

Chapter 13

Land and Multimodal Transportation

Multimodal Transportation

- Truck Transportation
- Rail Transportation
- Intermodal Transportation
- Freight Forwarders
- Project Cargo
- Other Means of Transportation

Truck Transportation

In many parts of the world, trucking is a vital way of shipping internationally.

- In some areas of the world, it represents 100 percent of the international traffic.
- In others, it is a lower percentage, but trucking is still a significant part of the international traffic volume.

Importantly, though, trucking is almost always the mode of transportation for the “first mile” and the “last mile” of a shipment’s itinerary.

Truck Transportation

The critical issues for a shipper using truck transportation are the many different national rules and regulations that govern truck transportation. These rules influence:

- The weight that can be placed in the truck
- The hours that the truck can operate
- The size of the equipment that can be used
- The number of hours a driver may work
- The training that a driver must have

These differences make for very different trucking practices from country to country.



A European truck is limited in its overall length. The tractor is therefore as small as possible.
Source: Vytautas Kielaitis



A North American truck is limited in the length of the trailer, with no limit on length overall.
The tractor can be very large.

Source: Nico Schmedemann



Australian trucks have few limits, leading to the creation of road trains.
Source: Nick Brundle



Switzerland does not allow trucks to cross the country. There is a “rolling highway” with which trucks are placed to travel from one end of the country to the other.

Source: Ralpin AG



Indian trucks can also travel on railcars, to avoid congestions on intercity highways.
Source: unknown



In some developing countries, the weight capacity of trucks is routinely exceeded.
Source: Lutz Heckenberger

Rail Transportation

Rail transportation is also an important mode of transportation for international shipments, although it is mostly a domestic mode for the United States.

Nevertheless, a significant amount of cargo moves by rail in the U.S. More than 40 percent of all ton-miles shipped long-distance in the U.S. is shipped by rail.

Rail transport has an approximate 18 percent market share for international cargo movements in the European Union when measured in FTKs.

Rail Transportation

Rail transportation is dominated by three issues:

- The ownership of the railroad, which can be private (the United States) or public (most of the remainder of the world).
- The infrastructure, such as issues of gauge (width of the tracks), electrification, curves, maintenance, and so on, which dictates the types of goods shipped and the speed at which they are delivered.
- The relationship between passenger traffic and merchandise traffic, and which has priority over the other. In the U.S., merchandise traffic has priority, in many other countries, it's passenger traffic that has priority.



Traditional railcars are designed to carry a certain type of merchandise.

Source: Geza Gurka



European railroads transport containers in single-stack railcars because the catenaries limit trains' height.

Source: Oriol Paris Fuste



North-American railroads transport containers in double-stack railcars.
Source: Canadian Pacific Railroad



North-American railroads also transport truck trailers over long distances.
Source: Richard Thornton

Intermodal Transportation

A shipment that takes more than one mean of transportation from its departure to its point of destination, using only one bill of lading, is said to be intermodal or multimodal.

Another term used for the same concept is co-modality.

International intermodal transportation is strongly linked to the creation of the container, which is ideally suited to be shipped by truck, train, or ship, and can be easily transferred from one mode of transportation to another.

The modern container was invented by Malcom McLean.



Containers have become ubiquitous in international trade, with more than 17 million containers worldwide. Most are 20- and 40-footers.

Source: Yoamod



Some intermodal containers are 45 foot long, to accommodate lighter goods.
Source: unknown



Refrigerated containers are always white and can be cooled by the ship's power supply or by an autonomous system.

Source: unknown



An open-top container allows cargo to be loaded by a crane rather than through the doors. It is closed with a tarpaulin.

Source: Kevin Khoo



Containers can also be used to transport drybulk cargo by using a liner in the container.
Source: LiquaTrans



Wet bulk is transported in 20-foot liquid-bulk containers.
Source: VanderWolf Images



Oversize Cargo can be placed on a flat-rack container, that is eventually placed on the top spot on a container stack.

Source: Kamonrat



Containers can be equipped with racks for roll-on roll-off cargo.
Source: CFR Rinkens



Containers at the bottom of a stack are attached to the ship by lash bars.
Source: unknown



Containers are connected to one another with the help of twist locks.

Source: unknown



Under deck, containers are placed in slides.
Source: Don Victorio



Air containers, called Unit Load Devices (ULDs) are not standardized and are not used in intermodal transport.

Source: Osugi

Intermodal Transport

The increased importance of containerization in intermodal transport has created new transportation models, such as land bridges and intermodal yards.

- Land Bridge

For goods that are shipped from Asia to Europe, it is often more economical to ship goods by ocean to the West Coast of North American, unload the containers, transport them by rail to the East Coast before shipping them by ocean to Europe. The more costly alternative is to ship the goods through the Panama Canal.

- Intermodal Terminal / Dry port

A location where containerized goods change means of transportation.



An intermodal train used as a land bridge in North America.

Source: Joseph Sohm



A stacker moving a container onto a train in an intermodal terminal.

Source: unknown

Freight Forwarders

Because international transportation is so complex, many shippers rely on freight forwarders to handle their international shipments.

Freight forwarders arrange all aspects of transportation and paperwork for a shipper, from following the exporting country's requirements to clearing Customs in the importing country.

Freight forwarders are essentially travel agents for freight.

Project Cargo

Project cargo is a type of cargo that requires more advance planning because of its size, weight, or volume.

Shippers need to take into account the cargo's dimensions and weight, in order to determine whether it will fit under bridges, inside tunnels, and around curves. Many project cargo shipments can take months to plan thoroughly, and often require specialized knowledge.

Shippers also have to account for the special permits that the cargo will need.



Project cargo requires careful planning because of its unusual size or weight.
Source: unknown



Project cargo requires careful planning because of its unusual size or weight.
Source: unknown

Other Means of Transportation

- Pipelines

Pipelines can be used for the transport of liquid cargo (petroleum oil, refined oil products, water), and gasses (generally natural gas), as well as coal, in the form of slurry, a mix of powdered coal and water. Pipelines are essential to the transport of energy products.

- Barges

Barges are flat-bottomed boats, are designed to carry cargo on rivers and canals. Some are self-propelled and others are designed to be pushed or pulled. In the United States, barges carry mostly bulk cargo (grain, coal, minerals), but in Europe and China, they also carry containers, automobiles, and other general cargo.



Pipelines are used to transport liquid bulk over long distances.
Source: Vladimir Kolobov



Barges on the Mississippi River. In the United States, they are not self propelled.
Source: Joseph Sohm



European barges are generally self propelled. Here, on the Danube River.
Source: unknown



Barges are often used for low-value cargo. Here, sand on the Yangtze River, in China.

Source: Claudio Zaccherini