Freight Rail & Intermodal

KEY TAKEAWAY

Countless products on a retailer’s shelves have traveled via highly efficient intermodal transportation, which involves the seamless movement of shipping containers and trailers by railroads, trucks and barges. By making substantial private investments, freight rail has established the world’s most advanced intermodal rail network, reducing emissions, alleviating congestion and enhancing trade.

DATA POINTS

In 2022, U.S. rail intermodal volume was 13.5 million units, and intermodal accounted for approximately 27% of revenue for major U.S. railroads, more than any other single rail traffic segment. Around half of rail intermodal volume consists of imports or exports, reflecting the vital role intermodal plays in international trade.

Rail intermodal is the long-haul movement of shipping containers and truck trailers by rail, combined with a truck or water movement at one or both ends. Intermodal combines the best attributes of different transportation modes to yield an efficient, cost-effective total movement. Intermodal transports various goods Americans use daily — from many products on a retailer’s shelves to industrial and agricultural goods like auto parts and grain. Together with other transportation providers, freight railroads carry nearly 61 tons of freight annually per American. Chicago and Los Angeles/Long Beach are by far the top U.S. metropolitan areas for intermodal volume.

- **Fuel-efficient:** On average, railroads are three to four times more fuel efficient than trucks. Because greenhouse gas emissions are directly related to fuel consumption, moving freight by rail instead of truck reduces GHG emissions by up to 75%, on average.

- **Easing Infrastructure:** One intermodal train can carry up to several hundred containers and trailers, which removes that many trucks off the road and helps shippers eliminate wasted time and fuel from their trucks sitting in traffic. Shifting freight from trucks to rail also reduces the pressure to build costly new roads and helps cut the costs of maintaining the roads we already have.

- **Trade Connector:** Intermodal helps U.S. firms connect with the rest of the world. About half of the U.S. rail intermodal volume consists of imports and exports. Experts predict continued growth in international trade in the years ahead.

- **Relieving Truck Driver Shortages:** Hiring and retention is a constant challenge for trucking companies. Truck driver shortages are less of a problem when rail intermodal is used because intermodal rail service takes millions of trucks off our highways each year.
Rail investments helped create the world's most advanced intermodal network.

Freight rail’s investments have a positive cyclical effect, leading to a surge in intermodal growth and then back into freight rail investing more into their networks to accommodate that growth and meet customer needs. For example, containers accounted for 47% of intermodal volume in 1990, 69% in 2000, and 92% in 2019. Unlike trailers, containers can be “double stacked,” which helps ensure there is sufficient traffic density to keep rail intermodal cost competitive with all-truck movements. Other examples of rail’s investments include:

- Adding terminals in new or underserved markets to provide intermodal access to small and medium-sized shippers for the first time.
- Adding new or expanded inland terminals to facilitate the transfer of containers and trailers between rail and truck, as well as new near-dock intermodal terminals to facilitate ship-to-rail container transfers.
- Expanding track capacity to help meet the needs of existing customers and to provide the foundation for future growth.
- Implementing high-tech cranes for faster, more efficient loading and unloading of trains, which increases the number of container lifts per year.
- Adding new gate and optical scanning technology that allows trucks to move freight through intermodal facilities faster.
- Building new rail facilities adjacent to or on docks to improve efficiency at ports, which benefits local residents by reducing truck traffic and improving air quality.
- Introducing new intermodal car types and modernizing the locomotive fleet to enhance customer reliability.
Rail intermodal’s success has a long history.

In many ways, it seems that demand for rail intermodal has skyrocketed overnight, but in reality, its success has been more than a century in the making. Below are six unique milestones that have contributed to developing the safe, reliable and cost-effective intermodal rail network we have today.

1. **Piggybacking:** Also known as “circus style,” “piggybacking” of wagons was pioneered in 1872 by P.T. Barnum’s circus. Barnum developed a crossover plate that allowed horses to pull circus wagons onto and off trains via a single ramp. Once onboard, circus wagons were rolled from train car to train car, a streamlined process that saved time, effort and money. In 1936, the Chicago Great Western Railroad built upon this approach when it modified several hundred truck trailers and loaded them onto its trains — making the railroad the first to move trailers and usher in commercial intermodal.

2. **Container Intermodal Service:** While intermodal piggybacking existed as early as the 1930s, the invention of a simple steel container established intermodal as we know it today. In 1952, Alaska Steamship Company created the first intermodal shipping container by converting World War II victory ships into vessels capable of handling shipping containers that could carry virtually any product.

Starting in 1956, Malcom McLean and his new company, Sea-Land, began working with maritime shippers, freight railroads and truckers to develop a common standard, allowing containers to be easily transferred across modes of transport.

Today, the shipping container has largely eliminated the need for handling individual pieces of cargo, resulting in drastically reduced shipping costs and delivery time. Alaska Steamship and McLean’s invention directly shaped international supply chains still used today.

3. **Double Stacking:** Early rail uses of shipping containers were inefficient since only a minimal amount of cargo could be loaded on a single railcar or train. In 1977, Malcom McLean partnered with the Southern Pacific Railroad (SP) to create and test the first double stacked intermodal rail car.

The test was a success, and by 1980, efforts to improve rail economics led to the ability to stack containers on rail cars across America. This process — logically known as “double stacking” — allows a single train to carry as much freight as hundreds of trucks. Over the years, freight railroads have raised clearances, upgraded tunnels and strengthened rail lines throughout most of America’s nearly 140,000-mile freight rail network to accommodate double stacked intermodal trains.

Since railroads are four times more fuel efficient than trucks, double stacking has helped reduce greenhouse gas emissions while significantly increasing intermodal efficiency for the industry and customers.
4. Intermodal Terminals: The first rail terminals were established in the 19th century during the peak of railroad development. With the advent of intermodal and McLean's shipping container, many of these original rail terminals were converted into intermodal facilities by 1960.

The success of modern intermodal is primarily built upon strategically located rail terminals where freight is transferred between modes. In recent years, railroads have spent billions of dollars on building and expanding intermodal terminals and installing modern equipment, including GPS-enabled cranes that can transfer intermodal containers between trains, trucks and ships in minutes.

The strategic locations of these terminals — more than 180 intermodal facilities in the U.S. alone — have made railroads tremendously competitive for domestic freight shipments and, in turn, helped reduce congestion on our nation's roadways while improving shipping times for rail customers.

5. Domestic Intermodal Growth: In 1989, trucking magnate Johnnie B. Hunt traveled from Chicago to Kansas City aboard a business train owned by the Atchison, Topeka and Santa Fe Railway. He was so impressed with the journey that he soon signed an agreement to move truck trailers on the railroad's flatcars, a significant leap forward in domestic freight movement.

Since then, truck driver shortages have increased fuel costs and congestion on our nation’s aging highways — together with massive investment and improved reliability and cost-effectiveness — have resulted in railroads carrying an increasing share of domestic intermodal freight historically moved by trucks.

This affordable domestic freight service has now become a competitive alternative to all-truck movements for journeys as short as a few hundred miles — proof of railroads' commitment to keeping America's economy moving, whether across the country or worldwide.

6. Tech-enabled Intermodal: Freight rail’s massive investments in cutting-edge intermodal technology have helped drive down shipping costs while improving network efficiency. Railways have invested in zero-emission electric cranes at ports and terminals, which speed container transfer between ships, trucks and trains while cutting pollution. Optical scanners and automated gates allow trucks to more quickly enter rail facilities, reducing idling time and enhancing security.

A network of “smart tracks” outfitted with detectors provides real-time feedback on the health of rail infrastructure and equipment, ensuring millions of intermodal containers safely and reliably reach their destination each year. Freight rail’s continued investment in these high-tech innovations will drive intermodal growth in the years to come.