

Training Material for Logisticians according to ELA Standards – “Management” Level (ESLog)

CHAPTER G : **TRANSPORTATION**

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ESLog - CHAPTER G : **TRANSPORTATION**

Contents :

- 6.4.07.01** How To Choose Transportation Mode In Logistics.
- 6.4.07.02** Market evaluation and selection of the appropriate carrier.
- 6.4.07.03** Implementation of agreements with Transport Service Providers.
- 6.4.07.04** Route Optimization.
- 6.4.07.05** Selection of Logistics Service Providers.
- 6.4.07.06** Planning Transport Network.
- 6.4.07.07** Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.
- 6.4.07.08** Selection and implementation of the appropriate Transport Management information (IT) Systems. (Transport Management System – TMS).

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6.4.07.01 How To Choose Transportation Mode In Logistics.

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Transport Modes.

The **different modes** of transport can be summarized in the following:

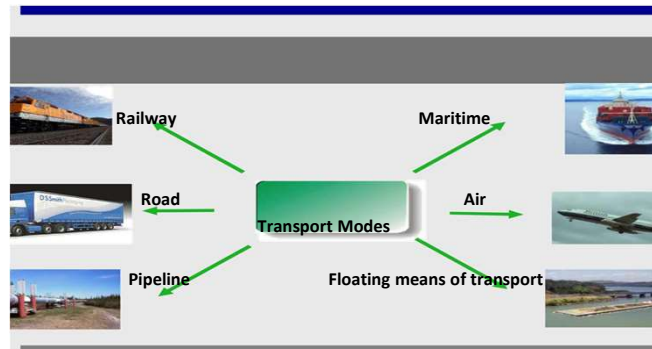
- Railway
- Maritime
- Air
- Road
- Pipeline
- Floating means of transport.

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Transport Modes:



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6.4.07.01 How To Choose Transportation Mode In Logistics.


Transport types.

The different types of transport can be summarized in the following:

- National transport.
- International transport
- Repeated transfers (routes)
- Non-recurring transfers.
- Couriers.
- Spot chartering
- Specialized transportation depending on the goods transported.

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6.4.07.01 How To Choose Transportation Mode In Logistics.


Product characteristics

The characteristics of the goods that we transport mainly, determines the way and the type of transport.

In general, the main characteristics of the goods transported that we must take into account are:

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Product characteristics

- Their size, shape and weight.
- Whether they are flammable, dangerous or toxic.
- Their value.
- Transport safety requirements (security).
- Whether they are fragile.
- How quickly they can be altered during transport.
- How quickly they need to reach the destination.

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Product characteristics

The characteristics of the goods transported affect the choice and the size of the means of transport.

- Due to the nature of some hazardous materials that needs to be transported, restrictions may be placed on the volume of materials that may be transported by the mean of transport. This in turn, determines the size of the means of transport to be used.
- The ratio volume / weight determines both the size and type of means of transport that we will use.

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Product characteristics

The characteristics of the goods may also create the need for special handling and equipment during transport, loading and unloading.

- The size of the goods can create needs for special means of transport (abnormal loads) or loading and unloading equipment (pallets and Clarks, lifts, trams, cranes, etc.)

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Product characteristics

- Drugs and other temperature - sensitive goods.
- The transport of animals requires special means of transport and handling.
- Standardization of loads (pallets, containers, etc.)

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6.4.07.01 How To Choose Transportation Mode In Logistics.


Product characteristics

Hazardous and Dangerous Goods

There are **international rules** applicable to road, sea and air transport. There are **nine main classes** (some also under - categorized) that determine the **degree** and the **nature of the risk**, as well as the potential risks during the transport.

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Hazardous and Dangerous Goods
What is classed as hazardous goods?

- Class 1: Explosive materials
- Class 2: Gases
 - 2.1: Flammable gases (butane - propane)
 - 2.2: Non-flammable – non-toxic gases (oxygen, nitrogen)
 - 2.3: Toxic gases (chlorine, methane)
- Class 3: Flammable liquids

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Hazardous and Dangerous Goods
What is classed as hazardous goods?

- Class 4: Flammable solids
 - 4.1: Flammable solids
 - 4.2: Materials that can ignite under special conditions (phosphorus)
 - 4.3: Materials that in contact with water create flammable gases (sodium, zinc elements, etc.)

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Hazardous and Dangerous Goods

What is classed as hazardous goods?

- Class 5: Oxidants and organic peroxides
 - 5.1: Oxidizing substances which, by the release of oxygen, cause or help in combustion (oxygen generator from chemical reaction)
 - 5.2: Organic peroxides that are unstable in temperature, may be explosive or react dangerously with other materials (e.g. hydrogen peroxide)

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Hazardous and Dangerous Goods

What is classed as hazardous goods?

- Class 6: Toxic and contagious substances
 - 6.1: Toxic substances (causing death or damage by inhalation, ingestion or contact with the skin).
 - 6.2: Contagious substances (virus)

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Hazardous and Dangerous Goods

What is classed as hazardous goods?

- Class 7: Radioactive materials (waste from radiological machinery)
- Class 8: Corrosive substances (mercury, battery fluids, etc.)
- Class 9: Miscellaneous other hazardous materials (not belonging to the previous categories)

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Hazardous and Dangerous Goods

- The consignor shall be responsible for informing of the risk of the goods transported.
- There are laws covering obligations in the transport of dangerous goods.
- It is usually forbidden to transport at the same time with other goods.
- There are written instructions for handling cargo, means of transport.
- Material Safety Data Sheet (MSDS). It consists of 16 chapters for material handling (transportation, storage, etc.)

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Cost

Cost is also an important factor in choosing the mode of transport.

Cost is usually expressed as unit costs for the transport of goods or materials rather than as a net number.

- Cost / box,
- cost / tons,
- Cost / cubic meter,
- cost / pallet, etc.

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Cost


In order to calculate the cost of transport, we should also take into account the distance at which the goods are transported.

So we can, for example, express the cost in **cost / tonne-kilometre**.

Often if the goods are a **Full Truck**, the cost is expressed in net number for transport from point A to point B.

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6.4.07.01 How To Choose Transportation Mode In Logistics.


Service Provided

The main objective of transport is to transport goods from one particular point to another, ensuring that they reach the point of destination in the correct condition, on time and at an acceptable cost.

The reliability of the above is a very important factor in the choice of mode of transport.

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Service Provided

- If the service provided is unreliable in time it will force the customer to increase stocks and thus increase its cost.
- If the goods arrive damaged, the cost of replacing them will be much higher than the original cost.

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Lead time

The mode of transport we choose has a predetermined speed at which the goods can be moved from the outset.


Of course, depending on the infrastructure that exists, the speed can change even for the same mode of transport.

(e.g. road quality, car type, etc.)

Environmental factors and/or traffic conditions may also affect the top speed of transport.

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Safety & Security

The transport of goods involves a number of issues relating to the safety of persons and goods.

Safety of personnel:

It's a very important factor in a successful transfer. Trained and insured personnel must be used, whether permanent or temporary.

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6.4.07.01 How To Choose Transportation Mode In Logistics.

Safety & Security

Security:

The safety of goods and staff is also very important. Potential safety risks can be identified by applying the risk assessment technique. Tracking the transport also helps the safety of the goods transported.

Communication and information between those involved during transport guarantees the safety of transport.

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6.4.07.01 How To Choose Transportation Mode In Logistics.

MODE	ROAD	RAIL	SEA	AIR
Speed	Middle	Middle	Low	High
Reliability	Good	Good	Limited	Very good
Cost	Medium	Low/Medium	Low/Very Low	High
Adaptability	High	Low	Low	Middle
Advantages	Economic, relatively fast, no transshipment.	Economic, large loads, long distances and relative speed	Economic, large loads, cheap, no restrictions on the load limit	Fast, reliable, direct, easily monitored.
Disadvantages	Hazard, nationalities of drivers, weather conditions	Difficulty finding wagons, delays, transshipment.	Slow, transshipment, 2nd option for large loads, risk of thefts in ports	High Cost, limited volume, transport restrictions, weight, etc..
Other	A large network of roads is required, good for short and medium distances	Large loads from ports to warehouses	Large loads, no emergency transport, long distances without time constraints	Expensive goods, fragile, consumables, cold chain, small loads, long distances with time constraints.

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6.4.07.02

Market evaluation and selection of the appropriate carrier

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6.4.07.02


Market evaluation and selection of the appropriate carrier

Categorize loads according to the mode and type of transport.

- *FTL (Full Truck Load)*
- *LTL (Less Than Load)*
- *Groupage*
- *Courier*

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6.4.07.02 Market evaluation and selection of the appropriate carrier

Categorize loads according to the mode and type of transport.

FTL (Full Truck Load):
 Full load. It is the case where we try and fill in a whole load that is usually expressed in weight or volume.
 The ultimate goal of full load is to improve the unit transport costs.

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6.4.07.02 Market evaluation and selection of the appropriate carrier

Categorize loads according to the mode and type of transport.


FTL (Full Truck Load):

Pros: Best price for full load and per unit. Fewer uploads to intermediate distribution centers.

Cons: It concerns large loads. The transfer cannot be done door-to-door.

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6.4.07.02 Market evaluation and selection of the appropriate carrier


Categorize loads according to the mode and type of transport.

LTL (Less Than Load):

It is a load less than the maximum that the means of transport we use can carry. Goods are received and transported to local transport stations (spokes) where they are loaded with others and go to larger stations (Hubs or Distribution centers) where together with others they are loaded into larger means of transport. At local stations the loads are weighed and checked if they match the accompanying documents. This can be done one or more times until delivery to the final recipient.

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6.4.07.02 Market evaluation and selection of the appropriate carrier


Categorize loads according to the mode and type of transport.

LTL (Less Than Load):

Cons: Longer transfer and delivery times due to network configuration and intermediate uploads that should be done up to the final recipient

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6.4.07.02 Market evaluation and selection of the appropriate carrier

Categorize loads according to the mode and type of transport.

LTL (Less Than Load):
 Pros: The best price compared to what we would pay for the whole truck, and the additional services that one enjoys at this price and do not offer FTL carriers, such as: lift gate service on pick-up or delivery, internal delivery, pre-delivery information, etc.

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6.4.07.02 Market evaluation and selection of the appropriate carrier

Categorize loads according to the mode and type of transport.

Groupage :
 It is the case of transporting different goods together, so that a full load is completed or so that we can have constant recurring routes. It can also be done in non-full loads.

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6.4.07.02 Market evaluation and selection of the appropriate carrier


Categorize loads according to the mode and type of transport.

Courier :

Courier transport is ideal for small packages, which can often be of great importance and must be transported quickly door to door. It is, of course, a relatively expensive transport and is not used for repeated transport.

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6.4.07.02 Market evaluation and selection of the appropriate carrier


Specify carriers for each mode and type of transport.

If we want to select carriers, the choice should be made with a careful approach and depending on the mode and type of transport:

- On the **scheduled routes** that we usually encounter in sea, rail and air transport, the choice of carrier is made mainly at company level based on its reliability.

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6.4.07.02


Market evaluation and selection of the appropriate carrier

Specify carriers for each mode and type of transport.

- In **spot** transport at sea, air and road, there is more flexibility and the choice of carrier and mode can be made for one transport or for a specific time (time chartered). This option may relate to the entire mode for a trip or part of it (trumper).
- In **special transport**, carriers and means are selected, especially and depending on the nature of the goods transported. Special trucks (low loaders), or ships and planes.

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6.4.07.03

Implementation of agreements with Transport Service Providers.

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6.4.07.03 Implementation of agreements with Transport Service Providers.


In transport we have the possibility and often the obligation to work with transport service providers.

These may be:

- Carriers
- Freight Forwarders
- Agents
- Custom Brokers
- Customs
- Port Authorities
- Stevedores

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6.4.07.03 Implementation of agreements with Transport Service Providers.

In cooperation with the above we try, for a fee, to exploit:


- their experience,
- their knowledge and
- good relations and networks

who have been with other companies in the transportation area for the proper execution of the transfer that we want to do.

With these partnerships, we transfer responsibility for safe, timely and lawful transportation to these partners (mainly forwarders and carriers).

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6.4.07.03 Implementation of agreements with Transport Service Providers.

Sub-contracting


There is the possibility of subcontracting all transport activity. There are two main reasons why we are thinking about this solution.

1. The inability to properly use (utilize) means of transport.
2. The cost of administration and support of the operation of the transport (overhead cost)

The subcontracting can be given either to a carrier that serves in addition to us and other customers, or to a carrier that is exclusively engaged in our own goods.

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6.4.07.03 Implementation of agreements with Transport Service Providers.

Sub-contracting

There is also the case of partial subcontracting, where we assign a part of the activity.


This may be the extra seasonal activity, for which we do not have the assets to implement or even the "difficult" part of our activity which is usually the most uneconomic for our organization.

Other advantages that subcontracting may have may be tax reasons, economic reasons, etc.

In subcontracting it is important to ensure that our level of customer service remains high.

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6.4.07.03 Implementation of agreements with Transport Service Providers.


Routes

Routes can be classified as primary transport routes and as secondary transport routes.

In primary transport we have routes of the main cargo (to warehouses or distribution centers) that are usually performed with fixed or towed vehicles. The use of these vehicles can be done with many variations regarding the number of trailers and tractors and/or trailers, in order to achieve the desired result (minimum cost /transport time).

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6.4.07.03 Implementation of agreements with Transport Service Providers.


Routes

In secondary transport (deliveries from warehouses to customers), there are 3 types of routes

- ARC or CIRCUMFERAL (arc path or circular path)
- AREA /REGIONAL (route covering a specific area).
- RADIAL (radial path).

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6.4.07.03

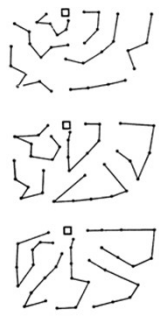
Routes

ARC or CIRCUMFERAL

REGIONAL


RADICAL

Implementation of agreements with Transport Service Providers.



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6.4.07.03

Routes

Implementation of agreements with Transport Service Providers.

The decision to use one of the three types of routes, **ARC or CIRCUMFERAL, REGIONAL ή RADICAL**, depends on the following factors:

- Size of orders in relation to available vehicles.
- Geographical characteristics of delivery points
- Techniques we use for routing.

Each type of route has its own characteristics. It is important to know that ARC creates multi-kilometre routes.

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6.4.07.03 Implementation of agreements with Transport Service Providers.

Routing Methods

Savings Method

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Routing Methods

Savings Method

Assuming that from the warehouse we want to supply customers 1 and 2 in the most economical way.

1st way: $D - 1 - D - 2 - D = 2X + 2Y$

2nd way: $D - 1 - 2 - D = X + Y + W$

The difference of the 1st way from the 2nd is:

$(2X + 2Y) - (X + Y + W) = X + Y - W$

Combining customers on the same route reduces the total distance for customer service 1 and 2.

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6.4.07.03 Implementation of agreements with Transport Service Providers.

Routing Methods

Operational Methods

- SDS – Simplified Delivery Systems
- TRANSIT – Time based Routing and Scheduling of Industrial Transport

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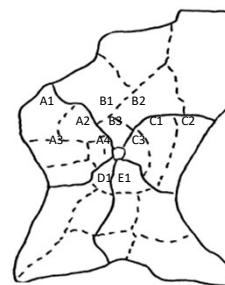
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Routing Methods


Operational Methods

1. SDS – Simplified Delivery Systems



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Routing Methods
Operational Methods - SDS – Simplified Delivery Systems

This method is based on the division of the geographical area we supply from a specific loading point (depot) into sub-regions, each of which has an alphanumeric code e.g. A1, B2 ,C4 etc. The letters usually correspond to the main roads that start radially from the depot, and the numbers indicate areas in that direction with specific customers. Each customer is listed with their password. Routing starts from distant points and closes towards the depot.

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6.4.07.03 Implementation of agreements with Transport Service Providers.


Routing Methods
Operational Methods

2. TRANSIT – Time based Routing and Scheduling of Industrial Transport

The routing area is again divided into sub-areas with a radius of e.g. 10 km and the customers of each sub-region are routed starting from the remote ones.

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6.4.07.03 Implementation of agreements with Transport Service Providers.

Equipment
 The equipment for transport services includes means of transport, as well as loading and unloading equipment which may be at the loading or unloading points but may also be attached to the means of transport.

- Pallets,
- Cranes
- Conveyors
- lifting machines.
- Containers.

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6.4.07.03 Implementation of agreements with Transport Service Providers.

Description of goods and packaging
 The correct description and packaging of the goods is always important for their safe transport.
 The description in the accompanying documents and the specific handling instructions specific to dangerous goods are essential factors for the proper and safe handling of cargoes by all those involved in their transport, loading and unloading.
 The packaging has to do with the nature of the goods (fragile, dangerous, toxic, etc.) and is the one that will protect the goods from damage or total destruction during transport.

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6.4.07.03 Implementation of agreements with Transport Service Providers.

Inspection of goods

During the transport of goods, their inspection during loading and at regular intervals along the way is an important factor for the safe transport of the goods but also for the safety of all those directly or indirectly involved in the transport.

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6.4.07.03 Implementation of agreements with Transport Service Providers.

Responsibilities of the Forwarder and Carrier


Freight Forwarder

He is the one who undertakes the operation of the entire transport from the initial point of loading to the final point of receipt. Usually transport is international and most of the time combined (many modes of transport are used). They will have to meet some basic conditions such as:


- Have a state license, experienced and trained staff
- Presence at all destinations and upload stations
- Warehouses, facilities, means of transport. Good partnerships.

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6.4.07.03	Implementation of agreements with Transport Service Providers.
Responsibilities of the Forwarder and Carrier.	
Freight Forwarder The services it provides, are: <ul style="list-style-type: none"> • Identification of products arriving at each transshipment or final destination station. • Management of loading, unloading and storage procedures • Control of the weight of the load • Check the shipped packages for obvious damage. • Arrangements at the final destination. 	
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6.4.07.03	Implementation of agreements with Transport Service Providers.
Responsibilities of the Forwarder and Carrier.	
Carrier Carrier is the person or company responsible for the safe and timely transportation of goods. Among other things, it is responsible for the following: <ul style="list-style-type: none"> • Selects the appropriate means of transport. • Selects the properly trained and certified driver. • Takes care of the driver's personal protective equipment • It has a responsibility not to load other goods. • It is responsible for the implementation of security procedures. 	
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6.4.07.03 Implementation of agreements with Transport Service Providers.

Delays and subsequent losses

Delays in delivery of goods mean possible sales losses for shipper.


Transport contracts always provide for the corresponding clauses in cases of delay.

In addition to the impact on the sale of goods, delays can also result in demurrages if the cargo remains in ports, transit airports for some reason.

Special is the case of force majeure where the delay is due to exceptional reasons which are outside the influence of those involved in the transfer.

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6.4.07.04 Route Optimization

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6.4.07.04 Route Optimization

Inputs

Transport Network

To optimize routes, one of the main factors that needs to be considered is the proper design of the transport network.

Networks:

- *Direct Delivery*
- *Distribution Centre Network*
- *Multi-Drop Network*
- *Cross Docking*

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6.4.07.04 Route Optimization

Inputs

Transport Network

In order to optimize the routes, we must therefore choose,

- A transport network or more often a combination of networks to serve the needs of it.
- The appropriate means of transport.
- The appropriate routes

In order to choose the appropriate combination of networks we use various models trying to answer questions such as the following:

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6.4.07.04 Route Optimization

Inputs

Transport Network

- Which network serves me better;
- How many warehouses should I have? Where should the warehouses be?;
- How many means of transport? What kind of means of transport;

Different answers to the above questions differentiate the individual costs and the total cost and thus we make our final decision.

Usually, it is right to **start** with the **simplest network** and if it does not satisfy us, then **add data** in order to achieve the desired result.

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6.4.07.04 Route Optimization

Inputs


Customers (Location, delivery or pick up, delivery time)

The second input that needs to be considered in order to improve my routes are our customers, specifically:

- What is the distance from the delivery point
- What is the size of the customer
- What are the customer's requirements
- What is the type of product
- What is the volume and weight of the products to be delivered
- What is the value
- What is the demand (frequency) of the product.

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6.4.07.04 Route Optimization

Inputs
Customers (Location, delivery or pick up, delivery time)


The answers to the above questions allow us to choose:

- the right transport network but also
- mode of transport (e.g. road).

Of course, we should always take into account the corporate strategy, which is always followed by the Supply Chain strategy.

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6.4.07.04 Route Optimization

Inputs
Fleet of vehicles


Once we have chosen the mode of transport, we can now also choose the means of transport where we will use and specifically:

- The number of trucks,
- Capacity,
- The possibilities they should have

But also whether it should be owned or we should work with transport companies or 3PL

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6.4.07.04 Route Optimization


Inputs
Drivers

The choice of drivers is also a very important step in optimizing routes. Trucks are expensive equipment and should be handled properly by trained drivers. Particular attention should be paid to safety, defence driving and load handling.

We should also have accurate descriptions of their work so that there are no misunderstandings about what we are asking them to do.

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6.4.07.04 Route Optimization

Inputs
Drivers


They should be assessed on the basis of quantitative and qualitative criteria, some of which may be:

Quantitative evaluation criteria

- Reports from fleet management system on driving, consumption, speed, accidents, maintenance, etc.
- Annual evaluation sheets with driver performance indicators during the year, such as number of deliveries.

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6.4.07.04 Route Optimization


Inputs
Drivers

Quality assessment criteria

- Customer feedback
- Feedback by colleagues
- Accompanying while driving and evaluating

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6.4.07.04 Route Optimization

Objectives
Optimize transport costs

As in all business activities, as in transportation, we try to minimize costs (fixed and variable costs), using various programs. The first thing that we should do is to see in which areas there is room for cost reduction.

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6.4.07.04 Route Optimization

Objectives

Optimize transport costs

We will do this by recording and analyzing all the costs, the contribution of each to the total cost and the reduction of the most important of them. Some of them may be:

- Driver wages and overtime
- Fuel, maintenance, vehicle replacement costs.
- Mix of privately owned and Commercial fleet.
- Load/route.
- Factor of use of drivers, vehicles

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6.4.07.04 Route Optimization

Objectives


Minimize vehicles used.

The size of the fleet required to carry out a specific transport project depends on the :

- quantity of cargo to be transported,
- transport distance,
- loading, unloading and travel conditions,
- available driver shifts,
- the degree of demand we want to achieve, etc.

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6.4.07.04 **Route Optimization**

Objectives
Minimize vehicles used.


It is necessary to decide what level of demand for transport the fleet will be designed to serve. Demand should be calculated both at an average monthly or weekly price and at a daily or weekly peak.

It must also be decided on the possibility that demand will not be served (e.g. 1%, 5%, etc.).

Debate: *What is preferable, normalizing demand to be served by the given fleet, or ensuring an adequate fleet to meet primary demand?*

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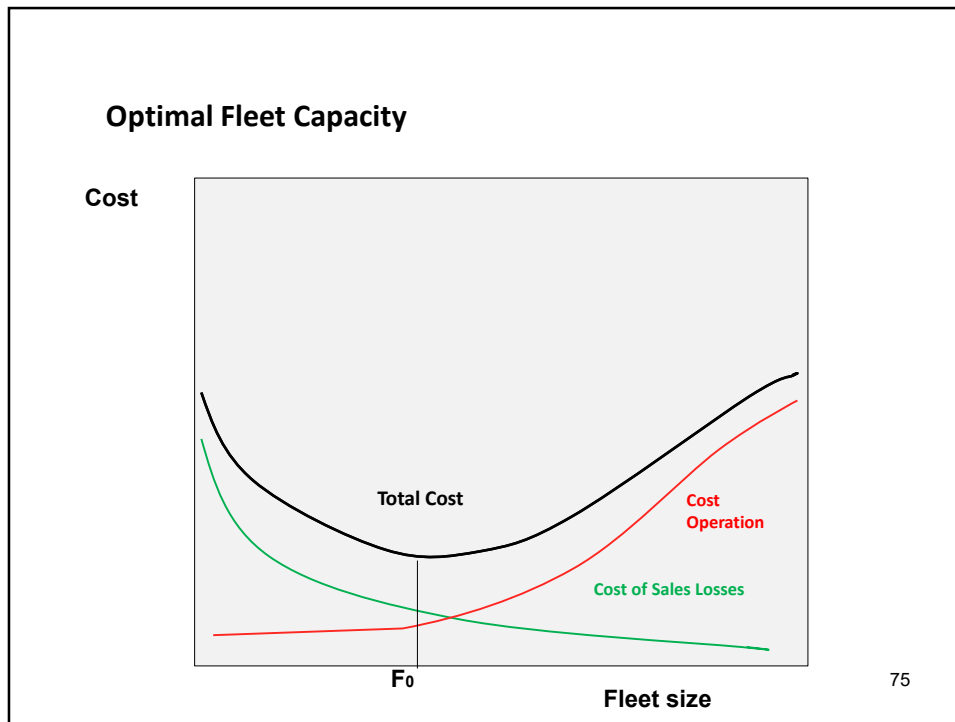
6.4.07.04 **Route Optimization**

Objectives
Minimize vehicles used

The optimal fleet size is calculated with the aim of making full and efficient use of vehicles and avoiding laytime. In the calculation, the failure levels should be included (delayed execution or execution of a smaller order) that should be agreed with the Administration of the Company.

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6.4.07.04 Route Optimization


Objectives
Minimize travel time

The total transfer time depends on the:

- The mode of transport (road, sea, air)
- The route option
- The transport network we use (direct delivery, warehouses, distribution centers, docking stations, multi-drop network).

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6.4.07.04 **Route Optimization**

Objectives
Minimize waiting time:


Minimization of waiting times is achieved by the use of automatic loading/unloading systems, the use of automatic packaging equipment, stacking, palletization of products, the use of containers, etc.

In addition, the loading/unloading systems of the vehicle also contribute to the reduction of these times.

Finally, the implementation of procedures, such as night deliveries, direct debit, can contribute to this direction.

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6.4.07.04 **Route Optimization**

Cases / Situations
Optimize delivery without delivery time limit

In order to optimize the deliveries we should always make some trade-offs taking into account the impact that our actions have on the following:

- Inventory Cost
- Installation Operating Costs
- Cost of cooperation with Carriers
- Level of Service we offer to our Customers.

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6.4.07.04 Route Optimization

Cases / Situations

Optimize delivery without delivery time limit

Where I have no restrictions on delivery times (mainly occurs in primary transport) the burden of optimization falls on the **trade-off with the cost of holding stocks and the cost of operating facilities**. Depending on the value of the goods, I choose a method of transport in order to have or not to have high inventory stock stored.

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6.4.07.04 Route Optimization

Cases / Situations

Combination of Deliveries and pick ups on the same route

In many cases and especially in cases of LTL loads, in order to gain time and for better use of driver and truck, we combine receipts and deliveries to be made on the same route. In the final loading centers (spoke terminals) drivers load the goods they have for delivery and start the route. After delivering and emptying the truck, they start receiving and return to their base to unload and group the deliveries they made and to load the next day's deliveries.

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6.4.07.04 Route Optimization

Cases / Situations

Deliveries (and pickups) with time limit on delivery

Where I have restrictions on delivery times (mainly happens in secondary transport) the burden of optimization falls **on the trade-off with the level of customer service**. If we want to keep the level of service at a high level, it is possible that the routes are not well planned (non-full loads, repeated deliveries to the same customer) resulting in an increase in transportation costs. If we reduce the level of service then we achieve better transportation costs, but of course we are losing revenue.

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6.4.07.04 Route Optimization

Route improvement tactics include:

- **Grouping nearby destinations**


It is obvious that grouping customers at close distances improves route performance because it reduces mileage gaps.

- **Examination and negotiation of appropriate delivery time margins with customers**

We mentioned that the level of service is inversely proportional to transport costs, but there is a point where a delay in deliveries that helps optimize services has no impact on customer service.

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6.4.07.04 Route Optimization

Route improvement tactics include :

- **Use of multi-partition vehicles**
 With these vehicles we can serve different customers at the same time (e.g. tanker compartments) or transport products with different transport requirements (Fridge and ambient temperature chambers together in the same truck).
- **Combination of deliveries and pickups on the same route**
 We're achieving a reduction in fleet and in kilometers at the expense of time.

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EJlog - CHAPTER G :
TRANSPORTATION

6.4.07.05 Selection of Logistics Service Providers.

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6.4.07.05 Selection Of Logistics Service Providers.

Selection of Carrier

For selecting a transport service provider, the main steps are:

1. Evaluation of our needs (volume to be transported, type of products, distance, frequency, etc.).
2. Carriers Market Evaluation (type and availability).
3. Planning a transport network. (type of transport, routes, combination of modes of transport)
4. Decision on the exact services that we will request.

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6.4.07.05 Selection Of Logistics Service Providers.

Selection of Carrier

5. Short list of suitable carriers (reliable and capable of the service we want).
6. Preparation of Request For Quotation (RFQ) by setting the terms and conditions for the requested services.
7. Offers Evaluation and Risk Analysis
8. Declaration of a preferred carrier and signing of a contract
9. Monitor/Track/Performance Reports.

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6.4.07.05 Selection Of Logistics Service Providers.


Selection of Carrier
RFQ Process Management, e-auctions, on-line ordering process:

When managing RFQ (Tender) we should clearly set the services we ask for, how we want them to be met in as much detail as possible.

Tenders can be submitted either in the traditional way (sealed envelopes) or by electronic means (emails) or by using some available e-auction platforms where bids are made online and the possibility of counter-offers in real time is given.

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6.4.07.05 Selection Of Logistics Service Providers.

Selection of Carrier
Offers Evaluation:


Tenders evaluation for the selection of the Carrier should be based on the following criteria, although only the financial offer gives an objective criterion.

Nevertheless, the following criteria should be examined:

- ✓ Reputation
- ✓ Reliability
- ✓ Capacity
- ✓ Availability
- ✓ Cost

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6.4.07.05 Selection Of Logistics Service Providers.

Selection of Carrier


Offers Evaluation:

- ✓ Reputation
Shows how this supplier works in the market over a long period of time and how the market evaluates it in general.

- ✓ Reliability
If we are talking about rail, ferry or airlines, reliability usually refers to their routes. If we are talking about road transport we refer to his ability to complete the transport at the specific time we want.

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6.4.07.05 Selection Of Logistics Service Providers.

Selection of Carrier


Offers Evaluation:

- ✓ Capacity
It is necessary to know the capacity of the carrier (Tender) in means, personnel, warehouses etc. in order to assess whether it can cover the volume of services we ask for, without problems.

- ✓ Availability
It's about capacity. What we are basically looking at, is the available capacity of the tenderer.

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6.4.07.05 Selection Of Logistics Service Providers.

Selection of Carrier
Offers Evaluation:

✓ Cost

It is basically the price offered by the interested party. To compare the prices offered it is important to make sure that they cover exactly the same services or, if this is not possible, to make sure what each offer covers, so that we can decide what we want and what we are prepared to pay.

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6.4.07.05 Selection Of Logistics Service Providers.

Selection of Carrier
Contract Assignment:

After evaluating the offers and selecting the supplier of the transport services, we sign the cooperation contracts.

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6.4.07.05 Selection Of Logistics Service Providers.


Carrier performance assessment.

After signing the contract it is necessary to monitor the performance of the carriers in order to be sure that they are performing in accordance with what we agreed.

This can be done both with daily performance monitoring and at a higher level through the collection of data analysis on a weekly or monthly basis, against the contract we have signed.

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6.4.07.05 Selection Of Logistics Service Providers.

Carrier performance assessment.

At the contract should be stated the following:

- The requirements that the customer has,
- The working method and
- The economic conditions,

As well as:

- Available number of vehicles of the carrier
- Transport services for the receipt and delivery of goods.

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6.4.07.05 Selection Of Logistics Service Providers.

Carrier performance assessment.

The charges for transport services in a contract may be:

- fixed cost – cost per load, a route where there are relatively fixed routes in volume and distance.
- Rate per unit – cost per case, day, time, kilometre, tonne-kilometre, etc.
- Open Book / Cost Plus. Together, the means and the way of working are defined, costs are determined and a contractor benefit is added to the supervision of work.

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6.4.07.05 Selection Of Logistics Service Providers.


Carrier performance assessment.

Depending on the type of contract, the correct execution of its terms is certified by certain data, which are generally divided into two categories:

- Hard data: They are mentioned in the accompanying documents and can be Delivery time, cost, damages etc.
- Soft data: They are reported by the consignor and/or consignee and may be the condition of the vehicle, the driver's willingness, efficiency, etc.

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6.4.07.05 Selection Of Logistics Service Providers.

Carrier performance assessment.

The performance of the carrier is compared with those mentioned in the contract and constitute its obligations and accordingly corrective actions or even termination of a contract in cases of large deviations.

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EJlog - CHAPTER G :
TRANSPORTATION

6.4.07.06 Planning Transport Network.

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6.4.07.06 Planning Transport Network.

Transport Networks - Design

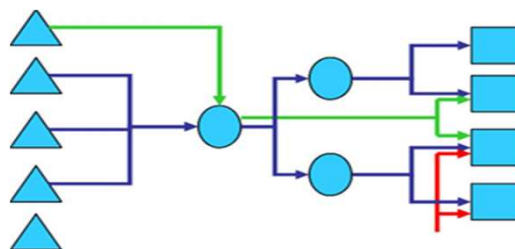
A supply chain network usually consists of supply points, process points, and demand points. The design of a transport network affects supply chain performance by determining the distribution of the different points (feed, processing, demand). A well-designed transport network allows us to achieve the desired degree of service at low cost.

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6.4.07.06 Planning Transport Network.

Supply Points - Processing Points - Demand Points



The different color shows the paths that follow different products

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6.4.07.06 Planning Transport Network.

1. Direct Delivery

In direct delivery networks, products are forwarded directly from supply points to demand points, without going through processing points.

They are used when the shelf life of the products is short and demand is consistently high. Loads are usually large, the route predetermined.

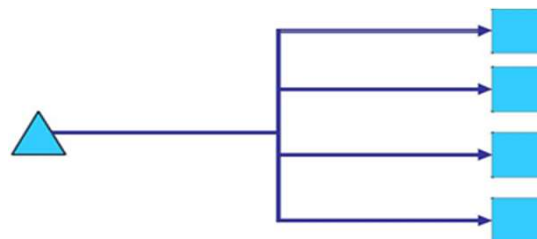
The main advantage of direct delivery networks is the elimination of intermediate warehouses and the simplicity of operation and the control that it gives. The routes are independent of each other and the transfer time is short.

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6.4.07.06 Planning Transport Network.

1. Direct Delivery



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6.4.07.06 Planning Transport Network.

2. Distribution Centre Network

For products that are not in high demand, to achieve full load with goods from different suppliers to a point of demand we use distribution centers. In this way we reduce the total number of transports necessary to fully supply the points of demand.

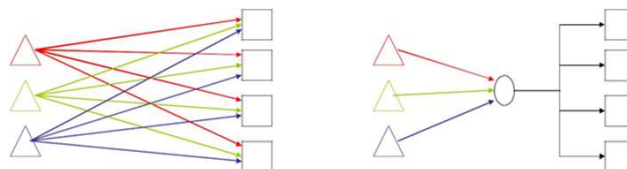
Their disadvantage is that often the duration of transport is longer than in direct delivery networks.

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6.4.07.06 Planning Transport Network.

2. Distribution Centre Network



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6.4.07.06 Planning Transport Network.

3. Multi-Drop Network

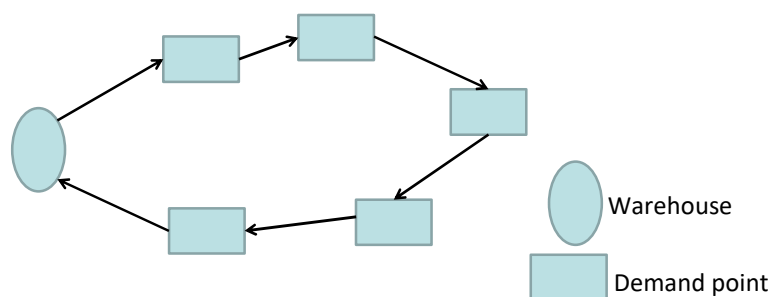
In previous networks, the plan was to deliver a full load to each customer. Sometimes this is not possible because the quantity to be delivered is small. In these cases the multi-drop network model can be used.

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6.4.07.06 Planning Transport Network.

3. Multi-Drop Network



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6.4.07.06 Planning Transport Network.

4. Cross Docking Network

Another type of network is cross docking. In this case, intermediate warehouses do not function as warehouses (where they maintain stock) but as points of cargo change. Vehicles arriving at them unload products, which are immediately uploaded to other vehicles to be forwarded to customers.

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6.4.07.06 Planning Transport Network.

Select a transport network.


An organization must choose:

- A transport network or more often a combination of networks to serve its needs.
- The appropriate means for transport
- The appropriate routes

Usually it is right to start with the simplest network and if it does not satisfy, then add elements in order to achieve the desired result.

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6.4.07.06 Planning Transport Network.

Potential Networks - Scenario

- **Central European Distribution Centre**
- **Regional Distribution Centers**
- **Central European Distribution Center and Satellites (Hub & Spoke)**

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EJlog - CHAPTER G :
TRANSPORTATION

6.4.07.07 Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.

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6.4.07.07 Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.

The measurement of transport performance is essentially about measuring performance in the areas of:

- Cost
- Productivity
- The utilization factor and the efficiency of the means


transport factors which are:

- The means of transport
- Drivers
- Customers and their orders

Performance is measured by the introduction of Key Performance Indicators in these areas.

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6.4.07.07 Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.

Productivity


In productivity we want to measure the **ratio of the result to the effort made (output / input).**

Some examples of measuring productivity in transport are:

- ✓ Kilometres travelled / Driving hours
- ✓ Deliveries / Driving Hours
- ✓ Kilometres travelled / Fuel consumption
- ✓ Miles travelled laden / Total kilometers
- ✓ Hours of truck use / Hours of non-use of truck.

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6.4.07.07 Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.

Utilisation


In the utilisation factor we measure **the ratio of the capacity we used to the capacity available.**

Examples of measurement the utilization in transport are:

- ✓ Driver Usage Hours / Available Hours
- ✓ Actual Driving Hours / Available Driving Hours
- ✓ Truck hours used / Hours available
- ✓ Used Truck Capacity / Available Capacity
- ✓ Useful weight used / Available useful weight.

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6.4.07.07 Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.

Cost


An important measure of performance is the operating cost and how it is distributed per truck or driver. We often measure some quantitative performance indicators rather than economic indicators, but they have an impact on the operating cost.

Performance essentially measures **the ratio of the actual result to the expected result.**

We therefore measure how we use the available means, which in turn determines our economic performance.

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6.4.07.07 Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.


Cost

Quantitative performance indicators that have an impact on operating cost are:

- ✓ Deliveries made / Deliveries to be made
- ✓ Kilometres travelled / Kilometres to be travelled
- ✓ Actual Working Hours / Budgeted Working Hours
- ✓ Actual Driving Hours / Budgeted Driving Hours
- ✓ Fuel consumption / Budgeted fuel consumption
- ✓ Volume (Weight) where it was transferred / Volume (weight) where it had to be transported.

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6.4.07.07 Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.


Cost

The above performance indicators we mentioned have a direct impact on the operating cost. They directly affect costs and economic indicators, such as:

- Total transport costs as a percentage (%) of sales
- Cost / tonne-kilometre
- Maintenance cost / kilometer
- Fuel cost / kilometer
- Tire cost / kilometer

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6.4.07.07 Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.


Cost

Quantitative performance indicators that have an impact on operating cost are:

- ✓ Deliveries made / Deliveries to be made
- ✓ Kilometres travelled / Kilometres to be travelled
- ✓ Actual Working Hours / Budgeted Working Hours
- ✓ Actual Driving Hours / Budgeted Driving Hours
- ✓ Fuel consumption / Budgeted fuel consumption
- ✓ Volume (Weight) where it was transferred / Volume (weight) where it had to be transported.

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6.4.07.07 Definition and implementation of Key Performance Indicators (KPIs) in order to improve the way of transport.

KPIs

The key performance indicators we've seen are used to see deviations from the goals (financial and/or customer service) we've set for transportation. Depending on the results, we can make corrective moves to improve them or find the best practices and apply them in other areas.

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EJlog - CHAPTER G : **TRANSPORTATION**

6.4.07.08 Selection and implementation of the appropriate Transport Management information (IT) Systems.
(Transport Management System – TMS).

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6.4.07.08 Selection and implementation of the appropriate Transport Management information (IT) Systems.
(Transport Management System – TMS).

- **Implement gap analysis of current operation and required functionality.**
- **Present a list of possible software and vendor solutions**
- **RFP (Request For Proposal)**
- **Bid evaluation including system demonstration**
- **Implement visits to reference facilities.**
- **Contract**
- **Implementation**
- **Implement improvements after completion of installation**

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6.4.07.08 Understanding the functionality of
Transport Management Systems
(Transport Management Systems – TMS).


Transport Management Systems

Strategic purpose

They are called Computerized Vehicle Routing and Scheduling (CVRS) and help to improve the routing plan, to execute orders quickly and accurately by using digital maps and a configuration set of parameters. Users interact with the system and make changes where necessary until the best solution is reached.

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6.4.07.08 Understanding the functionality of
Transport Management Systems
(Transport Management Systems – TMS).


Transport Management Systems

Strategic purpose – What they achieve

- Decrease routing time
- Reduce travel times
- Reduction of kilometres travelled by the vehicle
- Reducing fuel consumption
- Monitoring compliance with financial terms of contracts

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6.4.07.08 Understanding the functionality of Transport Management Systems (Transport Management Systems – TMS).


Transport Management Systems

Strategic purpose – What they achieve

- Improve the level of service
- Need fewer imported data reducing margins of error and working time.
- Less operating expenses
- More reliable timeplan (receipts and deliveries)
- Better use of the means we have (vehicles, drivers)

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6.4.07.08 Understanding the functionality of Transport Management Systems (Transport Management Systems – TMS).


Transport Management Systems

Functional level – What they achieve

- They manage the available capacity we have in drivers, vehicles and products.
- Manage customer information (products and order quantity, place of delivery, delivery time).
- They achieve the best possible cost given the service level we want.
- They implement the plan quickly without delays.

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6.4.07.08 Understanding the functionality of
Transport Management Systems
(Transport Management Systems – TMS).


Transport Management Systems

Functional level – What they achieve

- Manage orders that enter the system
- They create a load order when multiple products are loaded.
- Provide, depending on the transfer, for the issuance of appropriate accompanying documents
- They enable monitoring of the route and position of the vehicle.

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6.4.07.08 Understanding the functionality of
Transport Management Systems
(Transport Management Systems – TMS).


Transport Management Systems

Functional level – What they achieve

- They enable controls of various functions of vehicles (speed, route, stops, driving mode, consumption, etc.)
- They enable communication with the driver via GPRS.
- Where necessary, they assist in central routing by making better use of all available means.

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6.4.07.08 Understanding the functionality of
 Transport Management Systems
 (Transport Management Systems – TMS).

Transport Management Systems
Application difficulties

- At first there is resistance to their application by humans.
- Moreover, they are often considered difficult to implement (many times they are, but they are sure to amortise any investment very quickly).

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6.4.07.09 Various

Bermuda agreement


The Bermuda Agreement (formally Agreement between the government of the United Kingdom and the government of the United States relating to Air Services between their respective Territories), reached in 1946 by [American](#) and [British](#) negotiators in [Bermuda](#), was an early [bilateral air transport agreement](#) regulating civil [air transport](#). It established a precedent for the signing of approximately 3,000 other such agreements between countries. The Agreement was replaced by the [Bermuda II Agreement](#), which was signed in 1977 and effective in 1978.

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6.4.07.09	Various
<p>SAD (Single Administration Document)</p> <p>Single Administration Document is a customs form developed by the European Union (EU) to control the import and export of goods arriving into and departing from EU nations. The document uses harmonized codes to identify the countries of origin and destination, the exporter or carrier, the party(s) responsible for making the customs declaration and settlement payments, an inventory of the goods and the number of containers.</p>	
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6.4.07.09	Various
<p>PESTLE Model</p> <p>It is a method to investigate environmental factors that can positively or negatively affect our business decision to make an investment, that is, to enter a geographic market, a product or a service, to invest in infrastructure or means of transport, etc.</p> <p>The factors fall into the following categories:</p> <ul style="list-style-type: none"> P Political E Economic S Social-Sociological T Technological L Legislative E Environment 	
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6.4.07.09	Various
TRANSIT PROCEDURES	
Community Transit (CT) covers movements between:	
<ul style="list-style-type: none"> • the territory of the EU • the special territories of the EU • San Marino • Andorra 	
Common Transit covers movements between:	
<ul style="list-style-type: none"> • the territory of the EU • EFTA countries 	
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6.4.07.09	Various
TRANSIT PROCEDURES	
<ul style="list-style-type: none"> • The external Community transit procedure (T1) allows the transit of non-Community goods ("external" transit) via the EU Member States (and Andorra and the Republic of San Marino) suspending the payment of customs duties and other taxes. • The external Common transit procedure (T1) allows the transit of non-Community goods via the EU Member States and EFTA countries (Iceland, Norway, Liechtenstein and Switzerland), or Turkey. • The internal Community transit procedure (T2) allows the transit of Community goods ("internal" transit) between EU Member States via one or more EFTA countries suspending the payment of customs duties and other taxes. • The internal Common transit procedure (T2) allows the transit of Community goods between EU Member States and EFTA countries (Iceland, Norway, Liechtenstein and Switzerland), or Turkey. • The internal Community transit procedure (T2F) is used for the transit of Community goods between EU Member States and non-fiscal areas of the customs territory of the Community such as the French Overseas Departments, the Channel Islands, the Canary Islands. 	
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6.4.07.09 Various

Pro-Forma Invoice

- A pro forma invoice is a preliminary [bill of sale](#) sent to buyers in advance of a shipment or delivery of goods. The invoice will typically describe the purchased items and other important information such as the shipping weight and transport charges. [Pro forma](#) invoices are often used for customs purposes on imports.
- Most pro forma invoices provide the buyer with a precise sale price. It includes an estimate of any commissions or fees, such as applicable taxes or shipping costs. Although the pro forma invoice may be subject to change, it represents a good faith estimate to avoid exposing the buyer to any unexpected and significant charges once the transaction is final.
- A firm may send a pro forma invoice before shipping any agreed-upon deliverables or along with the shipped items. While it does contain exact cost details associated with the sale, it is not an official demand for payment. There are no guidelines dictating the exact presentation or format of a pro forma invoice, and it may or may not resemble other commercial invoices.

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6.4.07.09 Various

What a **final drive ratio** is and how it affects the truck

The final drive ratio is the last bit of gearing between your transmission and the driven wheels. By changing it, you can affect the performance of your car.

- In general, a lower final drive ratio will lead to less torque at the wheels but a higher top speed. Meanwhile, a higher ratio will result in the opposite, i.e. more torque at the wheels but a lower top speed. Remember, this is done without any change to the power and torque of the engine.
- Since torque is what helps you accelerate, a higher final drive ratio will give you better acceleration. The catch is that your engine also needs to work harder, i.e. produce more revs, for a given speed, so the higher your final drive ratio the more fuel you'll be using.



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6.4.07.09 Various

They are international trade rules concerning the transport and delivery conditions of goods

INCOTERMS 2010




- They are international trade rules concerning the **transport and delivery conditions of goods**
- Their purpose is to eliminate or at least significantly reduce the possibility of a difference in the interpretation of certain terms from country to country.
- If, at the time of conclusion of the contract, the buyer and seller expressly refer to one of the INCOTERMS of the International Chamber of Commerce, then they can be sure that they have simply and securely identified the responsibilities that each of them has assumed respectively. This minimizes the possibility of misunderstanding and subsequent questioning.

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6.4.07.09 Various

Incoterms® 2010

		FREIGHT/RISK		MORE DETAILS	
DESCRIPTION					
EXW Ex Works		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
FCA Free Carrier		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
CPT Carriage Paid To		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
CIP Carriage Paid To		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
DAT Delivered At Terminal		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
DAP Delivered At Place		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
DDP Delivered Duty Paid		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
FAS Free Alongside Ship		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
FOB Free On Board		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
CFR Cost and Freight		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms
CIF Cost, Insurance and Freight		Incoterms	Incoterms	Freight	Incoterms
		Incoterms	Incoterms	Risk	Incoterms

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6.4.07.09 Various

Difference between a Liner and Tramp service

Liner Service – is a service that operates within a schedule and has a fixed port rotation with published dates of calls at the advertised ports.. A liner shipping service generally fulfills the schedule unless in cases where a call at one of the ports has been unduly delayed due to natural or man-made causes..

A **Tramp Service** or trampster on the other hand is a ship that has no fixed routing, itinerary or schedule and is available at short notice (or fixture) to load any cargo from any port to any port..



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Good luck !

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