Logistics and Overland Transport Network for Training “Blue Collars“ (LogOnTrain) Project of the Estonia-Latvia-Russia cross border cooperation Programme within European Neighbourhood and Partnership instrument 2007-2013

THEORY OUTPUT OF THE SYLLABUS FOR TRAINING OF LOGISTICS FREIGHT FORWARDERS IN VOCATIONAL SCHOOLS ON THE BASIS OF SECONDARY WITH INSTRUCTION IN ENGLISH

Curricula Work Package of LogOnTrain project

Valga 2013

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1. Transport development and objectives

Transport means the relocation process of cargo, i.e. goods and materials, but also people. The object of transport is the output of other industry sectors; transport connects the different logistics chain links. Transport is one of the largest and most dynamic spheres in the world economy, consuming ¼ of the world’s electricity production, ⅓ of the metal production, ¾ of the rubber and lubricant production, and over ½ of the petrol production. In consequence, the transport bears a major environmental responsibility through the saving of fuels, an effective arrangement of shipments, and the recycling of used transport vehicles. On the other hand, in transport sector the environmental management and the interests of companies hold the same purpose - an effective and optimized logistics enables to protect the environment, at the same time saving transport costs and enabling to increase profit.

Logistics and logistics chain
Logistics means the management of cargo flow, cash flow, and information flow. Logistics is the art of planning and managing these flows, as a result of which the goods gaining additional value are moving through the whole logistics chain, from the procurement of raw materials to the delivery of finished products to the end consumer. Reverse logistics also includes the return and utilization of old products.

![Logistics chain](image)

*Figure Logistics chain*

Example: Logistics chain of motor vehicle industry
An example of the logistics chain in motor vehicle industry: procurement of raw materials (the mining of ore), processing of raw materials into metal in the metal industry, production of parts in the processing industry, assembly of the vehicle in the motor vehicle industry, storage of finished vehicles and their distribution to customers, and disposal or the recycling of unusable vehicle into metal.

The task of logistics is to optimize the process of cargo flow, and to monitor the smooth and seamless operation of the whole logistics chain, at the same time ensuring profitability.

The logistics cannot be handled separately from the rest of business activity, and the logistics costs are an important cost component in the price of product. Companies are increasingly dealing with the monitoring and the optimization of the whole logistics.
The logistics is directly connected with production as well as sales process. Therefore, logistic decisions are made fairly high in the company’s structure, taking into account the whole logistics chain and the objectives of the company.

**The role of transport in logistics chain**

Transport is a link in the logistics chain, and therefore, the transport cannot be handled separately from the rest of the chain. Transport has an important role in the chain - to forward the materials and goods in the logistics chain. Since the stock of goods should be kept at minimum level, the responsibility of the operation of a transport system is extremely high. For example, according to the principles of the so-called *just in time* delivery, the spare parts in the motor vehicle industry are moved directly to the production line, and possible errors in transport systems can result in the shutdown of the plant.

Mistakes are often made when problems occurring in a specific link in the logistics chain are attempted to be solved on account of transport. This situation can be described with the following example.

When ordering a lift from the lift plant, the waiting time formed 50 %, the preparation of the components formed 20 %, the installation (including setup and picking) formed 28 % and the transport formed 2 % of the whole time. With the acceleration of the transport time by half, the transport costs would increase 100%, but the time saving in the logistics chain would constitute only 1%.

The same proportions also apply to the ratio of costs, which means that with the increase of transport costs 2-3 times a year, the time gain resulting from it was 1%. Thus, all the problems in the logistics chain cannot be solved on account of transport logistics.

**Transport logistics**

Transport logistics means the relocation of goods to the right place at the right time, thus increasing the value of the goods. The purpose of the transport logistics is to ensure the operation of transport system with optimal costs, i.e., to ensure an effective arrangement of deliveries.

Transport logistics performs the following tasks:

- The creation of transport systems, including the creation of transport corridors and transport chains.
- The planning of transport processes for different types of transport in case of combined transport.
- The assurance of the technological consistency of transport and storage processes.
- The planning of transport processes together with warehousing and production processes.
- The choice of transport type.
- The choice of transport vehicles.
- The assignment of optimal delivery routes.
The organisation and coordination of the fulfilment of transport service orders.
Quality assurance.

Requirements for transport:

- The transport has to be flexible enough to guarantee transport processes, even in case of weekly or daily corrections.
- The transport must ensure one-time and periodic round-the-clock goods deliveries to remote and low-density areas.
- The transport must provide secure servicing of customers, in order to prevent downtimes in the work of companies, and to avoid the occurrence of stock deficiency.
- The transport must be able to carry relatively small lots of goods at small intervals in accordance with the changing demands of the customers.

Chart 1.1  Transport chain

Transport systems are an important part of transport logistics, consisting of the following:

- Roads, streets, railways, airports, ports, terminals, pipelines - the physical infrastructure.
- Cars, trailers, locomotives, wagons, airplanes, ships, containers, pumps - the transport vehicles.
- Car manufacturers, repair shops, fuel grid, electricity grid, insurance, information technology - the support functions.
• Legislation about transport, international agreements, the management of deliveries, traffic authorizations, taxation, the monitoring of deliveries, international contracts.

**Logistic competitiveness**

The transport logistics is an area where national and private sector interests directly merge and an effective performance depends on cooperation. Since the interest of the state is to ensure people’s employment and tax revenues, the state is directly interested in the handling and transport of cargo flow. The state is also responsible for the infrastructure, and therefore the state should create the conditions in which the transport operators could arrange their work effectively and competitively. Ineffective transport system, deadlocks on borders, the incapability of management, and the investments not carried out in time will direct the cargo flows into competing channels.

Transport as an industry has been open to the global international work allocation for a long time already. The cargo flow can be compared to a river looking for the best watercourse - the one with the least obstacles and the most competitive transport costs. The competitiveness of the background system is the precondition that enables the operators-companies organising and managing the movement of cargo flows to do well in this difficult and changing market.

The cost, time efficiency, and security of the handling of cargo flows constitute a unified and effective system of logistics and transport.

The transport fulfils the function of bringing together production and consumption. In this globalizing world, the role of transport logistics is continuously becoming more important, because the production and the markets are often located on different continents and a long interim storage is not used. Often, the global businesses have one central warehouse in Europe, from where the goods are distributed to customers. That kind of developments also present new challenges to the transport logistics, and besides costs, the quality of the services is becoming more important.

The transport sector is taking part in the global competition more actively than other sectors, expressed mainly in close competition for prices and labour force.

In European Union's transport sector and in the circumstances of open services and labour market, the Estonian road carriers are competing actively against the Finnish and Polish carriers, and the increase of labour costs brings out the competitiveness of companies - with the new keyword “efficiency”.

The qualified labour force is one of the keys of success in the logistics sector, including drivers, the warehouse and terminal personnel, the transport managers, expeditors, and the managers of different levels.

The Estonia’s accession to the European Union brought along significant changes for the whole transport sector:
  • The removal of border blocks and the simplification of customs procedures.
  • The relocation of central warehouses.
  • The geographical change of distribution flows.
For example, several large enterprises have moved their production and central warehouses to Poland, which, in turn, has caused a giant increase in cargo flows going out of Poland; on the other hand, the import flow into Poland has not increased remarkably.

- The enlargement of distribution areas.
- The creation of central warehouses in Estonia, which, in turn, has changed several transport schemes.
- Single labour market and competition.

In addition to the legislation about tax and customs arrangements, the competitiveness of the logistics sector is limited with the restriction to use long road trains in Estonia. At the same time, the long units are allowed in Finland, thus, increasing the competitiveness of Finland compared to Estonia.

An ever-larger part in the goods trade with Estonia is played by the neighbouring countries; therefore, we will focus on the use of the most common types of transport.

2. Types of transport

Depending on the nature and character of the goods, it has to be decided, whether to use a motor vehicle, a train, a ship, or an airplane, i.e. to choose between highway, railroad, maritime, or air transport. Every one of these types is represented on the transport map. The choice of the type of transport is made according to one or several of the following factors: The destination of the goods, quantities to be delivered, the required time of arrival etc. It is also necessary to find out whether you are dealing with raw material, semi-finished product or finished product, whether the supplier is a manufacturing enterprise or wholesale company, whether the goods are delivered to a plant, to a seller's warehouse or to the final consumer. These criteria make sure what kind of transport type is serving the interests of the final result most efficiently.

Historically, the oldest and most traditional type of transport is maritime transport. The main goods flows ran across seaway. The development of land transport started with the invention of the wheel about 4000 years ago. The wheel is considered to be one of the most important achievements of mankind. For a long time, the role of the main transport provider on mainland was played by the railway. Only in the second half of the XX century, the development of road transport begun to accelerate and its importance started to increase. The development of road transport was supported by the release of RO-RO (roll on - roll off) ships, which became the extension of the highway over the sea.

Nowadays, the road transport is in a somewhat crisis; the city streets have become too tight for the mass of cars; even the European highways cannot handle all the transport vehicles during peak hours and weekends. As a result, the governments of different countries have started to limit the road transport (driving prohibition during weekends); the development of a multimodal transport is supported in every way. Although it is possible for long main deliveries to use a ship or a train in certain stages, there is no alternative for road transport in distribution transport or in inter-European transport. However, the related restrictions create more problems for the organisation of deliveries. In the era of rising costs, the keyword is efficiency, which,
in turn, brings out new challenges to the carriers, the organisers of transport, and to
the customers, causing changes in the work organisation for every party.

Road transport
The road transport is characterised by great flexibility and manoeuvring ability. It is
also supported by the relatively tight network of European roads and terminals, and
the deliveries between terminals according to regular delivery schedules, as a result of
which good conditions have been created for the regular transport of small
consignments and grouped goods. One of the benefits is the possibility to offer door-
to-door services with a relatively short delivery time, and also, quite low requirements
apply to the packaging of goods. The delivery times have become shorter, and in the
European traffic, the road transport offers a significant competition to the air
transport.

The carrying capacity of the road transport is limited and the main disadvantage is the
relatively high cost price of the deliveries; also, it is not too eco-friendly. The allowed
measurements and weight restrictions also limit the size and dimensions of the
shipment. Relatively well developed European road network is overloaded and new
limits are constantly being set to road transport by different countries.

The advantages and disadvantages of road transport
Advantages:
- Direct customer-to-customer deliveries.
- Short delivery time.
- Flexibility.
- Tight network of terminals (in Western Europe).
- Packaging is less expensive than for maritime transport.
- Diverse inventory.

Disadvantages:
- Polluting the environment.
- The management of the road network is expensive.
- Traffic limits.
- Technical obstacles, the weight and dimensions of the shipment.

Rail transport
Rail transport is a regular and a weather proof type of transport for deliveries of goods
over long distances. One of the most important advantages of rail transport is the
relatively low cost price of the deliveries and the environmental friendliness; it is also
possible to organise the loading jobs effectively.
The flaws include long delivery times and the low flexibility of the railway organisations. The management of the rail network is expensive and the development requires major investments.

The advantages and disadvantages of railway transport

Advantages:

- Vast loads
- Cheap main transport
- Environment friendliness

Disadvantages:

- Long delivery times
- Low flexibility
- The railway management costs

Maritime transport

Maritime transport as a part of international deliveries is the type of transport with the largest transport capacities. The main advantages of maritime transport are low transport rates and extensive capacity. The disadvantages are low speed, strict requirements for the packaging and approval of goods, and the transport schedules with relatively long intervals. The disadvantages also include expensive port taxes and low flexibility.

The advantages and disadvantages of maritime transport:

Advantages:
Vast quantities
Cheap main transport
Environment friendliness
No traffic jams

Disadvantages:
Long delivery times
Low flexibility
High port taxes
Air transport
The advantages include high delivery speed and the possibility to offer quick transport of deliveries to faraway places due to a well-developed global airline network. The most suitable goods to be delivered by air transport are light goods with a very high price per kg. The ratio of specific weight 1 m³ = 167 kg promotes the transport of light goods. Low packaging costs. Administration is facilitated by standardised rules (IATA), independent of specific airlines.

The disadvantages include high transport rates and high dependency on the weather conditions, with the main flaw being the slowness of the airport’s ground operations. Due to the weight limits and restrictions established by IATA, the transport of several goods as air cargo is difficult. Also, the security requirements have become stricter.

The advantages and disadvantages of air transport:

Advantages:
- Speed – in case of some goods it is a transport advantage, and in case of other goods, it allows to save costs.
- Great traffic concentration, due to which no time is lost during the airline switch.
- Globally tight airlines network, so the air transport is quite close to all consignees.
- The handling of goods at the airport is faster compared to other types of transport.
- The delivery of goods is easy, because most of the airlines belong to the system created by IATA. This provides unified rules of action independent of specific airlines, even when the deliveries are carried out consecutively via several different airlines.
- Receiving information during transport is well organised.
- The security of the delivery, and cheaper insurance than other types of transport.
- Savings in packaging, because several items can be sent in their sales package.

Disadvantages:
- High cost
- The characteristics of the goods, for which IATA or aviation officials have established certain restrictions. These characteristics include the
hazardousness of the goods, and their harmfulness with regard to cargo, airplane or passengers, e.g. flammable, corrosive, or smelly products.

- The weight and dimensions of the container, which can be restricted by the airplane used.
- In case of short air deliveries, the savings are reduced due to relatively big proportion of other types of transport.

**Combined transport (multimodal transport)**
The combined transport means the use of several types of transport together. Usually the cargo compartment stays the same. The use of combined transport started with the adoption of standard containers. Mainly 20’ and 40’ containers are used.

The most common combined types of transport are:

- Container transport (container on a ship, on a train, or on a motor vehicle)
- Huckepack (trailer on a train, motor vehicle on a train);
- Ro-ro ferry transport (motor vehicle on a ferry);
- Train on a ferry (Railship, Searail)

In case of combined transport, the advantages of different types of transport are attempted to be used; at the same time, the development of combined transport is limited by the stiffness of the railway organisations.

**The transport of trains on ferries**
This means combined sea-to-rail transport. The system is based on the door-to-door carriage of goods via railway. This transport is used between Finland, Sweden, and Continental Europe, between Finland, Sweden, Ukraine, and Romania, between the British Islands and the Continental Europe, etc. The goods to be delivered stay in the same railway wagon during the trip from the place of departure to the place of destination. Railway wagons are forwarded on ferries, where there are rails on one or several decks. The providers of freight transport still refer to that type of transport as rail transport - the ferry acting as a bridge over the sea for the train. The ferries equipped with rails usually connect railways with the same track gauge; otherwise, the bogies of wagons have to be exchanged.
The choice of transport type depends on several factors, e.g. the value of goods, the packaging of items, the location of the manufacturer, the amount of freightage, the intended delivery time, etc.

3. Cargoes

In the context of transport process, we talk about stock batches, shipments, and cargoes.

**Shipment**

The shipment means the goods delivered from single place of departure and one sender to single place of destination and one receiver, with only one bill of lading, loaded to one vehicle or cargo compartment.
Cargo
The cargo means the shipments loaded into the freight or cargo compartment. Different groups of products are transported and packaged differently according to the characteristics of the product.

The cargoes can be classified as follows:

- **Bulk goods, for example**
  - Soil, sand, gravel, crushed rock, construction waste
  - Coal, oil shale
  - Peat, sawdust in bulk
  - Flour, cement in bulk
  Dumpers or special vehicles are used for transport.

- **Neo-bulk, break-bulk cargo, for example**
  - Unpackaged bricks and firewood
  - Cotton, hay bales
  - Loose cardboard boxes
  Platform trucks or dumpers, or vans with closed cargo compartments, if necessary, are used for transport.

- **Long cargo, for example:**
  - Rails
  - Long beams, panels
  Slung trailers are needed for transport.

- **Heavy and large goods, for example**
  - **Heavy machinery**
  - **Industrial equipment**
  A rolling stock with big loading capacity is used for transport.

- **Round wood (timber trucks)**
- **Packaging - bags, boxes, barrels, pallets etc.**
- **Highly perishable goods, for example** meat, fish, dairy products
  Types of transport complying with the ATP requirements are used for transport.
- **Non-packaged liquids, for example**
  - Heavy fuel oil, petrol, raw milk
  Road tankers are used for transport.

- **Packaged ordinary goods - closed vans are used for transport.**
  For example, the soil in large quantities is transported as bulk goods, however, when it is packaged into plastic bags and picked onto pallets during the transport process, it is considered to be ordinary goods that can be transported to the stores in closed vans. With the exception of extremely large lots of goods, most of the goods in the shipment process are nowadays transported as packaged goods, making it possible to handle them in the transport process. This is also the area we will mainly focus on in the overview of transport processes.

The volumetric weight of cargoes
The transport process is restricted by several factors, e.g. the allowed carrying capacity of the vehicle, and also the maximum allowed axle load. Additional restrictions include the tonnage of the cargo compartment (cubature) and the number of pallets that can be loaded to the floor area of the cargo compartment. In order to plan the use of right mechanisms, also the weights of the package units have to be known when loading the goods. In order to make right decisions and plans, the carriers require very specific information about the goods already in the ordering process - this information includes the type of package, the volume of the item, the dimensions, number of packages and the gross weight.

**Weight of goods**
During the selling and warehousing process of goods, the articles are usually accounted according to their net weight; in the transport process, the gross weight, the volumetric weight, and the rated weight are referred to.

**Gross weight**
Gross weight means the weight of the goods together with the packaging.

**Volumetric weight**
Volumetric weight is referred to when talking about light goods that do not load the carrying capacity of the vehicle but for which the limiting factor is the amount of space in the cargo compartment of the vehicle.

In road transport, the goods are divided into bulk and weight goods as follows:
- Bulk goods \(< 333 \text{ kg} / \text{m}^3\)
- Weight goods \(> 333 \text{ kg} / \text{m}^3\)

**Rated weight**
The analysis of the transport processes needs a unit which would take into account the weight and cubature of the item, the floor area and the size of the cargo compartment used, and would express the possibility of until how high the goods can be stacked in the cargo compartment. This unit is the rated weight by which the differences of the goods due to their dimensions, types of packaging, volume and the specific gravity can be expressed.

According to the formula used to calculate the rated weight, also the size of the cargo compartment in relation to the carrying capacity is expressed.
In road transport, following international agreements apply for the calculation of volumetric weight.

| 1 m³       | 333 kg |
| 1 LDM      | 1850 kg |
| EUR pallet  | 0.4 LDM  | 740 kg |
| FIN pallet  | 0.5 LDM  | 925 kg |
| Half pallet | 0.2 LDM  | 370 kg |

For air transport, another condition of volumetric weight must be considered.
For air transport 1 m³ = 167 kg

LDM - loading meter
The loading meter means one consecutive meter of the cargo compartment up to the full height of the compartment.

In transport, the highest indicator is used as the basis for calculating the rated weight, according to which the deliveries are planned, costs are accounted, the transport rate is rated, and the transport statistics are maintained.

Change in the conditions of volumetric weight
The release of transport vehicles with larger size (cubature) affects also the condition of volumetric weight, and therefore the condition of the volumetric weight used for the deliveries between Finland and Sweden is 1 m³ = 2000 kg, making the transport of bulk goods with the same transport rates cheaper.

Packing unit
The packing unit is the inseparable quantity of goods in the transport package.

Small package
Small package is a shipment whose total weight does not exceed 35 kg and that consists of one packing unit. The length of the packing unit of a small package does not exceed 2 m and the length + circumference does not exceed 3 m.

Parcel
Parcel is a shipment whose total weight does not exceed 99 kg and that consists of maximum 3 small packages.

Small consignment
Small consignment is the consignment whose rated total weight is less than 2500 kg and generally, the transport is carried out with transhipment.

Less truck load
Less truck load is the shipment whose rated weight is 2500 kg or more, and in addition to the load, also other shipments can be accommodated to the vehicle; generally, the transport is carried out without transhipment.
Full truck load

Full truck load is the shipment that fills the whole cargo compartment, or the customer pays for the use of the full cargo compartment. The transport is usually carried out without transhipment.

Mass goods

Mass goods are extremely large lots of goods, for the transport of which ships and train compositions are used.

The classification of cargo according to size:

<table>
<thead>
<tr>
<th>Weight</th>
<th>Description</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.3 kg</td>
<td>Small packages</td>
<td>LCL</td>
</tr>
<tr>
<td>0.3-30 kg</td>
<td>Parcel post</td>
<td>Parcel post</td>
</tr>
<tr>
<td>30-100 kg</td>
<td>Small packages</td>
<td>Small packages</td>
</tr>
<tr>
<td>100-2500 kg</td>
<td>Grouped goods</td>
<td>Grouped goods</td>
</tr>
<tr>
<td>2500 kg-2.5 T</td>
<td>Less truck loads</td>
<td>LTL</td>
</tr>
<tr>
<td>2.5 T-24 T</td>
<td>FTR</td>
<td>FTR</td>
</tr>
<tr>
<td>over 24 T</td>
<td>Maritime transport</td>
<td>Maritime transport</td>
</tr>
<tr>
<td></td>
<td>Railway</td>
<td>Railway</td>
</tr>
</tbody>
</table>

Classification of cargo according to the level of service

- **Shipments without time commitment**
  Shipment without time commitment means the shipment which is transported from A to B according to a scheduled timetable or during reasonable shipment time, or for which an estimated delivery time is agreed upon, but in case of a delay, no claim is filed against the carrier.

- **Shipments with time commitment**
  An agreement, according to which the carrier agrees to deliver the shipment within agreed timetable. For the shipment with time commitment, the carrier charges a higher freightage for the shipment, and in case of a breach of shipment deadline, specific sanctions are imposed on the carrier; also, the sender of the goods can require a contractual penalty from the carrier. This contractual penalty is usually the freight money, which means that in case of a breach of shipment deadline, the sender receives a free shipment.
The classification of shipments according to the performance of the shipment

Regular shipments

- Regular mode of transport
  A regular mode of transport is the mode of transport used on a given route or in shipment technology, with no special conditions.
  For example, when it is common in the transport process to use car trailers covered with a canopy as the cargo space, a requirement from the customer to use a box trailer is regarded as a special condition, and it has to be agreed upon during the conclusion of the transport contract.

- Regular timetable
  Timetable is usually an established goods delivery schedule. If the customer of the shipment demands a freight that does not correspond to the established goods delivery schedule, it is considered to be a special agreement.

- Regular risks
  The carrier takes responsibility according to the limits established for the carrier, and goods are not considered as an increased risk. For example, goods with an increased risk are tobacco products that some of the transport companies refuse to deliver, referring to their increased risk.

- Regular loading devices and conditions
  The packaging enables to use the most common loading and securing devices for the loading and fastening of the goods. For example, it is assumed that the freight transported with transhipments are generally picked on pallets that enable mechanised handling in the transport process. In this case, the delivery of loose goods for transport is a special condition.

Depending on the agreement, for example, the use of tail gate lifter can be a part of an ordinary contract or a special condition.

Below you will find the groups of products or the special features of the cargo that always need a special agreement.

Cargoes transported only under special agreements:

- Valuable items
- Shipments whose loading or approval requires special equipment
- Shipments with no packaging or insufficient packaging
- Shipments that may damage other shipments
- Shipments whose height is over 2 m, length is over 6 m, or width is over 2,4 m
- Shipments that cannot be transported together with other shipments, although the quantities and route would allow it
- Shipments causing unusual load share (axle load, the position of the load centre etc.)
- Live animals
- Plants
- Products sensitive to temperature variations
- Shipments that belong to the class of dangerous substances
• Shipments for which the delivery deadline is agreed upon
• The shipment of foodstuffs (ATP)
• The shipment of hazardous substances (ADR)
• Removals
• Shipment of exhibitions
• Shipment of strategic substances
• Other shipments with special requirements
4. Road transport

Road transport can be divided into international and national shipments. The development of road transport in Europe accelerated with the development of road network and ro-ro ferries. CMR convention - major act governing the international road transport - dates back to the year 1956. In national transport, the provisions of the Law of Obligations Act are followed. Since the main market of international road transport is Europe, an important influence on the road transport comes from the transport policy of the European Union. Although the EU officials speak a lot about the favouring of combined and maritime transport, in practice much success has not been achieved. Despite the restrictions set by several countries in order to direct the flow of goods into other channels, the role of road transport has still increased. The road network in Central Europe is at the limit of its capacity and road jams on highways are not rare. The set limits must be accepted by both the senders, and the carriers of goods.

During the last decades, the handling of goods has developed remarkably. The efficient use of the capacity of cargo compartment became into focus, and a situation where a vehicle would carry as little “empty space” or “air” as possible was attempted to be achieved. Different packaging methods were used as assistance, and the vehicle was loaded more and more densely. The use of terminals became more active, because in order to get closer to the manufacturers and the buyers, the transport companies and expeditors established new offices inland.

4.1 Means of transport

The most popular means of transport used in road transport for the delivery of ordinary goods are divided as follows:

- **Distribution vehicles**

  Distribution vehicles are used mainly in the distribution areas of terminals to distribute and gather goods. In order to simplify the loading operations, the distribution vehicles are usually equipped with tail gate lifter. It is also common to use vans to transport smaller and manually loaded shipments.

![Diagram of a distribution vehicle](image)

<table>
<thead>
<tr>
<th>Total weight, tons</th>
<th>14,0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of the technical part, tons</td>
<td>07,6</td>
</tr>
<tr>
<td>Carrying capacity, tons</td>
<td>06,4</td>
</tr>
<tr>
<td>Holding capacity, m³</td>
<td>40,5</td>
</tr>
<tr>
<td>Internal width of the van, m</td>
<td>02,5</td>
</tr>
<tr>
<td>Turning radius, m</td>
<td>10,0</td>
</tr>
</tbody>
</table>

Allikas: Lumsden, 2000
Figure 4.1  Distribution vehicle

- Road trains
For international and terminal-to-terminal shipments, the road train consisting of a towing vehicle and a semi-trailer is commonly used. For the direct distribution shipments, the road trains with a full-trailer are often used.

Aliks: Lumsden, 2000

<table>
<thead>
<tr>
<th></th>
<th>Auto</th>
<th>Haagis</th>
<th>Kokku</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total weight, tons</td>
<td>22,0 – 24,0</td>
<td>36,0</td>
<td>42,0 – 44,0</td>
</tr>
<tr>
<td>Technical part, tons</td>
<td>8,5</td>
<td>8,5</td>
<td>17,0</td>
</tr>
<tr>
<td>Loading part, tons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holding capacity, m³</td>
<td>25,0 – 27,0</td>
<td>25,0 – 27,0</td>
<td></td>
</tr>
<tr>
<td>Spaces for pallets, EUR</td>
<td>84,0</td>
<td>84,0</td>
<td></td>
</tr>
<tr>
<td>Turning radius, m</td>
<td>7,5</td>
<td>36,0</td>
<td>36,0</td>
</tr>
</tbody>
</table>

Figure 4.2  The combination of a truck and a semi-trailer, EU

Figure 4.3  Extreme road trains (not allowed in Estonia or in Europe in general)
Figure 4.4 The most common means of transport used in the international carriage of goods in Europe. The last combination of the trailer and van displayed in the figure is allowed only in Nordic Countries. Source AS Schenker
Estonia has adopted the acts limiting the dimensions and total weight of road trains in accordance with the relevant directive of the European Union, determining the maximum dimensions and weights of road trains.

Therefore, the road train consisting of a vehicle and a full-trailer:

- Must not be longer than 18.75 metres.
- The length of the road train with semi-trailer must not exceed 16.50 metres.
- Must not be wider than 255 cm.
- The total weight of the road train must not exceed 40 tons.
- The maximum authorized weight of the road train can be 40 tons.

Some countries have set additional limitations (Switzerland), others allow vehicles with larger dimensions and loading capacity.

On the roads of Finland and Sweden, the modules of road trains with the length of 25.5 metres are used.

For example, in Finland it is allowed to use the road trains with the length of 22 metres for domestic transport.

- Six-axle, with a full-trailer of 22 metres, loading capacity of 53 tons
- Seven-axle, with a full-trailer of 22 metres, loading capacity of 60 tons

![Figure 4.5 Road trains allowed in Nordic Countries](image)

The full length of road trains is 25.5 metres - it is possible to combine the vehicles with the EU dimensions into combinations meeting exactly that dimensional standard. It is under discussion in the European Union, whether the use of modular road trains should be allowed also in the road traffic of other EU countries. At the moment it is not allowed.
The development of the means of transport is directed towards the increase of effectiveness and at the same time greater environment-friendliness. In order to achieve this, cleaner engines have been adopted, and in order to increase cargo compartment volume, vehicles with smaller wheels are built.

Canvas trailers
When using the canvas trailer, the load is covered with waterproof cover or canvas. In this case, the handling of the load is much easier, because the cover is partially or fully lowered during loading and unloading. The walls and roof of the cargo are a bit elastic and to some extent, it is possible to load the goods more densely. Otherwise inconvenient containers are easier to load and unload. On the negative side it must be said that the cargo is dependent on weather conditions and that the canvas trailers are unsuitable for the transport of certain groups of products.

The development trends of canvas trailers
During the last years, the developments in using the trailers is the same as for the cargo compartments of the vehicles, i.e. the goal is to increase the size of the cargo compartment, and to simplify loading. In case of older trailers, the loading procedure from the sides or from the top of the trailer is rather time consuming. In order to facilitate the loading, curtain trailers have been brought to the market. These trailers can be opened from the side or from the top very easily.
Closed trailers
Closed trailers (van trailers) have a closed cargo compartment. Closed trailers are divided into three main groups as follows:

- Regular closed trailers with no heating or refrigeration equipment.
- Isolated (isothermal) trailers used for the transport of foodstuffs (e.g. fruit).
- Refrigeration trailers also used for the transport of foodstuffs (e.g. meat).

For loading the goods into a closed trailer, its rear or side door is used. The size of the door restricts the loading possibilities. In the closed trailer, the load is protected from the weather conditions, which is one of the advantages of the closed trailer over the canvas trailer.

The semi-trailer is often called a trailer, which in practice means a semi-trailer separated from the towing vehicle. The advantage of the trailer is the possibility to leave it separately to the desired place during loading or unloading. The towing vehicle or its driver is not needed during that time.

The development of the means of transport is mainly directed to the efficiency of the vehicle, without exceeding the specified limit dimension, pollution norms and other restrictions. Therefore, one opportunity to improve the efficiency is to increase the length of the loading part.

The development trends of the means of transport:

- Environment-friendliness
  The environmental requirements include cleaner and more economic engines, lower noise level and more environment-friendly fuels.

In Europe, the environment-friendliness of the means of transport is marked with the symbol
  Euro 1;
  Euro 2;
  Euro 3;
  Euro 4;
Euro 5;
Euro 5 represents the most modern means of transport with regard to environment, noise level and security.

- Short couplings
The development is towards the full use of the transport capacity, therefore it would be wise to reduce the gap between the towing vehicle and the trailer in road trains, using short couplings.

![Diagram of road train couplings](image)

<table>
<thead>
<tr>
<th>Tavaline legend</th>
<th>Regular coupling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maksimaalne kogupikkus</td>
<td>Maximum total length</td>
</tr>
<tr>
<td>Veovahendi laius</td>
<td>Width of the transport vehicle</td>
</tr>
<tr>
<td>Liigendi pikkus</td>
<td>Length of the coupling</td>
</tr>
<tr>
<td>Haagise pikkus</td>
<td>Length of the trailer</td>
</tr>
<tr>
<td>Haakepunkt</td>
<td>Coupling point</td>
</tr>
<tr>
<td>Haagise pöörderaadius</td>
<td>Turning radius of the trailer</td>
</tr>
<tr>
<td>Lühike liigend</td>
<td>Short coupling</td>
</tr>
<tr>
<td>Liigendi pikendus</td>
<td>Extensions of the coupling</td>
</tr>
<tr>
<td>Haagise uus pikkus</td>
<td>New length of the trailer</td>
</tr>
<tr>
<td>Laadimisosa juurdekasv</td>
<td>Increment of the loading part</td>
</tr>
<tr>
<td>Muutuva pikkusega liigend</td>
<td>Coupling with a varying length</td>
</tr>
<tr>
<td>Liigend, mis raskendabautorongi manööverdamist</td>
<td>Coupling that makes the manoeuvring of the road train more difficult</td>
</tr>
<tr>
<td>Pöörde ajal</td>
<td>During turn</td>
</tr>
<tr>
<td>Liigend pikeneb automaatseit</td>
<td>The coupling lengthens automatically</td>
</tr>
<tr>
<td>Manööverdamisvöime säilib</td>
<td>The manoeuvring ability maintains</td>
</tr>
</tbody>
</table>

Figure 4.8  The development trends of road trains
• Smaller wheels
The purpose is to increase the volume of the cargo compartment of the transport vehicle. With the use of smaller wheels it is possible to increase the loading height. On the other hand, several technical problems pop up, and the greater stacking height of goods also presents higher requirements to the packaging.

![Figure 4.9 Semi-trailer with smaller wheels (so called Jumbo trailer)](image)

• Air suspension
The use of air suspension gives advantages for loading, improves the operating conditions and is less harmful to the roads.

4.2 Combinations for road transport

The keyword of the transport process is the efficiency - maximising the load of the transport vehicle, and minimising the downtime. One way to improve the efficiency is to use combinations of several means of transport and several cargo compartments. The use of standalone cargo compartment enables to use the resource of the trucks in a better way. For example, if the customer has long loading times, it is possible to leave the cargo compartment at customer’s site outside working hours. The cargo compartment is left at the customer’s site and it is picked up at a suitable time after loading or unloading the cargo. Also, it enables to avoid peak hours and traffic jams. The combined shipments and multimodal transport usually means container shipments; below you will find some of the combinations related to road transport.

Exchangeable semi-trailers
The use of exchangeable semi-trailers in freight transport is very common in cooperation with shipping companies. In Estonia, most of the expeditors ship the goods to Finland or Sweden using exchangeable semi-trailers, meaning that on board the ship, the semi-trailer is without the towing vehicle. At the port, the carrier passes the trailer over to the ship company, and at the other port, the trailer will be picked up by the towing vehicle.
Interchangeable van (Swap body)
The swap body (in Estonian, the term kontreiler (contrailer) is used - a hybrid of a container and a trailer and their operating possibilities) means a 20 to 40 feet long transport unit, standing on its own support legs during loading and unloading (also during short time storage). It is like a cargo compartment of a semi-trailer (trailer) without the frame and axles. In Europe, also 7.15 m and 7.82 m swap bodies are used. For transport, this unit is connected to the frame of a special towing vehicle. The legs are lifted up and the item units equipped with the load are shipped to the place of destination.
The shipments with Huckepack, interchangeable vans, and trailers actually represent combined or multimodal consignments. The carrying capacity of such means of transport (cargo compartments) can be used in several ways.

![Figure 4.10 Interchangeable van (Swap body)](image)

The advantages of a swap body:
- Compared to containers, it is easier to find backload.
- No loading mechanisms are needed when loading the body to the vehicle.
- Compared to trailers, they are lighter and cheaper.

Transporting motor vehicles on ferries
The transport of motor vehicles on ferries is important for the truck transport between Estonia and Scandinavia or Finland, also between Estonia and Germany. The car-to-ferry connections take place from the ports of Tallinn City, Muuga, and Paldiski to the ports of Helsinki in Finland, Stockholm and Kapellskär in Sweden, Kiel in Germany, and to other ports. From the point of view of the consignor, car-to-ferry transport can be regarded as a regular road transport, only the goods have to be secured more tightly, the timetables of the ships affect the transport time, and in customs, the name of the ship has to be provided. As a rule, the transport and expedition companies charge for the maritime transport within their price rates, and they communicate with the ferry companies.
The transport of trailers on ferries can be considered a different type of transport. In that case, the interchangeable semi-trailers are carried on ferries without the towing vehicles. There are no costs for carrying the towing vehicles and the driver on the ferry, but the costs of loading and unloading the trailer at the port are added. This type of transport is used by the carriers/expeditors operating regular lines of merchandise who have a partner/agent in the country of destination.

**Huckepack transport**

Huckepack transport represents a means of transport that could be handled in connection with railway transport. Huckepack is a connected type of transport, where the trailer is transported by train for part of the distance (truck-train-truck). Germans use a term **huckepack**, the British use the term **biggypack** and the Swedes use the term **kombitrafik**. For example in Germany and in other parts of Europe, the traffic restrictions and limitations on highways have promoted the development of interchangeable trailers.

For Huckepack transport, **specially built trailers** are necessary. They must have reinforced parts on the frame for lifting equipment.

The idea is to forward the trailer from the port onto the train, where the journey continues on rails. The traffic limitations in German highways are not an obstacle for trailer transport. In this way, the trailer will continue its journey by the railway to the Huckepack railway station located closest to the point of destination. At the station, the trailer will be connected again to the towing vehicle, and the cargo is delivered to its final destination.

Huckepack transport is also called **piggyback transport** and **Circus loading**. These terms come from the United States of America, where the development of huckepack transport started in the 1880s. One of the reasons for the popularity of Huckepack transport might be the world’s political situation in the 1970s, the petroleum crisis and the increase of the petroleum price. Similar situation can be seen now, as the petroleum prices have increased very quickly and the taxes for road usage are increasing in Europe. This situation should give a new push to trailer traffic.

![Photo 4.11 The loading of a semi-trailer to the railway rolling stock.](image-url)
Solutions and transport units used for combined transport on railways:

- Large containers - transport of large containers.
- Huckepack or Piggyback: rolling motorway, accompanied traffic – vehicle/road train on railroad flatcars.
- Huckepack or Piggyback: semi-trailers, unaccompanied traffic – transport of trailers on special railway flatcars.
- Huckepack or Piggyback: Swap bodies – transport of interchangeable vans (contrailers) on railway flatcars.

In cooperation with Estonian Railways, only the first option can be used.
5. Developments on the market of transport services

The role of the goods carrier has changed continuously. As a result of the internationalisation of the world economy, the logistics chains have increasingly lengthened and improved. Logistics itself is one of the main preconditions for a globally successful business. Together with the movement towards a unified world economy, the principle of “global supply” has started to take effect. This refers to the procurement of input from the parts of the world where the balance between price and quality is the best; on the other hand, the main markets of the products are located in highly developed industrialised countries. All this has brought about a significant development and growth of international transport flows.

The companies are reducing the number of warehouses, in order to lower the storage costs, and to direct the released capital into more effective production. Companies used to build large warehouses to ensure availability of products and appropriate service level. With the simultaneous developments in international trade, regarding the simplification of customs procedures and the management of information, a synergy has been found from the merge of cargo flows, resulting in better delivery frequencies (the development being towards a perfect „just in time“ supply).

Since the buyers (customers) of transport services have grown and become more global, the service providers are required to provide global or trans-European services. This in turn has presented new challenges for logistics companies due to which many large forwarding agents have merged and smaller ones focus on niche markets. Suppliers of goods are extremely interested in creation of large-scale logistic networks since the decreased logistics costs also mean lower costs per product unit.

An obvious trend in the transport sector shows that the importance of own cargo transport is diminishing, and that the importance of outsourced services is increasing year by year. The market is developing and the demands for carriers are growing. More services are outsourced and the driver who transports goods by different customers in his or her truckload, needs to provide universal customer support.

Carriage of goods is still based on laws of physics and although when viewed from afar, the transport seems to be quite conservative, also here the changes are inevitable. Shipments become smaller and smaller, the stock reserves are decreasing. Security of provision becomes more and more important for the customers, i.e. the customers want to be sure that the goods arrive on agreed time. The orders are placed with a short notice which demands more flexibility from carriers. Providers of logistics services are involved deeper into the business technologies of the customers and together they develop a specific customer-focused transport scheme consisting of set of different standard services. Correct course of information from the customer of shipment to the carrier is the basis for quality carriages. To that end, the logistics companies integrate their computer systems with customers’ computer systems.
Expectations and developments of freight transport market:

- Improving the security of provision
- Minimising of transport costs
- Diminishing of warehousing related capital
- Speed, i.e. diminishing of supply and transport time
- shorter time between the order and carriage
- Increased number of shipments
- Diminished weight / quantity of shipment
- Improvement of planning and management of shipment and carriage
- Concentration of warehouses
- Diminished stock reserve
- Increased importance of direct transport
- Diminished number of shipments
- Expansion of service range of logistics services providers
- Increased number of outsourced logistics services.

5.1. Outsourcing

Outsourcing is a developing trend in the present world. Business processes have become more complicated and competition in the markets is tighter. This demands from the companies specialisation and focusing on main activities, and this in turn favours widespread outsourcing of supporting activities.

*Four levels of outsourcing the logistics services must be distinguished*

1. PL - First Part Logistics which means in-house logistics service, e.g. transport department for transfer of own goods.
2. PL - Second Part Logistics which means subcontracting of logistics services
3. PL - Third Part Logistics which means outsourcing
4. PL - Fourth Part Logistics which means logistical integration, development and management of logistical processes and logistics chain.

5.1.1 Outsourcing or third part logistics

Third part logistics is mainly referred to when speaking about logistics services, also the term *outsourcing* is used a lot.

*Importance of outsourcing*

The main aim for outsourcing logistics service is to increase the competitiveness of the company, focusing on the principal activity of the company and outsourcing services supporting the principal activities of the company.

Ancillary activities take resources from the development of principal activities. Channelling the company resources (finances, people) to the development of ancillary activities may draw development of principal activities to the background. At the same time the ancillary cannot be left undeveloped since this in turn hinders development of principal business. The principal activity should be developed with
maximum resources.

This also involves inefficient use of investments since investments are made to ancillary activities. Company owners are interested in increased company value or income received per share. Investments to ancillary activities generally mean decrease in productivity of equity capital which actually means wasting of owners’ money. Outsourcing helps several companies spend resources more expediently.

Gains from outsourcing of logistics services should not necessarily be expressed in money. Gains can be reached also by transmitting the problems outside the company, establishing hence basis for fast company development.

Goals of outsourcing:
- [PRIVATE]Better use and/or saving of resources
- Use of service provider’s resources and know-how
- Increasing of customer support level
- Saving of logistics costs
- Wish to focus on own area of activity and expand knowledge of it.

5.1.2 Development trends of transport services

Historically the transport companies have provided cargo services on a desired direction or route by allowing the customers to use the cargo compartment for a fee. Additional income has been received from mixed carriage of customers’ goods.

Traditional services of transport companies include:

- Carriage of parcels
- Carriage of small consignments (terms neo-bulk and grouped goods are also used)
- Less truck and full truck loads.

In order to be in line with customer development and to retain competitiveness, the transport services providers must update their activities and develop the provided services. This has brought about the specialisation and expansion on the freight market geographically as well as regarding the service range.

Development of logistics company’s services are clearly directed towards the best cost-effective service and servicing:

- One stop shopping
More and more complex contracts are entered into, e.g. warehousing with transport service, with customs clearance. Since the customers wish to buy all necessary logistics services from the same company.
• **Speed**
Expectations for shorter delivery time bring about the density of departures and lessening of travel time.

• **Regular scheduled departures**
Demanding customers are not satisfied with the service where sufficient amount of goods are collected and the truck leaves only with almost full cargo compartment. Means of transport departing from the point of origin operating by principle of regular services are mainly used for carriage of parcels and small consignments. Internationally well-known forwarding and transport companies provide scheduled routes for import as well as export of goods. This basically means the scheduled departures of regular transport from terminals. Customers can then take into account the departure of the vehicle at an agreed time independent of the size of the shipment and the actual quantity of load. Generally the departure time from the agreed terminal and approximate arrival time are agreed with the customer. An exact arrival time is generally promised only for buyers of guaranteed time services.

• **Guaranteed-time services**
Guaranteed-time contracts are concluded; this basically means that the carrier will provide financial securities, i.e. when the goods are not delivered on time, the contractual penalties are imposed on the carrier. The amount of contractual penalty is usually equal to the agreed carriage charges (so-called money back guarantee) which in turn is much costlier than an ordinary carriage.

• **Provision of additional services**
Provision of different additional services, e.g. loading of goods, processing of information, placing of goods already to the sales hall, packaging, labelling, etc. In Estonia, the information may soon be delivered by SMS messages in real time (e.g. SMS about task performance is sent, right after the goods have been handed over to the consignee).

• **E-solutions**
Placement of orders and following the shipment status on the Internet. Since the customer of transport service is physically not located near the consignee, the possibility to check the shipment route or its arrival without leaving the workdesk gives great additional value to the physical carriage.

• **Logistics solution**
Logistic processes are observed more broadly by concentrating on finding solutions between optimum service level and minimum costs. Service packets are developed based on customer needs or existing service modules are combined according to customer interests.

• **Partnership – integrated cooperation**
Long-term cooperation contracts are concluded, within the framework of which provision of complicated processes and additional services is agreed. Win-win principle agreements are often made.

**5.1.3 Transport service providers**
There are 2.5 million employees and 18 million trucks in European road transport industry. The market is shared between different agents, i.e. smaller carriers dominate and also the market shares of gigantic groups are relatively small. For example in Europe, the market shares of large companies remain below 3% in road transport. Work division in transport process is versatile and majority of carriers do not sell transport services directly to the customers but either use some marketing and sales company or perform subcontracting. Since the carriage capacity of companies and the goods flows in the market do not always match by schedule, the companies may compete in one sector and perform suitable cooperation in the other sector or at the next time period, which from the point of view of efficient use of means of transport can be very important.

The division of tasks, where one entrepreneur takes the responsibility towards the customer for organising the whole transport process and in turn hires other businesses as subcontractors for a certain section or a route is common in the transport market.

**Changed role of a driver**

More complicated services and expectations of the market present ever more comprehensive demands also to the drivers. The main emphasis is directed towards the customer support. The driver is the representative of the consignor by the customer. Decent appearance and good communication skills are important. It must be kept in mind that in the eyes of the customer, the driver represents himself or herself, his or her company, the customer as well as customer's customer. For example in the work of a distribution vehicle driver, steering forms only a very little part. Market needs more and more additional services like loading and bringing the goods indoors. It would be very nice if the driver who delivers the washing machine, could also connect the machine and set it in working order. Such services demand from drivers the skills and training which are quite different from what we are used to today.

Professional driver knows how to be a cargo-related technical consultant for the customer. In addition the driver also deals with information processing. For example forwarding information about the delivered shipment via GSM-phone.

Generally, the freight transport companies can be classified as:

- **Forwarding agents**
  European largest forwarding companies (DSV, Schenker, DHL, Kühne - Nagel …) mainly deal in the market of grouped goods (shipments less than full truck load) and they have terminal network covering whole Europe.

- **Truck centres**
  The truck centres act as joint ordering centres for several carriers.

- **Private carriers**
  Large private carriers organise forwarding of their goods and transport by themselves, however, smaller ones perform subcontracting works for large carriers or forwarding agents.
There are also several smaller transport companies in the market who serve loyal customers and also take additional orders, keeping in mind their transport capacity. Small companies operate based on family companies and often the combination of entrepreneur as a driver can be found in the market.

- Local specialised companies

Small companies specialising on a certain sector and operating in niche markets.

At present, quite often the market participants cannot be traditionally defined and the competition rather takes place between concepts and services.

See below the common division of tasks in the transport market based on the size of the market.

<table>
<thead>
<tr>
<th>-0.3 kg</th>
<th>-30 kg</th>
<th>-100 kg</th>
<th>-2500 kg</th>
<th>2.5 T -</th>
<th>24 T</th>
<th>over 24 T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letters</td>
<td>Parcel post</td>
<td>Packages</td>
<td>Parcels</td>
<td>Grouped goods</td>
<td>Less truck load</td>
<td>FTR</td>
</tr>
<tr>
<td>Mail</td>
<td>Mail</td>
<td>Couriers</td>
<td>Package systems</td>
<td>Forw. agents Logistics companies</td>
<td>Forw. agents Logistics companies</td>
<td>Forw. agents Logistics companies</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
5.1.4 Freight forwarding

Already from the early years of international trade in goods, the traders themselves have organised the carriage of goods and followed the goods to the destination in order to make necessary agreements on the road and with business partners at the destination. While the merchant was dealing with the shipment and reaching necessary agreements on the route, he or she had to stay away from the main business, often for a long period of time.

Problems of international trade in goods are similar also today.

- How to be certain that the consignee pays for the goods after delivery?
- How to organise carriage of goods?
- How to be sure that the goods do not get damaged during the transport process or in transit?
- What is the fastest possible transport option for goods?
- Who would store the goods in destination, if needed?
- How to handle export procedures – documents, reimbursement of taxes, filling in the statistical reports?
- How to manage the import procedures in the import country (documentation, import taxes, restrictions, etc.)?
- Whose recommendations can be trusted concerning selection of transport routes, foreign agents, international banks?
- What are the requirements and legislation of the transit countries and what kind of documents and taxes could be demanded?

What could be more logical than to find a trustworthy person to whom all these tasks could be delegated? The people who helped traders in choosing the routes, documents and organisation of transport have currently become freight forwarders who have played an important role during the whole history of trade in goods in the global economy being a connecting link between the producers and consumers.

Historical freight forwarders, who helped to formalise customer’s documents, have now become logistics companies providing customers globally with logistics solutions.

In the future, the companies providing courier service for the standard transport price will survive, and the merger of big freight forwarders helps to achieve this goal. At present, control over the pan-European networks, which cover the international transport routes as well as domestic routes is a key to important international agreements.

The role of the freight forwarder is to find the solutions for customer’s logistics problems by using the most appropriate mode of transport or multi-modal transport, i.e. combined mode of transport. Although the customers seek global solutions for transporting their cargo flows, there is still a certain specialisation among the freight forwarders by different modes of transport. Even large freight forwarders who provide
to their customers all services from one place use in-house specialisation since different areas demand very specific knowledge from the freight forwarder.

**Figure 5.1 Related activities of a freight forwarder**

### Role of a freight forwarder in organising international road transport

In addition to transport services, several transport companies have started to provide also forwarding services, basically becoming freight forwarders with means of transport. At the same time other freight forwarders have established office and agent network and outsource all physical transport services from subcontractor. Hence it is difficult to classify the freight forwarders from the point of view of possessing or not possessing means of transport.

The role of the freight forwarder as an organiser of international road transport can vary. Usually the freight forwarders’ tasks are to find the carrier, organise the provision of means of transport for loading, organise export customs, deliver goods to the destination country, organise import customs, deliver goods to the customer (if
agreed so). In addition the tasks may include placement of goods to the terminals during export as well as import, consolidated transport, payment of all export and import taxes, sorting of goods, packaging and also labelling. Freight forwarders may also act as intermediaries between the supplier and carrier; in some cases, it could be organised so that the supplier pays directly to the carrier and separately to the freight forwarder for the service.

The freight forwarder acts as

- An intermediary

Acting as an intermediary means that the freight forwarder does not take the full responsibility for an actual transport but brings together the customer needs and carrier’s possibilities. Carriage contract is concluded directly between the carrier and the customer and the carrier is directly responsible towards the customer. The freight forwarder submits an invoice for a commission fee.

or

- Organises transport on its own name

The freight forwarder gives out on its own name the freight document (consignment note, CMR) and takes the full responsibility for the whole carriage, basically, in case of road transport, the freight forwarder acts as road carrier and is responsible as a carrier towards the customer.

Today’s freight forwarder performs the following functions:

- Organisation of carriages or recommendation of trustworthy transport companies
- Organisation of distribution and collection carriages
- Organisation of formalising or filling in the transport documentation
  - Consignment note, CMR, Sea Waybill, Air Waybill, Bill of Lading
  - Certificate of origin
  - Goods invoices
  - Veterinary certificates
  - Customs declarations
  - Statistical reports

- Organisation of customs clearance

In addition to carriage of goods, transport of cleared goods demands from the freight forwarder also organisation of customs clearance services, brokerage services; the freight forwarders are also able to provide complex solutions by knowing the clearance specifications and being posted with legislation of different countries. Freight forwarders also provide additional services related to customs organisations like for example:

- Formalising the customs declarations (permanent or temporary export-import).
- Paying the customs duties (VAT, state fee, excise duty) in place of the customer.
- Acquiring import licences for the customer, if needed.
- Customs-related consultations (how to get back the payments made in importing of goods) and much more.
• Organisation of carriages and selection of the route. Ordering and organising the transport, i.e. finding a proper vehicle, selection of cargo compartment and loading sequence, coordination of carriers’ work, booking the ferry, etc.
Selection of the best transport route considering the costs, transport time, possible problems related to loss and damage of goods. Often the forwarder has more experience regarding delivery of goods to some region than the supplier. Hence, the forwarder is able to recommend optimum route so that the goods would reach the destination. In case of road transport it is especially important since in addition to the kilometres it is essential to know about the restrictions for vehicle and load which are valid in different countries and about road and customs taxes.

• Organisation of goods handling
Handling and consolidation of goods become possible in case of existence of terminal network. Consolidation means finding an additional value in connecting of goods flows, i.e. directing of goods of different customers through the same terminals resulting in better fulfilment level of means of transport and decreased costs. On request of the customs, the forwarder must enable to check the goods and provide the necessary loading and handling service, accordingly.

• Wide range of services
  o Scheduled shipments
  o Guaranteed-time services
  o Last minute offers or so-called SPOT shipping

• Loading and warehousing of goods
• Provision of additional value services
  o Handling of goods
  o Sticking of labels
  o Sorting of goods
  o Picking
  o Packaging into transport packaging
  o Re-packaging
  o Re-addressing
  o Change of goods documents (e.g. import documents are changed to sales documents and the goods move directly to retail network)
  o Checking of volume and quality of goods
  o Taking examples and samples
  o Cleaning

• Cash on delivery / cash against documents (COD/CAD) delivery term. The service means that the seller of goods has delegated to the forwarder the right to transfer goods only for cash or for a document proving the payment.
• Provision of services related to other carriage of goods or organisation of provision
• Performance of calculations and offers
• Protection of customer interests
The forwarder can protect customer interests also abroad through its agent or partner network who is posted with local laws, prices, state of works and other necessary local information. In case of possible problems, the forwarder protects customer interests and represents the customer in relations with officials, other transport companies, and other organisations. If standing for the customer interests and following customer’s instructions contradict and it is impossible to gain contact with the customer, the forwarder should be able to make decisions itself considering the interests of the customer.

International trade in goods involves trade partners from different countries and organisations related to them. The role of the forwarder is to be a connecting link between the trade partners abroad and at home through its agent network.

The following schema shows the multiplicity of parties:

![Multiplicity of parties](image)

*Figure 5.2 Multiplicity of parties*

*In-house work organisation of freight forwarders depends on the size of the company, its structure and provided services.*

*If in a small company the forwarder deals with finding the customers as well as entering into contracts, conducts negotiations with subcontractors and organises shipments, then in large enterprises the work process is very exactly defined and each person is responsible for his or her segment of work.*
**Example: Service chain of a freight forwarder of systematic carriage of goods**

<table>
<thead>
<tr>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enters into a transport contract with the client, determining</td>
</tr>
<tr>
<td>- the type of sold service</td>
</tr>
<tr>
<td>- schedule</td>
</tr>
<tr>
<td>- conditions</td>
</tr>
<tr>
<td>- additional services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer support</th>
</tr>
</thead>
<tbody>
<tr>
<td>- communicates operatively with customers and partners abroad</td>
</tr>
<tr>
<td>- receives orders and processes the orders in computer system</td>
</tr>
<tr>
<td>- forwards the orders in order to arrange the transport</td>
</tr>
<tr>
<td>- exchanges information during the transport</td>
</tr>
<tr>
<td>- solves current issues</td>
</tr>
<tr>
<td>- settles accounts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planning / organisation of shipments</th>
</tr>
</thead>
<tbody>
<tr>
<td>- selects proper transport scheme</td>
</tr>
<tr>
<td>- proper means of transport</td>
</tr>
<tr>
<td>- selects the route</td>
</tr>
<tr>
<td>- selects goods to deliver in one load</td>
</tr>
<tr>
<td>- appoints assignment to the driver</td>
</tr>
<tr>
<td>- checks performance of the task</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance of carriage of goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>- driver accepts the task</td>
</tr>
<tr>
<td>- driver is responsible for the performance of the task</td>
</tr>
<tr>
<td>- reception for transport</td>
</tr>
<tr>
<td>- delivery of goods to the consignee</td>
</tr>
<tr>
<td>- provision of additional services</td>
</tr>
<tr>
<td>- feedback</td>
</tr>
</tbody>
</table>
6. Formation and costs of road carriage of goods

6.1 Entering the road transport market

Paid road transport is a licensed activity. Road Transport Act regulates the provision of paid domestic as well as international transport services with a vehicle or road train with the permissible maximum mass exceeding 3,500 kg. The aim of the act is to regulate the transport service market to ensure professional and trustworthy provision of transport services for the customer in the market, in accordance with the European Union practice.

Activity licence and licence card of paid road transport
The carrier must have the activity licence and licence card per each used motor vehicle to organise the paid road transport. Activity licence and licence card for paid road transport are issued for organising domestic or international road transport. Activity licence for paid international road transport provides also the right to organise paid domestic road transport.

Issuing of activity licences and licence cards in Estonia
The Road Transport Act prescribes the domestic road transport activity licence and licence card, and the applicant receives the licence card for international road transport from the non-profit organisation with whom the Ministry of Economic Affairs and Communications has entered into respective contract on behalf of the state.

Today this body in Estonia is
- Union of Estonian Automobile Enterprises – as a body for conducting proceeding of domestic road transport activity licences and their issuer, and
- Association of Estonian International Road Carriers (ERAA) as a body for conducting proceeding of international road transport activity licences and their issuer.

To apply for the activity licence for paid road transport, the company must meet the minimum requirements prescribed by the law, which include:

- Requirements to the Statutes of the company where the road transport must be the principal activity
- Have good reputation and financial state Rate of owner’ equity determined by law per each means of transport proceeding from the balance of the company
- Person responsible for carriages. A company must appoint a person responsible for carriages who complies with requirements prescribed by the law and has professional higher education or passed relevant training courses.
- Occupational education requirement of the driver. A driver can work in domestic or international road transport (maximum authorized weight exceeding 3,500 kg) or provide paid transport service as a sole proprietor only when he or she has passed the occupational education course in an educational
instituion approved by the Ministry of Transport and Communications and passed the final exam of such course.

To receive the activity licence for international road transport, the carrier must have worked at least 2 years in a domestic road transport market.

Carriages with no considerable significance from the point of view of the nature and length of the carriage can be organised without activity licence for paid road transport and licence card. The Minister of Transport and Communications establishes the list of such carriages.

6.2 Administration of the truck and calculation of cost price

The aim of the transport company is to gain profit through provision of transport service. The task of transport management is to shape the existing transport capacity into transport service. When to compare road transport with other kinds of production where the production lines or equipment form the means of production, the means of production for road transport are vehicles. The road transport service is formed from the work performed by the means of transport in delivery of goods to the customer. The skill to provide high quality transport service with minimum costs per delivered unit of goods, depending on the travelled distance shows the excellence of transport management.

Carriage charge taken from the customers for performing transport service must cover all vehicle related costs. The aim of calculating the cost price is to find an actual cost price for services provided by the company which covers all costs made for provision of the services.

Below we handle the basis for calculation of the cost price for the automobile enterprise. The transport costs depend on very many factors like vehicle type, nature of work, travelled distance, rate of worked hours, etc. First the cost calculation principles must be determined.

**Costs are divided into two big groups:**

- Fixed costs
- Variable costs.

Fixed costs are related to possession of a means of transport and variable costs to performance or transport work of the means of transport. Hence the fixed costs exist also in case the means of transport does not work.

**Fixed costs of the truck include:**

- Capital costs (depreciation, interest expenses, price of money)
- Insurance premiums
• Transport authorisation taxes
• Garaging expenses
• Administration costs
• Free travel in transit cost

**Truck’s variable costs**

• Fuel consumption
• Lubricant consumption
• Maintenance and repair costs
• Tyre costs
• Variable part of remuneration costs

Variable costs are directly connected to transport operations, i.e. mileage.

**Costs related to obtaining and maintaining of a truck**

• Means of transport and its purchase price
• Profitability time
• Planned period of truck usage, basically depreciation period
• Fuel costs
• Lifetime of tyres
• Purpose and nature of use of the truck and its operating mode

Let’s select a truck for sample calculations. Accessories and supplies are added to the purchase price of the truck. For example the pallet truck is imperative for a distribution truck.

**Yearly mileage** – an average monthly mileage and an average number of working days of a truck are taken into account. An average of 250 working days a year can be considered but this greatly depends on the character of work as well as average distances of transport, etc.

**Useful life (temporal and mileage)**
The useful life means the period of time during which we intend to run certain means of transport and then replace it for a newer one. Useful time depends on the type of the vehicle, yearly mileage, specification of work, region of work. The costing as well as experience is taken into account for determination of useful life.

**Useful life of tyres - km**
From the point of view of costing, the useful life of tyres is determined proceeding from planned mileage, establishment of which is based on experience, statistical basis of the company as well as parameters determined by the manufacturer. Naturally the resource of tyres depends on the state of the roads as well as operating mode. Useful life of tyres can be increased by retreading of tyres. The table below can help to determine useful life of tyres:
<table>
<thead>
<tr>
<th>Vehicle class</th>
<th>Nature of work</th>
<th>Useful life of tyres -km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vans</td>
<td>Urban cycle</td>
<td>30 000 - 50 000</td>
</tr>
<tr>
<td>Light duty trucks</td>
<td>Urban cycle</td>
<td>30 000 - 50 000</td>
</tr>
<tr>
<td>Medium duty trucks</td>
<td>Urban cycle</td>
<td>40 000 - 60 000</td>
</tr>
<tr>
<td>Heavy duty trucks</td>
<td>Urban cycle</td>
<td>40 000 - 70 000</td>
</tr>
<tr>
<td>Medium and heavy duty trucks</td>
<td>Road cycle</td>
<td>60 000 – 100 000</td>
</tr>
<tr>
<td>Road trains</td>
<td>Road cycle</td>
<td>80 000 – 140 000</td>
</tr>
</tbody>
</table>

**Wages and salaries**

The wages and salaries of the company are formed from the payroll with all taxes the company has to pay to the state from employment income. In Estonia, the wages and salaries are formed from the gross salary with added 33.5 % (formed from social tax of 20 %, health insurance tax of 13 % and unemployment insurance tax of 0.5 %). Business trip costs are separately rated.

The number of working hours of drivers usually exceeds the number of hours of using the vehicle by app. 5 - 15 %. This is the time spent by the driver for preparing the vehicle for transport and daily maintenance.

The drivers usually get monthly salary, hourly wages or also the combined versions are used (e.g. basic pay and additional fee for mileage or working hours).

Hence the wages and salaries of the drivers are divided as follows:

- Basic salary (monthly salary)
- Additional fees
- Business trip costs (daily allowance) and driver accommodation costs

**Labour costs** are divided depending on the remuneration principles as variable or fixed costs. For example the basic salary paid to the driver independent of whether the vehicle is working or is in service or how much it works, is anyway a fixed cost.

At the same time, additional fee directly related to performed works, i.e. hours of journey or driven mileage, is a variable cost.

Fixed costs are costs which do not depend on mileage of the vehicle and are present by all means.

**Capital costs** mean depreciation and interest expenses or price of money. Leasing costs belong here. From the point of view of the cost price, all leasing payments cannot be considered as costs. Only the interest expenses can be rated as costs.
Depreciation must be seen as book money put aside for obtaining a new vehicle after the end of depreciation period. Selection of depreciation period must be possibly realistic since the depreciation period is time during which the company collects estimated money for replacing the equivalent means of transport after the end of depreciation period. As per costing, depreciation period should not necessarily match the accounting depreciation period. The cost price of the vehicle is more exact in case of smaller mistake in assignment of depreciation period and actual useful life of the vehicle.

**Insurance premium** – casco insurance of the vehicle, carrier’s liability insurance, mandatory motor third party liability insurance.

**Transport authorisation taxes** - yearly taxes of vehicles, transport authorisation taxes (domestic licence card, CEMT permits, single transport permits).

**Garaging expenses** – parking related costs, depreciation of a garage or parking lot, heating, administration, guarding related costs or paid parking, territory cleaning, snow clearing costs, also vehicle washing costs could belong here.

**Free transit costs** – mileage of a vehicle for which the customer does not pay the carriage charge. Driving to repair, inspection, washing facilities, garaging place when the route starts from somewhere else, or other. It may be approx. 2,000 to 5,000 km per vehicle’s useful life. The free transit cost certainly also depends on the working region of the vehicle, the distances, also whether service is performed in the garaging place or somewhere else, etc.

**Administration costs** – dispatcher service costs, management costs of the company, accounting, communication (except phone expenses of drivers), other overhead costs of the company.

**Fuel consumption**
Vehicle’s fuel consumption depends on the structure of shipments, GVW of the vehicle, nature of work, climate conditions, tyre pressure, order of engine, driving style, etc. The following table shows average fuel costs by vehicle classes:

<table>
<thead>
<tr>
<th>Vehicle class</th>
<th>Fuel consumption litre / 100 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light duty vans</td>
<td>10-15</td>
</tr>
<tr>
<td>Heavy duty vans</td>
<td>14-20</td>
</tr>
<tr>
<td>Light duty trucks, 2-axle</td>
<td>18-25</td>
</tr>
<tr>
<td>Medium duty trucks, 2-axle</td>
<td>22-35</td>
</tr>
<tr>
<td>Heavy duty trucks, 3-axle</td>
<td>30-40</td>
</tr>
<tr>
<td>Light duty road trains, 4-axle</td>
<td>35-45</td>
</tr>
<tr>
<td>Medium duty road trains, 5-axle</td>
<td>40-50</td>
</tr>
<tr>
<td>Heavy duty road trains, 7-axle</td>
<td>45-55</td>
</tr>
</tbody>
</table>

**Lubricant consumption**
Usually the experiential determination is used depending on the vehicle class - 1+ - 17% of fuel consumption.

**Tyre wear**
Following the number, price, and mileage of tyres, the tyre wear is rated per kilometre.

The following formula is used for calculating tyre wear:

\[
\text{Tyre wear (EEK/km)} = \frac{\text{tyre price (EEK)} \times \text{no. of vehicle tyres (pcs)}}{\text{planned durability (km)}}
\]

**Maintenance and repair costs**
Running regular maintenance works as well as need for repair due to normal wear belong to the maintenance and repair costs. EEK per kilometre is usually brought out in cost accounting.

It is considered that during the useful life, the combined repair and service costs form from the value of the vehicle:

- 50-70 % from the purchase price of vans
- 30-50 % from the purchase price of medium duty trucks
- 25-40 % from purchase price of heavy duty trucks and road trains.

This is extremely general statistics depending on the mileage of the vehicle, nature of its work, and the type of roads the vehicle is driving.

It is relatively easy to calculate the service costs of new vehicles since today several year warranties are given and also the manufactures foresee volumes and costs of maintenance.

It would be more correct to calculate the repair and service costs depending of the age and mileage of the vehicle. The repair and service costs should definitely not be divided equally during the useful life. The repair need increases in years and this should also be taken into account.

The **cost price** is received when all the costs are summarised.

**Cost price per kilometre**

\[
\text{Cost price per kilometre EEK/km} = \frac{\text{total yearly costs per vehicle (eek / means of transport)}}{\text{km of paid journey}}
\]
**Cost price per hour**

Cost price per working hour (eek/h) = total yearly costs per vehicle (eek) / working hours (total working hours of vehicle)

**Cost price of the deliveries ( kroons/t)**

Cost price of the deliveries = total transport costs per vehicle (EEK/vehicle) / carried tons

**Price per ton kilometre**

Ton kilometre is an estimated unit indicating the volume of work (unit) performed per transporting of 1 ton of goods to the distance of 1 kilometre.

**Summary**

The most fair measures are received when fixed costs of a vehicle are divided by hours and variable costs are divided by kilometres. Depending on the influence of time factor and mileage factor, it is correct to divide the vehicles as time work vehicles or km vehicles and following that the tariffs should be developed.

The cost price per hour or per km can be reduced when we are able to divide the fixed costs between larger number of paid kilometres or hours. Hence to increase the efficiency, the vehicle should work in 2-3 shifts per 24 hours and the number of paid kilometres should be maximised.

**Example**

If the depreciated cost of a truck during a 10 year period is EEK 1 million, the cost price of the depreciation cost per working hour in case of 8 hour working day is EEK 50, in case of 16 hour working day (working in two shifts) is half of it.

**Task**

Please calculate the influence of a km to the cost price in case of increasing of paid mileage from 300 km to 600 km in a shift when the fixed costs of the vehicle are EEK 2,500 per working day.
6.3 Main economic/technical indicators of the vehicle

Planning, following of efficiency, and measures of the motorpool's production activities

Different vehicles work on different routes and under different conditions passing different distances and transporting different shipments. To assess the productivity of vehicles, different indicators must be made comparable. For that the comparable rolling stocks should be observed. Urban cycle or transport within the radius of 100 km, domestic county route, Finland or Western Europe. These are completely different regions and they differ in used motorpool as well as passed mileage. It is also important to observe and compare comparable reference figures.

The reference figures or measures should reflect:

- Stock of the motorpool (list of rolling stock and operating vehicles), basically how many vehicles of the existing car park are operating and how many are idle. Certainly nobody buys vehicles for non-running today, but for different reasons it may be useful to have a certain amount of reserve vehicles.

- Degree of working time efficiency or use of working time (working time of rolling stock and degree of its use)
  - Mileage of rolling stock and degree of its use
  - Loading capacity and capacity of rolling stock
  - Work results and productivity of rolling stock.

The following operating indicators form the basis for assessment of use of road transport rolling stock:

- Factor of technical readiness of the rolling stock
- Factor of departure to work of the rolling stock
- Duration of working time of the rolling stock on the route (time of being on the route)
- Travelling speed - technical speed \( v_T \) and operating speed \( v_E \)
- Downtime of the rolling stock during the loading works
- Average distance travelled.

Coefficient of using mileage has one of the major effects on the vehicle km cost price and it characterises the ratio of loaded and empty journeys to the total mileage of the vehicle.

**Coefficient of use of vehicle mileage ( \( \beta \) )**

Indicates the ratio of loaded journey kilometres to total mileage. The aim of transport management is naturally to achieve the maximum loaded and minimum unloaded mileage. Coefficient of using mileage can be improved by extensive customer portfolio and presence of products of different levels in the transport portfolio.
\[ \beta = \frac{m_{\text{loaded}}}{M} \]

where

- \( m_{\text{loaded}} \) - loaded mileage in kilometres
- \( M \) – general mileage (km)

Coefficient of using mileage of a vehicle is brought out for the journey as well as the working day.

**Mileage**

- \( M \) – mileage a day or shift (km)
- \( m \) – length of travel (km)
- \( m_{\text{loaded}} \) - laden mileage;
- \( m_{\text{empty}} \) - empty travel,
- \( l_0 \) - zero travel (km) – empty travel of the vehicle from garaging place to the beginning of customer’s route.

Hence the mileage a day or a shift of the vehicle is formed according to:

\[ L = l_0 + m_{\text{loaded}} + l_{\text{empty}} \]

Empty travel in turn is divided into:
- Zero travel – travel from garaging place / parking place to the first loading place
- From the end of the route to the garaging place

To diminish the zero travel, it would be ideal if the first loading place is near the garaging place of the vehicle. The less is the daily mileage of a vehicle, the more significant is the importance of a zero travel. In case of a permanent job the possibility to park the vehicle by the customer is often used. The clients of logistics companies, large wholesale and logistics companies usually allow to park the vehicles of contractual carriers (subcontractors) in their territory.

What does the coefficient of mileage use depend on:
- Efficiency and planning of transport process
- Parking place location (garaging place) nearby the transport route
- Carriage balance – possibility to load trucks in forward as well as return direction
Carriage balance for international transport can be influenced by the import-export balance of Estonian foreign economy by items of commodity as well as countries.

It is not always possible to find the return load. Below are listed carriages in case of which it is usually not possible to find the return load or a special transport technology is used which cannot be used for a different purpose:

- Transport of building materials to the site
- Transport of timber from the forest, transport of round logs
- Dumper carriages
- Transport with tank vehicles

All in all, the mileage use coefficient plays rather big role in formation of a cost price per vehicle's kilometre and hence it is important to bring the percentage of empty travel as low as possible.

**Working time**

\[ T_{\text{working time}} = \text{hours in a working time} \]

\[ T_{\text{travel}} = \text{travel time in hours} \]

\[ T_{\text{doc}} = \text{time for formalising travel documents} \]

\[ T_{\text{lu}} = \text{loading and unloading time (h)} \]

\[ T_{\text{working time}} = T_{\text{travel}} + T_{\text{doc}} + T_{\text{lu}} (\text{if} \ T_{\text{lunch}} > 0) \]

**Technical speed of a vehicle**

We get the technical speed by dividing kilometres travelled per day or per shift by the travel time. Mileage per day is usually rated as follows:

\[ V_{\text{technical}} = \frac{M}{T_{\text{travel}}} \text{ (km/h)} \]

**Vehicle’s service speed** \( v_{\text{service}} \)
We get the service speed when we divide the kilometres travelled per day per one shift with total working time of a vehicle (i.e. in addition to time travelled also the time spent for formalising the documents and loading and unloading).

\[
V_{\text{service}} = \frac{M}{T_{\text{work}}}
\]

When the technical speed characterises the route, road, and traffic conditions (speed limits, traffic jams, etc.), the service speed is a measure characterising influence of non-travel time to the transport process, i.e. time and efficiency spent for loading and formalising documents.

Service speed is also lower than technical speed. Small difference in speed indicates the smoothness and efficiency of loading and formalising the documents or that the activities related to non-travel time are organised more efficiently.

**Factor of using loading capacity \( \gamma \) (payload ratio)**

\[
\gamma = Q \times q
\]

where

- \( Q \) – cargo weight (kg)
- \( q \) – loading capacity (kg)

Use of loading capacity is an important measure in transporting of weighed goods.

Today, the importance of bulk goods in a transport process is considerable and the factor of using rated payload ratio should rather be used because it takes into account also the bulk weight conditions.

**Coefficient \( \gamma_{\text{rated}} \) for using estimated payload ratio**

\[
\gamma_{\text{estimated}} = \frac{Q_{\text{estimated}}}{q_{\text{estimated}}}
\]

where

- \( Q_{\text{estimated}} \) – estimated weight of cargo (kg)
- \( q_{\text{estimated}} \) – estimated loading capacity of a vehicle (kg)
Estimated weight and estimated loading capacity mean so-called calculation of bulk weight.

Use of estimated weight and loading capacity definition helps to regress different variables to one factor and proceed from only rated kilograms. We get the estimated loading capacity when we divide the estimated weight of the load by estimated loading capacity of the means of transport.

In automobile industry the agreed

- Estimated gross weight of 1 cubic metre is 333 kg
- Estimated gross weight of 1 loading metre is 1,850 kg

Freight transport work – carried consignment volume in tons

\[ Q = q * \gamma \]

The freight transport work indicates work performed by the means of transport but does not consider the travelled distance. It is a suitable measure for assessment of freight transport work on the same route or in the same service area of a truck.

Definition of ton kilometre must be used for taking distance travelled into account. Ton kilometre is a freight transport work performed for transporting of one tonne of goods over the distance of 1 kilometre.

**Freight transport work in ton kilometres**

\[ W = Q * m_{\text{loaded}} = q * \gamma * m_{\text{loaded}} \]

Freight transport work can be expressed per travel, day, month or year.

**Productivity of rolling stock – transported volume per time unit (usually transported tons per hour)**

\[ Q_{\text{per hour}} = \frac{Q}{T_{\text{work}}} \quad (\text{tons/hour}) \]

\[ W_{\text{per hour}} = \frac{W}{T_{\text{work}}} \quad (\text{ton-kilometres / hour}) \]
Similar to calculation of loading capacity, it would be more correct to consider also the bulk weight conditions and hence analyse the estimated tons as a measure.

\[
Q_{\text{per hour estimated}} = \frac{Q_{\text{estimated}}}{T_{\text{work}}} \quad \text{(estimated tons / hour)}
\]

\[
W_{\text{per hour estimated}} = \frac{W_{\text{estimated}}}{T_{\text{work}}} \quad \text{(estimated ton-kilometres / hour)}
\]

In case the time factor is more determinant than the fulfilment level, the number of delivered consignments in a time unit is an important indicator. For example delivered consignments / hour is an important measure for distribution transport, especially on urban cycle and transport of small consignments and parcels.

### 6.4 Routes

Route is a journey the rolling stock passes for performing the transport task. Transport cycle – transport cycle with all relevant works.

The following depicts routes with diagrams characterising loaded carriages.

Pendulum routes – routes passed between two points are repeated.

E.g. pendulum route with empty return travel

![Diagram of pendulum route](image)

Used mainly for transporting with special rolling stock (transport of round logs from felling area to store yard, fuel transport with tank vehicle, transport with dumpers in the quarries)
Pendulum route with loaded return travel

Pendulum route with less truck load return travel

Circle routes – routes passed along closed cycles connecting several loading and unloading places.
Distribution and collecting routes during which constant loading and unloading takes place and the cycle is a full cycle.
7. Systematic transport

Direct transport and transport with transhipment
Transport activities are generally divided into two – main carriage for filling the warehouses and local distribution transport of sales offices. Performance of reverse carriage is becoming more and more important.

Reverse carriage means gathering of used products and their transport to reprocessing and through that to recycling of products. In connection with importance of nature preservation and requirements of environmental directives, the role of reverse carriage has become more and more important.

Physical freight transport processes always consist of certain stages:
- Loading and collecting of goods
- Main carriage
- Distribution transport and unloading.

In case all stages are performed with the same means of transport from the sender directly to the consignee without transhipment or intermediate warehousing, it is called direct carriage.

7.1 Transport systems

Systematic transport means transport systems based on terminal networks, distribution and collecting transport in the terminal area, and the main transport between the terminals. Transport systems usually operate based on a schedule. The aim is to consolidate possibly more different shipments for the same route.

The following figure depicts physical processes of the carriage of goods.
Collection of goods
Collection of goods is basically the first stage of transport during which the goods are also loaded. In case several shipments are loaded during one loading, it is called **combined collection of goods**. In case of combined collection of goods the shipments are generally delivered to the first collection terminal where the shipments are sorted and reloaded to the means of transport performing next stages of transport.

Collection of goods is very responsible transport stage where the goods are received for transport, loading and fixing of goods and checking of received goods proceeding from the freight documents. Incorrect procedures of reception and delivery of goods may cause problems and claims for all participants in the transport process.

Terminals
Terminals have an essential role in the process of systematic transport. The aim of the terminals is to consolidate the flow of goods in the transport process. Terminals cannot be mixed with warehouses. When the main aim of the warehouses is short or
long-term warehousing of goods and the warehoused articles of commerce are recorded, the terminal is part of a transport process for consolidating the flows of goods.

**Figure 7.2 Hub**

Source: ECL

Customs terminal is the place for starting or finishing an international carriage of goods and where the goods remain under inspection until import customs clearance. Possessor of customs terminal records the goods under customs inspection and is responsible for the customs. Customs terminal cannot be mixed with customs warehouse where the procedures like purchase or sales of goods can be performed.

**Principal transport**

In transport systems the principal transport means transport between terminals and also from manufacturers for filling the warehouses. Shipments from different customers are transported in the same cargo compartment and a good loading and fulfilment level is achieved and usually they comprise complete or partial loads. Proceeding from that the cost of transport is optimum. Compared to collection of goods and distribution, principal transport is simple. Goods are often transported in sealed cargo compartment and in that case there is no need to perform delivery and receipt procedures of goods. Main transport between the terminals usually take place at night so that the goods can be delivered by the morning of the next day either directly or through the next terminal to the customer.

**Distribution transport**

Distribution logistics means distribution of goods either directly or through intermediaries to the end consumers. Distribution transport usually mean domestic
distribution transport from the central warehouse or within the distribution area of the terminal. At the same time the distribution transport has developed across the borders. Distribution of goods from the central warehouse in Tallinn to the shops in Helsinki or vice versa has become usual.

As the trend is towards diminishing the number of warehouses, the companies try to keep minimum stock, and distribution transport is directly connected to customer support, the expectations and requirements to the service level and quality of distribution logistics and distribution transport are getting higher.

In addition to delivery of goods to the customer, the market is expecting ever more the value added services. Additional services related to distribution transport:

- **Deep distribution** – goods are delivered indoors to the place agreed with the customer and not transferred on the trestle or the cargo compartment of the vehicle. Delivery of goods directly to the sales hall in retail can be an example of this.

- The carrier places the goods to the agreed warehouse without the consignee. For example the carrier delivers goods to interim warehouse, using its own key. Such systems enable even more to increase the efficiency of distribution transport since the time of use of the vehicle can be increased. In addition to ordinary working time, it is possible to deliver goods also in the evenings and at nights.

- **Distribution truck driver** acts directly as the representative of the customer by providing additional services – e.g. replacing a non-working computer monitor at the office as well as connecting the wires to the computer.

- **Consignee** forwards the order for a new lot of goods through the distribution truck driver.

- **Do-to-door service for private persons** – especially in case of white coloured home gadgets and furniture, the warehouse spaces in retail have been diminished and often only the examples are displayed in shops. The goods are delivered from the warehouse directly to the customer.

- **Consolidated distribution** where all cargo flows addressing the same consignee are connected and transported in the same means of transport.

Selection of the most suitable combination depends on:

- Package or peculiarity of goods
- Time guarantee
- Agreements with customers
- Customs related reasons
- Size of the shipment.

Smaller shipments which may come under the definition of small consignment (grouped goods) and parcels are generally transported with trans-shipments through the transport systems.
Larger shipments which fall under the definition of less truck load with estimated gross weight over 2,500 kg in road transport are transported as direct transport and without transhipment. This is a very general distribution and actual transport scheme depends on the costs of transhipment and storage in terminals, transport schedules, system volumes, transport costs on a specific route, etc. Hence the margin of direct transport and transport with transhipment may differ by terminals as well as by routes of the same terminal.

Transhipment is definitely not an aim in itself and it must give either financial or temporal gain. If possible, transhipment should be avoided since each loading increases the risk of damages.

7.2 Systematic transport costs Transport tariffs

The aim of the whole systematic transport is to achieve from consolidation of goods a higher efficiency than it is needed to keep up the terminal. Efficiency of systematic transport depends on several circumstances like correctly built terminal network, cargo flows moving along the system, i.e. whether volumes are sufficient to achieve the synergetic effect. All parties should be interested in efficient system: system administrators, consumers, and also the society. In that case the customers will be able to lower their logistics cost. Thanks to the systematic transport it is possible to load the means of transport better by achieving better fulfilment levels and diminishing the number of half-empty trucks on the roads. This will result in cleaner environment and decreased traffic jams on the roads.

Distribution transport is relatively the most expensive and the most problematic link of the transport system. High transport costs are quite often caused by simple and easily avoided circumstances. Time consuming procedure of conveyance of goods or unsatisfactory state of consignee’s loading trestle can be examples which both make loading difficult and may also cause the damaging risk of goods.

Efficiency of vehicle use is determined by how many hours a day the vehicle can be used. Distribution transport is limited with the working time of the customers and usually the loading intervals requested by different customers tend to match as well. It would be relatively easy to save the costs of all the parties by finding a solution of how receive and convey goods also after working hours.

Fair distribution of costs and formation of transport tariffs

The aim of fair distribution of costs is to generate a correct and competitive price and to balance the service price and quality. There is also a risk that without knowing actual costs, the service can be sold below its cost price in the competition situation.

In case of systematic transport the calculation of cost price is difficult due to multiplicity of parties. One shipment may be in the cargo compartment of 4 to 5 different means of vehicle and pass several terminals at its route. In case of
systematic transport, each shipment is generally calculated separately meaning that if there are for example 25 different shipments in the means of transport, 25 invoices are given to the customers.

At the same time the shipments are of different size, they pass distances with different length in the means of transport, they are unloaded in different stages of the transport cycle meaning that some shipments stay at the cargo compartment for the full day while other shipments are delivered to the consignee already half an hour after loading.

The key issue is how to distribute the costs accurately between the parties of the transport process, to shipments of different size and weight and through the freight money of shipments to the customers.

**Activity based costing**

Production and service processes have become so much more complicated during the last century that when in the industrial society the direct costs of the product were approx. 70-80%, today the direct costs form only 15-20% and the remaining costs are all indirect costs.

Direct costs can be
- material cost
- direct labour costs.

Indirect costs can be:
- overhead costs.

As overhead costs form today approx. 70% of the product costs, fair distribution of costs to different products and provided services is extremely important.

Activity based costing method suits well for precise distribution of costs to services. Activity based costing tries to answer following main questions:
- Is the product/service/customer profitable?
- What is the cost price of the product?

The main difference between the activity based costing and traditional costing is that in case of activity based costing, the basis for distribution of costs is taken to be the causal relationship between the activities and the resources needed for activity performance (people, money, production equipment, time).

**Activity based costing in the process of systematic transport**

Application of activity based costing method is especially important for systematic transport since the systematic transport process can be characterised by multiplicity of parties, activities, and different shipments.
Let’s have a closer look at systematic transport process:

Transport schema:  

Transport system costs can by large be distributed as:

- costs related to the upkeep and use of vehicle and
- costs related to the efficient use of vehicle’s / means of transport’s cargo compartment and transport work.

Costs related to the upkeep and use of vehicle are influenced by:

- Number of working hours  
  Number of working hours per 24 hours is an important indicator from the point of view of fixed costs. If the vehicle begins operating in two shifts instead of one shift, the planned depreciation cost of the vehicle can be diminished by half. At the same time the increasing labour costs and reliability of the vehicle must be considered. Work in several shifts certainly demands newer and more reliable technical equipment.

- Mileage  
  24-hour mileage essentially influences the cost price per kilometre. The greater the mileage, the smaller will be the cost price per kilometre, caused by distribution of fixed costs to larger number of kilometres.

Costs related to the efficient use of vehicle’s / means of transport’s cargo compartment and transport work
Characterised also by economic/technical indicators:

- Coefficient of mileage use  
  Transport management can influence the costs of transport process through route and load planning, achieving mileage with maximum load.

- Balance of carriage balance  
  Carriage balance means the load of the vehicle on forward as well as return travel. In case of distribution trucks which deliver/collect shipments, conveyance and even loads at conveyance/collection transport.

- Efficiency of use of vehicle’s cargo compartment or fulfilment level, indicating the level of fulfilment of cargo compartment.
- Average speed influenced by road and traffic situation, downtime, and speed and loading efficiency.

- Efficiency of goods handling;
  Goods handling by the customer or at unloading and goods handling in terminals must be differentiated. Time and resources spent on loading are considerable and cost-effective performance of loading process is very important from the point of view of the whole transport process. In case of systematic transport, the transhipment must give additional savings to the system, and not increase the costs.

The efficiency of goods handling shows the speed of loading and handling of goods. The efficiency of handling depends on how the loading process is organised and whether the loading process is continuous or there are also interruptions. Delays in loading process may be caused for example from loading queues, also the time spent for searching goods, checking of goods and comparing the goods against documents.

The option to handle shipments with mechanisms and loading conditions in general, like trestles and loading bridges (and the state of these mechanisms) e.g. whether the vehicles can be loaded from the floor surface or from the ground surface, also have major impact to the efficiency of loading process.

**Main physical indicators of loading efficiency are:**
- tons / hour
- cubic metre / hour
- estimated tonnes / hour
- shipments / hour.

All in all the terminal costs are expressed either per shipment or handled goods kg (estimated kg). Taking into account the terminal costs, the administrator of systematic transport can decide on the transport schema. The size of the shipments, reasonable routes and distance for direct transport/transhipment in terminals. This decision may differ by region as well as by terminal or route and it depends on transport and terminal costs.

**Terminal service costs are formed by:**
- facilities, depreciation
- equipment – loading bridges, gateways
- operating costs – electricity, heating, current operation
- equipment costs
  - fuel and repair of hoists
- labour force costs
  - wages and salaries of workers
  - taxes
- overhead costs
and from efficiency indicators:

- terminal’s utilisation factor
  - working hours per 24 hours
  - days a week
- terminal’s fulfilment level
  - Volume of goods m$^2$ per 24 hours
  - handled tonnes (estimated tonnes) per hour
  - tonnes (estimated tonnes) per 24 hrs
  - efficiency of goods reception
  - efficiency of goods conveyance
  - efficiency of loading to and unloading from vehicles (estimated tonnes per hour)

Terminal usually consists of reception and loading area and distribution areas. There is also a separate area for unsold and damaged goods. Depending on the terminal type, shelves for warehousing are usually not used in terminals and the goods are standing on a handling level which enables fast moving of cargo. Fast movement of goods through terminals is important since investments to the facilities are big and skilful use of floor space determines the efficiency of investment. Goods usually do not stay in terminals for more than 24 hours. Terminals with the best goods turnover use 1 floor space m$^2$ twice a day.

Presence of proper loading bridges is important, enabling also to load on the floor level of the terminal.

*Photo 7.3 Goods handling terminal.*
The goods handling terminal depicted on the picture operates on distribution area operating principle. Arrived shipments are sorted by the departure postal code to the distribution areas from where the goods are loaded on the next means of transport. Distribution areas are marked with yellow lines which in addition to information system data, help to assess visually the need for means of transport for departure from that area.

**Process of systematic transport**


The transport schema shows a typical systematic transport process where the first vehicle collects shipments. After that the shipments are reloaded in the terminal to the means of transport for basic carriage which delivers cargo to the second terminal where the goods are again reloaded to the distribution truck.

It is usually a distribution truck based in the terminal area, collecting all orders coming from its service area and bringing the orders to the collection terminal.

Sales and customer support costs, general management and administration costs, and profit margin of the company are added to transport process costs. These costs are usually added to cost price as surcharge.

When speaking about the direct production costs of the transport process, the costs can be divided as general and on the accrual basis as follows:

- time-based measures
- shipment weight and size based measures.

Transport costs are formed in a combination of time spent on different activities and used resources.

**Transport tariff of a shipment on systematic transport is formed by costs made in each section of the process, including:**

- costs related to loading (EEK/shipment)
- transport cost related to collection of goods (EEK/kg)
- transhipment cost in departure terminal (EEK/kg)
- basic transport cost (EEK/kg)
- transhipment cost in receiving terminal (EEK/kg)
- distribution transport costs (EEK/shipment)
- costs related to unloading and delivery of goods (EEK/shipment).

Administration cost, customer support and management cost, and company’s profit are added.
If the carrier sells the cargo compartment of the means of transport, the kilometre or hourly price is usually agreed upon; in case of systematic transport, there are tariff tables which may have different structure and principles.

**Example**  Tariff table 1

Transport tariffs for door to door carriage and parcels and small consignments with estimated weight of 2,500 kg

<table>
<thead>
<tr>
<th>M³</th>
<th>Area 1</th>
<th>Area 2</th>
<th>Area 3</th>
<th>Area 4</th>
<th>Area 5</th>
</tr>
</thead>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 -</td>
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</tr>
<tr>
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<td>143</td>
<td>213</td>
<td>143</td>
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<tr>
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<td>550</td>
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<td>625</td>
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<td>988</td>
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<td>682</td>
<td>1035</td>
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</tr>
<tr>
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<td>6,76-</td>
<td>389</td>
<td>760</td>
<td>1131</td>
<td>760</td>
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</tbody>
</table>

Freightage is calculated according to the estimated weight of the shipment, using the delivered area column.

For example, according to the tariff table 1, we calculate the freightage of 1 EUR pallet with gross weight of 300 kg for transport to area 5. Since the gross weight is smaller than estimated weight, we find the freightage according to the estimated weight. Estimated weight of 1 EUR pallet is 740 kg.
Tariffs are given for each shipment, hence we find the freightage from 740 kg line in column Area 5, from the range of 700 - 799 kg.

The result – freightage of the shipment is EEK 771.

Example Tariff table 2

Tariff table based on travel distance and consisting of components on the basis of the transport schema: Collection of goods – terminal handling – basic transport – terminal handling – distribution transport

Goods handling costs in terminal included in transport tariff calculations.

<table>
<thead>
<tr>
<th>M³</th>
<th>Collection of goods</th>
<th>-100 km</th>
<th>-200 km</th>
<th>-300 km</th>
<th>Distribution transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEK / shipment</td>
<td>KG</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1   -</td>
<td>26</td>
<td>112</td>
<td>157</td>
<td>204</td>
<td>29</td>
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<tr>
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<td>115</td>
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<tr>
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<td>851</td>
<td>1107</td>
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</tbody>
</table>

For example, finding the freightage for the shipment with the gross weight of 1,000 kg, consisting of 1 EUR pallet, from point A to point B over the distance of 150 km.
First we determine the estimated weight of the shipment. Since the estimated weight of one EUR pallet is 470 kg, we take the larger indicator - gross weight. Tariff calculation must consider the transport schema. Since the terminal handling charges are included in transport tariffs, the freightage is formed from three components:
Collection of goods – basic transport – distribution transport.
Transport tariff is formed by summarising the tariff from shipment weight category line.
Freightage = 114 + 700 + 125 = 939 kroons

The door to door price lists are easier to understand, however, the advantage of tariff table consisting of several components is that the freightage for combined (consolidated) shipments can be found rather easily. For example, in case the same sender sends goods to several consignees in the same distribution terminal area, the tariff table consisting of components enables to view different shipments during collection of goods and basic transport as the same consolidated shipment, and only during distribution transport find separate freightage for each shipment.

Example Tariff table 3

<table>
<thead>
<tr>
<th>KG</th>
<th>M³</th>
<th>Area 1</th>
<th>Area 2</th>
<th>Area 3</th>
<th>Area 4</th>
</tr>
</thead>
<tbody>
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<td>37</td>
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</tr>
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<td>45.05</td>
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<td>60.06</td>
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<td>8</td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>

Tariffs are indicated per 100 kg of estimated weight. To calculate the freightage, the 100 kg tariff must be found from the destination area column and the freightage must be calculated based on estimated weight of the shipment.

For example the freightage for a shipment with the estimated weight of 6,000 kg to area 2 is found based on tariff table 2 as follows:
6000*16/100 = 960 kroons.

Transport tariff is developed based on cost price. Naturally the transport tariffs are influenced by competition and general market condition, the fact which makes an efficient actions of all parties in the transport process even more important. Transport process efficiency also depends on geographical and economic policy factors, e.g.
- Population concentration person/km²
- Concentration of industrial enterprises
- Density of road network km/km²
Hence the costs and transport tariffs for the same travel distance in different regions may be essentially different.

For example, the efficiency cannot be compared in the city of Hamburg and in Finland, where people and companies are located between two loading points in low density area and more kilometres must be travelled. This is also valid for Estonia. For example, the distribution transport costs in Tallinn may vary almost 50% depending on the area, traffic conditions, and customer density per km².

Since the costs continue growing and it is not possible to directly increase prices because of this, the service provider must still manage profitably by providing sustainable service, the only way to ensure development is to keep continuously contributing to the growth of efficiency which is also in the interest of the buyers/customers of the service.

Possibilities for freight transport customers to raise efficiency:

- Flexible working time
  Long hours for goods reception or a chance to transfer deliveries without the consignee being present
  If the consignees enable goods reception, for example, before the beginning of the working day, this will also enable to avoid rush hours and operate the means of transport for more hours a day.

- Decreasing of loading times, documents formalising, and waiting times
  - Reasonable and fast loading procedures
  - Improvement of loading conditions which enable fast loading and using mechanisms during loading

- Proper package and labelling
- Precise order information.

Possibilities for carriers and systematic transport to raise efficiency:

- Selecting the most suitable means of transport
  Finding the means of transport suitable for a specific route with minimal maintenance cost and maximum load on that route.

- Properly built transport network
  Optimum number of terminals and proper terminal locations and handled cargo flows. Since additional handling of goods always involves increasing risk of damaging goods and certainly each additional handling is also a cost, hence the transhipment in terminals must give considerable savings in transport process.

- Production based on schedule
  Cargo trucks depart to the routes/regions at agreed departure times, i.e. each shipment is not transported separately, but different shipments are consolidated in order to achieve better fulfilment levels. Transport management based on schedules enables to perform pre-planning and pre-sorting of cargo flows. This also facilitates order reception and sales process.

- Preparing the optimum transport schedule
When the cargo flows are not sufficient for servicing a specific region, it is reasonable make the schedule sparse.

- **Balance of carriage balance**
  Even cargo flows in both transport directions enable to improve the mileage use coefficient and hence to lower costs per transported unit.

- **Combining of cargo flows**
  Systematic handling of large volumes enables to diminish the overhead costs of transport system and use mass production technology which in turn diminishes management costs. Instead of planning or organising each shipment separately, the shipments are consolidated.

- **Standardised services can be managed easily and make selling services and production simple.**

**Summary. Monetary measures for cost price and efficiency of systematic transport.**

1. Management efficiency of means of transport/profitability of the vehicle.

2. Line and route efficiency/profitability

3. Customer’s profitability which expresses the proper service price formation and excludes serving one customer on account of other customers.

All in all performance of systematic transport is not a goal in itself but the transport systems are becoming an important part of today’s transport world. When handling big volumes systematically, the transport systems can provide services at competitive cost level, based on the market developments.

**8. Handling of goods in transport process**

**8.1 Package and labelling**

It is difficult to underestimate the role of packages and labelling in transport process. Packaging is the obligation of sender and the cargo should be packaged considering its type and agreed mode of transport so that the cargo is protected against damages and loss and does not cause any damage to the carrier.

Goods packaging
Packaging Act classifies packages as sales packaging, grouped packaging and transport packaging.

The aim of the sales packaging is to preserve the proper form of the products and at the same time it bears important marketing function so that the product would be in original state, of high quality, hygienic, unspoilt, and attractive for the customer. In addition the sales packaging must give to the buyer information about properties and content of the product, established by the law, so that the consumer could select a proper product.

Transport packaging is an additional packaging used for transporting sales packaging and grouped packaging, intended for avoiding transport damages and facilitating the handling of goods. Filler is also considered to be packaging as it is used together with the packaging for ensuring the transport safety.

For the purpose of the Packaging Act, road, railway, marine, and flight containers are not deemed as transport packaging.

Packaging has an important role to ensure that the goods arrive in undamaged condition and to preserve products original state, unchanged in volume as well as quality, and unspoilt during the whole transport chain. During the transport the goods are exposed to different trouble: physical load, impacts, pressure, compression, vibration, tilting, falling, humidity, several smells, strange substances, etc. Load affecting the product can be diminished by the means of correct packaging and packaging material.

Packaging planning must consider the following:

- Product properties (size, weight, structure)
- Handling methods used in different loading and unloading spots
- Carrier’s requirements
- Insurance companies’ requirements
- Wishes and demands of buyers
- Legislation
- Possibility of recycling

Packaging must also consider the environmental impacts and laws of physics. The vapour content in the air may vary from almost non-existent to 100 % relative humidity. Also the temperature has decisive impact, as well as mode of transport and the route. Conditions of sea freight transport differ from road transport. When the ferry has loaded the shipment in winter time in some cold port, and heads towards the warm seas, the steel structures of the ferry warm up fast to the sea water temperature and the load warms up much slower. So the load is colder than the outdoor temperature and the vapour condensates on the surface of the load. The generated condensate may damage goods. Such situation is dangerous at places with fast fluctuation of temperature.

On railway transport, the temperature of the railway carriage is an average the same as outdoor temperature, perhaps a bit lower due to ventilation. Temperature and pressure fluctuations at flight transport take place during take-off and landing. Since the temperature inside the plane is permanent, the impact of climatic conditions is small. Aerosols form an exception as there may occur problems during air transport.
Temperature fluctuation have also dangerous impact on several goods like electronic equipment. Especially when sudden changes in temperature involve accumulation of humidity. There is more humidity during sea transport which presumes moisture-proof packaging of shipments.

Environmental impacts for packaging cannot be excluded. The conditions to which the packaging is exposed to during transport must be considered.

Damages due to climate during the transport and loading are caused by the following circumstances:

- high or low temperatures
- humidity
- interaction of high temperature and high relative humidity
- fluctuation of temperature and humidity
- rain, mist, dew, snow, and other.

**Packaging costs**

Packaging is also an essential cost article expressed separately as a logistics cost. The shorter the carriage, the larger is the importance of packaging cost in freightage and the carriers often see how savings made on account of the transport packaging will result in damaged goods not compensated by the insurance companies referring to the poor packaging. Percentage of packaging costs can be from one per cent to tens of per cents according to the quality of the product.

Insurance companies have been dealing the most with the packaging issues and they have developed requirements about conditions to which the packaging must measure up to, in order to get compensation for possible transport damages.

In case of more complicated cases it is reasonable for the sender and carrier to find in cooperation the most proper transport technology, packaging, and way of securing. Cooperation with insurance companies upon packaging planning is quite frequent since in case of loss event, one reason for rejection of the claim is insufficient packaging or wrong loading. In case of disputes between the carrier and the sender, whether the packaging corresponds to packaging requirements, it is reasonable to address the independent expert for obtaining an assessment.

Goods packaging must enable carriage of goods together with other goods, stacking, and securing with load securing straps. The packaging must also ensure steady loads until destination and exclude shifting of the centre of gravity of the load.
The task of the transport packaging is:
- protection of goods against mechanical load (impacts and shaking)
- avoidance of theft and diminishing of loss
- facilitation of handling and loading
- protection against environmental impacts, incl. climate conditions like humidity, cold, and corrosion.

Labelling
The carrier should not generally accept goods for transport without proper labelling and packaging. CMR convention also handles the damages caused by insufficient labelling as the responsibility of the sender. At the same time poor or insufficient labelling may often cause delay in transport or delivery to the wrong customer. There may also be situations where the goods have several labels, and it is not possible to identify the address of goods to be delivered. Senders must see that the wrong labels are removed from the goods.

Labelling must be clear and unambiguous. Role of labelling is especially important on systematic transport where the loading process is performed based on labelling.

Each packaging unit must be labelled by the sender and contain clearly readable information for identification of the shipment with the following data:
1) sender and its address
2) consignee and its address (incl. zip code)
3) internationally recognised warning signs
4) warning expressed in words
5) weight of packaging unit
6) number of packaging unit
7) dimensions of packaging unit

Illustration 8.3  Example SSCC (Serial Shipping Container Code) in transport mark conforming to standard EAN
(International Article Number)
Above specified labelling contains a unique number for each packaging unit according to which it is possible to check the movement of the packaging unit in the transport chain by reading the bar code.

**Special labels**
Use of special labelling of goods is of great importance. Special labelling or instruction of how to handle goods must be definitely used on goods which require special handling.

*Example* Labels of dangerous goods

<table>
<thead>
<tr>
<th>Explosives (class 1. 1.1-1.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Explosives Label" /></td>
</tr>
<tr>
<td>1.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gases (class 2. 2.1-.2.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Gases Label" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flammable liquids (class 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Flammable Liquids Label" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flammable solid (class 4. 4.1-.4.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Flammable Solid Label" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oxidiser (class 5. 5.1-.5.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Oxidiser Label" /></td>
</tr>
</tbody>
</table>

*Example*
The customer has ordered freight for cold-sensitive goods. The carrier has been informed and there is relevant mark in the freight document but there is no label on
the packaging and the terminal worker loads the goods to an ordinary tent trailer. The goods are spoilt and the sender is responsible for the damaged goods.

*Example*  Labels used for handling of goods according to standard ISO 7000

- Keep upright
- Handle with care
- Keep from direct heat
- Lifting place
- Keep dry
- Centre of gravity
- No hand trucks here  Stacking limitation by weight
- °C max
- °C min
- Temperature limits
- Direction for lifting with gripper
- Do not roll

Max … kg
Packaging and freightage
Packaging must enable carriage of goods with other shipments hence the shipment cannot damage other goods or the vehicle. It must be possible to load other goods in the extent of the whole cargo space if there is no full load and it is not agreed otherwise. If not, the freightage must be paid for the use of the whole cargo compartment.

The carrier and the sender calculate the gross weight based on the volumes of transported goods, on the basis of loading metres or volume (m³). From the point of view of efficient use of the cargo compartment, the goods should be packed in a way that it would be possible to stack the products to the whole extent of the cargo compartment or that the packaging would enable to load other goods. Freightage generally depends of the simplicity of handling of goods or whether the goods are packed on pallets which can be loaded with mechanisms, or whether loading is performed totally manually.

Packaging Act
The aim of the Packaging Act is to establish requirements for the package and use of the package. The aim is to favour the circulation or recycling the packages or packaging material, in order to diminish formation of waste from used packages and harmonise the requirements for package and the use of the package with international requirements.
Lately it has been started to pay attention to destruction and reuse of packaging materials after use. The law also establishes the responsibility of the package owner for environmentally safe destruction. Preference and pressure is through on recycling. Hence the law establishes responsibility for the packaging to the sender i.e. owner of the goods.

Pallets
Pallet is the most widely used way for handling goods in ordinary goods transport. Use of pallets enables to use several auxiliary equipment for facilitating the goods handling: pallet trucks, carts, tailgate lifts on distribution vehicles. Thanks to the simple handling in transport process, it is possible to transfer goods fast, shorten the loading times, and facilitate goods handling. Also from the point of view of costs, it is important whether the goods are packed on pallets which can be loaded with mechanisms or manual loading should be applied.

Wooden or plastic pallets are used mainly. Plastic pallets are meant for food, pharmacy, chemical and heavy industry where cleanness and durability are important. Non-packaged food items cannot be in contact with wooden pallets (but wooden pallets are cheaper than plastic pallets). Since the plastic pallets can primarily be characterised by the large number of usages and high price, they are suitable only in closed logistics systems (e.g. between manufacturer and the shops marketing its products).

In Estonia, mainly the EUR (800*1200 mm) pallets are used. Half pallets (600x800 mm) and FIN pallets (1000 x 1200 mm) are also used. In addition specific pallets for handling specific goods. Pallets are divided into certified and non-certified pallets.
Certified pallets conforming to standards are manufactured by trustworthy manufacturer and comply with specific parameters and are respectively marked.

Use of non-certified pallets have risks to some extent since one cannot be sure that certain pallet parameters conform to requirements. Due to the cheaper price, the use of non-certified pallets is more common in domestic goods exchange. Loading of heavy goods on non-certified pallets and using non-certified pallets for storage should certainly be avoided. There have been cases where the use of non-standard pallet has caused falling of goods from the warehouse shelf.

*Photo 8.3 Standard pallet with EUR mark*

Pallet is part of packaging and since European and Estonian legislation both define unambiguously that the sender is responsible for recycling of packaging, it is important that the agreement about how the goods are packaged and which pallets are used should be made already during purchase/sales. It is also important to agree what becomes of the pallets after delivery of goods. Generally the responsibility for pallet return and registration of pallets is not put to the shoulders of the carrier. Pallet is part of transport packaging in transport process. Pallet is needed for goods handling. Pallets returned to the consignee should be labelled with consignee related labels and reception and delivery for transport should take place in the same way it is done with the goods.

Since pallets are relatively expensive packaging, the buyer and seller of goods agree on the type of pallets to be used and the procedure for their recycling and the party being responsible for this and also for the incurring costs.

**Pallets with a collar**

Pallet with a collar is a safe transport packaging which basically excludes damages to goods during transport as well as thefts. Veneer boar placed on collars enable to load goods in several layers.

Disadvantage is its high price. Collars are returned as folded.
**Cage containers**

Cage containers with steel elevation enable to stack goods higher.

**Rolling containers**

Rolling containers are mainly used for transport of necessities to the shops in order to save the cargo compartment space and pick small consignments in several layers, saving cargo compartment space and through that also saving up freightage. Pallet tuck is not needed for moving rolling containers. In case of missing return transport, some types can be fitted inside each other. It is not as universal packaging as a pallet and hence needs customer-side registration.
8.2 Load planning Loading and securing of goods

In addition to transport organisational load planning which considers optimum routes, sequence of loading and unloading, etc., much care and attention should be paid in physical stowing of goods to the load. Badly prepared load is a danger to road safety, the lives and the health of people as well as the vehicle and also goods.

Load securing is especially important when the route also includes sea transport. In that case the requirements of shipping companies for loading and securing must be considered as well. Hence it must always be considered that the load is supported and secured according to the requirements prescribed for the type of transport.

Forces affecting the load
Laws of physics and forces affecting the cargo must be considered upon planning and securing of loads. The cargo is affected by longitudinal forces which are strongest in sudden stopping, emergency breaking or in case of a collision. Lateral movement occur on sudden turning, driving on rough roads or emergency breaking and in case of traffic accident.
Effect of vibration and sinking of a load which in turn involves sagging of lashing.

The driver must check the securing of the load during breaks and it is also mandatory to check the securing of the load after a sharp turn or sudden stop.

The permitted load capacity and axle loads must be taken into account when planning the load. The general rule is that the heavier shipments are placed underneath and lighter ones on top of them.

The following must be considered upon loading goods:

- securing of goods, loading and unloading requirements
- placement of shipment
- centre of gravity
- axle loads
- loading sequence
- special conditions of goods.
Loading capacity and gross vehicle weight restriction
Loading capacity of the vehicle is determined by the manufacturer. Gross vehicle weight restrictions and additional restriction on roads of the route valid in different countries must be considered.

Axle loads
Special attention must be paid upon partial unloading of shipment. The load is in balance in case of a full load and the axle loads are within limits. The GVW diminishes upon partial unloading, however some axles might need endure larger load than allowed. In that case, besides the unloaded goods, the remaining shipment must be relocated to achieve the allowed load on axles.

Centre of gravity of the cargo
The lower is the centre of gravity, the steadier is the vehicle. High centre of gravity may cause the rollover of the vehicle. Care must be taken when loading the goods with high centre of gravity and special attention must be paid to securing. Goods with high centre of gravity are marked with relevant symbol.

Securing
To avoid moving and rollover of the cargo, different load securing equipment is used; the most common are the load securing straps. Load securing straps must definitely conform to the prescribed requirements and they cannot have any damages or ruptures. Use of damaged load securing straps may cause falling apart of the cargo.

Load securing straps are most wide-spread means for securing loads

Illustration 8.9 Load securing straps

In addition to load securing straps also the chains and ropes are used
Specific loads
In the context of the contract of carriage, the separate agreements should not be mixed with specific loads determined by the law. The special permit must be applied for transport of large and heavy cargo following the Regulation of large-scale and/or heavy motor transport. Special permit must not be applied for when the width of the load does not exceed 3 m (under condition that vehicle’s width does not exceed 2.55 m) and/or the marked cargo does not exceed more than 2 m forwards or backwards of the vehicle.

Responsibility for loading and securing of the loads
Problems with sharing the responsibility in loading and securing of the loads are not rare. The rules for loading and securing of the loads must be taken into account during loading of the goods. The goods must be loaded and secured in the load so that they do not get damaged during transport and that the road safety is ensured. International agreements determine the responsibilities for securing of goods in case of different modes of transport. Insurance companies and shipping companies have their own certain rules.

Loading order in Estonia is regulated by the Regulation of the Minister of Transport and Communications “Rules for loading and securing of cargo on road transport” which determines that:
- sender must ensure the appropriate loading and securing of the cargo.
- Driver of the vehicle must check the securing of the cargo before starting the delivery, soon after departure and from time to time during the transport, especially after a sudden stop or turn and, if needed, tighten the cargo.
- Before starting the delivery, the driver is entitled to demand from the sender to eliminate the mistakes made during loading and securing.

Hence the sender is made directly responsible for loading and securing of the load. The sender must load and stow the cargo for safe transport. It is assumed that the
sender should also unload the cargo. The carrier is obliged to create a possibility and conditions for safe loading and unloading. The carrier receives the cargo for transport and is responsible for it during the transport process. When the driver is participating in loading process, the sender will be responsible for it.

**Loading**

Loading covers loading and unloading of shipments.

Loading means loading of a shipment to the truck at loading place, correct stowing and securing in the load.

Unloading means unloading the shipment from the vehicle and stowing the shipment next to the vehicle or to the trestle or the distance of up to 6 m.

**Obligations of the driver on receipt and delivery of goods**

The carrier is obliged to give the ordered means of transport at the agreed place and time and be immediately ready to start the carriage. The means of transport must be clean, technically operating, suitable for transporting the given cargo and loadable in ordered volume.

The distribution trucks supplied with pallet trucks and manual carts for handling parcels and white goods is usually used for parcels and small consignments.- The carrier shall usually load the parcels and small consignments.

Loading of partial and full loads is usually handled by the sender with the help of the loading equipment and tools which belong to the consignee or sender. The driver is obliged to be present during loading, intermediary loading, and unloading. The carrier must see that the rules for loading and securing are performed. The transport manager must be immediately informed about any possible deviances during loading, this must happen before signing the consignment note, and a relevant note must be added to the bill of lading.

**Loading conditions**

In order to organise loading as reasonably as possible, elementary conditions must be present in the loading spot.

It seems natural that loading cannot be performed in thick snow and that a pallet cannot be moved on a bumpy surface up- or downhill. Loading procedure is also directly connected with traffic culture. When the passenger cars are parked in front of the loading bridge, it is not possible to load.

Hence the conditions to be fulfilled for performing of loading procedure are defined next:

- normal access to the loading stop is ensured for the means of transport
- means of transport is able to stop for loading
- loading area
  - has solid cover and smooth surface
  - has no slope
  - is without steps
- cargo compartment is in the range of vision during loading; safety of the cargo
compartment and other shipments in the cargo compartment is ensured.

**Loading times**
The carrier may request separate compensation for the time spent for loading or unloading only when the reasonable loading time is exceeded. At present in Estonia there are general road transport conditions which also fix the maximum loading times depending on the size of the shipment:

<table>
<thead>
<tr>
<th>Shipment weight</th>
<th>Maximum loading time</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 99 kg</td>
<td>Up to 10 min</td>
</tr>
<tr>
<td>up to 2,500 kg</td>
<td>Up to 20 min</td>
</tr>
<tr>
<td>up to 5,000 kg</td>
<td>Up to 30 min</td>
</tr>
<tr>
<td>up to 10,000 kg</td>
<td>Up to 45 min</td>
</tr>
<tr>
<td>Over 10,000 kg</td>
<td>Up to 45 minutes per each tonne</td>
</tr>
</tbody>
</table>

In case of not sticking to the loading times, the driver has to make a remark on the delivery note which must be approved by the sender / consignee and the transport manager must be immediately notified.

Maximum loading times are specified above and although the carrier has the right to demand compensation for exceeding these times, the received additional money does not cover the income not received for unperformed works and quality problems occurring due to resentment of customers not served. Hence the parties should organise their work so that the loading times would be kept minimum.

**8.3 Reception of goods for transport and delivery to the consignee**

Large material values are received, delivered, and handled during the transport process. To avoid the claims, the delivery/reception procedures must be correctly performed. Responsibility of the driver upon reception of goods is very high and with correct activities the driver can eliminate possible further claims when receiving the goods.

**Reception of goods for transport**
The driver receives the goods for transport, checks the volume of goods, packaging and conformance to the consignment note, and signs the bill of lading. When the means of transport for carriage is sealed, the driver checks the order of seals and receives the sealed trailer. The driver is obliged to check the order of seals and the impresses and make a remark about the number, impress and order of the seals to the consignment note. The driver must enter data of all seals to the consignment note.

The driver is obliged to act as a representative when receiving goods from the sender or delivering goods to the consignee, follow the conformance of quantity to the consignment note, and demand unambiguous writing of a name, signature, date,
arrival and loading time, and if possible, a seal impress, to the consignment note from
the consignee, in order to verify reception of goods.

If the goods or packaging have visible damages or it is impossible to check the goods
and its quantity, the driver is obliged to inform immediately the transport manager
about it and make a relevant remark on the bill of lading. Remarks on the bill of
lading must be approved by the consignee/sender.

The driver must check the following when receiving goods:
• Conformance of the goods to the freight documents
  During the goods check, the driver must assess whether the goods are the ones
  that have been ordered or when detecting essential differences, he or she has the
  right to refuse from performing the task. When the differences do not disturb
  performance of the task, the driver receives the goods for transport and makes
  respective remark to the freight documents.
  The freightage also depends on the size of the shipment. Hence the transport
  company may lose planned income due to careless reception procedure.
• Number of packaging units
  The packaging unit is the smallest unit for which the carrier takes responsibility in
  the transport process. Transfer of responsibility from one link to another during
  the whole transport process is based on the number of packaging units
• Condition and sufficiency of packaging
  In the fear of further possible claims or blames the driver must check the condition of
  the packaging. When detecting of deficiencies or damages, the remark must be made
  to the bills of lading or the driver may refuse from receiving the goods for transport.
  The driver must also assess whether the packaging is sufficient for the respective
  goods in order to soundly deliver the goods to the consignee.

The carrier signs the bill of lading, verifying that he or she has received the goods for
transport. When there are no remarks on the bill of lading, it is presumed that the
shipment and its packaging was externally in good condition upon reception and that
the number of packaging units and their labels conform to what’s written on the bill of
lading. The carrier may enter a reasoned remark on the bill of lading which shows that
the marked data can be checked. When the carrier does not know the condition of the
carrier (e.g. was not present during the loading), he or she must write relevant remark
on the bill of lading. When entering the remark, the carrier is not responsible for
possible damages.

The carrier should check the quantity of received goods. The sender usually declares
the weight and volume of the shipment or used loading metres of the cargo
compartment.
The driver usually assesses the correctness of presented data. When failures are
detected, relevant correction must be made to the freight documents which both
parties sign.
In case of doubt, the driver must check the gross weight, quantity or on request of the
sender, also the content of the shipment. The carrier can seek from sender
compensation for checking activities.
Example
The sender ordered transport for the goods on two (2) EUR pallets from the carrier. The vehicle arrived to loading and actually the goods was packed on three (3) EUR pallets.

What are the risks for different parties?

The driver may refuse to load the third pallet referring to the lack of space in the cargo compartment. When the driver receives the goods for transport, corrections must be made to the accompanying document about the packaging units as well as quantity of goods. In case the carrier receives goods for transport and does not make any corrections, the carrier is responsible only for two pallets. The carrier also does not get the carriage charge for one pallet.

Example
The sender and the carrier have agreed on the price of running metre of hanging garments on transport of hanging garments. When the sender sends unpacked articles of commodity (clothes hangers) to the multipack, the carrier may present an invoice according to the price offer for transport, as well as according to a separate agreement to pay for counting the commodity items or reception the items for transport for which the carrier must receive compensation.

At the same time, the carrier usually does not have means to perform any checks. In practice, this clause is solved as follows. If the carrier has suspicions about the gross weight of the shipment during transport, i.e. the data of the sender on the consignment note do not correspond to actual weight, the shipment is weighed in the terminal or in case of larger quantities the vehicle drives over checkweighing weight. Relevant report is formalised about weighing and if the suspicion is justified, additional invoice is submitted to the sender for additional work as well as for freightage not received, also possible fines for exceeding the load capacity or axle load.

Main mistakes made during reception of goods:
- goods with incomplete packaging are received
- conformance of actual packaging units to freight documents is not checked
- visible damages on packaging or goods are not put in writing
- the driver is not allowed to observe the loading but relevant mark is not made to the freight documents

Delivery of goods to the consignee
The consignee and the carrier must compare the quantities of goods written down in the freight documents to actual quantity of goods and number of packaging units. External damages must be fixed immediately and relevant mark should be entered into the consignment note. The remark must be certainly entered into both copies of the consignment note, one for the carrier and one for the consignee. To verify the delivery of goods, the customer must enter into the consignment note with a readable handwriting the name, signature, date, and time.
If the consignee refuses to receive goods, does not stick to the loading times, or the volume and quality of goods does not correspond to the consignment note, relevant mark must be certainly made to the consignment note and it must be approved by the customer’s signature.

Delivery of goods to the consignee is a very responsible task for the carrier since for example, transfer of goods to the wrong consignee is interpreted as intentional activity. The carrier must identify the correct consignee. However, asking for a passport is not a very common custom in freight transport and generally, the correct consignee is considered to be the one on the address indicated in the consignment note and the goods will be delivered to the employees of that company. Usually this kind of problems do not arise, but the carriers ask the name of the consignee of goods, in addition to their signature, so that in case of disputes of confusion, it will be possible to identify the consignee more easily.

Example

In Finland there was a court case where the carrier of goods delivered the goods to the company indicated on the consignment note to the correct address. The carrier delivered the goods on the company’s trestle to the company’s employees. Company workers were wearing apparel with company’s logos. As it later transpired, they were swindlers and the goods were actually stolen. The company filed the claim to the court against the carrier. The court did not identify the guilt of the carrier. To avoid such situations in the future, it was agreed that the goods can be delivered only to specific workers of the company.

Damaged goods

- The carrier must check the exterior appearance of the goods, whether there is packaging and if it is sufficient for packing that type of goods; whether there is labelling and if it is sufficient; whether the goods are damaged, etc.
- All kinds of deficiencies must be fixed in written and immediately upon reception of goods (no difference, whether the carrier receives goods from the customer or the terminal).
- The remark must be accompanied with the signature of relevant customer or the terminal worker
- The remarks not approved by the second party are later binding to nobody and the carrier will be solely responsible for everything.

Example Example remarks on the consignment note

- There is no packaging
- The packaging is incomplete
- X number places are missing
• X number places are damaged
• 1000 boxes packaged to three filmed pallets are on the consignment note Remark: Three filmed pallets are received
• The carrier receives sealed cargo space and was not present at loading Remark: Was not present at loading and did not check the number of places or the state of goods; sealed trailer received. (For international transport, it is nowadays common that the carriers are not present at loading and, later after reception of goods but before arrival to us, make a remark on CMR that they were not present at loading. However, one copy remains at the loading spot and if there is no similar remark, the driver will be responsible).
• Not allowed to be present at loading – in case the customer does not allow the driver be present by loading
• The packaging is dirty
• Goods are soaked.
9. Entering into carriage contract. Responsibilities during the transport process

Content of the right of carriage comes from very different legislation concerning the carrier, customer, and other participants in the transport process, but also use of the means of transport and the routes. Legislation of transport areas in Estonia is based on the rules approved by international agreements. In case of different modes of transport, international conventions regulating relevant mode of transport are taken as the basis with which the principles of operations and responsibilities of different parties are agreed.

In case of international road transport, CMR convention is followed, in case of domestic road transport, Law of Obligations Act is followed.

The legal basis of transport is formed from the following:

- International agreements which in case of discrepancies are of priority compared to domestic legislation (e.g. CMR convention)
- Domestic legislation of transport (acts with elaborated other normative acts)
- General rules agreed in the society between the parties

These are for example EEA General conditions, General Transport conditions. Areas not regulated by the law are usually determined with general conditions of transport.
- Agreements

For example a specific carriage contract together with mentioned conditions is an important document where the instructions and obligations not regulated in the legislation can be agreed.

Sales agreement of goods

Before carriage of goods, usually the carriage contract is concluded which in turn is preceded by the sales agreement of goods in which:

- The seller is obliged to deliver the agreed goods.
- The purchaser is obliged to pay for goods.

From the point of view of transport process, the information included in the sales agreement and agreement on delivery terms are important, agreeing upon which party and under which conditions concludes the carriage contracts. Generally standard internationally agreed delivery terms are used, e.g.

- Incoterms 2000;

or domestic delivery terms (e.g.)

- Finnterms;
- American Foreign Trade Definitions – 41.

The parties must definitely agree about and refer to used delivery terms in the sales agreement. The marking can have different meaning in case of different conditions.

In our business environment, Incoterms 2000 delivery terms are most commonly used.
Incoterms 2000 regulates everything related to delivery in detail:

- Where, how and when the seller must perform its delivery obligations
- Where, how and when the risk of goods loss or damage is transferred from the seller to the buyer
- Where and when the costs related to the goods are transferred from the seller to the buyer or in other words, which seller’s costs are included in the sales agreement price
- Which are the parties’ obligations and distribution of costs in customs clearance and obtaining of goods export and import licences
- Who concludes the carriage contract and on whose cost it is done
- Who concludes the insurance contracts and on whose cost/to whose benefit it is done
- What kind of notifications it must be given to the other party, by whom and when
- Who incurs the costs of goods inspection and checking operations
- How the goods must be packaged and labelled
- Which are the other obligations of the parties for helping each other and who incurs relevant costs.

**Incoterms 2000 do not regulate**

- Transfer of ownership rights
- Currency and financial conditions, procedure of billing
- Sanctions and responsibility of parties for failure to perform ones obligations
- Procedure for filing of claims
- Solving of disputes and jurisdiction
- Applied laws

Hence the use of only Incoterms is not sufficient for preparing of perfect sales agreement. If listed issues are not regulated between the parties with developed practices, the issues must be unambiguously and clearly provided or solved by involving of such general conditions of the agreement which regulate the listed conditions.

Although Incoterms conditions form instrument of sales agreement, this essentially concerns other participants and agreements of the sales agreement like:

Carriage or freight forwarding contract
Insurance contract
Billing contract
….

The contracts must match and they must not be in discrepancy with the conditions of the sales contract. Hence the accompanying agreements depend also on delivery terms the parties have agreed upon in the sales agreement.
**Definition of contract for the carriage of goods in the Law of Obligations Act**

By a contract for the carriage of goods, one person (the carrier) undertakes to carry movables (goods) for another person (the sender) to a destination and to deliver the goods to a third party (the consignee). The sender undertakes to pay a charge therefor (a carriage charge) to the carrier.

In its activities the carrier proceeds from the contract for carriage of goods entered into between the sender and the carrier. In case of possible discrepancies of delivery terms in the sales contract and contract for carriage of goods, the carrier shall not be responsible.

**CRM convention**

The principles of CMR convention are followed in international road transport. CMR convention is valid for paid carriage of any type of goods by road when the place of reception of goods and place foreseen for delivery of goods indicated in the contract are in different countries of which at least one is the party of the convention, independent of the place of residence and nationality of the contract parties. Hence there is no alternative for international carriage of goods by road for entering into different contract than CMR when the carriage is performed with the means of road transport, i.e. vehicle, vehicle with a trailer (road train), full or semi-trailer.

Abbreviation CMR comes from French expression *convention relative au contrat de transport international de marchandises par route*. Convention (contract) is prepared by UN European Economic Committee already in 1956 and it handles provisions of international road transport. Estonia joined the convention after regaining independence in 1993.

Hence the CMR convention is valid towards each contract for carriage of goods without the parties to agree on it separately when the following conditions are performed:

- Fee is paid for carriage of goods
- Place of reception and delivery are in different countries
- One of these countries have joined CMR convention (convention is not adjusted to transport between Great Britain and North Ireland and Republic of Ireland).
- Transport is performed by a vehicle of road traffic defined in the convention which include a car, road train, trailer, semi-trailer.

**Meaning of carriage contract based on the Law of Obligations Act**

The concluded carriage contract is a pre-requisite for transport. The carriage contract means an agreement concerning one carriage occasion as well as framework contract consisting of sub-agreements.

Contract law in Estonia is regulated by the Law of Obligations Act which also brings in the terms *offert* and *accept*. The logic of concluding of contracts is based on the custom to make offers and in case the other party accepts the offer, the contract is deemed as concluded. The Law of Obligations Act also indicates the regulation of
different types of contracts or when the parties have not agreed on something separately among each other, the provisions of relevant type of contract written in the law are valid.

Long and thorough contracts are mainly used in case of long-term several year cooperation relations. Generally the fast pace of life does not enable to conclude traditional signed substantial contracts where all details are highlighted in detail. There is also no need for that in case of more simple contracts since the Law of Obligations Act itself regulates the contract type of relevant area which means that when there is no separate agreement, the provisions of the special part of the Law of Obligations Act are the provisions of the contract.

Conditions of the contract of carriage of goods of the special part of Law of Obligations Act basically mean that Law of Obligations Act has written in detail the typical example of typical contract of carriage of goods and when the parties have separately changed some conditions, the conditions of the contract of carriage of goods of Law of Obligations Act are valid.

**Typical conditions in the Law of Obligations Act**
The Law of Obligations Act brings the definition of **typical conditions**. The typical conditions mean the basic contract of Law of Obligations Act, also previously prepared contracts. The typical conditions also mean version of contracts written in the computer.
The Law of Obligations Act determines that the carrier cannot agree in its typical conditions in circumstances which decrease the responsibility of the carrier.

Hence the typical condition cannot agree on conditions which handle

- Expiration of claims faster than provided for in the law
- Decreasing of carrier’s responsibility
- Relieving of the carrier of liability
- Increasing of the liability of the sender

Basically it means that the parties can agree on decreasing of the carrier’s liability or increase the customer’s liability but the law insists that such points are separately negotiated between the parties and that such agreements should not be hidden in the standard text of the contract but they must be formalised as separate written agreement, e.g. as an annex to the contract.

In practice the most commonly used agreement regarding decreasing of the carrier’s responsibility for guaranteed-time domestic transport. The Law of Obligations Act establishes the carrier’s responsibility in case of being late in the extent of three times carriage charge for guaranteed-time carriage. Usually the carrier’s responsibility is decreased to the limit defined by CMR convention or to single carriage charge.

**Which goods are carried based on contract for the carriage of goods**
When on international carriage the mail transport and moving transport are following other conventions, the same structure is also in Law of Obligations Act where in addition to contract for carriage of goods the freight forwarding contract and moving
contract are described as separate contract type. Postal traffic is provided with separate law in Estonia.

The most simple carriage contract can be an oral agreement where the carriage of goods from point A to point B and carriage charge is agreed and when there are no special agreements, the provisions of contract of carriage of goods of Law of Obligations Act are valid.

Still, the oral carriage contract has several risks and in case of possible problems, it is very difficult to verify who is right. In case of oral carriage contract, the recommendation is to be very careful and such type of contract is used exceptionally when there is no opportunity to use other ways of communicating information.

The technological development has been fast and in connection with active use of electronic channels, the term “communication of information in a format which can be reproduced in writing” is taken into use which may be e-services in Internet environment, e-mail, fax, or other.

Correct sequence of activities for concluding of contract is as follows:
- Price inquiry
- Price offer
- Transport order
- Performance of carriage of goods

The price inquiry communicates information necessary for the carrier based on which the carrier can prepare the price offer. In case of single transport the data on parties and goods is enough but in case of longer term contracts very thorough preliminary work is carried out about the statistics of previous movement of goods and forecasts.

Price inquiry should contain the following information:
- Company name
- Person to whom the offer must be made
- Contact phone number
- Fax number
- E-mail address
- Company’s mail address (if not on the form)
- Payer of transport costs
- Delivery term (Incoterms 2000);
- Loading place of goods (zip code, city)
- Unloading place of goods (zip code, city)
- Weight of goods kg (or approximate quantity)
- Dimensions (length, width, height)
- Goods packaging (whether on a pallet or boxes, or other)
- Loading instructions (whether the goods must be kept upright, lying, or other, whether other goods can be loaded on top)
- How is it possible to load (how large are the items, whether the tent must be removed, to load from the side or from the top, the securing requirements, and other)
- Approximate time of transport
• Approximate transport frequency
• Special conditions (if thermal transport is needed, is it the transport of dangerous goods, or other)

Based on the price inquiry, the carrier or freight forwarder makes the price offer, acceptance of which by the sender of goods is considered to be the conclusion of the carriage contract.

All in all, conclusion of a single carriage contract is performed as simply as possible and in an understandable way for both parties; the factors characterising goods are agreed upon – from where to where the goods must be transported and the carriage charge and terms of payment.

Single and short term contracts must be differentiated from long-term contracts which regulate the cooperation of parties usually for 1-3 years.

Carriage contract regulating the long-term cooperation usually contains:

• Service description
It is agreed which service is bought and sold. For example, whether it is an ordinary carriage or fast transport or guaranteed-time transport, involving sanctions for the carrier. Also what the service (offered price) includes and what it does not include.
• Transport volumes
Planned transport volumes are taken into account in offer preparation and hence, it is possible to get better conditions, e.g. cheaper price.
• Carriage prices and basis for carriage charges calculation
Whether it is a negotiated price for this shipment only or the whole scale of price list is offered and the carriage price is found according to the weight or dimensions accordingly. Also what are the conditions for calculation of specific weight.
• Terms of payment
Is it possible to pay by instalments and on what conditions, or whether prepayment is requested.
• Adapted legal acts
Usually CMR convention is referred to, freight forwarders also refer to EEA general conditions
• Period of offer (contract)
Period of offer is determined. More common period is either 3 (three) month or 1 (one) year.
• Procedure for submission of transport order
• Contact persons and their telephone numbers and e-mail addresses
• annexes
The annex usually includes schedules, general price lists, transport conditions, etc.

High quality service is increasingly appreciated and ever more frequently the service quality criteria form a part of the contract.

Price offer is communicated to the customer usually by fax or e-mail. After that, the offer is re-formulated to a contract which the parties sign or most common tradition is
that the transport order is submitted according to the order, and with that, the contract is deemed as concluded.

This long-term contract is a framework contract continuously supplemented with orders or contracts about specific transport occasions.

**Freight documents. Consignment note.**

Different documents are used for different modes of transport (Sea waybill for maritime transport, Air Waybill for air transport, CMR consignment note for road transport, railway transport depending on which basis the transport is performed, either CIM consignment note or SMGS consignment note). Consignment note used on multimodal transport.

*Bill of lading* is commonly used in maritime and multimodal transport which cannot be mixed with consignment note. Bill of lading is a document of title which in addition to the function of transfer of responsibility indicates the owner of goods and also defines the right of disposal of the cargo.

**Freight documents for road transport**

Carriage contract of international road transport is generally verified by preparing of CMR consignment note but lack of accompanying document or its incorrectness does not influence the existence of a carriage contract. At the same time, the CMR consignment note is deemed as concluded also in case the carrier has signed the CMR consignment note and the carrier has received the goods for carriage.

The consignment note is a specific work task for the carrier as well as a document based on which the reception and delivery of shipments takes place.

**The consignment note should include:**

Data about the sender, consignee and carrier (name and address)

Data about the time and place of reception and delivery of goods

**Data about the goods**

- Gross weight or marking in other units of measurement
- Number of packaging units

**Special conditions and instructions to the carrier**

- For example: transhipment prohibited
- About carriage in an open cargo compartment
- “cash on delivery” charge
- Taxes the consignee must pay (usually determined with Incoterms delivery terms)

…

**Hence the consignment note performs the following important tasks:**
- Verifies conclusion of the consignment note and its conditions
- Is a certificate about the received goods and the carriage task

The signed consignment note with no remarks also verifies delivery of goods without any deficiencies or performance of a contract carriage and is a basis for receiving carriage charges when the sender did not have to pay the carriage charge as prepayment.

**Role of consignment note in international road transport**

In addition the CMR accompanying document is a verification of international carriage of goods and freight forwarding procedure and hence forms the basis for provision of services without VAT.

The sender is determined to be responsible for the correctness of a consignment note with CMR convention. Hence the sender is responsible towards the carrier for the costs subject to incorrect or incomplete data in the CMR accompanying document like:

- Sender’s name and address
- Date and place of reception of goods and place foreseen for delivery
- Consignee’s name and address
- Name of goods and type of packaging (generally known labelling of dangerous goods)
- The number of packages and their special marks and numbers
- Gross weight or their quantity otherwise expressed
- The requisite instructions for customs and other formalities

The sender is responsible towards the carrier for all costs, losses, and damages occurring to the carrier due to the incorrectness or incompleteness of the following data:

- Remark that the transhipment is prohibited
- Taxes the sender undertakes to pay
- Cash on delivery – amount of the sum to be delivered upon transfer;
- The declaration of value of the goods
- Sender’s instructions to the carrier regarding insurance of the goods
- The agreed time limit within which the carriage is to be carried out
- List of documents handed to the carrier.

**Consignment note of domestic carriage**

The form of consignment note for domestic transport is administratively approved in many countries and the requirements are developed in detail. For example in Finland there is a central register of consignment notes and each company sending the goods has their own series of numbers. Issuing of a consignment note is an obligation of the sender of goods.

In Estonia, the standard and format of the consignment note is not determined. This enables to use the manifest or also an electronic consignment note printed from the information system as a consignment note. Several companies use also an invoice-consignment note or other similar document as a consignment note. In that case it is important that all information necessary for the carriage process is written on the
accompanying document so that different links in a carriage process are able to interpret such information unambiguously.

For domestic transport, the Law of Obligations Act gives the carrier the right to demand the issue of consignment note from the sender of goods but in practice different practices are common, and the work order is often used, where the carrier issues a consignment note, based on the data of the order received from the customer.

Liabilities of the carriage of goods
Essential principles of the contract for carriage of goods of the Law of Obligations Act and the CMR convention are the same. Carriage contract of the Law of the Obligations Act provides the organisation of domestic carriages and it is developed based on the principle of CMR convention. Domestic carriages are based on provisions of the Law of Obligations Act but in case of discrepancies in international carriage of goods, the international convention in international law is deemed as prevailing towards the local law.

Liabilities during the transport process
The carrier is liable for the goods from the moment of its reception until delivery to the receptionist. The carrier must take care of the transported goods and is liable for delivery of packaged goods in an original state, without damages, in correct quantity, in timely manner, and to the correct consignee.

The carrier’s liability starts form the moment of receiving goods and ends when the goods are delivered to the consignee. Carrier’s liability is primarily connected to:

- Loss of goods
- Damages to the goods
- Being late with delivery of goods

The carrier of goods is not responsible if the damages have been caused by:

- Insufficient quality of goods
- Special sensitivity of goods to damages
- Carelessness or mistake of the sender or consignee
- Incomplete or bad packaging of goods
- Incomplete or deficient labelling of goods
- Situation the carrier of goods could not prevent or avoid.

Since the carriage process is related to high risks and also the carried goods have different value and pertinence to risk group, certain general basis for exemption from the responsibility are established for protection of the carrier. The carrier can be discharged of liability when he or she can refer that damage to the cargo is caused by circumstances which could not be avoided or foreseen and the consequences of the effect of which he or she could not prevent. In addition, the basis for relieving from liability is relieving from compensation for such damage which is generated by goods themselves or defective packaging conditions.
For example, the carrier is not liable for decreasing of goods due to their natural properties in case of vaporisation or spoilage of goods in the closed cargo compartment as the consequence of excessive humidity or condensate water. The cause for most common damages is incomplete transport packaging. Also in that case the carrier is relieved from the liability.

**Limit of carrier’s responsibility**

The operational responsibility of the carrier in case of destruction or loss of goods is limited according to CMR convention as well as Law of Obligations Act. The limited responsibility means that the carrier shall not be responsible for the whole extent of the value of goods but the maximum limit of responsibility is agreed per kg of the gross weight of the goods.

The conditional unit of money – SDR is used as the unit of value. SDR value changes daily according to the changes in the international currency market.

SDR = Special Drawing Rights are supplementary foreign exchange reserve assets and SDR is a billing unit determined by the International Monetary Fund containing currencies of different countries.

Banks are quoting SDR-s and the value of 1 SDR in kroons is ca 17-20 kroons.

Carrier's liability on road transport is limited to 8.33 SDR / per kilogram of gross weight.

8.33 SDR = 140 - 170 kroons.

Hence the maximum responsibility of the carrier in Estonia is limited with 140 - 70 kroons per kg of the gross weight of the goods.

**Liability for the loss of goods, damage to goods, or exceeding the time-limit for the carriage**

**Time-limit for the carriage and guaranteed-time carriages**

The carrier must deliver the cargo during agreed time, in case of absence of the agreement, during reasonable time.

Time limit for the carriage is agreed in the carriage contract or whether it is a guaranteed-time service or approximate delivery time of the goods without guaranteed time.

Purchasing of guaranteed-time service must be definitely fixed in writing. This will avoid confusion in handling possible claims.

Several providers of systematic transport advertise the schedules of carriage of goods. The schedules are usually not deemed as time limit for carriage (guaranteed time). For European road transport it is a common practice not to promise the arrival time of the goods but the customer is informed about the departure time from for example
Germany and the presumed carriage time in days. This way the possible problems on the road, borders, or ports are eliminated without breaking the promises given to the customer.

**Carrier’s responsibility for being late with the delivery**
The shipment is deemed as delivered with delay when
- The agreed delivery time is exceeded
- A reasonable carriage time is exceeded in case of not guaranteed time carriage.

This highlights one of the main differences between CMR convention and contract for carriage of goods of the Law of Obligations Act. The Law of Obligations Act prescribes the carrier’s liability related to delay of carriage in domestic transport in the extent of three times carriage charges. According to the CMR convention the carrier is responsible for the delayed delivery up to carriage charge of the shipment. The claimant is obliged to verify that the delayed carriage of goods caused him or her damage.

To avoid confusion and facilitate proving, guaranteed-time and non guaranteed-time services are offered in the transport market. Guaranteed-time service is more expensive than non guaranteed-time service but in case of delay the agreed compensation is automatically guaranteed for the customer.

Hence the carrier is responsible for being late with the delivery:
- Up to the full extent of the carriage charges in international carriage
- Up to three times carriage charges in domestic carriage

**Confirmation of goods as lost**
The goods cannot be late forever during the carriage process and hence the timeframe is agreed upon, during which the undelivered goods are deemed as lost.

The goods are deemed as lost if for **international** road transport
- The goods are not delivered within thirty (30) days after the agreed term.
- When timeframe is not agreed upon, during sixty (60) days from the day the carrier received goods for delivery.

In case of guaranteed-time **domestic carriage** the goods are deemed as lost:
- If it is not delivered during the time limit of carriage or during the period of time equal to the time limit of carriage.
- But not less than within four (4) days.

In case the goods are found within one (1) month after the specified term, the consignee or sender has the right to demand that the goods are delivered for compensation.

**Carrier’s liability on accompanying documents**
The carrier is liable for the damage caused by loss or damage of delivered accompanying documents or their incorrect use except in case the loss, damage, or
incorrect use of specified documents occurred due to circumstances the consequences of which the carrier was not able to avoid. Carrier’s liability is limited to the amount he or she should pay in case of the loss of cargo.

Relieving of a carrier of liabilities
The owner of goods has the right to demand compensation for damages from the carrier if it is proved that damages, loss, or delay in delivery happened during the transport process and according to the legislation there are no circumstances for relieving the carrier of liabilities.

In case the goods get damaged during the carriage, the carrier must prove that he himself or she herself or anybody of his or her assistants have not caused damages due to negligence, in order to be relieved from the liability.

For that the consignee of goods must immediately make the remark to CMR consignment note on obvious damages or deficit on reception of goods. For internal damages and deficit the claim must be filed to the carrier within seven (7) days from reception of goods.

The carrier is relieved of liabilities when the loss, damage, or delay in delivery was caused by:

- Incorrect activity or negligence of the claimant;
  For example the consignee of goods does not enter a remark about the visible damage or obvious deficit on reception of goods.

- As the consequence of instructions given by the claimant, if giving of instructions was not prompted due to incorrect activity or negligence of the carrier.

- Activity or negligence of the sender of goods
  These usually include incomplete packaging of goods, damaging goods by the sender during loading, natural properties of the goods (e.g. corrosion).

- Defect inherent to the goods
  Defect or deficiency which during transport may cause damage to goods (for example micro crack in the glass which causes fracture of the glass).

- Use of open unsheeted vehicles, when their use has been expressly agreed (remark on the CMR consignment note).

- Circumstances which the carrier could not avoid and the consequences of which he was unable to prevent.
  Such circumstance may be, for example, robbery, strike.
  An example from the court practice where the armed robbers in police uniforms stopped the vehicle carrying goods, and using violence, tied the driver to the tree in the woods by possessing so the electronic equipment in full trailer. The carrier was not held responsible in that case. Although the sender of goods should assess the risks,
in order to decide, when it is reasonable to conclude additional cargo insurance contract.

- **Force Majeure**
The carrier shall not be responsible for the loss or damage of goods or delay in delivery, if loss or damage of goods or delay in delivery was caused by Force majeure. Force majeure means circumstances the carrier could not influence or consider or avoid. Extreme climatic conditions (storm, flood) are commonly regarded as force majeure.

**Carrier’s full liability or cessation of limitations of liability**
Carrier’s liability limitations are not valid when the damage caused by the carrier due to intent or serious negligence. In such cases the compensation for damages is demanded from the carrier in full.

As an example it could be referred to the full liability of the carrier as the result of theft by its driver, driving of the vehicle while intoxicated by alcohol or drugs, deliberate delivery of goods to a wrong consignee.

**Sender**
Use of the name of the sender may be confusing when the sender of goods (physical company loading the goods) and the person concluding the contract are different persons. Also the data entered to the CMR consignment note may be confusing where very often the loading spot is entered as the sender. In the meaning of the carriage contract, the person concluding the carriage contract is the sender.

In the meaning of the carriage contract there are always two parties – one who orders transport and the other who performs it. Legally the sender is a person (usually legal person or a company) who concludes the carriage contract with the carrier and who orders and pays for the carriage.

**Sender’s liability**
Sender of the goods must deliver goods to the carrier of goods by the way agreed with the carrier and must supply the carrier with necessary documents and information. The sender must take care also for due protection of goods and/or protection of people and other goods to survive common carriage and handling loads so that it does not cause damage to the property or people.

For the carriage customer to demand the responsibility for loss event occurring during the carriage, it is presumed that the claim (remark, reminder) has been filed about the loss event to the carrier.

The sender is liable for and must compensate the damage and costs to the carrier, occurred due to:
- Incomplete packaging or labelling of the cargo.
- Incorrect or incomplete data in the consignment note.
• Not informing, wrong or incomplete informing about the danger related to dangerous cargo.
• Improper loading of the cargo.
• Lack of, incomplete, or incorrect accompanying documents or information.

In such cases, the sender will be responsible, independent from whether violation of obligations is excusable.

At the same time, when a consumer (private person) is a sender, he or she will be responsible only when he or she violated the obligation wrongfully.

**Cancellation of a carriage contract by the sender**
If the sender has cancelled the carriage contract without an essential violation of the contract, the carrier may demand the carriage charges, demurrage charges and payment of compensation costs from where the amounts the carrier saved or possessed or could possess due to termination of the contract are deducted.

If the sender cancels the contract due to violations of the contract by the carrier, the carrier must unload the cargo immediately at its own cost.

**Dispose of goods in the transport process**
After reception of goods for carriage, the carrier’s task is to perform the carriage according to the concluded carriage contract. Still the situations may occur where it is necessary to give additional orders to the carrier or to change the carriage contract. Also the carrier may have questions or need for additional orders during the transport process. Legal regulation in that issue is very important for the carrier since performing of the orders of a wrong party, the carrier will be responsible for any kind of damages.

The sender has the right to dispose of goods in the transport process. Hence the **sender** (person concluding the carriage contract) is the person **entitled to dispose of the goods** in the meaning of CMR convention. The sender may delegate the right of dispose of the goods to another party, for example the consignee with relevant mark on the consignment note.

The person entitled to dispose of the goods has also the right to dispose of the goods in the transport process. Basically this means giving of orders different from the carriage contract to the carrier, demanding to stop the goods in transit, to change the delivery place, or to deliver the goods to a consignee other than the consignee indicated in the consignment note.

If the carrier does not get orders from the person entitled to dispose of the goods during reasonable time, he or she must continue carriage according to such conditions which seem to correspond to the interests of the person entitled to dispose of the goods the most. It means that for example not receiving instructions about impossibility to transfer goods or continue carriage, the carrier itself can decide whether to transport the goods back or unload them to the intermediate storage.
The carrier has the right to unload the goods immediately if continuation of carriage under specified circumstance becomes impossible. The carrier has the right to unload the goods to the suitable storage place at the cost of the person entitled to dispose of goods and the carriage in that case is considered as finished.

In case of highly perishable goods the carrier has the right to sell it for compensation of costs. The carrier has also the right to sell the goods in case the carrier has not received personal instructions form the person entitled to dispose of the goods.

Income received from the sales must be delivered to the person entitled to dispose of the goods. The carrier has the right to get compensation for additional costs and if the costs exceed income, the carrier has the right to receive additional money to cover the costs.

The carrier may refuse to deliver the goods to the consignee, if:
- The consignee does not pay the taxes indicated on the consignment note
- The consignee demands transport of the goods to another unloading spot.

In such cases the carrier must ask for instructions from the person entitled to dispose of the goods or the sender.

In practice the situation where the consignee wishes to transport the goods to its affiliate or another warehouse is common. In that case it is possible that
- either the carrier addresses the sender of the goods for new orders and also agreement for covering additional costs, or
- the carriage contract is terminated and the goods are deemed as delivered and the carrier and the consignee are concluding a new carriage contract for delivery of the goods.

**Informing about damages and filing of a claim**

When the remark about the damage to or loss of goods is not entered to the consignment note upon reception of the shipment, it is presumed that the cargo has been delivered in the condition foreseen in the contract.

When the damages to or partial loss of the cargo was not externally clear to the consignee of cargo upon delivery, it is presumed that the cargo is delivered in the condition foreseen in the contract if the consignee or the sender have not informed about the loss or damage within seven (7) days from the transfer to sender. In case the carrier does not admit his or her fault for causing internal damages, he or she must verify it.

**Submission of claims to the carrier**

- Loss or damage of goods – visible damages immediately, hidden damages within seven (7) days.
If the carrier was late with the delivery, the customer has the right to file a claim within twenty one (21) days after unloading. To receive compensation, the customer must be able to verify the damage caused by delay.

When customer detects damaged goods upon reception of the load, he or she must make a remark “goods received with damages” to the consignment note. The court will consider this also in case of further disputes.

When the damages occurring to the goods during transport are not noticed at once, the claim can be filed within seven (7) days after reception of the goods. During that time the representatives of all parties must be convened and a report must be prepared about the damages of the goods. If the carrier’s representative does not show up, an expert of loss adjustment (expertise office, insurance company) should be invited.

In case there were several carriers in the transport chain, the sender’s claim can be filed to the first and last carrier. The payer of the compensation has the right of action to the direct party at fault.

**Limitation period of claims**

Terms for expiration of claims:

- Limitation period of claims following the carriage is one (1) year.
- Limitation period of the claim for the compensation of intentional damage or damage due to serious negligence is three (3) years.

Limitation period of claims starts from delivery of the cargo. CMR convention specifies that in case of partial loss of goods, from the day of delivery of the remaining goods. When the cargo is not delivered, the limitation period starts from the day when the cargo should have been delivered. According to CMR convention, on the thirtieth (30) day after the expiry of agreed term. When the time of delivery of goods is not agreed, the limitation period starts sixty (60) days after giving the cargo for carriage.

**Determination of the size of carrier’s liability in case of loss or damage of the goods.**

In case the carrier is responsible for damage or loss of the goods, the amount to be paid is determined based on the cost of goods in the place and time of reception of the goods. Customs duties and other costs related to the carriage are added.

In case of damages, the size of the compensation must not exceed the amount to be paid in case of loss.

Since the carrier’s liability is limited, the claims filed against the carrier cannot exceed the value of 8.33 SDR per kilogram of gross weight of the goods.
In case of partial loss or damage of the goods, the upper limit of carrier's liability is calculated proportionally. The carrier is responsible for the damaged or lost goods in the same proportion as the part of damaged or lost goods relates to gross weight of total shipment. Hence, the heavier is the transported goods, the higher is the limit of carrier's liability. In case of damage or loss of lightweight and expensive goods the owner of goods definitely cannot get compensation from the carrier in full extent.

**Compensation of damages to the owner of goods**
In addition to the fact that the carrier has the right to rely on legal basis, which exempt him or her from responsibility, he or she has the right to limit his or her responsibility to some extent. According to the laws, the lowering of the value of the goods is compensated to the customer / owner of goods and only to some extent.

**Principles for determination of compensated value**
In case of road transport the value of goods in the point of origin is taken as the basis for compensation for damages. At the same time in case of maritime transport, the value of goods in the destination is taken as the basis for compensation. The upper limits used for compensation for damages differ according to the use of modes of transport.

**Risk management in a transport process and the insurance**

**Carrier’s liability insurance**
Carriers manage the risks caused by their activities through the activity liability insurance known also as CMR insurance. CMR insurance protects the carrier for the responsibility determined based on CMR convention. Carrier’s liability insurance does not replace the cargo insurance being the obligations of the parties of the cargo contract and corresponding to the delivery terms.

In case of serious negligence and intent the insurance does not cover the costs.

**Goods in transit insurance**
Goods in transit insurance protects the owner of goods in case the carrier is relieved of liabilities, also in case the value of goods is higher than the limit of carrier’s liability.
Either the buyer or the seller prepares the goods in transit insurance according to the delivery terms.
The sender of the goods must assess its risks and, if needed, decide for an additional insurance (for the goods in transit insurance).

**Right of security**
To secure the claims proceeding from the carriage contract and carriage or freight forwarding or warehousing contracts concluded with the consignee, the carrier has the right of security to the cargo which means that the carrier may sell the transported goods for covering its costs. The notification about the item of the object of security must be submitted to the consignee. If it is not possible to detect the consignee or if it
refuses to receive the cargo, the notifications must be submitted to the sender. The packaged items are sold in a reasonable way and also the sales process related costs must be covered.

**Payment of carriage charges**
The Law of Obligations Act prescribes that the carriage and demurrage charges must be paid to the carrier on delivery of cargo to the consignee. The carriage charges are however usually paid according to the conditions of the carriage contract. At the same time the law gives the right to the carrier not to deliver goods before reception of carriage charges. In addition to the carriage and demurrage charges the carrier has the right to demand compensation of costs incurred by him or her to the cargo.

Payment for carriage charges becomes a problem in case of claim for the compensation of damage against the carrier. At the same time, quite common are agreements, according to which the customer claims will not be reviewed before payment of carriage charges.