 (FRSA 1970), as amended, authorized the Secretary of Transportation to prescribe regulations for all areas of railroad safety (supplementing existing rail safety statutes and regulations), but does not prevent management and labor from bargaining collectively under the Railway Labor Act, including agreements relating to employee qualifications. Prior to the 2008 Rail Safety Act, the Secretary of Transportation's historical authority for establishing specific employee qualifications was limited to railroad employee physical or medical disabilities as they relate to safety. The Secretary has historically delegated the responsibility of regulating railroads, including Amtrak and other passenger railroads, to FRA.

(FRA regulations for train Engineers (*49 CFR, Part 240, Engineer Certification*) [8], included requirements that individuals meet minimum physical or medical criteria, demonstrate knowledge of railroad operating and equipment inspection practices, train handling practices, and safe locomotive operation skills under the most demanding types of service. Engineer qualifications and training are discussed further in Chapter 3.)

2.1.1.1 *Railroad Safety Enforcement Procedures (Part 209)*

FRA enforces compliance with railroad safety regulations by all railroads that operate on the general railroads system, including Amtrak train operating crews, according to 49 CFR, *Part 209, Railroad Safety Enforcement Procedures* [9]. § 209.301 prescribes rules for determining an individual's fitness for duty for performing "safety-sensitive" functions, under the Hours of Service Act (PL-91-69, first enacted in 1907, and substantially revised in 1969 by PL-91-169. Further amendments were enacted as part of the Federal Railroad Safety Authorization Act of 1976, Public Law 94-348 and by the Rail Safety Improvement Act of 1988, Public Law 100-342. The purpose of the law is "to promote the safety of employees and travelers upon railroads by limiting the hours of service of employees" § 209.303 states that disqualification procedures for violating any FRA rule, regulation, order, or standard apply to railroad employees assigned to perform "safety-sensitive" functions, as defined under the Hours of Service Act. 49 CFR, *Part 228, Hours of Service of Railroad Employees* [10] addresses the definition of "safety sensitive" and other related provisions

2.1.1.2 *Hours of Service (Part 228)*

The Hours of Service Act restricts the number of hours that railroad employees work in a day. The purpose of regulations in *Part 228*, which implemented the Hours of Service Act, is to minimize operating train crew fatigue, which could result in accidents and injuries due to human error. § 228.5 defines "employee" as including individual employees by the common carrier [railroad] who is actively engaged in or connected to the movement of any train. (Note: transit system employees are excluded from the definition of "railroad.") The Secretary of Transportation and FRA have both designated certain employee positions, including passenger and freight train Conductors and Assistant Conductors, as well as Engineers and Assistant Engineers, as "safety sensitive," since they are involved in the actual operation (e.g., transportation) of the train. The Hours of Service Act requires that "safety-sensitive" employees work no more than 12 hours in a tour of duty, and requires 8- or 10-hour rest periods, depending on the number of consecutive hours worked. Appendix A of *Part 228* describes how FRA interprets the Hours of Service Act requirements.

The Rail Safety Improvement Act of 2008 (2008 Rail Safety Act) revised the Hours of Service Act laws in order to address the serious issue of "safety-sensitive" worker fatigue [7]. In addition, the Secretary was required to establish Hours of Service regulations specifically for intercity and commuter rail employees, which may differ from the existing general hours of service regulations [in *Part 228*], within 3 years after enactment of the 2008 Rail Safety Act. Those regulations may address railroad operating scheduling practices, scientific and medical

research related to fatigue, railroad use of new or novel technology, variations in freight and passenger railroad scheduling and operating practices, and duties and operating conditions, etc.

The 2008 Rail Safety Act also requires that each railroad, including Amtrak, develop and update a fatigue management plan as part of its required safety risk reduction program. The fatigue management plan must include the development of fatigue countermeasures to address the varying operational circumstances on each part of its systems. Other required elements of the fatigue management plan pertain to education, scheduling, alertness practices, etc.

2.1.1.3 *Drug and Alcohol (Part 219)*

As “safety-sensitive” railroad employees, Amtrak passenger train operating crews, including Conductors and Assistant Conductors, and Engineers (and Assistant and relief Engineers) are subject to the requirements of 49 CFR, *Part 219, Control of Alcohol and Drug Abuse* [11], which includes minimum safety standards for random alcohol and drug testing.

2.1.1.4 *Other Federal Train Operating Crew Safety-Related (Parts 217, 218, and 220)*

While FRA has historically required training for Conductors and Assistant Conductors (see the following discussion of 49 CFR, *Parts 217 and 220*), FRA has not previously specifically regulated the minimum number of operating train crew required or operating train crew responsibilities and duties. FRA does currently regulate certain aspects of all passenger train operating crew training, including passenger train crew emergency preparedness (see subsection 2.1.2).

49 CFR, *Part 217, Railroad Operating Rules* provides one means for FRA to learn the condition of operating rules for railroads, including Amtrak, that operate rolling equipment by requiring that railroads instruct their employees on operating practices [12]. § 217.9 requires that all railroads (including passenger) periodically conduct a written program, which is filed with FRA, of operational tests and inspections to determine the extent of compliance with its own code of operating rules, timetables, and timetable special instructions. In addition, § 217.11 requires that all railroads, including Amtrak, periodically instruct each railroad employee on the meaning and application of operating rules to ensure understanding of those rules. The railroad program of instruction is required to be written, but is not required to be submitted to FRA.

FRA issued a final rule in 2008 containing revisions to *Part 217 and 218* [13]. § 217.11 now requires that all railroads, including Amtrak, provide a written program of operational testing and inspection for their train operating crews under the various operating conditions on the railroad, with particular emphasis required for those operating rules that cause or are likely to cause the

most accidents or incidents, such as those identified in six-month reviews. In addition, a new Subsection F of *Part 218* adds minimum operating requirements for equipment handling, derails, and switches. A written program of instruction, training, and examination is also required which may be consolidated with § 217.11. As part of their normal or emergency duties, Amtrak passenger train operating crews may be called upon to operate derails and switches so that passenger equipment is protected from other train or other equipment movement when stopped at track locations other than at stations.

These recent revisions to *Parts 217* and *218* would likely increase/confirm the specific level of general “safety-sensitive” employee knowledge and skills, (i.e., train-movement related), already required by FRA Conductors and Assistant Conductors (and Engineers).

FRA regulations in 49 CFR, *Part 220, Railroad Communications*, § 220.25 [14] require that all employees authorized to use a radio in connection with a railroad operation be provided with copies of the operating rules and instructed in the proper use of such equipment as part of the program of instruction required in § 217.9 and be periodically tested as part of testing program required by § 217.11.

2.1.2 Emergency Preparedness / Response

FRA regulations contained in 49 CFR, *Parts 217, 218, 220, and 239* require that Amtrak train operating crewmembers, be able to respond in a timely and effective manner to passenger train emergency situations.

2.1.2.1 49 CFR, Parts 217 and 218

§ 217.13 contains requirements for train operating crew reporting of train emergencies and § 217.47 specifies emergency radio transmission procedures. As a part of the operating rule requirements in *Part 217*, if an Amtrak train is stopped, it may be necessary for passenger train operating crew to comply with “flag protection” of the train by complying with provisions in 49 CFR, *Part 218, Railroad Operating Practices* [15].

2.1.2.2 49 CFR, Part 239

FRA regulations for passenger train emergency preparedness were initially published in 1998 to ensure the safety of intercity passenger and commuter train occupants during emergencies [16]. *49 CFR, Part 239* [4] specifically addresses passenger railroad emergency preparedness planning, procedures, and training [4]. *Part 239* established minimum emergency preparedness standards to ensure that railroads involved in passenger train operations can effectively and

efficiently manage emergencies. Accordingly, each railroad that operates passenger trains is required to develop emergency plans and instruct employees on the provisions of its plan to ensure that appropriate procedures during emergencies are followed.

§ 239.7 defines “emergency” to mean “an unexpected event related to the operation of passenger train service involving a significant threat to the safety or health of one or more persons requiring immediate action.” Such events include collisions, derailments, and/or fires. (49 CFR, *Part 238* addresses certain passenger rail car equipment emergency systems that are referenced in *Part 239*).

§ 239.7 defines “onboard crew” to be that person (railroad or contractor) “who performs functions:

- “1) Connected with the movement of the train and subject to the Hours of Service Act, or
- 2) In a sleeping car or coach assigned to intercity service, other than food, beverage, or security.”

Accordingly, FRA-required emergency preparedness-related training must include all Amtrak Conductors and Assistant Conductors and Engineers (and Assistant and relief Engineer, if used), except for freight train crews who serve as the relief crew on a passenger train, as long as one person is qualified.

As a minimum, § 239.101 (a) (2) (i) requires that the initial and periodic training for the employees designated in § 239.7, include:

- Rail equipment familiarization;
- Situational awareness;
- Passenger evacuation;
- Coordination of functions; and
- “Hands-on” instruction concerning the location, function, and operation of on-board emergency equipment.

§ 239.101 requires that Amtrak’s emergency preparedness plan address individual passenger train employee responsibilities and provide for initial training within 90 days after hire, as well as periodic training at least once every two calendar years thereafter, on the applicable plan.

§ 239.101 requires that all railroads, including Amtrak, test persons being evaluated for emergency preparedness qualification. The testing must accurately measure the employee’s

knowledge of his or her responsibilities under the applicable portion of the plan, be objective and written, and not be open book. (In this manner, the evaluation is consistent with the Engineer test requirements in *Part 240*.) However, § 239.101 does not include a requirement for railroads, including Amtrak to evaluate the onboard (train operating) crew “hands-on” ability to operate train emergency systems equipment.

2.1.3 Train Conductor Certification

The 2008 Rail Safety Act requires that a Certification Program be established for all passenger and freight train Conductors within 18 months after the Act is enacted [7].

In addition, the Secretary must also issue regulations requiring railroad carriers, including Amtrak, to develop training plans for crafts and classes of employees, determined appropriate, that include the requirements of relevant Federal railroad safety laws, regulations, and orders, and test employees for their proficiency in the subject matter of the training. Rail carriers would be exempted if they submitting training plans covering employees for which the Secretary has issued training regulations before the date of the bill enactment.

FRA has been delegated to develop the required regulations. While FRA has not yet determined what specific train Conductor certification and training requirements would be required, the regulations would likely be similar to the train Engineer requirements contained in 49 CFR, *Part 240*.

2.1.4 Engineer (Safety-Specific)

49 CFR, *Part 240, Engineer Certification* prescribes minimum FRA safety standards for the eligibility, training, testing, certification, and monitoring of all railroad locomotive Engineers, including those employed by Amtrak [8].

§ 240.121 requires that Engineers meet certain minimum criteria for vision and hearing acuity, while § 240.117 requires that Engineers comply with specific types of operating rules.

§ 240.123 requires railroads to provide a program of initial and continuing education to ensure that Engineers maintain knowledge and skills in railroad operating rules and practices, mechanical condition of equipment, safe handling including use of locomotive and train brake systems, physical characteristics, and relevant Federal safety rules.

§ 240.125 requires testing criteria to determine whether a person has sufficient knowledge by means of a written objective program that includes railroad operating practices, equipment

inspection practices, train handling practices including physical characteristics of the territory, and Federal safety rules, including use of locomotive and train brake systems, physical characteristics, and relevant Federal safety rules.

§ 240.127 requires criteria and procedures for examining the performance skills of a person being evaluated for qualification as a locomotive Engineer, in either train or locomotive service, to determine whether the person has the skills to safely operate locomotives and/or trains, including the proper application of the railroad's rules and practices for the safe operation of locomotives or trains, in the most demanding class or type of service that the person will be permitted to perform and cover operating practices, equipment inspection practices, train handling practices, compliance with Federal safety rules and conducted either when the person at the controls of a locomotive or a Type I or Type II simulator; the conduct of the test is required to be documented.

Each railroad, including Amtrak, must certify to FRA that Engineers have qualified by demonstrating that they have successfully completed the training program and have passed written knowledge and “on the job” skills, related to the safe operation of the locomotive.

Each railroad, including Amtrak, is required to annually test Engineers to ensure that they continue to comply with the initial performance knowledge and skills and operating rules.

2.1.5 Security

The Conductor and Assistant Conductor are primarily responsible for carrying out Amtrak security procedures on board Amtrak intercity passenger trains.

In May 2004, the Transportation Safety Administration (TSA) issued a rail security directive to Amtrak in response to the March 2004 commuter train bombing that occurred in Madrid, Spain [17]. TSA considered the directive to be a mandatory security standard and required that it be implemented by Amtrak. Examples of security measures required by the TSA directive included asking passengers and employees to report unattended property or suspicious behavior, inspecting each passenger rail car for unattended property or suspicious behavior at periodic intervals, and requiring that Amtrak request that adult passengers provide identification at the initial point where the tickets are checked.

In 2007, the U.S. Congress passed a bill to improve rail (and other surface) transportation security [18]. **Was this ever passed?** The bill required that the Secretaries of the Departments of Homeland Security and Transportation establish security training. The bill recognizes that “passenger railroad carriers ...are high consequence targets in terms of potential loss of life...

They carry large numbers of people in a confined environment, offer the opportunity for specific populations to be targeted at particular destinations, and often have stations located below or adjacent to high profile government buildings, major office complexes, and iconic structures. Terrorist bombings since 1995 highlight the need for improved government access to, and monitoring of, transportation of passengers by rail. Terrorists have attacked the Tokyo subway system (1995); areas in and around the Moscow subway system (2000, 2001, and 2004); Madrid commuter trains (2004); the London Underground system (2005); and the train system in Mumbai (formerly known as Bombay), India (2006)".

TSA adopted a final rule in 2008 [19] that requires that each carrier operating or providing intercity passenger train service report potential threats or significant security concerns to TSA, including incidents, suspicious activities, and threat information including, but not limited to, the following:

- (1) Interference with the train crew.
- (2) Bomb threats, specific and nonspecific.
- (3) Reports or discovery of suspicious items that result in the disruption of rail operations.
- (4) Suspicious activity occurring on board a train ...or inside the facility of a passenger railroad carrier...that results in a disruption of rail operations.
- (5) Suspicious activity observed at or around rail cars or ...facilities, or infrastructure used in the operation of the passenger railroad carrier...
- (6) Discharge, discovery, or seizure of a firearm or other deadly weapon on a train ...or in a station, terminal, facility, or storage yard, or other location used in the operation of the passenger railroad carrier.
- (7) Indications of tampering with passenger rail cars.
- (8) Information relating to the possible surveillance of a passenger train ... or facility, storage yard, or other location used in the operation of the passenger railroad carrier...system.
- (9) Correspondence received by the passenger railroad carrier...indicating a potential threat to rail transportation.
- (10) Other incidents involving breaches of the security of the passenger railroad carrier ...operations or facilities.

The TSA rule requires that "passenger railroad information reported should include, as available and applicable:

- (1) The name of the passenger railroad carrier ...and contact information, including a telephone number or e-mail address.
- (2) The affected station, terminal, or other facility.

- (3) Identifying information on the affected passenger train ...including number, train or transit line, and route, as applicable.
- (4) Origination and termination locations for the affected passenger train ..., including departure and destination city and the rail ...route.
- (5) Current location of the affected passenger train...
- (6) Description of the threat, incident, or activity.
- (8) The names and other available biographical data of individuals involved in the threat, incident, or activity.
- (9) The source of any threat information.”

In practice, the Amtrak Conductor, as the employee-in-charge on a particular Amtrak passenger train, would provide this detailed information to the Amtrak or host railroad train dispatcher for forwarding to TSA:

2.2 OBS ATTENDANTS AND OTHER RELATED POSITIONS

FRA does not generally regulate either the qualifications and training or the functions of Amtrak OBS Attendants and related positions. The exception is that *Part 239* requires passenger railroads to provide specialized emergency preparedness training, for “Train Attendants who are assigned to Coach and Sleeping cars.”*** The same § 239.101 (a) (2) (i). requirements for the initial and periodic training apply to those positions, as for the train operating crew:

- Rail equipment familiarization;
- Situational awareness;
- Passenger evacuation;
- Coordination of functions; and
- ‘‘Hands-on’’ instruction concerning the location, function, and operation of on-board emergency equipment.

In addition, the same § 239.101 requirements for the Amtrak emergency preparedness plan to address individual employee responsibilities and initial training within 90 days after hire, as well as periodic training at least once every two calendar years thereafter, on the applicable plan, applies to Train Attendants, who must also be qualified by means of a written and objective test.

*** As part of the 1998 collective bargaining agreement revision [x], the separate categories for Coach and Sleeping Car Attendants were combined into a Train Attendant category.

Although not required by *Part 239*, Amtrak policy is to also provide emergency preparedness (as well as security) training) to all train on-board crewmembers, including Café and Lounge Car Attendants, as well as kitchen / dining room staff (i.e., chef and other kitchen employees, and waiters).

3. AMTRAK SYSTEM OPERATIONAL ENVIRONMENT

Amtrak intercity passenger train travel is usually uneventful. However, the Amtrak train system operational environment has a unique set of variables which have a safety impact on passengers and on-board crew during normal operations and unusual / adverse conditions, as well as during emergency and security situations. This chapter describes these operational environmental variables. The information in this chapter is derived primarily from Amtrak-provided documents [20][21][22][23], as supplemented by documents provided by the United Transportation Union (UTU), and information obtained through other resources.

3.1 GENERAL

Amtrak operates intercity passenger trains to 500 destinations located in 46 states (and certain Canadian cities), over a nationwide 21,000-mile (33,800 km) railroad network, which consists of 42 routes (Figure 1).

Amtrak trains operate over a physical infrastructure right-of-way consisting of track and signaling, the majority of which are owned by freight railroads.

Crew staff members who work on-board Amtrak passenger trains consist of the Engineer, Conductor, and one or more Assistant Conductors, all of whose duties are directed at the operation of the train. In addition, depending on the train route, category of service, and type of equipment operated, one or more OBS Attendants and other related crew work on board Amtrak trains and perform non-train operational duties.

Amtrak passenger demographics are different than those of commuter trains. Those trains typically carry regular passengers who ride to and from work on the same type of train equipment, on the same route, at the same time each day, in the morning and evening, within large metropolitan areas.

Amtrak intercity trains carry a variety of passengers using intercity train equipment that includes many different categories of service, passenger car configurations, and ticketing, depending on the route location and distance and the time of operation. Moreover, the number of and type of passenger cars that are carried as part of the Amtrak train consist affects car / train passenger capacity and the number of train operating and OBS crewmembers assigned to a particular train.

The type and nature of emergency and security situations that may occur are similar to those of other transportation modes but important differences exist due to the unique operational environment.

3.2 ROUTES

Amtrak defines its routes as follows:

- Short-distance: less than 500 miles (805 km) in length, with terminals more than 125 miles (200 km) apart. (Exceptions: Boston-Portland, Springfield-New Haven, and Chicago-Milwaukee and certain California route terminals are less than 125 miles apart). (A terminal is a starting and end point city on a route).
- Medium-distance: lengths of 500 and 750 miles (805 and 1208 km).
- Long-distance: longer than 750 miles (1208 km).

Amtrak operates intercity passenger trains on the Northeast Corridor (NEC) route located between Boston and Washington, DC, a total distance of 457 miles. In addition to operating a frequent schedule of *Acela Express* high-speed trains on the NEC, Amtrak operates numerous other short-distance trains along the NEC, as well as trains in several non-NEC Eastern corridors, Midwest corridors, the Northwest region of the US, and California. The frequency of these latter trains ranges from one train in each direction to more than 8 trains in each direction, per day.

In addition, Amtrak operates 14 long distance passenger trains that provide overnight (or multiple day / night) service between terminal cities on East – West and North – South routes. Depending on the time of operation, and the class of track (see Section 2.3), and type of passenger equipment operated (see Section 2.6), Amtrak train-trip time length between terminal stations, as well operating speeds at different track locations, may vary. Amtrak operates at least one train a day in each direction between terminal stations, except for the New Orleans – Los Angeles, and Chicago – New York via Cincinnati –trains.

Many Amtrak passenger train routes can operate through several regions over the right-of-way infrastructure of several railroads.

Table 1 summarizes Amtrak intercity train service including routes, trip times, and mileage, as well as the typical categories of service, type of passenger rail equipment, and typical capacity offered.

3.3 RAILROAD RIGHT OF WAY / INFRASTRUCTURE AND OPERATIONS

3.3.1 Right of Way / Infrastructure

In 1976, Amtrak took over ownership of the Northeast Corridor (NEC) right of way / infrastructure including track and signaling, as well as the Philadelphia – Harrisburg route, both from Conrail. (The NEC exceptions are a segment of 48 miles (77 km) between Boston and

5-12-09
Table 1. Amtrak Intercity Passenger Train Service

ROUTE TYPE	ROUTE LENGTH m	TRIP TIME h: min	TERMINAL LOCATION	OPERATION	EQUIPMENT / NUMBER OF CAR LEVELS/ CATEGORY OF SERVICE / NUMBER OF CARS / OTHER SERVICE ¹	MOTIVE POWER/ SPEED	TYPICAL / MAX. TRAIN CAPACITY	
NEC	231	3:15 / 3:00 / 6:30	Boston – NYC / NYC – Washington, DC	Day Limited stops	Acela Express ³	Electric/ 150	427	
	226		Boston – Washington, DC		Amfleet I & II, Metroliner	Electric/ 125	234-462	
	457	3:30 / 3:50 / 7:45						
Non- NEC Short corridor Up to 500 miles End points: 125 miles apart ⁹	60.5	1:05	New Haven -Springfield	Day	Single- level	Diesel/ 79	144	
	107	1:20	Philadelphia - Harrisburg		Metroliner	Electric 125	288	
	142	3:10	New York City –Albany ⁴		Amfleet I & II	Electric 125	328-	
Medium distance Up to 750 miles ⁹	86 / 310	1:29 / 5:30	Chicago Midwest Corridors	Day	Amfleet I & II, Horizon ⁴	Diesel 79/ 95 ⁵	234-306	
	157 / 310	3:55 / 6:10	Northwest		Talgo ³	Diesel 79	196	
	128 / 350	2:40 / 9:15	California		California / Pacific Surfliner	Single- level	Diesel 79 / 90	438
Long distance Over 750 miles	173/ 611	3:10 / 11:40	Other	Day and Overnight	Amfleet I & II, Horizon ⁶ Baggage car ⁶	Diesel 79	234-270	
	764 /- 2438	14:34 / 51:20	Various North – South and East – West		Amfleet I & II, Viewliner, Superliner, ⁶ Baggage car	Single or BI-level	Diesel 79 / 90	365-390
	855	17:30	Lorton, VA – Sanford, FL		Superliner, Auto-Train car trailers	BI-level	Diesel 79	610

1 Approximate, varies by train
 2 Number & type of cars, etc. varies by train
 3 Fixed consist
 4 "Cab" & this note refers to other Cab / Coaches and Cab / baggage / Coaches
 5 Food service not on all trains
 6 Superliner cars operate on some routes
 7 Not all trains
 8 Due to long distance, total average number may be more than 500 persons.
 9 Certain routes are less than 125 m

Pawtucket, RI, owned by the Massachusetts Bay Transportation Authority (MBTA); and 56 miles (90 km) owned by the states of New York and Connecticut over which MetroNorth Railroad operates commuter rail train service). Amtrak also owns and maintains a 96-mile (154.4 km) track segment in Michigan and a 29-mile (47) segment of track near Albany, NY.

Other than these track segments and other shorter segments, which provide access to certain Amtrak yards and passenger stations, the remainder of the 21,000 miles of right-of-way over which Amtrak operates passenger trains is owned by entities other than Amtrak.

The majority of the remainder of Amtrak passenger trains travel over the track segments and signaling systems that are privately owned, operated, and maintained by five host railroads: BNSF Railway, CN Railway, CFX Transportation, Norfolk Southern Railway, and Union Pacific Railroad. (Short segments of other railroads are also used). In addition, the Massachusetts Bay Transportation Authority owns certain segments of track on which Amtrak operates certain trains that are considered part of the NEC; Amtrak also maintains those track segments.

The physical characteristics (e.g., tracks, bridges, tunnels, and stations), signals/communication, and type of maintenance conducted for the NEC and each other host railroad operating territory may differ in several aspects.

3.3.1.1 *Track*

The track right-of-way physical structure may vary in construction and be located at-grade, in open cuts, on filled land; in valleys or ravines; in tunnels, use bridges or elevated structures that cross over roads, city and town streets and neighborhood housing, as well as wetlands, lakes, rivers, or other bodies of water. Moreover, right-of-way structures could be located at high altitudes.

The track roadbed may consist of ballast or concrete slab and on bridges and other elevated structures. The track may be laid over open trusses consisting of steel or wooden beams. In addition, the right-of-way is elevated in many areas, to eliminate grade crossing conflicts.

Freight trains are operated by the host railroads on the majority of the same track infrastructure as passenger trains. Those trains usually operate at much slower speeds, and may operate on track alongside the track that the passenger train is moving on or in front or in back of the passenger train on the same track. Along a specific route Amtrak train speed is indicated by the signaling systems while movement between parallel railroad tracks is achieved through the operation of switches and interlockings (e.g., junctions), according to both general and railroad-specific operating rules and practices.

3.3.1.2 *Signaling and Control*

Signaling and train control for Amtrak passenger train speed, as well as its location and separation from other passenger and freight trains, is achieved by Amtrak or other host railroad dispatcher by means of a traffic control system. This system controls train movement onto a particular track or siding, as well as control of switches and interlockings, and may use wayside signals, train cab signals, automatic block signals, automatic train control (ATC), automatic train stop (ATS) systems, and /or advanced civil speed enforcement system (ACSES), or an incremental train control system (ITCS). Depending on the host railroad, other types of signaling and train control are used.

Depending on the ownership of the railroad right of way (its own or host) that Amtrak operates a particular passenger train over, the signal system may differ significantly in the way that signals are displayed and their meaning. Although FRA regulations in § 236.23 specify minimum basic signal aspects (colors) and indications, i.e., red = stop, yellow = restricted speed and stop may be required, green = proceed at authorized speed; some railroads combine colors in different arrangements, which have different meanings. For example, a red over yellow signal on one railroad may mean “restricted speed of 15 mph, but be prepared to stop,” since another train could be occupying the next track segment (block) ahead. On another railroad, that same signal arrangement may mean “slow approach” at 30 mph, and that no train is occupying the block ahead. Since Amtrak operates passenger trains on several different railroads, and through various regions of the country, signal instructions covering a single trip on a single route may be scattered among multiple operating rulebooks and timetables.

3.3.1.3 *Passenger Stations*

Amtrak operates a variety of 500 passenger stations. Major route end terminal stations are large and provide passengers with the ability to purchase or pick-up Amtrak train tickets, and check baggage. (The majority of Amtrak train routes require advance reservations, which require ticket advance issuance / pickup from a station ticket agent or a “Quik Trak” self-service vending machine, if the ticket is not issued by a travel agent.)

The station platform may provide high- or low-platform train boarding for passengers. On low platforms, it may be necessary for passengers to “cross over” to another track to reach the track that the train may actually be boarding on.

Checked baggage is accepted only at stations that Amtrak station agents are posted; the Assistant Conductor is responsible for unlocking and locking the baggage car and assisting the station agent in transferring baggage between the station platform and the car.

3.3.2 Passenger Train Operations

As noted previously, Amtrak shares the majority of its passenger train operations on the same track right-of-way privately owned host (in most cases, freight) railroads.

Amtrak train frequency and route diversions can change on a daily basis to meet peak and off-peak passenger service demands. In addition, during summer and holiday periods, and as a result of special charters, the number and type of passenger car equipment in the train consist can expand. The time period for scheduled passenger train operation between intermediate stations and city terminal station can be shorter or longer, depending on the time of day, week, or season, and weather or when track maintenance or other conditions require slower train speeds, and diversion onto other tracks than normally used. Weather conditions also may impact on train movement operations, but in most cases, Amtrak passenger trains are differently affected.

While a “common” code of operating rules and practices is followed by most U.S. railroads (e.g., *General Code of Operating Rules (GCOR)* [24]), Amtrak and the host railroads have modified or omitted provisions for flexibility of their individual operations. Amtrak has developed its own operating rules and timetable for the NEC and its Michigan-Chicago route track segment, consistent with the GCOR [25] [26]. Amtrak and host railroad train timetables (e.g., [27] indicate the time that passenger trains are expected to arrive at a specific location, such as signal points along the right-of-way, and passenger stations

As noted previously, either Amtrak or another host railroad provides signaling and train control for Amtrak passenger train speed, as well as its location and separation from other passenger and freight trains, is provided to Amtrak trains.

The Amtrak train operating crew is responsible for following all train orders issued by the Amtrak or other host railroad trainmaster and or dispatcher that describe deviations from the Amtrak and other railroad train timetable and other train movement actions (such as location of speed restrictions, track location operation, time in siding, or of switch operation, etc.), that may be necessary due to other traffic or maintenance activities.

3.4 PASSENGER TRAIN CREW

As noted previously, there are two general categories of train crew who work on-board Amtrak intercity passenger trains: train operation and OBS Attendants (and related food service and dining car positions).

3.4.1 Train Operating Crew

The Conductor is responsible for the overall safe movement of the Amtrak passenger train, including the safety of passengers.

The Conductor is in charge of the Amtrak train and has two types of specific safety-related functions related to:

- Right of Way / Operations (see Section 3.3 and Chapter 4); and
- Passengers
 - Supervision of other train crew,
 - Ticketing,
 - Emergency and security situations.

As assigned, per the collective bargaining agreement and Amtrak policy, one or more Assistant Conductor (s) assist(s) the Conductor in carrying out these functions.

The Amtrak Engineer operates the locomotive / other motive power (i.e., MU) that is used to move passenger trains over the right-of-way between stations. The Engineer operates the train over the designated track at the speeds designated by the host railroad between Amtrak passenger stations and stops at those stations so that the doors of the passenger cars line up with the platform that passengers are directed to use to enter and leave the train by on-board train staff.

Amtrak train operating crew assignment is described in Chapter 4. Safety-related functions, qualifications, and training are extensively described in Chapter 5.

3.4.2 OBS Attendants and Related Positions

The employment of all OBS Attendants and related positions was transferred to Amtrak in 1971. These positions include those Service Attendants who provide First Class / Business Class service and / or sell food and beverages in the Café / Lounge Cars on short- and medium-distance Amtrak trains. Depending on the route and type of rail car equipment used on Amtrak long distance trains, the OBS crew may include Train Attendants (Coach and Sleeping car), as well as Lounge Service Attendants, and Dining car staff (chef/ cooks and pantry) and waiters). Amtrak OBS Attendant staff assignment is described in Chapter 4. Chapter 5 reviews safety-related functions, qualifications, and training in more detail.

3.5 PASSENGERS

In FY 07, Amtrak reported that it carried an average of nearly 70,000 passengers per day, with a total of nearly 26 million passengers [7].

3.5.1 Demographics

A GAO report contains information relating to passengers who travel on Amtrak trains [28]. The report states that a much higher percentage of NEC and other corridor ridership is comprised of commuters and business travelers, particularly on the *Acela Express* and *Regional* trains, in comparison to the long-distance routes. The GAO report also states that Amtrak survey data indicated that 82 percent of travel on the NEC was business-related in fiscal year 2004.

Passengers on Amtrak's *Regional Service* — the other primary NEC trains — reported that 49 percent were traveling or commuting for business or school; 50 percent reported traveling for personal or family business, or traveling primarily for leisure purposes. For non-NEC corridors, the designated trip purpose varied widely between the routes because they operate in a number of different states and passenger markets. For example, the frequent *Empire* service in New York State is targeted at business travelers and commuters, while the more frequent California Coastal and Capitol Corridor routes are characterized by a larger share of leisure and personal travel.

In addition to the GAO report, the Amtrak System Timetable [8] shows that Amtrak provides frequent service between many cities in several states, in addition to California, where colleges and universities are located, e.g., Illinois, Michigan, North Carolina, Oregon, Washington, and Wisconsin.

Many charter groups have historically traveled on Amtrak trains, including school children.

Long distance trains, particularly those that have sleeping car service have traditionally attracted a large number of older persons and families. In addition, *Auto-Train* service is specifically targeted at older retired persons and families who travel to Florida in the winter. (As noted previously, this overnight train, which permits passengers to take their motor vehicles, does not make any passenger stops between Lorton, VA and Sanford, FL.).

3.5.2 Categories of Service

Coach Class (Coach) seats (Figure 2a) provide the basic level of revenue service offered to passengers on all Amtrak trains (with the exception of the *Acela Express*, while lower density Business Class seats are offered on the majority of NEC and non-NEC short-corridor / medium-distance trains (Figure 2b). The majority of Business Class seats are located in single level

a. Coach

b. Business Class

Figure 2. Amtrak Single-Level Car – Interior Seating-

passenger cars, with the exception of Business Class seats in the bi-level California-owned cars operated by Amtrak.

Many Amtrak bi-level cars provide Coach seating on both levels (see Figure 3).

On the majority of long-distance trains that operate overnight or multiple-day service, First Class private rooms in sleeping cars are available to provide a higher level of comfort; the rooms are equipped with seats during the day which convert to beds (see Figure 4).

Passengers may also upgrade their Coach seats to a higher category of service, if available, on a particular train after boarding by paying an accommodation charge and being issued the appropriate ticket by the Conductor (see also subsection 0).

The majority of Amtrak short- and medium-distance trains carry one or more food service and beverage cars available to all Amtrak passengers, managed by one or more on-board Service Attendants. A higher level of food and beverage service options is provided on most Amtrak long distance / overnight trains ranging from Lounge / Dinette cars to Dining cars. The type of the type of service and train equipment determines the number of OBS attendants assigned to a particular train (see Chapter 0). (Due to recent Amtrak revamping of food service cars, fewer OBS staff have been assigned to certain trains than previously.)

Single-level baggage cars are operated on most long-distance trains to provide passengers with a means to check baggage to major cities.

- a. Coach - upper level
- b. Coach - lower level

Figure 3. Amtrak Bi-Level Car – Interior Coach Seats

- a. Day use
- b. Night use

Figure 4. Amtrak Sleeping Car Compartment

3.5.3 Passenger Boarding / Detraining

Acela Express trains stop only at high platform stations located in the NEC and do not have side door trap stairways; the height of the platform and the car floor level permit passengers to directly enter the car without going up or down steps (Figure 5a). (This door configuration presents unique issues for passenger evacuation, which are discussed in [REDACTED].)

All other Amtrak cars are designed to permit low-platform boarding (Figure 5b). (*Amfleet I* and *II / Metroliner* and *Horizon* cars were built for passenger boarding and exiting at high platform stations, but do have side door trap stairways for boarding at low-platforms. Due to the great variability of low- platform height, train crewmembers must typically provide a “step box” to assist passengers to reach the bottom step of single-level car side door stairways for passengers to enter and leave the train.

a. *Acela Express*

b. *Amfleet*

Figure 5. Amtrak Single-Level Car – High and Low Platform Stations

Train side doors for passenger entrance/egress are operated electrically on all *Acela Express* and *Talgo* trainsets, as well as *Metroliner* cars, *Amfleet I* and *II* cars, and *California / Surfliner* cars. Each of these side doors is trainlined to enable control by one on-board train crewmember in one location to open one or more selected individual side doors, or all side doors; one train crew

Train side doors for passenger entrance/egress are operated electrically on all *Acela Express* and *Talgo* trainsets, as well as *Metroliner* cars, *Amfleet I* and *II* cars, and *California / Surfliner* cars. Each of these side doors is trainlined to enable control by one on-board train crewmember in one location to open one or more selected individual side doors, or all side doors; one train crewmember can also control the operation of individual doors on the car where they are stationed; specific door operation varies by car type. In contrast, *Horizon* and *Superliner* bi-level car side doors must be manually operated at each door location by a train crewmember. Movement by passengers and crewmembers between all bi-level cars is possible only on the upper level through powered end sliding doors.

Depending on the type of bi-level car, passengers can board and leave through one or more side doors located on the lower level of the car. A step box may be necessary at some low-platform locations for some passengers.

Passengers use a central interior stairway to reach the upper level of *Superliner* bi-level cars which contain the majority of passenger seating and private sleeping compartments (Figure 6a), while the *California / Pacific Surfliner* cars have two sets of bi-parting side doors on each side of the car, leading to two stairways, each located towards each end of the car (see Figure 6b), which lead to the majority of the seating areas.

a. *Superliner*

b. *California / Pacific Surfliner*

Figure 6. Amtrak Bi-level Car – Stairway (s) to Upper Level

3.5.4 Ticketing

With certain exceptions, Amtrak requires that advance reservations be made by passengers before they board a train. However, for Philadelphia-Harrisburg *Keystone* service, and certain California corridors, passengers can buy tickets on the train from the Conductor (or Assistant Conductor) without reservations, however there is no guarantee of a seat.

Passengers cannot reserve or purchase Coach tickets for specific assigned seats in individual cars on any Amtrak short-, medium-, or long-distance trains with one exception: non-specific seats may be reserved on the lower level of *Superliner* cars, if operated on a long-distance route.

The majority of passengers purchase tickets at a station, or either use the Amtrak telephone reservation system or the Amtrak website. For convenience, and due to the great number of

Amtrak stations that do not have ticket agents, passengers are permitted to either make an advance reservation, or if space is available on unreserved trains, and pay on board, with a ticket issued by the Conductor (or Assistant Conductor), and also. Unless the ticket purchased is for specific space in a sleeping car room, the ticket purchased on board is for a non-individual Coach seat.

There is modified open seating for the Business Class and First Class Acela Express categories (the latter available on *Acela Express*). That is, while only passengers buying tickets in that upgraded category of service are guaranteed a seat in that car(s), specific seats are not assigned to specific individuals prior to boarding the train. Passengers traveling on long distance routes who purchase sleeping car space in advance are assigned to specific individual rooms on specific cars when they make their reservation (including those who reserve and purchase day room use tickets in advance.)

As noted earlier, passengers may also upgrade their Coach seats to a higher category of service, if available, on a particular train after boarding, again by paying an accommodation charge and being issued the appropriate ticket by the Conductor.

Due to the requirement for advance reservations on most trains, charter groups may board with individual tickets or a group ticket block. If they board the train at a station that is not staffed with a ticket agent or do not obtain tickets by other means, the Conductor is responsible for ticketing each passenger.

3.6 TRAIN EQUIPMENT CONFIGURATION AND CAPACITY

The number of passengers expected (e.g., advance reservations), and the availability of equipment, as well as the route, time of year, day of week, can all affect the number and type of passenger cars carried on a train. (with the exception of *Acela Express* and *Talgo* equipment described below which are fixed consists.) For example, on Friday and Sunday evenings or during holiday periods, the number of cars may be increased, or an additional train (e.g., section) may be used. In addition, the passenger train capacity could increase or decrease depending on the car configuration, including the number and type of seats (Coach or Business Class), type of sleeping car, and whether the car is single level or bi-level). Weather or malfunctioning equipment may also have an impact on train capacity, rendering some cars or sleeping car compartments unavailable for passenger use, even if part of the train consist.

During holiday periods (e.g., Thanksgiving and Christmas), Amtrak typically operates trains with extra cars and extra sections. (An extra section is an additional train that operates 10 to minutes later than the normally scheduled train.) Those train consists may use commuter rail

cars, providing significantly higher Coach passenger capacity per car (100-120 persons vs. 72 persons).

Charter groups may also reserve a large number of seats at any time, necessitating the addition of passenger cars to a train consist. Finally, weather or malfunctioning equipment may also have an impact on passenger seating capacity, rendering some cars (or sleeping car components) unavailable for passenger use, even if carried as part of the train consist.

3.6.1 NEC

Amtrak operates two types of single-level passenger train equipment on the NEC.

Acela Express train service uses a fleet of French-designed eight car electric trainsets, which make limited stops between Boston and Washington, DC. Each semi-permanently coupled trainset is comprised of two power cars, a food service (Bistro) car, one First Class car seating with seating for 43 persons and four Business Class cars, each seating 64 persons for a total capacity of 427.

Other Amtrak NEC trains operate with electric locomotives and up to six *Amfleet I / Metroliner* passenger cars (including a cab control car*). The majority of these 85 ft (26 m) long cars were designed for high-density passenger Coach seating for 60-84 persons. To provide space for wheelchair users and ADA-accessible restrooms, the majority of the *Amfleet I* passenger cars have been reconfigured to provide 72 Coach seats, while other cars are now reconfigured to provide 18 (if in located in a Café car) to 59 Business Class seats.

A typical NEC *Regional* train operates with five Coaches, one or more *Amfleet I / Metroliner* cars with half or full car Business Class seating, and depending on the number of Coach seating cars, one or more Café / Lounge / Dinette cars to provide food and beverage service. An *Amfleet II* car with 59 seats may also be carried for those Coach passengers who travel the entire distance between Boston and Washington. Off-peak trains may carry four Coaches, while peak weekend service may carry six Coaches. Additional Coaches, each seating 74-84 passengers may be added, depending the day of the week or time of day and/or season. The typical approximate maximum train capacity at any one time thus ranges from 234 to 362 persons.

* A cab control is a car with passenger seats that has an operator cab on one end of the car, which allows for “push” – “pull” operation so that the train can be operated with the locomotive on the rear of the train.

3.6.2 Non-NEC Short and Medium-Distance Trains

Amtrak operates numerous short-distance intercity passenger trains in several non-NEC Eastern corridors, Midwest corridors, as well as Northwest region and California corridors. Amtrak trains are powered by diesel locomotives and operate during the day, with the exception of the Boston-Washington, DC route (that operated overnight service, but with no sleeping car).

With the exception of Northwest and California corridor operations, Amtrak operates trains with single-level *Amfleet I and II* cars and single-level *Horizon* cars. *Amfleet II* cars were designed to provide lower-density Coach seating for passengers traveling on medium- and long-distance trains. They are thus equipped with only 59 Coach seats. *Horizon* cars seat up to 82 Coach passengers. Either 14 Business Class seats and booth table seating for 32 persons or table seating for 48 persons are located in the food Service cars, which are staffed with an OBS attendant. Certain Midwest routes operate with bi-level *Superliner* cars with Coach seating on both levels, or seating on upper level and a Café on the lower level at certain times of the year.

Depending on the route, a typical Chicago Corridor short / medium train could carry three Coach cars with a total seat capacity of between 177-216 passengers, depending on the number of Coach seats. If Business Class seating with 15-18 additional passengers (as part of the Café car) is provided, the total train capacity could be as high as 234 persons, if 4 cars are operated. Each additional car with Coach seating could increase the train seating capacity by 59-72 passengers.

Amtrak operates single-level diesel-powered *Talgo* trainsets along routes between Oregon and Washington State and from Seattle to Vancouver, BC. Each of the five trainsets consists of an articulated set of 10-12 cars that are permanently coupled; each car shares a pair of trucks with another. The *Talgo* passenger cars are 43 ft (13 m) long, rather than the standard 85 ft (26 m) length of U.S. passenger cars. Coach and Business Class seats are available as well as Café car service; Dining car service is provided on the Seattle to Vancouver, BC route. There is also a Dining car and a Lounge car, which are both staffed on OBS Attendants. The total fixed passenger seating consists of 18 and 26 Business Class seats in two cars, and 17 Coach seats in one car and 26 Coach seats in five other cars, for a total capacity of 196 persons.

Amtrak operates bi-level *California* and *Pacific Surfliner* equipment over various California routes, as part of a push pull diesel locomotive / cab car train consist. The number of passenger car revenue seats varies, depending on their configuration. For example, the *California* Coach trailer car has 76 Coach seats in the upper level and 18 seats in the lower level and the Cab / Baggage / Coach car has Coach seating for 70 seats on the upper level and 12 on the lower level. The Café / Coach has 72 Coach seats on the upper level. The Business Class car has 77 seats on

the upper level. A typical train capacity is 411. (*Superliner* coach cars are sometimes used on this route to increase train capacity.)

Pacific Surfliner equipment is made up of three types of Coach cars: Cab/Baggage/Coach with 82 seats, Coaches with 90 seats, and Coach /Café with 72 Coach seats. In addition, a Business Class car has 77 seats on the upper level. Passengers may purchase food and beverage from an OBS Attendant. A typical train capacity is 411 persons. (*Superliner* coach cars are sometimes used on this route to increase capacity.)

3.6.3 Long-Distance / Overnight Trains

The majority of Amtrak long distance trains operate overnight or multiple day / night service.

All Amtrak overnight long-distance trains provide Coach seating and some type of food and beverage service (Café or Lounge / Dining) cars.

Most long-distance trains that Amtrak operates between Chicago and the East Coast use single-level *Amfleet I* and *II* and *Horizon* passenger cars, and single-level *Viewliner* sleeping cars. The *Viewliner* sleeping cars contain bedrooms and roomettes. The *Auto-Train*, and Chicago-Washington, DC trains operate with bi-level *Superliner* cars.

Bi-level *Superliner* cars are operated on the Western and Southern routes from Chicago, and the two routes from Los Angeles to Seattle and to New Orleans.

Coach seats on *Superliner* cars are typically located on the upper level (62 seats) and may also be on the lower level of other cars (12 seats). Space for passengers to store wheelchairs and large un-checked baggage, as well as restrooms, are also located on the lower level of many Coach cars. Other *Superliner* cars have Coach seating on the upper level and a snack bar on the lower level to provide passengers with food and beverage service.

Superliner sleeping cars have large bedroom and smaller roomette compartments on the upper levels. *Superliner* Sleeping cars have five large bedroom compartments and 10 smaller roomette compartments on the upper levels. The large bedrooms are capable of accommodating two adults, or an adult and one-two children, and also have a toilet / shower room and a sink. The roomette does not have a toilet, sink or shower in the room and the capacity is 2 adults. On the lower level, an ADA accessible bedroom, 4 other roomettes, a family bedroom, two public toilets, and luggage storage space are provided. On certain *Superliner II* cars, a public shower is also located on the lower level. The total approximate adult capacity is 45 persons for each car.

Superliner Dining cars, and Lounge cars are also part of the train consist. OBS attendants staff the Dining /Lounge car, and serve as train attendants for Coach cars and Sleeping cars.

The approximate number of passengers at any one time traveling on a long distance train could range from 365-to 410. If additional cars are operated, the number of passengers carried would be higher , i.e., 610 for Auto-Train.

Amtrak sometimes carries private passenger cars attached to the rear of certain Amtrak long-distance trains, including the regularly scheduled *California Zephyr*, *Southwest Chief*, or *Silver Meteor* routes.

4. AMTRAK INTERCITY TRAIN CREW ASSIGNMENT

As indicated in Chapter 2, no Federal regulations exist that specify the minimum number of either railroad transportation crews (i.e., train and engine) who operate Amtrak intercity (or commuter rail) passenger trains, or for any type of OBS Attendants or related positions.

Passenger train operating crew size has always been determined by collective bargaining agreements between railroad management and labor.

However, several states (e.g., Arizona, California, Indiana, Washington, and Wisconsin) had previously established legal requirements for a minimum number and type of operating crew for passenger trains. The Rail Reorganization Act of 1993 prohibited states from enforcing statutes that regulate a specific number of persons employed by Amtrak on board Amtrak passenger trains.

The remainder of this Chapter describes the historical background for train operating and other crew assignment and Amtrak's on-board train crew assignment, as contained in collective bargaining agreements and Amtrak policies.

4.1 HISTORICAL BACKGROUND

4.1.1 Train Operating Crew

Prior to the establishment of Amtrak in 1971, passenger trains were operated by the train employees of the same private railroad company who operated its freight trains. Each train operating crew consisted of a minimum of five employees: an Engineer, Fireman (who functioned as an Assistant Engineer), Conductor, and two Trainmen (e.g., Flagman, and Brakeman, who both reported to the Conductor. The Brakeman position was designated as responsible to ensure that handbrakes were applied when necessary and for handling switches. The Flagman was responsible for providing flag protection from other trains to the rear of the train. In addition, a "baggage man" worked on passenger trains that carried a baggage car to load and unload passenger checked baggage and other limited railroad packages.

Due to operating necessities associated with 10-20 car passenger trains, including the large numbers of passengers, the policy of most railroads was to assign additional Trainmen to assist the Conductor, beyond the minimum of Trainmen required by the national agreements.

The railroad procedure was to change operating train crews when passenger trains moved onto a different private operating railroad. In addition, train operating crews also changed at different

locations along an individual railroad, according to mileage (150 miles was the minimum with a premium for additional miles), and according to the Hours of Service regulation (which established that 12 hours was the maximum permitted time that passenger train operating crew may work, with the exception of during narrowly defined emergencies).

The “Assistant Conductor” position consolidates the historically separate “Trainman” crew categories of flagman, brakeman, and baggage-master into one category on Amtrak trains.

As noted above, other passenger train operating crew generally historically consisted of one Engineer and one Assistant Engineer, unless agreed to between the railroad and the local union chapter. However, the “lone” Engineer was negotiated as part of the introduction of the *Metroliner* high speed multiple unit (MU) passenger train equipment service that the Pennsylvania / Penn Central Railroad introduced in 1966 on the NEC. Amtrak inherited the *Metroliner* “lone Engineer” operation in 1971 and later began to expand it beyond the NEC, as a result of collective bargaining efforts.

4.1.2 OBS Attendants and Other Related Positions

“Snack car” attendants were employed by many of the private operating railroads, to provide food and beverage service to passengers. Dining and sleeping car service attendants were employed by the Pullman Company, before it went bankrupt and its operations were transferred to the private railroads in 1966.

The employment of all OBS Attendants and related positions was transferred to Amtrak in 1971.

4.2 AMTRAK TRAIN OPERATING CREW ASSIGNMENT

In 1971, Amtrak inherited passenger train operating crew assignment policies from the private railroad companies, as well as operating rules contained in local and national agreements incorporated into union contracts in place at that time, as a result of collective bargaining. Amtrak train operating crews, including the Conductor, and Assistant Conductor (s), and Engineer and Assistant Engineer, continued to remain employees of the “host” private railroads until the early 1980s.

Beginning in 1983, Amtrak negotiated collective bargaining agreements with the train operating crews that transferred their employment from the privately owned freight railroads and instituted crew assignment changes.

4.2.1 Conductor and Assistant Conductor

As explained in Chapter 3, the Conductor is in charge of the overall safe operation and movement of the train over the railroad. Chapter 5 further describes train operating crew functions and training.

4.2.1.1 *Amtrak Collective Bargaining Agreements*

It is noted that Amtrak and the UTU reached agreement in March 2008, to maintain the same number of Conductors and Assistant Conductors, for all Amtrak passenger trains as the prior agreements, described below, until the end of 2009.

As of January 1, 1983, passenger train Conductors and Assistant Conductors for NEC operations employed by the former operating railroad (e.g., Conrail) were transferred to Amtrak, as a result of the 1982 agreement between Amtrak and the UTU [29], as required by Section 1165 of the Rail Service Act of 1981 ("NERSA"). The payment of train operating crew by mileage / time was changed to an hourly wage rate and a 40-hour workweek.

Rules 1, Scope and Definitions, and 11, Crew Consist, as contained in the UTU NEC collective bargaining agreement, relate to train operating crew assignment. Rule 1 states that the "agreement applies to the work or service performed by the employees...and governs...working conditions of all employees, as defined in this Rule, engaged in the performance of work presently recognized as the exclusive work of passenger train service employees." The employees covered by the UTU agreement are Conductors and Assistant Conductors.

While the Rule 11 requirement contained in the 1982 agreement maintained one Conductor as the minimum required for a passenger train consisting of one Revenue Car, the number of Assistant Conductors was established as follows:

- Two to six Revenue Cars: One Conductor and One Assistant Conductor, and
- Seven or more Revenue Cars: One Conductor and two Assistant Conductors.

A "Revenue car" is defined by Rule 11 of the 1982 agreement "as a car in which seats or accommodations may be purchased, i.e., coaches, sleepers, and parlor or club cars. In addition, a baggage car that is scheduled to be worked by the train crew will be included in the passenger car count used when determining the minimum crew. Diners, lounges, café cars with no revenue seats, and deadhead passenger equipment will not be counted in determining the minimum crew requirement." The 1982 agreement also stated that: 1) "nothing...will prevent [Amtrak] from using more than the minimum crew assignment and 2) any prior crew arrangement for the operation of a train with less than a Conductor or two Assistant Conductors would remain in

effect. (The Springfield, MA-New Haven, CT *Shuttle* train and the Pennsylvania *Keystone* train schedules normally operate with one Conductor). Financial compensations in the form of reduced crew payments and productivity payments were also provided, as applicable.

Passenger train Conductors outside the NEC became Amtrak employees as a result of the 1986 collective bargaining agreement (as amended in 1994 relating to certain increased payments for seniority) between the UTU and Amtrak [30].

In addition, the same crew assignment formula, the same type of financial compensation as noted previously, and 40-hour work-week rules, as had been adopted previously for the NEC were implemented. (Since the Hours of Service rules are Federal regulations, the 1986 agreements did not change the maximum number of hours worked.)

The 1999 collective bargaining agreement between Amtrak and the UTU established a new category of “long haul” train. For that type of train, defined as “a train that includes one or more sleeping cars,” the minimum crew was established as one Conductor and one Assistant Conductor, regardless of the number of cars [31]. The rationale is that: 1) “long-haul” trains carry a lower passenger seating capacity in Coach and Sleeping cars and 2) more train attendants are assigned to that type of train than to short distance trains.

Both the non-NEC agreement and the non-Corridor agreements include the same previously described provisions relating to Amtrak use of more than the minimum crew assignment and prior one car train operation exception. Per the 1999 agreement, that if Amtrak operated a seven or more car train long haul train without the second Assistant Conductor, it added to a savings fund which is divided between the Company and the Union (UTU) on an annual basis.”)

The *Auto-Train* Service is a long-distance over night passenger train that operates between Lorton, Virginia and Sanford, Florida. The train operates without scheduled stops between the terminals; however, a brief stop for changing operating crews and watering the train is made at about the halfway point. The 1985 collective bargaining agreement rules for *Auto Train* Conductor and Assistant Conductor train assignment (Rules 1 and 9) are similar to those of the 1999 non-NEC agreement. Rule 1 pertains to Scope of the *Auto-Train* employee assignment. Rule 9 is similar to Rule 11 of the 1999 long haul agreement in that one Conductor and one Assistant Conductor are required, regardless of the number of cars. As in the other agreements, a statement is included that nothing prevents Amtrak from using more than the minimum crew requirement if it so chooses. The collection of tickets is not handled by the Conductor or Assistant Conductor on *Auto-Train*.

4.2.1.2 *Amtrak Train Operating Crew Policy*

According to Amtrak's response to FRA's 2006 inquiry, current on-board intercity passenger train staffing is based on both the number and type of cars in the train (e.g., train consist) and the number of passengers, and is predicated solely on operating crew consist agreements and Amtrak policies with respect to passenger comfort and service [4]. Amtrak's stated policy is that all passenger trains are operated with a Conductor and at least one Assistant Conductor. Amtrak also indicated to FRA that its policy for the number of Conductors and Assistant Conductors assigned to a passenger train complies with Rule 11 of the UTU collective bargaining agreement; and that additional Assistant Conductors are assigned to passenger trains with less than seven revenue cars to "address customer and operational needs and per Amtrak management prerogative."

4.2.1.3 *Public Law Board Cases*

Since the 1983, 1986, and 1999 collective bargaining agreements were implemented, Amtrak and the UTU have had several differing interpretations for the meaning of "Revenue car," related to train operating crew assignment on certain intercity trains. The UTU and Amtrak have appealed to the Public Law Board (PLB) to resolve these disagreements. The PLB is a tribunal established pursuant to Public Law 89-456 that authorized the establishment of special boards of adjustment on individual railroads. The PLB can be established upon the written request of either party. While the majority of PLB cases pertain primarily to salary disputes, certain cases contain safety-related issues potentially pertinent to the operation of Amtrak trains and operating crew assignment. Accordingly, Volpe Center staff reviewed several PLB cases related to Amtrak train crew staffing, in terms of the safety impact on Amtrak passenger operation (see Chapter 5 and Appendix X).

4.2.1.4 *Hours of Service*

It may be necessary for "Relief" Conductors and Assistant Conductors to board an Amtrak passenger train and take over duties from the "initial" Conductors and Assistant Conductors while the train is moved to another crew change point or a end terminal station, particularly if a particular Amtrak train is running late (over the maximum times permitted by the Hours of Service Act).

4.2.2 *Amtrak Engineer and Assistant Engineer*

As explained previously, while the Conductor is in charge of the overall train movement, the Engineer actually operates the motive power of the train (e.g., locomotive/cab car, or MU).

The most recent agreement (2008) maintains the same provisions as the earlier collective agreements relating to Engineer assignment, as described below.

The number of Assistant Engineers assigned to a passenger train was reduced), as part of the train operating employee transfer from the private railroads to Amtrak in 1982, 1986, and 1999, through the collective bargaining process, with the Brotherhood of Locomotive Engineers (now the Brotherhood of Locomotive Engineers and Trainmen (BLET)).

From 1986 to 1998, Amtrak operated under a collective bargaining agreement rule that required two Engineers (an Engineer and an Assistant Engineer), if the duration of the Amtrak train run was scheduled to be more than 4 hours. Amtrak and BLET subsequently agreed to revise the train operation time period requiring a second Engineer to be 6 scheduled hours or more [32]. However, day or night train operation was not considered in the second Engineer assignment.

According to an NTSB accident investigation report which discussed train crew fatigue [33], Amtrak identified 39 assignments that had a 3 hour or more “intrusion” into the midnight to 6 am time period and committed to placing a second Engineer in the locomotive cab for those 39 assignments, due to an FRA-expressed concern for the risk of fatigue relating to the single Engineer operation of Amtrak passenger trains between those hours.

It may be necessary for “Relief” engineers to board an Amtrak passenger train and take over operation from the “initial” Engineer to move the train to another crew change point or a end terminal station, particularly if a particular Amtrak train is running late, (over the maximum times permitted by the Hours of Service Act).

4.3 AMTRAK ON-BOARD SERVICE (OBS) EMPLOYEE ASSIGNMENT

Amtrak uses the general term “on-board service” (OBS) for staff who provide passengers with food and beverage service, and who otherwise provide assistance to passengers on long-distance trains.

All OBS staff are members of the Amtrak Service Workers Council (ASWC). While the collective bargaining agreement between Amtrak and the Service Workers Council [34] contains general descriptions for several categories of OBS Attendants (and chefs), there is no language requiring a minimum of number of food and beverage Attendants, or other Attendants, based on the number of Revenue cars or passengers.

Amtrak OBS crew assignment practices currently in effect for long distance train car staffing are:

- Lounge car: One Lead Service Attendant (LSA)
- Sleeping car: One Train Attendant per car
- Coach: One Train attendant based on number of cars and passengers (see Table 4 below).
- Dining car – minimum of 3 employees (one Chef, 2 Waiters)

In addition, the Amtrak Service Standards Manual contains guidance for the number of Train Attendants to be assigned to a train [16]. The number of Coach Train Attendants assigned to an Amtrak intercity passenger train is based on the total number of coaches and passenger capacity (see Table 4). The Amtrak policy requires that the number of passengers must exceed the maximum count for at least (4) hours during daylight travel to warrant the assignment of an extra Train Attendant.

Table 4. Amtrak OBS Train Attendant for Long-Distance Trains

NUMBER OF COACHES *	NUMBER OF PASSENGERS	NUMBER OF TRAIN ATTENDANTS
1-3	0 – 150	1
	151 – 225	2
4	0 – 150	1
	151 – 300	2
5	0 – 300	2
	301 – 375	3
6	0 - 300	2
	300 - 375	3
	376 - 450	4

Source: Adapted from Amtrak Service Standards Manual [Reference 16]

In its 2006 response to FRA, Amtrak stated that for trains operated not exclusively within the NEC, Amtrak assigns OBS Attendant crewmembers “according to whether the train is operates over a short-distance or long-distance route. Amtrak defines “short distance” operation as between cities that are not more than 125 miles apart.” “Long-distance” is defined as operation between large cities more than 125 miles apart.

In an effort to provide good customer service and to address certain accommodation issues, Amtrak practice is to provide one Lead Service Attendant (LSA) if food and beverage service is offered on a train. If a train offers First Class service (NEC) or Business Class service in an

entire car in non-NEC Corridor service, that service is provided by one or more OBS Attendants assigned solely to that car.

On some short-distance routes that do not have Café cars, an OBS Attendant uses a service cart to move through the train and sell food and beverages to passengers at their seats. However, this type of service is typically operated on short corridors such as Chicago-Milwaukee.

5. AMTRAK ON-BOARD STAFF SAFETY-RELATED FUNCTIONS, QUALIFICATIONS, AND TRAINING

This chapter includes a review of Amtrak train operating and (OBS) crewmember safety-related job functions and is based on the information available to Volpe Center staff during the time this study was prepared. This information was derived from review of Amtrak collective bargaining agreements and several other Amtrak-provided documents:

- Amtrak Position Descriptions;
 - Train Operating Crew,
 - o Conductors [35]
 - o Assistant Conductors [36]
 - o Engineers [37] and
 - OBS Crew including Service and Train Attendants [38] [39]
- Service Standards for Train Service and On-Board Service Personnel Manual [16];
- System Safety Program Plan [40];
- Emergency Preparedness Plan [41];
- Amtrak Operating Rules and Timetables [26] [27];
- Other Amtrak rules and documents
 - Electrical Operating Instructions (AMT-2) [42],
 - Air Brake and Train Handling Rules and Instructions (AMT-3) [43],
 - Special Instructions Governing Operations of Signals and Interlockings (AMT-4) [44],
 - Safety Instructions for Transportation Employees (AMT-5) [45], and
 - Equipment diagrams showing location of emergency exits and emergency equipment [46];
- General Code of Operating Rules (GCOR) [25];
- Host Railroad Timetables and Special Instructions (e.g., [28] [47]; and
- Additional Selected Amtrak Training Materials (train operating and OBS service crew)
 - Initial Assistant Conductor Training [48],
 - PREPARE [49], and
 - Security [50].

In addition, previous FRA studies (e.g., [51], and other pertinent information were reviewed.

More specific job responsibilities, related to emergency preparedness and security functions are reviewed in Chapter 6.

None of the information in this Chapter or in Chapter 6 is intended to provide a comprehensive task analysis for any of the job positions or functions.

5.1 TRAIN OPERATING CREW

5.1.1 Conductors and Assistant Conductors

As noted in Chapter 4, the Amtrak Conductor is in charge of the overall safe operation and movement of the passenger train over the particular railroad route. Accordingly, the Conductor is responsible for the safety of all passengers and on-board crew, and that each member of the train crew performs his/her duties according to Federal regulations; and Amtrak and host railroad rules and procedures.

The Assistant Conductor assists the Conductor in coordinating the activities of the entire train crew assigned to the particular Amtrak passenger train.

5.1.1.1 *Job Functions - General*

Detailed requirements for Conductor and Assistant Conductor positions are specified in their job descriptions [36] [37], as well as in the Amtrak Service Standards Manual [16].

Amtrak train Conductors and Assistant Conductors are required to perform the following general safety-critical functions to ensure the safety of all passengers, crew, and the train along the particular route and at all stations:

- Passengers
 - Boarding / deboarding,
 - Door operation,
 - Ticketing,
 - Equipment (PA, intercom, lighting),
 - Security (disruptive passengers, other), and
 - Emergency preparedness;
- Operations
 - Operating Rules (including timetable),
 - Operating Procedures (switching, train orders, flagging, etc.),
 - Physical characteristics of route,

- o Track, including switch and siding location
- o Signaling location and type of aspect
- o Grade crossing locations; and
- Train equipment
 - Couplers, HEP cables,
 - Brake operation,
 - o Air brake
 - o Hand brake
 - o Emergency brake, and
 - Other.

5.1.1.2 *Job Functions and Qualifications - Conductors*

Requirements for the Conductor position are specified in the Amtrak job description [36], as well as the Amtrak Service Standards Manual [16]. Amtrak requires that Conductors possess knowledge of and keep up to date on the Service Standards Manual and all Operations Standards Updates (OSU) and Operations Service Advisories (OSAs) (The latter supplement or revise parts of the Service Standards Manual, and are issued, when necessary (44 OSUs and OSAs have been issued from January 5 through July 17, 2009). The Conductor must be familiar with the physical and operating characteristics of the train route, Operating Rules and Timetable ([26] [27] for Amtrak and host railroad R-O-W), air brakes and train handling (AMT-3) [43] Special Instructions [44], Safety Instructions (AMT-5) [45], and electrical heating, ventilation, and air conditioning systems. ****

The Amtrak Conductor job functions are to:

- Collect, sell, cancel, and account for all passenger transportation ticketing; *****
- Supervise the operating crew and OBS crew to ensure the proper discharge of their duties;

**** Knowledge of Electrical and HVAC equipment sometimes play a critical role in isolating and resolving equipment safety-critical defects. This is further reviewed in Chapter 6.

***** Although not strictly “safety”-related, collecting and accounting for all passenger tickets is an integral part of the Conductor’s job responsibilities. This is necessary to compare with the passenger manifest for long-distance and other reserved trains, or other method to obtain knowledge of the passenger count for safety “accountability” in an emergency. In addition, the ticket collection process provides a means to for the train operating crew to familiarize themselves with passengers for security reasons and identify/confirm the presence of any passengers with special needs who may require assistance during the train trip, at the station, or in an emergency.

- Be responsible for the safety of each employee he / she supervises, in accordance with the Amtrak System Safety Program;
- Make the decision, in coordination with Amtrak management, when possible, to evacuate the train under unusual or emergency condition.
- Monitor and maintain an accurate record of all train delays and train performance problems en-route, and reports such information to the proper authorities; and is responsible to report and complete necessary accident reports for passengers and employees on his / her train;
- Report to the relieving Conductor and to the proper authorities, pertinent passenger and operating information to ensure that all mechanical, personnel, accounting, and safety problems are corrected.

In addition, the Conductor, as a consequence of working as an Assistant Conductor, before promotion, must also qualify and comply with all Amtrak rules and be able to perform all specified and inherent job functions of the latter position (see B. below).

In unusual or emergency situations, the Conductor notifies the appropriate Amtrak and host railroad dispatcher and performs other essential duties to ensure the safety of passengers and crew. In the majority of these situations, passengers are not evacuated from the train. However, if necessary, the Conductor supervises the train evacuation. Chapter 6 contains further information related to Conductor and Assistant Conductor duties during emergency situations.

5.1.1.3 *Job Functions and Qualifications - Assistant Conductors*

One or more Assistant Conductors are assigned to each Amtrak train, per Rule 11 of the Amtrak / UTU collective bargaining agreement. Accordingly, the Assistant Conductor(s) reports to the Conductor and performs train operation and passenger-related duties under the supervision of the Conductor. As noted previously, Amtrak may assign additional Assistant Conductors beyond the minimum required, per the Amtrak / UTU collective bargaining agreement, primarily for assisting passengers in boarding and deboarding and ticket collection, depending on the number of passenger reservations and the number of passenger revenue cars in the consist beyond six.

Requirements for the Assistant Conductor position are specified in the Amtrak job description [37], as well as in the Service Standards Manual [16].

The Assistant Conductor must be able to:

- Work around moving equipment (e.g., locomotives, and other passenger equipment) and stoop and crouch under and between cars to assure car is safe for movement;
- Transmit information by radio or intercom to the passengers, crew and Engineers.
- Listen to instruction on radio or audible signals;

- Distinguish hand signals and other information signs, colored lights and flags;
- Physically move between and around train cars, manipulating and lifting heavy air hoses and electrical cables.
- Safely ride the side of the train equipment getting on and off the equipment as required.
- Opens trap doors, maintains balance while working about moving equipment; and
- Possess:
 - Ability to hear well in the presence of other noises;
 - Color vision, visual acuity to distinguish signals and read handwritten or printed material;
 - Depth perception to judge distance and speed; and
 - Ability to project voice and speak clearly.

Amtrak policy is that Assistant Conductors must qualify to be Conductors within **6 months of**

Specific Assistant Conductor safety-related job functions include the following:

- Reports to and receives their instructions from the Transportation Superintendent and must follow applicable operating rules / practices and obey instructions and the Transportation Managers, Stations masters, and Yardmasters and Operators on matters pertaining to the safe and efficient movement of passenger trains.
- Obey the instructions of the Conductor and assist the Engineer and the Conductor in the safe movement of the train.
- Read, understand and comply with train orders, Timetable schedules, and other written instructions received from the Train Dispatcher and Conductor.
- Maintain understanding of operating characteristics and practices including physical characteristics, safety rules, air brake rules, electrical instructions, equipment trouble shooting practices and emergency procedures.
- Co-responsible for the protection of trains, the handling of switches, the coupling of cars and locomotives.
- Ensure that the proper train signals are displayed for the safe movement of the trains.
- Responsible for complying with the Amtrak Manual of Instructions for Conductors, Assistant Conductors in Amtrak Service, Timetable, Operating Rules and Instructions, Air Brakes, and other safety rules and practices for the railroad property over which he/she is operating.
- Submit various reports to record movement delays, unusual occurrences, passenger inconveniences and mechanical defects.
- Oversight of all-onboard train employees in the safe service delivery by complying with Amtrak service standards.
- Assist in ensuring that departure time from stations is in accordance with Time Table schedule.

- Assist passengers in boarding and detraining at station stops.
- Assist handicapped passengers with their baggage, when boarding and detraining.
- Announces train stops and passes signal to the Conductor to restart the trains.
- Ensure that each passenger has the proper fare and collects fares, tickets, or passes from passengers and several other specific ticket collection related tasks; makes customer service announcements, and answers passenger inquiries *****
- Ensure safe and orderly passenger conduct, including preventing passenger from riding on vestibule platforms, opening vestibule doors, or getting on or off train s while in motion; exerts efforts to keep passengers from tripping or falling; checks train for unsafe conditions such as improperly secured baggage, baggage in the aisles, etc. and make the appropriate corrections.
- Prevent visibly intoxicated or disorderly individuals boarding the train; prevents the disorderly conduct on the train; ejects passengers who persist in disorderly conduct, or refuse to pay fare.
- Provides information about train service including train connects;
- Makes special arrangements in case o f service failure;
- Evacuate passengers in the event of a fire, derailment, or flood; keeps passengers on board and informed in the case of a power breakdown or other delay or stoppage of the train.
- Be properly trained to administer first aid or obtain medical attention for ill or injured employees or passengers (including knowledge of first aid and emergency evacuation procedures).
- Determines whether removal of non-paying passengers would endanger their well-being.
- Completes required Amtrak forms to report problems with equipment, incidents on board, ticket revenue / revenue information, accidents, injuries, or death.
- Checks for hotbox excessive temperature (200^o F or higher) at the wheel bearings using a temple tensil stick a t suspected hot journal bearing / box.
- Checks and controls ventilation, lighting, water heating and cooling systems on cars; turns off ventilators, fans, and air conditioning, in case of fire; assures that cars have adequate ventilation in tunnels or snow; checks location sand the security of trigger pins.

***** Although not strictly “safety”-related, collecting and accounting for all passenger tickets is an integral part of the Assistant Conductor’s job functions. This is necessary to compare with the passenger manifest for long-distance and other reserved trains, or other method to obtain knowledge of the passenger count for safety “accountability” in an emergency. In addition, the ticket collection process provides a means to for the train operating crew to familiarize themselves with passengers for security reasons and identify/confirm the presence of any passengers with special needs who may require assistance during the train trip, at the station, or in an emergency.

5.1.1.4 *Initial and Periodic Training and Certification*

A. General

As noted in Chapter 2, 49 CFR, *Parts 217, 218, and 220*, require that all railroads, including Amtrak, instruct their employees on operating practices; equipment handling, derails, and switches; and communications equipment, respectively [12], [13] and [14].

These regulations also require periodic inspection and testing of train operating crews, including Conductors and Assistant Conductors.

Amtrak requires that Assistant Conductors attend initial training and take qualifying examinations on Operating Rules, Air Brake Instruction, Physical Characteristics of the train route (of the railroad over which the train operates), Safety Rules, Accounting/Ticketing, Safety Rules, and Accounting /Ticketing / General Rules of Conduct, First Aid training, and Emergency Evacuation Training.

The Assistant Conductor initial training consists of eight weeks of written classroom and equipment familiarization training. Safety-related topics include General Safety (AMT-5), Emergencies, Job Responsibilities, Crew Resource Management, Operating Rules, Communications, Air Brake and Car handling (AMT-3). Students are required to pass five examinations in the subject covered in training. In addition, students are required to be evaluated on their “car handling” ability. After completion of the training, extensive qualifying and on the job training associated with the assigned crew base is required.

B. Certification

As noted in Chapter 2, Congress passed a law in 2008 that require that Conductors (and Assistant Conductors) be certified. FRA is developing a rulemaking that will contain those certification requirements. It is not known what the exact form and content of the Conductor certification requirements will be; however, it is plausible that the requirements will be adapted from FRA *Part 240* certification requirements for Engineers [8].

C. Emergency Preparedness and Security

As noted earlier in this chapter, the train movement and several other safety-related job functions of Conductors and Assistant Conductors are directly related to ensuring the safety of passengers while the Amtrak train is traveling normally or at reduced speed on the main line; waiting at a signal or in a siding; and when the train is stopped, whether at a station or, or under abnormal or emergency situations. Accordingly, the correct performance of safety-critical job functions (see examples listed in Subsections 5.1.1.1, 5.1.1.2 and 5.1.1.3 above) are included in the Amtrak

Assistant Conductor training workbook [], Amtrak Service Standards Manual [16], and the numerous other operating rules, timetables, and safety instructions previously described, which are used as references during the Amtrak training program. In addition, the Assistant Conductor training workbook contains a separate specific section labeled “Emergencies” which addresses

In addition, to the initial training described in Item A above, all Conductors and Assistant Conductors are required to complete a 16 hour PREPARE module [49] relating to emergency preparedness, as part of initial and refresher training to comply with the FRA *Part 239* requirements [4]. As noted in Chapter 2, § 239.101 of *Part 239* requires that the initial and periodic training for onboard train crewmembers assigned to perform functions connected with the movement of the train (e.g., Conductor and Assistant Conductor), include:

- Rail equipment familiarization;
- Situational awareness;
- Passenger evacuation;
- Coordination of functions; and
- “Hands-on” instruction concerning the location, function, and operation of on-board emergency equipment.

Amtrak has stated that it complies with the FRA requirement for individual passenger train employee responsibilities and provides initial training within 90 days after hire, as well as periodic training at least once every two calendar years thereafter, on its applicable plans.

Amtrak also stated that it tests Conductors and Assistant Conductors being evaluated for emergency preparedness qualification to accurately measure the employee knowledge of his or her responsibilities under the applicable portion of Amtrak Emergency Plan and System Safety Plans; the tests are objective and written, and not be open book.

While § 239.101 does not include a requirement for Amtrak to evaluate the train operating crew “hands-on” ability to operate train emergency systems equipment, Amtrak does include that evaluation.

To comply with TSA security regulations, Amtrak requires that Conductors and Assistant Conductors complete a Security training module [50].

Emergency preparedness and security topics are discussed more extensively in Chapter 6.

5.1.2 Engineers

49 CFR, *Part 240, Engineer Certification* prescribes minimum FRA safety standards for the eligibility, training, testing, certification, and monitoring of all Amtrak railroad locomotive engineers [8].

5.1.2.1 *Job Functions and Qualifications*

The Amtrak Engineer is responsible for operating the motive power of the passenger train to move the equipment from station to station along the railroad right of way.

§ 240.121 requires that Engineers meet certain minimum criteria for vision and hearing acuity. Amtrak Engineers comply with those requirements.

Amtrak has stated that Amtrak Engineers comply with the FRA issued Emergency Order 20 requirement for the Amtrak-established operating rule to call out certain signal indications (approach or less favorable than approach) to another train crewmember. This other crewmember must acknowledge their receipt and in the absence of appropriate response to restrictive signal, take action to ensure appropriate response [52]. (The other train crewmember can be the Assistant Engineer or Relief Engineer, if located in the operating cab, or otherwise the Conductor or Assistant Conductor.)

5.1.2.2 *Training and Certification*

A. General

Part 240 contains training and certification requirements applicable to Amtrak Engineers [8].

The Amtrak training program for Engineers was not obtained from Amtrak. However, Amtrak has indicated that the Amtrak training program complies with the FRA regulation to provide initial and continuing training and written testing to ensure that engineers maintain knowledge and skills in railroad operating rules and practices, mechanical condition of equipment, safe handling including use of locomotive and train brake systems, physical characteristics, and relevant Federal safety rules.

In addition, Amtrak has stated that the training program for Engineers complies with FRA requirements by specifying criteria and procedures for examining the performance skills of a person being evaluated for qualification as a locomotive engineer in either train or locomotive service to determine whether the person has the skills to safely operate locomotives and/or trains, including the proper application of the railroad's rules and practices for the safe operation of locomotives or trains, in the most demanding class or type of service that the person will be

permitted to perform. Amtrak has also stated that the training program also covers operating practices, equipment inspection practices, train handling practices, compliance with Federal safety rules and conducted either when the person at the controls of a locomotive or a [REDACTED] Type II simulator which one does Amtrak use? Finally, Amtrak documents the Engineer test conduct.

Amtrak has stated that its written certification program for Engineers complies with the FRA-required *Part 240* procedure to evaluate prior safety conduct and visual, and hearing acuity, as well as provided a written program for Engineer training and knowledge and skills testing.

B. Emergency Preparedness and Security

As noted in Chapter 2, § 239.101 of *Part 239* requires that the initial and periodic training for onboard train crewmembers assigned to perform functions connected with the movement of the train (e.g., passenger train Engineers) include the same type of training requirements:

- Rail equipment familiarization;
- Situational awareness;
- Passenger evacuation;
- Coordination of functions; and
- “Hands-on” instruction concerning the location, function, and operation of on-board emergency equipment.

In addition, FRA requires that Amtrak address Engineer responsibilities in its Emergency Preparedness Plan and provide initial training within 90 days after hire, as well as periodic training at least once every two calendar years thereafter, on its applicable plans.

Lastly, FRA requires Amtrak to also evaluate passenger train Engineers for emergency preparedness qualifications to accurately measure their knowledge of his or her responsibilities under the applicable portion of Amtrak Emergency Plan and System Safety Plans; the tests must be objective and written, and not be open book.

5.2 OBS CREW

Since OBS crew do not perform job functions related to the actual movement of Amtrak passenger trains, they are not considered by FRA to be part of the train operating crew, and thus are not “safety-sensitive” employees subject to the Hours of Service regulations. As noted in Chapter 3, Amtrak crew, including service attendants, are assigned to the various types of train

service by Amtrak Policy, as specified in “Chapter 24, Operations Standards, contained in its *Service Standards for Train Service and On-board Service Employees* [16].

5.2.1 Job Functions and Qualifications

OBS train attendant job functions vary according to the type of Amtrak train they are assigned to and the type of job responsibilities.

Although the Amtrak job description used for hiring passenger train on-board service attendants does not specify safety-specific job functions, train attendants for Coach, 1st Class and Business Class train service attendants do perform safety-related responsibilities. However, the OBS attendants and kitchen staff (such as chefs) are not considered safety-sensitive employees and are thus not subject to the Hours of Service Act regulations. OBS attendant safety-related job functions include:

- Reporting to and obey the instructions of the Conductor and Assistant Conductor.
- Maintaining understanding of safety rules and equipment operating procedures including door operation, equipment trouble shooting practices, and emergency procedures.
- Complying with the Amtrak Manual of Service Standards.
- Assisting Conductor and Assistant Conductor to ensure that departure time from stations is in accordance with the Time Table schedule.
- Assisting passengers in boarding and detraining at station stops.
- Assisting handicapped passengers with their baggage, when boarding and detraining.
- Announce train stops and passes signal to the Conductor to restart the train.
- As delegated by the Conductor, assisting in ensuring that each passenger has the proper tickets for 1st Class, Business Class, and sleeping car accommodations; makes customer service announcements, and answers passenger inquiries *****
- Ensuring safe and orderly passenger conduct, including preventing passenger from riding on vestibule platforms, opening vestibule doors, or getting on or off train s while in motion; exerts efforts to keep passengers from tripping or falling; checks train for unsafe conditions such as improperly secured baggage, baggage in the aisles, etc. and make the appropriate corrections.

***** Although not strictly “safety”-related, this type of assistance to the Conductor and Assistant Conductor is necessary to for comparing with the passenger manifest for long-distance and other reserved trains, or other method to obtain knowledge of the passenger count for safety “accountability” in an emergency. In addition, this process provides a means to for the OBS attendants to familiarize themselves with passengers for security reasons and identify/confirm the presence of any passengers with special needs who may require assistance during the train trip, at the station, or in an emergency.

- Assisting the Conductor and Assistant Conductor to prevent visibly intoxicated or disorderly individuals from boarding the train; and prevent disorderly conduct on the train.
- Provides information about train service including train connects;
- At the direction of the Conductor, makes special arrangements in case of service failure;
- If necessary and at the direction of the Conductor (if possible), evacuate passengers if a fire, derailment, or flood occurs; keeps passengers on board and informed in the case of a power breakdown or other delay or stoppage of the train.
- Be properly trained to administer first aid or obtain medical attention for ill or injured employees or passengers (including knowledge of first aid and emergency evacuation procedures).
- Completes required Amtrak forms to report problems with equipment, incidents on board, accidents, injuries, or death.
- Checks and controls ventilation, lighting, water heating and cooling systems on cars; turns off ventilators, fans, and air conditioning, in case of fire; assures that cars have adequate ventilation in tunnels or snow.

Add qualifications Depending on what type of work Amtrak PD and the Service Manual

5.2.2 Training

5.2.2.1 *General*

No training program materials were obtained from Amtrak for OBS service attendants. However, it is clear from a review of the Amtrak Service Standards Manual, that the type of training program provided to these on-board staff must contain extensive safety-related information.

5.2.2.2 *Emergency Preparedness and Security*

As noted in Chapter 2, FRA regulations contained in *Part 239* include intercity passenger train sleeping car and coach attendants (other than those employees with food or beverage functions) within the definition of “on-board crew member” for emergency preparedness plan training.

No training materials for initial hire Amtrak service attendants have been obtained from Amtrak, with the exception of the Operation Prepare (emergency preparedness) and Security training program, which while tailored to the type of employees are applicable to all passenger train employees.

6. ON-BOARD TRAIN CREW ACTIONS DURING EMERGENCIES

The majority of passenger train motive power units are equipped with a radio (the train conductor normally uses a hand-held radio). If uninjured, the train crew should be able to contact the passenger train system Train Dispatcher/Control Center. (The term "passenger train system operator" includes the passenger car and motive power unit owner, system operator, right-of-way/wayside facility owner, railroad carrier, and subcontractor organization, or other entity, any or all of which may be responsible for the actual operation and movement of intercity or commuter trains.)

6.1 FRA

6.2 AMTRAK

6.3 NTSB REPORTS

6.4 OTHER INFORMATION

Summarize the actions previously described in Chapter 4-6

Summarize several Amtrak evacuations and the actions of train crew.

7. STAFFING REQUIREMENTS OF OTHER RAILROADS

7.1 COMMUTER RAILROADS

Federal regulations applicable to commuter railroads are the same as those applicable to inter-city railroads.

Commuter trains are staffed differently than intercity commuter trains [REDACTED]. For service operated under contract to Amtrak, the minimum assignment of Conductors and Assistant Conductors to many commuter trains is the same as for intercity trains. However, certain “new” commuter trains operated by both Amtrak and private contractor are operated with one Conductor only. [REDACTED]

The assignment of more than one Conductor is a policy decision of the commuter railroad. State laws???

**Table 4. U.S. Commuter Rail Operating Crew Staffing*
(Conductor /Assistant Conductors)**

OPERATING RR / AGENCY	MINIMUM CREW SIZE	NUMBER OF CARS	ADDITIONAL CREW ASSIGNED :
MBTA	Conductor Assistant Conductor	Same as National agreement except for Old Colony line	Additional Assistant Conductor for every two coaches depending on number of passengers
METRO-NORTH			Up to 3 additional Assistant Conductors depending on fare collection and operating requirements
LIRR			
NJT	Conductor Assistant Conductor		At least 1 additional Assistant Conductor if there are more than 2 cars; more depending on number of cars, ticket sales, etc.
SEPTA	Conductor		Additional Assistant Conductors (fare collectors) added when train size reaches 3-5 cars
MARC			Additional Assistant Conductor added when train size exceeds 5 cars
TRI-RAIL			
METRA	Conductor Assistant Conductor		
NICTD			Additional Assistant Conductor depending on train

			size
CALTRAIN (Coaster)			Additional Assistant Conductor when more than 3 cars, depending on train size
METRO-LINK	Conductor		
TRINITY RAILWAY			
VRE			

7.2 CANADIAN AND EUROPEAN RAILROADS

8. U.S PASSENGER AIRPLANES AND SHIPS

8.1 PASSENGER AIRCRAFT

The operational environment of a passenger airplane is significantly different from passenger trains. With the exception of the Boeing 747 aircraft with coach seating on the lower level and Business Class 1st Class seating on the upper of two levels, U.S. airline aircraft cabins consist of a single “open” passenger compartment, which passengers normally enter and exit by means of a single door located toward the forward end of the airplane, (with certain exceptions for rear deboarding of certain flights at certain airport terminals). Commercial aircraft passenger seating ranges from 8 persons for conventional planes up to 525 persons for the new Airbus A380. U.S aircraft typically have either have a single seating class for coach passengers, or up to three classes: Coach, Business and First class. The seating classes vary in the number of seats per section, and beyond the single aisle of the first class section, the number of aisles,” depending on the total capacity. The Coach, Business and First Class sections are always located at the forward end of the aircraft, but are contained within the physical cabin, and physically separated from each other only by a curtain. Depending on the aircraft size and seating configuration, the aircraft will operate with one or more flight operating crew, i.e., pilot, co-pilot, etc. If a locked flight deck door is required by airline operating rules, the door installation must be designed to provide a separation between the flight crew and the main passenger cabin which resists forcible intrusion [53].

The remainder of this chapter focuses on aircraft crewmember safety-related requirements, which apply to certificated common carrier passenger transport aircraft. (The certificate holder is the commercial airline.)

8.1.1 Federal Requirements

The Federal Aviation Administration (FAA) extensively regulates U.S. commercial airline operation of passenger aircraft, over domestic routes (48 contiguous states), international “flag” routes (including to Alaska and Hawaii), and charter (supplemental). FAA regulations cover aircraft crewmember qualifications, training, and the minimum number of crew assignment, including flight attendants.

8.1.1.1 *General*

FAA requirements for flights attendants are described in 14 CFR, *Part 121; Operating Requirements: Domestic Flag and Supplemental Operations* [54].

FAA currently requires that flight attendants be assigned to passenger aircraft cabins to perform certain “routine” safety and security tasks, as well as to respond to safety emergencies and security threats. Section 8.1.3 reviews FAA flight attendant assignment in terms of FAA requirements and airline policy.

8.1.1.2 *Hours of Service*

FAA regulations require that flight attendants may not be assigned to a duty period of more than 14 hours and must be provided at least 9 consecutive hours rest [55]. Certain exceptions for shorter rest periods are permitted if one or two additional flight attendants (depending on the duty period length), in addition to the minimum complement of flight attendants are provided.

8.1.1.3 *Certification*

In 2003, Congress established flight attendant certification requirements. Under Section 814 of the Vision 100-Century of Aviation Reauthorization Act (PL 108-176)[56], for aircraft providing 20 or more seats, all flight attendants are required to hold a Certificate of Demonstrated Proficiency issued by the FAA to those individuals. The requirement became effective after December 11, 2004. The certificate is awarded to the flight attendant from the airline director of operations after determination that FAA-approved training requirements have been successfully completed. The training requirement must include TSA-established cabin security and self-defense requirements. In addition, flight attendants must meet a series of competency checks and tests, as well as pass mandatory recurrent training every twelve months. The certificate is portable, e.g., it is awarded to the flight attendant, based on qualification for various aircraft.

8.1.2 Flight Attendant Assignment

Flight attendant assignment requirements for U.S. passenger airline common carriers /were reviewed to gain an understanding of how the FAA flight attendant assignment requirements were developed. For the safety of the traveling public, FAA requires that airlines provide assign a minimum number of flight attendants for domestic flag and supplemental aircraft operations, based on the seating capacity of the aircraft used and the payload of the aircraft.

8.1.2.1 *Current*

§ 121.391, *Flight Attendants*, describes flight attendant assignment requirements, which are based on seating capacity [57]. FAA requires that that each certificate holder (e.g., airline) provide a minimum number of flight attendants on each passenger-carrying airplane if the seating capacity is nine or more passengers. These requirements are listed in Table 4.

Table 4. Current FAA Flight Attendant Assignment Requirements

AIRCRAFT SEATING	MINIMUM NUMBER OF FLIGHT ATTENDANTS
(1) maximum payload capacity of more than 7,500 pounds and having a seating capacity of more than 9 but less than 51 passengers *	1
(2) maximum payload capacity of 7,500 pounds or less and having a seating capacity of more than 19 but less than 51 passengers	1
(3) seating capacity of more than 50 but less than 101 passengers	2
(4) seating capacity of more than 100 passengers, and Plus for each unit (or part of a unit) of 50 passenger seats above a seating capacity of 100 passengers	2 1 additional

* Bold added for emphasis

FAA also requires that no less than the number of flight attendants can be assigned to the certificated aircraft operated who participated in the emergency evacuation demonstration required by §121.291 c [58].

Finally, FAA requires that during aircraft take off and landing, the required flight attendants be located as near as possible to the required floor level exits and be uniformly distributed throughout the aircraft to in order to provide the most effective passenger emergency egress during an emergency.

FAA requirements for floor level doors and other types of emergency exits (e.g., over wing emergency window exit]) are contained in 14 CFR, *Part 25*, § 25.807, which specifies the maximum number of seats permitted for each type of door located on each side of the aircraft [59]. In addition, § 25.807 requires that the doors and other emergency exits be uniformly, but not necessarily symmetrically, distributed throughout the fuselage with no seat located farther than 60 ft (18 m) away from the exit.

In addition to meeting the FAA minimum flight attendant assignment requirements, airlines assign additional a specific number of flight attendants to flights, based on the number of coach

passenger reservations [60], in order to carry out food and beverage duties according to service standards, as determined by a particular airline [61].

8.1.2.2 *Historical*

Originally, the Civil Aeronautics Board (FAA's predecessor agency) did not require that a minimum number of flight attendants be assigned to common carrier passenger aircraft. [REDACTED]

AA says there was requirement for either 1 or 2 in 1951.

In 1953, the CAB first proposed that: "At least one flight attendant shall be provided by the air carrier on all flights carrying passengers in airplanes of 10 passenger capacity or more. [REDACTED]

ever made a requirement?

Beginning in 1964, FAA required that domestic air carriers provide at least one flight attendant on each plane with a capacity of more than nine passengers [62]. For [REDACTED], flag, and supplemental air service, FAA required at least the minimum number of flight attendants on each airplane used with the following seat capacities.

- At least 10 but less than 45 passengers – One flight attendant;
- At least 45 but less than 101 passengers – Two flight attendants; and
- More than 100 passengers – Three flight attendants.

However, FAA permitted a lower number of flight attendants, if approved by FAA, and in consideration of the kind of operation, number of passenger seats, number of compartments, number of emergency exits, emergency equipment, and the use of other trained crew members, not part of the flight crew.

In 1969, FAA issued the additional requirement that no less than the number of flight attendants could be assigned than the number who participated in the emergency evacuation demonstration required by §121.291 [].

In 1972, the FAA revised the flight attendant regulation to require on each airplane used with the following seat capacities:

- More than 9 but less than 51 passengers – One flight attendant;
- More than 50 passengers but less than 101 – Two flight attendants; and
- More than 100 passengers – two flight attendants plus one additional flight attendant for each unit (or part of a unit) of 50 passenger seats above a seating capacity of 99 passengers.

FAA stated in the Federal Register notice for the 1972 final rule that

The cu

8.1.3 Qualifications and Training

The information contained in this section is primarily derived from FAA regulations contained in *14 CFR, Part 121*. Information is also derived from the *Occupational Outlook Handbook* [63] and TSA regulations.

8.1.4 Qualifications

All U.S. airlines require that applicants be citizens of the United States or registered aliens with legal rights to obtain employment in the United States. Airlines have height requirements to enable flight attendants to reach overhead bins, which often contain emergency equipment. Vision is required to be correctable to 20/30 or better with glasses or contact lenses (uncorrected no worse than 20/200).

Airlines also require a background check that includes an investigation of date of birth, employment history, criminal record, school records, and gaps in employment. Employment is contingent on a successful background check and dismissal results if his or her background check shows any discrepancies.

8.1.5 Training

§ 121.415 requires that crew member initial ground training consisting of 40 programmed hours be provided that includes duties and responsibilities, as applicable; appropriate FAA regulations; appropriate portions of the airline operating manual; emergency training (121.417). In addition to initial and recurrent training, additional ground training and flight training, instruction, and practice, must be provided as necessary to insure that each crew member remains trained and currently proficient related to each airplane, crew member and type of operation; and qualified on new equipment and procedures, including modified airplanes.

§ 121.421 requires that Flight Attendants be provided training in passenger handling, including deranged personnel, crew resource management; physical characteristics of each airplane type that may impact on ditching, evacuation, and emergency procedures; use of cabin ventilation system; and the use of PA system and means of communicating in case of hijacking. A competence check is required to determine ability to perform assigned duties and responsibilities. Initial ground training must be either 8 or 16 programmed hours in length, depending on the type of airplane.

In addition to meeting FAA requirements, the length of formal training required for all Flight Attendant trainees, ranging from 3 to 8 weeks, depends on the size and type of carrier and takes place at the airline's flight training center. New hires learn flight regulations and duties, and gain knowledge of company operations and policies. Trainees must perform many drills and duties unaided, in front of the training staff and towards the end of their training, go on practice flights.

Flight Attendants also are required to go through periodic retraining and pass the FAA-approved safety examination and obtain certification in order to continue flying.

8.2 SAFETY RESPONSIBILITIES AND DUTIES

Flight Attendant normal responsibilities include ensuring that the airplane cabin remains safe during pre-flight, during flight, and post flight. Specific safety-related duties include ensuring that carry on luggage is properly stowed, passenger seat belts are stowed, and that personal electronic devices are not used during take off and landing. Flight Attendants also arm and disarm the door emergency exits prior to takeoff and after landing. In addition, Flight Attendants are required to enforce the "stay in seat and keep seat belts fastened) directive from the Pilot during turbulence.

8.3 EMERGENCIES AND SECURITY

8.3.1 Emergencies

8.3.1.1 *Responsibilities and Duties*

FAA requirements for Flight Attendant emergency and emergency evacuation functions are contained in § 121.397 and § 121.805.

§ 121.397 requires that the airline assign to each category of crewmember, as appropriate, the necessary functions to be performed in an emergency or a situation requiring emergency evacuation. The functions must be shown as realistic to be practically accomplished and take into account any reasonably anticipated emergency, including possible incapacitation of individual crew members.

§ 121.805 requires Flight Attendant training related to emergency medical equipment. The FAA regulation notes that the instruction, drill and recurrent training are not required to be equivalent to the expert level of proficiency required by professional emergency medical personnel.

8.3.1.2 *Training*

§ 121.417 and 121.433 require that Flight Attendants, as crew members, be provided training for each type of aircraft type, model, and configuration: instruction in emergency assignments

and procedures, including coordination among crew members; the location, function, operation of emergency equipment (including fire extinguishers, and emergency exits); handling of emergency situations including rapid cabin decompression, fire, evacuation, ditching for water landings), hijacking, and other unusual occurrences; and review of actual emergency situations.

As part of the initial training, Flight Attendants, as crew members, are required, to participate in several drills: including use of a personal breathing equipment during use of a fire extinguisher to combat actual or simulated fire; emergency evacuation, using at least one type of emergency slide (observation or actual performance is permitted); operation of emergency exits in normal and emergency modes, including actions and forces required for the emergency slide deployment; each type of installed fire extinguisher; emergency oxygen system; donning, use and inflation of individual flotation devices and ditching.

Recurrent training in the drills described above is required, every 12 months, although alternate training may be accomplished by approved pictorial presentations or demonstrations. A competence check is required.

In addition, § 121.805 requires that Flight Attendants, as crew members, be provided with instruction in emergency medical procedures including coordination among crew members; location, function, and operation of emergency medical equipment; familiarization with the contents of the emergency medical kit (including modification as of August 12, 2004). In addition, Flight Attendants are required to be provided instruction, including performance drills, in the use of automated external defibrillators and cardiopulmonary resuscitation. Recurrent training is required at least every 2 years.

8.3.2 Security

As noted in Section 10.5.1, Flight Attendants must be provided training to enable them to carry out procedures addressing passenger disruptions and hijackings (§ 121.417 (b) (v)).

TSA aviation security regulations are contained in 49 CFR *Part 1544* [64]. The summary in this section highlights regulations applicable to Flight Attendants. The actual TSA regulations should be referred to and take precedence over the text included below.

Flight Attendants (and other aircrew members) are required to carry out security functions in the TSA-required, airline-developed Security Program. Flight attendants are not allowed to perform any security-related duties to meet the requirements of the airline security program unless that individual has received training as specified in its security program including their individual responsibilities.

TSA requires that each aircraft operator ensure that individuals (e.g., Flight attendants) performing security-related duties for the aircraft operator have knowledge of the provisions of *Part 1544*, applicable Security Directives and Information Circulars, the approved airport security program applicable to their location, and the aircraft operator's security program to the extent that such individuals need to know in order to perform their duties.

49 CFR *Part 1544*, § 1544.233 requires that no crewmember be used unless they have received the training required by § 121.417 (b) (v) relating to hijacking and as specified in the aircraft operator's security program.

In addition, as part of the airline Security Plan, Flight Attendants are required to follow certain security procedures to restrict access to the aircraft flight deck. It is noted that prior to the institution of the 2-person flight crew on larger planes, the third flight crewmember was, at times, called upon by the Flight Attendants to “handle” disruptive passengers. TSA [CO1]

8.4 OTHER FAA SAFETY RELATED REGULATIONS

8.4.1 Emergency Demonstrations

Since 1965, FAA has required that passenger transport common carrier certificate holders conduct a full scale emergency evacuation demonstration of each type of aircraft with an seating capacity of 44 passengers or more (14 CFR *Part 121*, § 121.291). The current performance requirement is that all passengers and crew members must evacuate the airplane in 90 seconds or less using only 50 per cent of the exits under dark of night conditions. At least one floor level exit must be used. The purpose of the demonstration is to demonstrate the ability of crewmembers to execute established emergency evacuation procedures and to ensure realistic assignments of crewmember functions. Various amendments have been adopted over the years, including the participant demographic mix. A 1993 revision prohibited the flight crew [from taking an active role in assisting in the passenger cabin.

Note 14 CFR, *Part 25* contains many common carrier passenger transport aircraft requirements relating to the type, number, arrangement and distribution of of emergency exits; as well as emergency lighting, and marking for exits and the exit path. Airlines must comply with these requirements, as well as the emergency demonstration.

8.4.2 Security

9. ANALYSIS

There are almost twice as many persons riding on an Amtrak train as on an aircraft Source

Amtrak infrastructure includes signaling, dispatching, track, maintenance

While certain aspects of commuter train movement operations and the physical infrastructure right-of-way (track and signaling) may be similar, the train travel time and distance, passenger characteristics and ticketing, means of train boarding / deboarding, and the level of on-board train crewmember responsibilities differ in important aspects. Moreover, these aspects are vary different for passenger aircraft.

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10. FINDINGS AND CONCLUSIONS

11. SUMMARY

is considerably different from that of passenger aircraft. For example, while passengers do share a “confined” seating environment in the aircraft cabin and a rail car, an Amtrak intercity passenger train may consist of several “connected” cars, which offer the ability and expectation that passengers, may move if they choose, from seat to seat (if available), as well as to other cars (to purchase food and beverages). Amtrak passenger trains operate with a variety of rolling stock to 500 stations, over a diverse nation-wide route network of track. *Move to analysis*

With certain exceptions, aircraft normally travel from location to location, non-stop. Passengers must purchase tickets prior to boarding the train, are assigned specific individual seats in advance, and must pick-up and show boarding passes before going through security checkpoint, and prior to boarding the plain. Passengers are expected to sit in those assigned seats for the duration of the flight. Airport security is stringent, all passengers must go through X-ray security screening, including any carry-on luggage, prior to entering the terminal boarding areas where the aircraft is located. While passenger traveling on multiple stop service may be able to leave the plane at intermediate stops, they cannot leave the secure area of the airport airline terminal, without being required to go thorough security screening again. New passengers who board must go through security screening secure walk up and board the plane train without going through a security checkpoint, including x-ray. *Move to analysis*

In contrast to airplanes, passengers are allowed and in fact expected to enter the train from one or more doors; walk between cars when first entering the train to locate seats since individual seats are not assigned in advance, or leaving the train; as well as throughout the trip, primarily to the reach the food service car (if provided). Depending on the route length, Amtrak permits passengers to board and leave the train at any of the numerous stations located between end terminals *Move to analysis*

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