

# Title: Transportation in Logistics



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# Transport Goods & Unit Loads

- ❑ Selecting the appropriate storage units for the transported goods has major impact in the transportation cost, susceptibility to damages, loading / unloading efficiency.
- ❑ Some of the storage units used are: Bottles, Boxes, Metal dispensers, Pallets, Roll-pallets, Sacks, Barrels, etc.
- ❑ Many combinations between different storage units can be made in order to achieve better space utilization and better handling of the transported goods (i.e. boxes on a pallet)
- ❑ Selection of storage units depends on:
  - Shape, size and weight of transported goods
  - Ability to stack units on top of each other
  - Other handling criteria (transport means loading ability, ability to carry certain storage types, Warehouse gates dimensions)
- ❑ Special attention has to be given to Pallets and Containers

# Unit Loads - Pallets

“A pallet is a flat transport structure that supports goods in a stable fashion while being lifted by a forklift, pallet jack, front loader or other jacking device. A pallet is the structural foundation of a unit load which allows handling and storage efficiencies. Goods or shipping containers are often placed on a pallet secured with strapping, stretch wrap or shrink wrap and shipped. While most pallets are wooden, pallets also are made of plastic, metal, and paper.

Pallet users want pallets to easily pass through buildings, stack and fit in racks, forklifts, pallet jacks, automated warehouses, and pack tightly inside intermodal containers and vans.”



The Simple Wooden Pallet



Plastic Pallet that can be lifted from all sides

<http://en.wikipedia.org/wiki/Pallet>

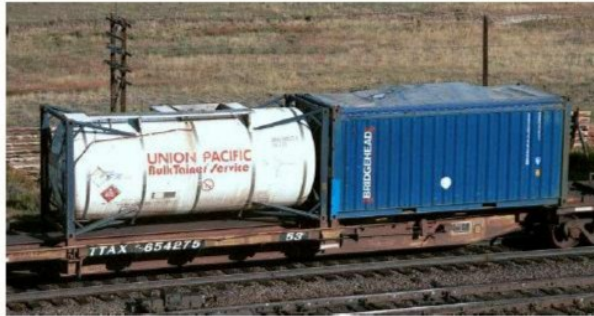
# Unit Loads - Containers

“An intermodal container or freight container (commonly shipping container) is a reusable transport and storage unit for moving products and raw materials between locations or countries.

There are approximately seventeen million intermodal containers in the world and a large proportion of the world's long distance freight generated by international trade is transported inside shipping containers.”



A 12.19 m long shipping container.



A railroad car with a 20 ft tank container and a conventional 20 ft container

# Transport Providers: Introduction

- ❑ Warehousing and Transportation of Products / Commodities consist of one of the core procedures in Business Operations.
- ❑ These procedures can be performed by own resources or by external partners:
  - Common & Private Carriers (distribution)
  - Freight Forwarders (distribution & storage)
  - Third Party Logistics Providers (3PL) (integrated distribution & storage)
- ❑ Each company selects (based on their needs) the types of services to outsource to an external partner.
- ❑ 3PL companies provide an wide variety of services, apart from simple distribution and storage procedures.

# Common Carrier

- ❑ A common carrier is a business that transports people and/ or goods, offers its services to the general public under license or authority provided by a regulatory body.
- ❑ Common carriers typically transport persons or goods according to defined and published routes, time schedules and rate tables upon the approval of regulators.
- ❑ Public airlines, railroads, bus lines, cruise ships, motor carriers (i.e., trucking companies) and other freight companies generally operate as common carriers.
- ❑ In Continental Europe the term is seldom used and has little or no legal implications. Any person who undertakes to transport goods is simply referred to as a carrier.
- ❑ In contrast, private carriers are not licensed to offer a service to the public. Private carriers generally provide transport on an irregular or ad hoc basis for their owners.
- ❑ It should be mentioned that the carrier refers only to the person (legal or physical) that enters into a contract of carriage with the shipper. The carrier does not necessarily have to own or even be in the possession of a means of transport. Unless otherwise agreed upon in the contract, the carrier may use whatever means of transport approved in its operating authority, as long as it is the most favorable from the cargo interests' point of view. The carriers' duty is to get the goods to the agreed destination within the agreed time or within reasonable time.

# Freight Forwarders

- ❑ Freight Forwarders are not the classic common carriers
  
- ❑ Their business is to:
  - Hire “transport space” from transportation means (carriers, ships, etc.)
  - Group and integrate loads and shipments
  
- ❑ The advantages of the existence of freight forwarders and their provided services can be summarized in the following:
  - They succeed in better transport means’ capacity utilization (due to consolidation of shipments)
  - Consolidation of shipments and the handling of larger integrated loads/shipments leads to efficient material handling (loading , unloading, transshipment, etc.)
  - Due to the consolidation and the transshipment of larger shipments, freight forwarders succeed in lower transport prices with the transport means’ operators, leading to minimized cost in comparison with sending smaller shipments by each shipper.

# Third Party Logistics (3PL) Providers

- ❑ Recent trends in logistics and business operations have led to the 3PL providers.
- ❑ A 3PL firm provides outsourced services to companies for part, or sometimes all of their supply chain management function.
- ❑ Typically specialize in integrated operation, warehousing and transportation services that can be scaled and customized to customer's needs based on market conditions and the demands and delivery service requirements for their products and materials.



# Third Party Logistics (3PL) Providers

- ❑ The usual operations 3PLs provide are related to Warehousing and Transportation (W&T) Services :

Services Provided	Description
Exclusive W&T	<ul style="list-style-type: none"><li>❑ One single customer (shipper),</li><li>❑ All transportation related procedures are provided from the 3PL</li><li>❑ Offer Warehouses, Transportation Fleet &amp; Distribution Centers</li></ul>
Multiple W&T	<ul style="list-style-type: none"><li>❑ Multiple customers (shippers)</li><li>❑ Warehousing and Transportation Costs / Expenses are shared (leading to cost benefits for all participants)</li></ul>
Specialized W&T	<ul style="list-style-type: none"><li>❑ Services such as Warehousing and Transportation of frozed goods or works of Arts.</li></ul>
Peripheral Multi-Customer W&T	<ul style="list-style-type: none"><li>❑ Multiple customers are served, for many different product types that do not require specialized services (i.e. companies from distant places or islands)</li></ul>
National Multi-Customer W&T	<ul style="list-style-type: none"><li>❑ Same as above</li><li>❑ Usually uses larger Warehousing facilities and serves transportation from depot to depot (intra-company distribution)</li></ul>
Transit	<ul style="list-style-type: none"><li>❑ Offers only collection, distribution and picking / sorting services</li></ul>

Source: Rushton, A., Croucker P., Baker P., The handbook of logistics & distribution management, 3th Edition

# Third Party Logistics (3PL) Providers

- Apart from the usual operations (warehousing, collection, distribution, picking, fleet management, etc.) 3PLs also undertake other operations that are related to the transport of goods.

Other Services Provided	Description
Assembly Services	<ul style="list-style-type: none"><li>□ PC manufacturers sent the components (monitors, hard drives, etc) of computers to 3PL companies, where the final assembly (and software installation) is taking place and forwarded to the final destination.</li></ul>
Packing & Repacking	<ul style="list-style-type: none"><li>□ 3PL companies undertake the packing operations of several products to be transported.</li><li>□ Additionally, repacking operations (such as containerization, pallets or blister-packing) are performed</li></ul>
Reverse Logistics & Packing Materials Returns	<ul style="list-style-type: none"><li>□ Due to legislations, packing some packing materials may have to be returned in order to be re-used</li><li>□ Containers may have to be returned to their starting locations (empty or loaded)</li><li>□ Damaged or malfunctioned products should be returned to the shipper.</li></ul>
Time-Related Services	<ul style="list-style-type: none"><li>□ The major 3PL providers support the JIT (just-in-time) operations of major manufacturers by supplying accurately and in the proper volumes (based on production schedules) raw materials or spare parts (i.e. TOYOTA)</li></ul>

# Advantages of 3PL Services

	Description
Cost / Expenses	<ul style="list-style-type: none"><li>❑ Investments to Facilities (warehouses, transshipment centers) or equipment (vehicles, material handling) are not required.</li><li>❑ Costs / expenses are known in advance in detail and based on the transported volumes and distances (usually based on contractual agreements)</li><li>❑ Economies of Scale: It is cheaper for small manufacturers and shippers in contrast to maintain own facilities and fleets.</li><li>❑ It is easier to change the operational logistics model, in order to succeed in more efficient logistics services, than re-engineer the company's own logistics services (if there are already fixed facilities and resources)</li></ul>
Organization	<ul style="list-style-type: none"><li>❑ Companies (shippers) can focus to their core business operations (sales, marketing, etc.)</li><li>❑ Can gain immediate access to intelligent IT &amp; Telematics infrastructure (without the additional cost of investment)</li></ul>
Physical	<ul style="list-style-type: none"><li>❑ Offers great flexibility in market penetration (due to the wide distribution network of a 3PL company)</li><li>❑ 3PL companies offer a wide variety of vehicles that can undertake commodities with specialized characteristics and even use multiple-compartment vehicles that can transport different products simultaneously (i.e. frozen goods with simple product compartments in a vehicle)</li></ul>

# Disadvantages of 3PL Services

□ Apart from the advantages of utilizing a 3PL provider for some of the operational procedures of a company there are also some disadvantages that should be taken under consideration when selecting a 3PL provider or when deciding to adapt a logistics strategy based on 3PL services:

- Using 3PL providers may lead to lose control of the distribution and storage procedures of the products (Usually it is managed through contractual agreements and Key Performance Indicators-KPIs)
- 3PL providers have a physical advantage in comparison to the shippers (“since they own all related facilities, equipment, systems) and the shipper may start to depend on specific 3PL providers
- Shippers cannot gain expertise and experience in distribution and storage operations and processes (and it becomes difficult to re-adapt a non-3PL distribution and storage model)
- Service provision issues may arise: (1) the company’s sales and deliveries to customers may not be aligned and in-time and (2) there is no direct contact with customers.
- Trust issues may arise: 3PL companies that serve different competitive shippers

# Issues in Transport Management

- ❑ Transport Managers / Dispatchers are facing operational issues daily regarding the organization of the transportation network, the management of the fleet and the management of shipments
  
- ❑ Some of the problems that should be confronted either in the planning phase of a transportation network or during daily operations are summarized below:
  - Mode Selection
  - Route Selection
  - Fleet Sizing
  - Vehicle Scheduling
  - Shipment Consolidation

# Issues in Transport Management

## ❑ Mode Selection

- Which transport mode to select and how to combine them (intermodal) in order to achieve lower transport costs and better customer satisfaction ?

## ❑ Route Selection

- Route selection determines:
  - The sequence of customers to visit
  - The shortest path to follow in order to minimize travel costs and times.
- Vehicles may return to starting location or not, multiple origins / destinations may exist, intermediate may exist or not.

## ❑ Fleet Sizing

- Fleet sizing deals with the trade offs between fleet size and customer needs satisfaction.
- The larger the fleet, response time to demands increases but vehicles utilization decreases. In contrast a limited number of vehicles may not be able to cope with the total demand.
- Homogeneous or heterogeneous, fleets exist, with different capacities and different capabilities and characteristics.

# Issues in Transport Management

## ❑ Vehicle Scheduling

- Vehicle Scheduling deals with time-related options / decisions in routing problems.
- Main decisions to be answered are what time to send shipments, how many vehicles and when to dispatch them , when to serve customers with specific time-windows, etc.

## ❑ Shipment Consolidation

- Answers to questions regarding when, where and how to group shipments with same or similar characteristics (i.e. can be loaded to the same vehicle) in order to achieve in minimized transport costs.
- Shipments can be grouped by time (serve similar customers in same day), inventory (increase order sizes and achieve order discounts) or hub-resource (use an intermediate station - warehouse in order to consolidate shipments and use larger vehicles to their final destinations)

# Transport Operation Costs

- ❑ Various cost factors have to be taken under consideration in order to generate the cost associated with Transport Operations. Costs are related to routes, terminals, vehicles, personnel.
  
- ❑ Cost can be separated in Capital and Operating and costs
  
- ❑ Capital costs include:
  - Facilities cost (investment in route, terminals, distribution centers)
  - Equipment cost (vehicles, containers)
  
- ❑ Operating costs include:
  - Maintenance costs (facilities, equipment),
  - Transport cost (fuel, tolls)
  - Personnel costs (drivers and admin salaries, overtimes)





# SZWEDZKIE doświadczenie zawodowe



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