

Freight Train Length

“Long trains” have operated safely for decades, and the industry’s safety record has dramatically improved during that period.

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. According to FRA data, since 2000, the:

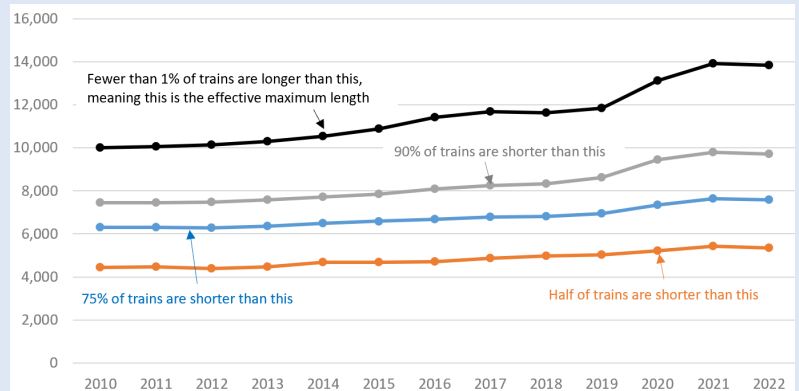
- Industry mainline accident rate is down 44%.
- Hazmat accident rate is down 78%.
- Train accident rate is down 28%.
- Employee injury rate is down 63% to an all-time low.

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. For longer trains, railroads:

- **Invest millions of dollars to improve infrastructure and equipment:** 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 more than \$20 billion a year over the last five years.
- **Employ sophisticated modeling tools** that reliably predict the performance and effects of a change in a train’s makeup over a specific route before the train is put into service.
- **Assess the territory:** 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.
- **Provide simulator and on-the-job training** for in-cab technologies such as energy management systems, Positive Train Control (PTC) and distributed power (DP), as well as changes in the train’s makeup or a crew’s introduction to a new territory. The FRA requires locomotive engineers to demonstrate proficiency in operating trains on routes they are assigned to. Railroads are required to conduct annual evaluations to ensure their locomotive engineers can adhere to federal railroad safety standards.

Class I Railroad Train Lengths (feet)



In 2021, the median length of a train on Class I railroads — meaning half were longer, half were shorter — was 5,400 feet. Just 10% of trains were longer than 9,800 feet and fewer than 1% of trains were longer than 14,000 feet.

Technical advances allow railroads to increase train length safely.

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.

Longer trains improve fuel efficiency and reduce GHG emissions.

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](#).

An AAR analysis found that, based on 2019 data, limiting train length to 7,500 feet could increase U.S. mainline freight train fuel consumption by approximately 13%, or an additional 423 million gallons of fuel annually. 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.

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.

Market forces influence train length.

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 on 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.