



2017  
INFRASTRUCTURE  
REPORT CARD  
ASCE

**B** ↑

# Rail

**\$27 billion in improvements in one year by the freight railroads**

*In the 2013 report card, this chapter included commuter rail, which is included in the 'Transit' chapter in this report card.*

## OVERVIEW

For more than 150 years the rail network has been a critical component of the U.S. transportation system and economy. Today it carries approximately one-third of U.S. exports and delivers five million tons of freight and approximately 85,000 passengers each day. The private freight rail industry owns the vast majority of the nation's rail infrastructure, and continues to make significant capital investment — \$27.1 billion in 2015 — to ensure the network's good condition. U.S. rail still faces clear challenges, most notably in passenger rail, which faces the dual problems of aging infrastructure and insufficient funding.

## CAPACITY & CONDITION

The U.S. rail network is comprised of nearly 140,000 miles of track and over 100,000 bridges. The system can be divided into two categories: private freight railroads and intercity passenger rail, operated almost exclusively by Amtrak.

### FREIGHT RAIL

U.S. freight railroads are categorized into three classes based on the distance served and earnings: seven large Class I railroads, 21 regional/Class II railroads, and 547 short line/Class III railroads. In 2015, U.S. freight railroad volume was nearly twice what it was in 1980, even though the network's overall reach has declined. Class I railroads shed nearly 30% of their rail miles between 1990 and 2013, with many portions becoming short lines or abandoned. As of 2013, Class I railroads operated approximately 95,000 rail miles, regional railroads operated approximately 10,000 miles, and short line railroads operated approximately 33,000 miles. Capacity across the Class I network today is generally sufficient to meet current needs, but demand for rail is expected to grow as road congestion and demand for goods continue to increase. Recently, the Class I railroads have increased carrying capacity through the operation of double stack containers and heavier carloads.



Freight railroads, as owners of the infrastructure, are responsible for the condition of the majority of the nation's track, bridges, and connections at ports and intermodal facilities, and proactively maintain, replace, and upgrade systems through maintenance and capital programs. Changes in freight cargo trends in recent years have necessitated changes in the network. Coal, the most commonly transported bulk product by rail, has experienced a decline, while intermodal traffic has experienced substantial growth, requiring investment in connections to ports and truck transfer facilities. Freight railroads continue to upgrade their networks to support additional demand with greater capacity, added efficiency, and improved safety. This has required the rebuilding of bridges, tunnels, track, and signal systems.

Federal forecasts predict an approximately 40% increase in U.S. freight shipments, including by rail, by 2040. To prepare for the future, the U.S. Department of Transportation worked with the transportation industry to draft the first *National Freight Strategic Plan*, to address impediments to the efficient flow of goods in support of the nation's economy. The Fixing America's Surface Transportation (FAST) Act requires the strategic plan be completed by 2017 and be updated every five years.

### PASSENGER RAIL

Amtrak operates a 21,356-mile network in over 500 communities, which served 31.3 million passengers in 2016. The system can be divided into two categories: the Northeast Corridor (NEC), running from Boston to Washington, D.C., and the "national network" of 15 interstate routes. Amtrak owns and operates the majority of the NEC's track—363 out of 457 miles—as well as 260 miles of track outside the NEC, including 18 tunnels and 1,414 bridges. Eight commuter railroads and four freight railroads operate on the NEC. (*For more information on commuter rail, see the Transit chapter.*) More than 90% of Amtrak's network, and almost all of the "national network," runs on tracks owned by freight railroads and, to a lesser extent, commuter railroads, and Amtrak pays the infrastructure owner for its use. As a result, Amtrak relies on freight railroad maintenance and system support to deliver quality, timely service.

Including the commuter railroads that operate on the NEC, there are approximately 750,000 passenger trips on the NEC each day and the corridor accounts for over half of Amtrak's daily ridership. The NEC is the busiest railroad in North America with approximately 2,200 trains operating over some portion of its network every day. It is highly capacity-constrained, creating service challenges for both Amtrak as well as commuter and freight railroads that operate on the corridor. Capacity is generally sufficient in other parts of Amtrak's network, with states supporting service expansions particularly on the West Coast and the connections to the NEC. Recently there has been a renewed national interest in expanding passenger rail service. High-speed passenger rail project planning is underway in several areas, including California, Florida, the Chicago area, and Texas.

While safe to operate, much of the NEC's infrastructure is beyond its useful life, increasing maintenance costs and reducing system reliability. The average age of major NEC backlog projects is 111 years old, including 10 moveable bridges, three sets of tunnels, and one viaduct. Upgrades and repairs to basic infrastructure items like signals, power systems, and tracks, as well as service improvement projects to add capacity, are needed to meet growth in the northeastern economy and related travel demand. The



condition of the NEC continues to deteriorate while projects are on hold pending funding. Amtrak has been left with little choice but to be reactive to maintenance issues due to inadequate funding.

## FUNDING & FUTURE NEED

### FREIGHT RAIL

The freight rail industry's private investment in their infrastructure has been growing over the last five years. The railroads used the slower traffic period during the recession to make improvements and redesign the freight network to meet future need. In 2015, the Class I freight railroads spent \$27.1 billion maintaining, modernizing, and expanding their systems with major track and bridge replacement projects, capacity upgrades, and the deployment of the federally-mandated signaling system, positive train control.

Short lines and regional railroads provide a connection to Class I railroads for lower density traffic and are therefore important to help farmers and businesses move goods. Their investment needs are more difficult to fund from freight receipts and they often rely on state and local funding, as well as tax credits, to provide this important freight service. Currently significant investments need to be made to upgrade track to handle 286,000 pound rail cars, as well as repair and replace aging bridges. In 2013 the Federal Railroad Administration estimated that Class II and III railroads would only be able to invest \$1.6 billion out of a needed \$6.9 billion over the following five years to maintain, modernize, and expand capacity. Federally, the Railroad Track Maintenance Tax Credit—also known as the 45G Tax Credit—helps short line railroads make capital investments by providing a credit equal to 50% of the cost of qualifying infrastructure projects. The tax credit was authorized in 2004 for five years and has been extended repeatedly.

Through the FAST Act, Congress created a new federally-funded, freight-focused competitive grant program. Fostering Advancements in Shipping And Transportation For The Long-Term Achievement of National Efficiencies (FASTLANE) grants will provide \$4.5 billion through 2020 to freight and highway projects of national or regional significance.

### PASSENGER RAIL

The U.S. invests a much smaller amount in passenger rail, relative to the size of our population and landmass, than many countries in Europe and Asia. Amtrak covered 94% of its operating costs in 2016 with ticket sales and other revenue, but relies heavily on government funding for capital investment. This is not unusual—no country operates a passenger rail system without some form of public funding.

Despite Amtrak's growing ridership, with 2016 the sixth straight year in which ridership exceeded 30 million, financial support for capital investments in infrastructure has been insufficient. The NEC, which accounts for the majority of infrastructure Amtrak owns and the majority of its ridership, has a state-of-good-repair backlog of \$28 billion. \$11 billion is needed to fund basic infrastructure projects while \$17 billion is needed for major backlog projects.

Amtrak received a \$2.45 billion loan from the U.S. Department of Transportation in fall 2016, primarily for the purchase of 28 new high-speed train sets, but also to make track and station upgrades along the





**Double stack** – The stacking of a shipping container on top of another container. To allow of double stack containers on a route, railroads frequently need to raise bridge and tunnel clearances.

**Positive Train Control** – A signaling system designed to determine a train's location, direction and speed and use that data to prevent: train-to-train collisions; derailments caused by excessive speed; unauthorized incursions by trains onto sections of track where maintenance activities are taking place; and movement of a train through a track switch left in the wrong positions.

## SOURCES

American Association of Railroads. [21st Century Railroads: Safety through Technology](#).

American Association of Railroads. [The Economic Impact of America's Freight Railroads](#). August 2016.

American Association of Railroads. [The Environmental Benefits of Moving Freight by Rail](#). April 2016.

American Association of Railroads. [Total Annual Spending, 2015 Data](#). July 2016.

American Association of Railroads. [2016 State of the Industry Report](#).

Amtrak. [National Fact Sheet: FY2015](#).

Amtrak. [Press Release: Amtrak Delivers Strong FY 2016 Financial Results](#). November 17, 2016.

Michael Renner and Gary Gardner. [Global Competitiveness in the Rail and Transit Industry](#). September 2010.

Northeast Corridor Commission. [Northeast Corridor Five-Year Capital Plan Fiscal Years 2016-2020](#). April 2015.

Northeast Corridor Commission. [State-of-Good-Repair Backlog](#). August 2016.

U.S Department of Transportation, Federal Railroad Administration. [Summary of Class II and Class III Railroads Capital Needs and Funding Sources](#). October 2014.

U.S. Department of Transportation, Bureau of Transportation Statistics. [Freight Facts and Figures 2015](#).

U.S. Department of Transportation, Bureau of Transportation Statistics. [National Transportation Statistics, Table 2-5: Highway-Rail Grade-Crossing Safety](#).

U.S. Department of Transportation. [Beyond Traffic 2045](#). January 2017.

U.S. Department of Transportation. [DRAFT National Strategic Freight Plan](#)