

Freight Train Length

Key Takeaway: Railroads carefully consider several factors when determining train length. Thanks to improved infrastructure, advanced modeling tools, training programs and technological advancements, railroads have safely increased train length while improving overall safety record, enhancing fuel efficiency and reducing GHG emissions.

There is no standard definition of a “long train.” Recent legislation defines a long train as 7,500 feet, and railroads have operated millions of trains exceeding that length without incident or notice for the past 80 years. The industry’s [safety record](#) has improved even though trains are longer today. Since 2000 based on FRA data, there has been a:

- 42% decline in the Class I mainline accident rate.
- 75% decline in the hazmat accident rate to an all-time low.
- 27% decline in the total train accident rate.
- 50% decline in the employee injury rate.

Class I Railroad Train Lengths

“Long trains” have operated safely for decades, and the industry’s safety record has dramatically improved during that period. In 2023, the median length of a train on Class I railroads — meaning half were longer, half were shorter — was 5,300 feet. Just 10% of trains were longer than 9,600 feet and fewer than 1% of trains were longer than 14,000 feet.

The highly competitive freight transportation marketplace has increased pressures on railroads to become more efficient, and changes in the industry’s traffic mix have affected train length. For example, traffic mix plays a role in the length of trains in the network. A 100-car coal train is shorter than a 100-car intermodal train. In the past 10-plus years, coal traffic has declined by 50% while intermodal traffic has continued to increase.

Railroads are committed to safe operations, no matter the train length.

While processes differ slightly by company, railroads consider several factors when determining the safe train makeup (how rail cars and locomotives are arranged) and train length. These factors include but are not limited to commodity mix, terrain, track conditions, layout, congestion, crew training and more.

- **Investments:** Railroads have added new sidings and lengthened existing sidings on routes used for longer trains, which allow trains of various lengths to make way for other trains safely. The locomotive, car fleets, and track have been upgraded by freight rail’s capital expenditure programs, averaging well over \$23 billion a year over the last five years.

- **Operations:** Railroads review the characteristics of a route, incorporate lessons learned for the most effective operation of trains on that route, and confirm the safe operation by such measures as supervised pilot runs and modeling simulations that predict the performance of changes to a train's makeup.
- **Training:** Railroads offer training, both simulator-based and on-the-job, for in-cab technologies like energy management systems, PTC and distributed power. This includes adapting to changes in train composition or a crew's introduction to new territories. The FRA mandates that locomotive engineers demonstrate proficiency on assigned routes, with annual railroad evaluations.

Certain technologies have allowed railroads to operate longer trains more safely.

For example, distributed power (DP) is the placement of one or more locomotives at points other than the front of a train. These locomotives are connected by closed communications systems to the lead locomotive, operate in a coordinated fashion, and are all under the control of the train's engineer.

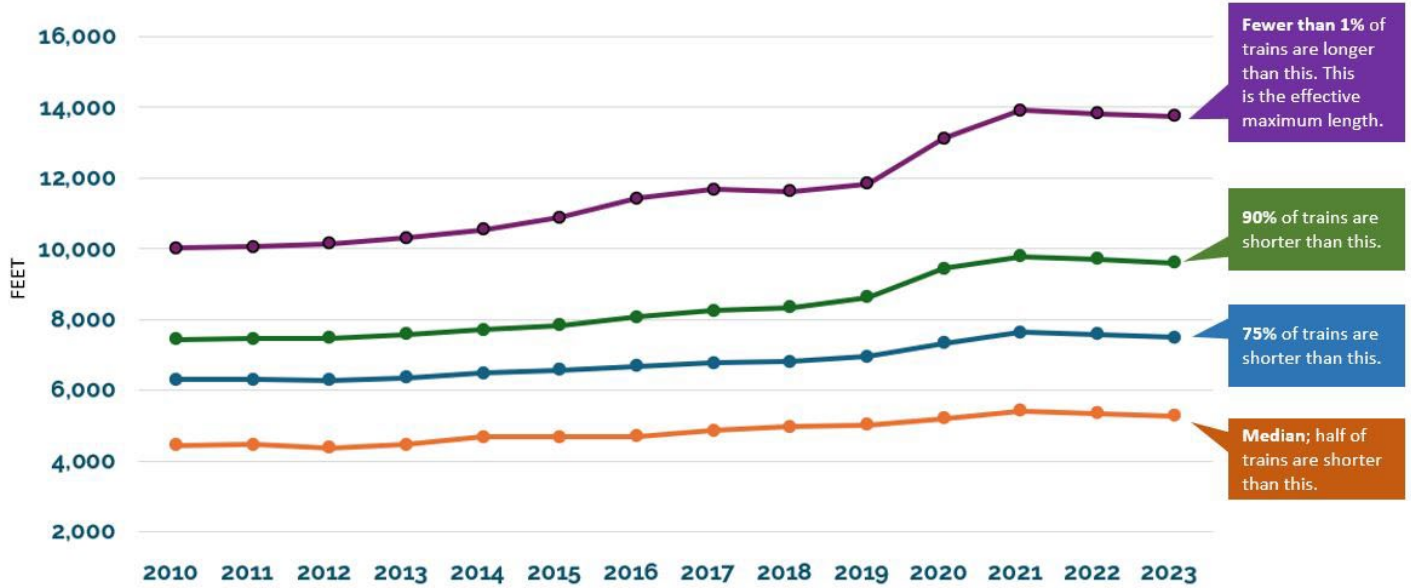
DP reduces in-train forces, which can endanger safe operations if they become too great. DP also enhances the handling of longer trains on hilly and curved terrain, allowing quicker and more uniform application of a train's air brake system compared to a conventional train. Advanced "train builder" algorithms can help guide railroads on where to place locomotives and blocks of freight cars within a train to maximize effectiveness.

The extra fuel consumption of trains limited to 7,500 feet is the equivalent of 640 Olympic-size pools worth of wasted fuel.

That's about the annual emissions of roughly 930,000 cars. Moving a given amount of freight in fewer trains requires less fuel. Because GHG emissions are directly related to fuel consumption, longer trains mean reduced GHG emissions. That's why capping train length is not environmentally sound.

AAR analysis of federal data finds: If 25% of the truck traffic moving at least 750 miles went by rail instead, annual greenhouse gas emissions would fall by approximately 13.6 million tons. Emissions would rise further if a cap on train length and the subsequent reduction in rail efficiency caused freight to divert to trucks, which are significantly less fuel efficient than rail.

Class I Railroad Train Lengths (feet)



"Long trains" have operated safely for decades, and the industry's safety record has dramatically improved during that period. The median train length increased by 19% in 2023 since 2010, 6% since 2018; decreasing overall since 2021.

Source: AAR analysis of industry data.