



TIER 1 FINAL ENVIRONMENTAL IMPACT STATEMENT  
VOLUME 1 (PREFERRED ALTERNATIVE)

## 7.18 Safety



## 7.18 SAFETY

### 7.18.1 Introduction

A critical element of the Federal Railroad Administration’s (FRA) mission is the safe operation of the passenger and freight rail systems in the United States. This chapter addresses how the Preferred Alternative could affect railroad safety, railroad users, and those who live and work along the Northeast Corridor (NEC), compared to the No Action Alternative. This assessment takes a corridor-wide, multimodal point of view.

### 7.18.2 Resource Overview

For purposes of this analysis, the FRA divided safety into three categories: modal safety, railroad operational safety, and railroad infrastructure safety and security. These categories are defined below. The NEC FUTURE safety analysis of the Preferred Alternative focuses on the following:

- ▶ Overall safety of passenger rail compared to the other modes in the Affected Environment
- ▶ The effect of the Preferred Alternative on passenger rail service operations
- ▶ Rail incidents resulting from infrastructure deficiencies or failures

The FRA considered safety in the following contexts:

- ▶ **Modal Safety:** This term refers to the overall safety of passenger rail as a transportation mode when compared to other transportation modes, including highway and air travel. The FRA considered the safety of passenger rail as a mode compared to other modes based on the number and rate of accidents.
- ▶ **Railroad Operational Safety:** The Intercity and Regional rail operators on the NEC operate different equipment types, at different speeds, and with different stopping patterns. The multiplicity of operators with distinct operating practices together influences the overall safety of the railroad. Train collisions or derailments represent the types of incidents related to operating practices.
- ▶ **Railroad Infrastructure Safety and Security:** This term refers to accidents or incidents caused by the failure of existing railroad infrastructure. Infrastructure failures can contribute to either train- or station-related incidents that involve operating personnel and passengers. Security-related vulnerabilities include incidents resulting from unwanted intrusions or trespassing on the railroad infrastructure, whether unintended or intentional.

### 7.18.3 Affected Environment

The Affected Environment for safety is the multimodal transportation system within the Study Area. The system comprises the highway network, airports, passenger rail (both Intercity and Regional rail service), mass transportation systems, freight assets, and bicycle and pedestrian facilities. The focus of the safety analysis is how the Preferred Alternative would affect the overall safety of the multimodal transportation network with an emphasis on the safety of the Intercity passenger rail network in the Study Area.

Along the NEC, many different types of passenger and freight trains operate in physically and temporally shared lines. The NEC is unique in the United States in functioning simultaneously as a high-speed rail line, a corridor for Intercity and Regional rail passenger trains, and in various locations as a corridor that includes both through and local freight trains.

The FRA's passenger-equipment safety standards govern various aspects of the design and maintenance of passenger trains, to include crashworthiness, brake system requirements, emergency egress/rescue access systems, and periodic maintenance. The FRA's track regulations also set the maximum allowable speed for different classes of track. Tier I equipment operates at speeds not exceeding 125 mph. Tier II equipment operates at speeds between 125 mph and 150 mph, and requires regulatory approval before such operations can begin, or changes are made to safety critical components.

The NEC supports operation of both Tier I and Tier II trains. Because of this unique mix of services on the NEC, in certain cases the FRA may grant waivers to permit operating characteristics outside of the limits prescribed in the regulations. There are currently no Tier I restrictions regarding shared use of right-of-way with freight operations. The connecting corridors off the NEC also operate in the Tier I environment.

Tier II standards govern operations along the portions of the NEC where maximum authorized speeds for passenger trains range between 125 mph and 150 mph. The FRA has authorized the operation of Amtrak's Acela Express at speeds up to 150 mph. Amtrak Acela Express trains are the only Tier II train equipment permitted to operate at these speeds. Under the Tier II regulations, the Acela equipment can operate intermixed with other Tier I passenger and freight operations and operate above 125 mph. Intermixed operations currently include Amtrak Intercity-Corridor and long-distance trains, along with Regional rail and freight trains along significant portions of the NEC. Amtrak has petitioned the FRA to increase the top speed of its Tier II operations to 160 mph in certain locations. This would require a waiver from the Tier II regulations, and is contingent on Amtrak meeting certain conditions. If Amtrak does not meet these conditions, the maximum authorized speed will continue to be 150 mph.

#### **7.18.4 Environmental Consequences**

##### **7.18.4.1 Modal Safety**

The NEC FUTURE Travel Demand Model anticipates that interregional travel within the transportation network in the Affected Environment will shift between modes in 2040. Table 7.18-1 identifies the anticipated interregional travel modal shift for the No Action Alternative and Preferred Alternative. Model outputs estimate that in the No Action Alternative, the percentage of interregional travel occurring on rail for 2040 will be 6.3 percent. For the Preferred Alternative, interregional travel is projected to be 10.9 percent in 2040. Relocating trips anticipated for highways onto increased rail capacity, that operates on a combination of shared-rail corridor and segregated rail right-of-way, would result in a safer tripmaking.<sup>1</sup>

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<sup>1</sup> According to the U.S. Department of Transportation Bureau of Transportation Statistics, highway fatalities are responsible for the largest share (93 percent) of transportation-related fatalities.

**Table 7.18-1: Anticipated Tripmaking by Mode (2040)**

Mode	No Action Alternative	Preferred Alternative
Highway	377,804,800	362,553,200
Rail (Intercity)	26,113,300	46,664,300
Aviation	10,224,300	9,061,600
<b>TOTAL</b>	<b>414,142,400</b>	<b>418,279,100</b>
<b>% of Overall Intercity Tripmaking</b>	<b>6.3%</b>	<b>10.9%</b>

Source: NEC Future, Travel Demand Model Output, Group 2 MSA to MSA Intercity Trips

Note: For the Tier 1 Final EIS, the FRA adjusted the NEC FUTURE Interregional Model based on issues identified during the Tier 1 Draft EIS comment period and a reassessment of the overall model outcomes. Appendix BB, Technical Analysis on the Preferred Alternative, contains a detailed description of the reasoning for these model adjustments and the process used, and a summary of the changes in the model results, compared to the results presented in the Tier 1 Draft EIS.

Regarding bicycle and pedestrian safety, while most of the NEC is grade separated, between Waterford and Stonington, CT, there are 11 at-grade crossings. Additionally, the Hartford/Springfield Line includes 42 at-grade crossings. (See Chapter 4, Preferred Alternative, for a full listing of these locations.) Both the No Action Alternative and Preferred Alternative include these 53 existing at-grade crossings. The Preferred Alternative does not add any new at-grade crossings since all new segments will be fully grade separated. Additional information on at-grade crossings is provided in Section 7.18.4.2.

Based on information from the National Park Service and comments submitted as part of the Tier 1 Draft EIS public comment period, the FRA understands that there are existing and planned trails adjacent to the NEC. The FRA has not evaluated specific details about accommodating bicycles and pedestrian access as part of the Tier 1 EIS process. However, to minimize any potential risk, site-specific consideration of bicycle and pedestrian accommodations will be considered in more detail as part of subsequent Tier 2 project studies.

#### 7.18.4.2 Railroad Operational Safety

The FRA is developing Tier III passenger-equipment safety standards. The Tier III standards would represent a new national standard for high-speed rail operations and equipment (above 125 mph), which will apply to the California high-speed rail system, and are assumed for future operations with the Preferred Alternative.

The FRA's track safety standards also govern other factors, such as at-grade crossings. No at-grade crossings are permitted when operating speeds exceed 125 mph (Class 8 and Class 9 track). As described in Section 7.18.4.1, both the No Action Alternative and Preferred Alternative include the existing 11 at-grade crossings between Waterford and Stonington, CT, and 42 at-grade crossings between New Haven, CT, and Springfield, MA. At these locations the maximum authorized speed of trains is 110 mph or less. The FRA has not evaluated specific at-grade crossings as part of the Tier 1 EIS process. The Preferred Alternative provides increased service between Waterford and Stonington and New Haven, CT, and Springfield, MA, compared to the No Action Alternative; however, some trains between Waterford and Stonington, CT, will operate on the new segment between Old Saybrook, CT, and Kenyon, RI, and avoid the 11 at-grade crossings. The FRA evaluated the safety systems of the crossings between New Haven, CT, and Springfield, MA, as part of the New Haven-

Hartford-Springfield (NHHS) Rail Program. The 30 crossings south of Hartford, CT, will be upgraded either with four quadrant gates or with two quadrant gates and a median barrier, as part of the NHHS Rail Program. The Preferred Alternative includes upgrades for the 12 remaining at-grade crossings on the Hartford/Springfield Line that will not be upgraded as part of the NHHS Rail Program. In addition, for the Hartford/Springfield Line and on the existing NEC between Old Saybrook, CT, and Kenyon, RI, maximum operating speeds for the Preferred Alternative will remain up to 110 mph, due to the presence of grade crossings. To minimize any potential safety risk, site-specific consideration will be considered in more detail as part of subsequent Tier 2 project studies.

In conjunction with the FRA's track safety standards and other regulations, the pending Tier III passenger-equipment regulations will establish the safety standards for equipment that can operate on shared tracks or on separate tracks within a shared right-of-way and the infrastructure and systems required for safe operations. It is anticipated that Tier III passenger-equipment safety standards (along with the FRA's track safety standards) will permit higher-performance high-speed rail operations, with maximum authorized speeds above 125 mph and up to 220 mph. The Tier III standards are anticipated to generally require exclusive right-of-way for high-performance trainsets operating above 125 mph and prohibit other equipment types from sharing the exclusive high-speed tracks. There would be no intermixing of high-speed operations with freight or non-Tier III passenger operations (Tier I or Tier II) at speeds above 125 mph, unless a waiver were granted for high-speed operations in a shared right-of-way. However, Tier III equipment could freely operate in a Tier I shared-use environment on tracks used by conventional passenger and freight equipment at speeds at or below 125 mph.

While the No Action Alternative continues mixed operations of Tier I and Tier II trains, Amtrak plans to replace the Tier II trainsets with new trainsets consistent with Tier III standards. The representative Service Plan for the Preferred Alternative includes the operations of Tier III equipment for Intercity-Express and Metropolitan services. For both the No Action Alternative and Preferred Alternative, a waiver is anticipated to be necessary to permit Tier III high-performance trainsets to operate at the current Acela speeds in a shared-use environment. With such a waiver, Intercity-Express and Metropolitan trains would be able to match the performance of the Tier II Acela Express equipment when operating on the Preferred Alternative. Tier III passenger equipment is also assumed to be able to operate with a waiver above 125 mph, up to 160 mph (Class 8 track), on tracks that are also used by freight trains with temporal separation. As a result, freight service would be strictly limited from operating on express tracks to times of day and night during which passenger service with Tier III equipment is not operating.

The Preferred Alternative provides for a conflict-free pair of high-speed tracks either on new dedicated segments or within the NEC, and freight is anticipated to generally operate on separate conventional (non-high-speed) tracks. Within the NEC where operation of freight trains on high-speed or express tracks (at Class 8 or below) would be unavoidable and could be accommodated—either for normal or contingency operations—restrictions may be placed on the type, weight, or maximum speed of freight trains operating on the high-speed tracks, with possible requirements for signaling, dragging equipment, overheated bearing, shifted load, and high-impact wheel detectors in place at entry points to such tracks. Additional requirements may apply to locations where freight operates on tracks directly adjacent to the high-speed tracks.

In general, as the overall level of rail traffic increases, and the level of capacity utilization approaches or reaches practical capacity, operational reliability tends to decline, and the potential safety risks associated with unpredictable operations can increase. Compared to the No Action Alternative, the Preferred Alternative provides incremental capacity that would match or exceed the projected rate of growth in demand. This increased capacity would result in more predictable and less variable day-to-day operations. While the infrastructure, operational, and regulatory elements described previously provide for a safe railroad operating environment in the No Action Alternative and Preferred Alternative, the improved future balance between capacity and demand can be expected to reduce the magnitude of safety risk for the Preferred Alternative.

#### **7.18.4.3 Railroad Infrastructure Safety**

The Preferred Alternative features infrastructure improvements, new tracks, new segments, updated operations, and reduced chokepoints, compared to the No Action Alternative. The Preferred Alternative also brings all railroad assets to a state of good repair and modernizes infrastructure that is obsolescent or beyond its useful life. Upgraded infrastructure could result in a reduction in the number of accidents associated with equipment failures or infrastructure deficiencies. The required amount of time required for track outages to support infrastructure maintenance and repair will decrease on a per-track-mile basis, decreasing safety risks associated with these activities. Additionally, separating passenger and freight trains will reduce the wear and tear on rail infrastructure resulting from the hauling of heavier freight rail.

Positive Train Control (PTC) is a control technology used to prevent or avoid train collisions and derailments. The purpose of PTC is to slow or stop a train that is operating at an excessive speed or operating in a manner inconsistent with the section of track it is traversing. As of December 2015, Amtrak's version of PTC (Advanced Civil Speed Enforcement System) is fully implemented along all Amtrak-owned track between Washington, D.C., and Boston. The implementation of PTC technology will continue for both the No Action Alternative and Preferred Alternative. All new segments proposed as part of the Preferred Alternative will also have PTC fully installed and activated.

#### **7.18.5 Potential Mitigation Strategies**

As noted in Section 7.18.4.1 and 7.18.4.2, the FRA has not evaluated specific at-grade crossings as part of the Tier 1 EIS process. To minimize any potential safety risk, site-specific consideration of at-grade crossings will be considered in more detail as part of subsequent Tier 2 project studies. Potential passenger safety mitigation measures could be passive (fencing; channelization; swing gates; pedestrian barriers; pavement markings) or active (flashers; audible active warning devices; automated pedestrian gates; pedestrian signals; variable message signs) devices. Additionally, future Tier 2 studies could recommend additional improvements to reduce the number of at-grade crossings on the Hartford/Springfield Line.

#### **7.18.6 Subsequent Tier 2 Analysis**

The FRA assumes that the future Tier 2 actions will include all necessary analysis and coordination with the FRA to ensure that any improvements associated with implementing the Selected Alternative would be consistent with existing and proposed safety standards and regulations. Tier 2 project analysis will provide additional details on changes to the presence and frequency of passenger rail service on shared or constrained rail corridors.