



Chapter 6 Intermodalism and Land Transport

Book: International Logistics: Global Supply
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Outline

- What is intermodalism?
- Intermodal equipment
- Managing intermodal transport
- Roadway transport
- Railroad transport
- Inland shipping
- pipelines



1. Intermodalism

- What is intermodalism?
 - A system of coordinating different modes of transport for a shipment
 - One of the most revolutionary developments in logistics in this century
 - This point is not that multiple modes are being used, but that they are coordinated so one leg of the journey is coordinated with the next



1. Intermodalism

○ Containerization

- Containerization is the difference between just multimodalism and true intermodalism.
- Intermodalism is most commonly understood as the use of intermodal containers in a coordinated shipment using multiple modes of transportation
- The important thing about containerization is that the equipment adheres to the same standards worldwide
- The most common modes of transport in an intermodal movement are trucking, rail, and ocean shipping
- Air cargo has intermodalism, but the containers are in air cargo are very different



1. Intermodalism

- Benefits of intermodalism
 - Security
 - Safety
 - Efficiency
 - Speed
- Consequence of intermodalism
 - The ports are larger, but fewer
 - The trade lanes handle more cargo, but the number of trade lanes has decreased



2. Intermodal Equipment

- Cargo container
 - The basic element of intermodalism
 - Size
 - 8 feet wide, 8 feet 6 inches high
 - Majority are 20 feet long or 40 feet long
 - Also come in 45 feet long, or 48 feet long, and few others, but not conform to the universal standards



2. Intermodal Equipment

- Cargo container
 - Low value cargo tends to move in 40s, it is more important to keep costs low.
 - Higher value cargo tends to move in 20s.
 - Heavy cargo tends to move in 20s, because the weight limit
 - A trend toward more use of 40s



2. Intermodal Equipment

- Types of containers
 - Dry
 - Open top
 - Flat rack
 - Platform
 - Refrigerated
 - Live animals
 - Tank
 - Bulk



2. Intermodal Equipment

- Cranes
 - Used at ports to pick up and handle the containers
- TEUs and FEUs
 - The measurement of containerized volume
 - Twenty-foot equivalent units, TEUs
 - Forty-foot equivalent units, FEUs



3. Managing Intermodal Transport

- Cooperation and coordination
 - The most important aspect of intermodalism is not the equipment, but the operating and management issues
 - Intermodalism requires the coordination of multiple carriers.
 - Intermodalism requires cooperation and coordination among a diverse group of companies on a level that is rarely seen in other industries.



3. Managing Intermodal Transport

- What are intermodal companies?
 - Sometimes they are asset-based carriers, such as a shipping company that expands into providing intermodal service.
 - There are companies that do not control any assets, but only provide intermodal services. They coordinate shipments between the other carriers.
 - One distinctive thing about intermodal carriers is their sophisticated information system.
 - They need to process a lot of information, under time pressure and in coordination with other carriers.



3. Managing Intermodal Transport

- Intermodal traffic patterns
 - There is a lot of required infrastructure to handle intermodal cargo.
 - Usually a few major trade lanes, and many minor trade lanes.
- Equipment balance
 - Problem of handling empty containers.
 - One way to deal with equipment balance issues is to lease containers instead of using one's own.



4. Roadway Transport

- Trucking is an indispensable part of almost every shipment, both domestically and internationally.
- It is an important link in the intermodal chain, but it is also used in some regions for international trade.
- Its role in intermodalism is to link the ocean port or rail yard with the local origin or destination.
- Trucking is also used for some international shipments, and of course for non-intermodal shipping.



4. Roadway Transport

- Trucking has low entry requirements.
- Of all the different modes, this has the lowest entry costs.
- There are relatively many players in the field, which creates a highly competitive market.
- One of the newer developments is shipper-owned fleets offering contracts to other companies. They decide to offer trucking services to other shippers, maybe during their slow season, or maybe to earn extra maney.



4. Roadway Transport

- regulations

- Every transportation mode is influenced by regulations
- Trucking is more influenced by local rules, such as speed limits, registration and so on.
- The longer the trip, the more legal jurisdictions it passed through. This creates a strong disincentive for long distance trucking.



4. Roadway Transport

- Safety issues are more important with road transport than any other mode.
- In 1997, there were 711 fatalities by trucks in the US, which is low considering this is a very safe environment.
- In other countries, truck-related accidents are much higher.



4. Roadway Transport

- Road capacity
 - Measured by a passenger car equivalent (PCE)
 - On level roads a truck may be only 1.2 PCE. But on curving, mountainous roads the same truck can be four PCEs.
- Weight laws
 - Partly for safety reasons, and partly because roads can only stand a certain amount of weight.
 - Road damage is based on weight per axle, known as equivalent standard axle load, or ESAL.
 - The damage drops off exponentially.
 - Pavement thickness also varies exponentially.



5. Railroad Transport

- Railroad are best for large loads going long distances.
- Rail is preferred for loads over 30000 pounds over distances exceeding 300 miles.
- Rail industry have the high entry barriers.
- Railroads have been in steady decline over the past several decades, mostly due to competition with trucks.
- Tax money pays for roads that benefit trucks, but the railroad industry has not benefited as much from public support.



5. Railroad Transport

- There are high fixed costs because of the tracks and the trains, but there are very low variable costs.
- There are also almost no weight or volume restrictions.
- There are restrictions on dimensions. Trains go through tunnels and bridges, which means that their load cannot exceed their dimensions.
- There tends to be high damage (about 3% of total tonnage) due to vibrations and shock from steel wheels on steel track.



5. Railroad Transport

- Piggybacking
 - Container-on-flatcar (COFC)
 - Trailer-on-flatcar (TOFC)
- Railroad service is not nearly as flexible for obvious reason. They can only go where there is track, and they only stop at railheads.
- Trains are much less dependable in keeping to a schedule, which is an important part of intermodalism.
 - Truckers: 95% on-time performance
 - Railroads: 70%



5. Railroad Transport

- Governments have traditionally kept close control over the railroad industry for military and social reasons.
- Railroads could not abandon lines just because they were not profitable.
- The European railroad system is well developed.



6. Inland Shipping

- Inland shipping includes rivers, lakes, and canals.
- The ships and their service are very different from maritime (ocean) shipping.
- There is a gray area between coastal shipping, which is in some ways like inland shipping but is in an ocean.
- The fundamental difference is that the service is mostly domestic for coastal shipping, so it is similar to inland shipping.



6. Inland Shipping

- One of the biggest limitations is geography.
 - Rivers may be too shallow
 - Depth changes with the shifting mud and sand
 - Seasonal variation can create problem
 - Water freeze
- Inland shipping companies have low fixed costs since they do not need to pay for the right-of-way, and government usually pays for dredging and navigational aids.
- The vessels are much more expensive than trucks, but not very different from trains, and less than ocean ships.
- The biggest competition is railroads and pipelines.



6. Inland Shipping

- Few areas that have the majority of inland shipping
 - US Great Lakes
 - Russia's great rivers
 - Europe's river system
 - Mississippi River
 - China's great rivers



7. Pipelines

- Require very high investment, but with very low variable costs.
- One unique thing about pipelines is that the cargo only moves in one direction, with rare exceptions.
- Cargo safety is a strong point, with low loss and damage.
- Pipelines are very dependable, requiring low maintenance and are not affected by weather.
- Pipeline cargo is slow for a storage function.
- There is very limited accessibility since the cargo can only be delivered and accessed at certain places.



7. Pipelines

- Piped commodities are considered bulk.
- The commodities carried in pipes are quite limited.
 - Petroleum dominates the list.
 - Coal slurry
- Larger pipes are much more cost effective than smaller ones. There is slight friction the liquid and the inside of the pipe.