SIMULTRA PROJECT

2017-1-IT01-KA202-006140

SIMULATION OF LOGISTICS AND TRANSPORT PROCESSES

INTELLECTUAL OUTPUT N°4

Activity A.5.8

Learning Material for the Traffic Officer Simulator

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AFT

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Contents

Introduction

This document contains an overview of the key road freight transport concepts presented in the Traffic Officer Simulator.

To facilitate learning, the concepts are presented through summaries, tables and/or diagrams.

This document brings together the skills and techniques essential for any student or professional in the field of road freight transport.

1. Road freight transport in Europe

1.1 European labour regulations

The work day of professional drivers is divided into various types of activities: driving, vehicle maintenance and technical preparation, mechanics, handling, loading and unloading of goods, waiting, etc.

Drivers are not the only employees of transport companies, and may not even have the status of employees, but the specific nature of their work has attracted particular attention from legislators. As such, truck drivers are subject to two main types of regulations:

If they are employees, they are subject to the rules of labour law in their country of employment. As drivers, they are subject to regulations adopted at the European level.

Since 1969, the activity of driving has been governed by European regulations, the provisions of which are common to all Member States of the European Union. Community regulations, or "European Social Regulations" (ESR) consist of two agreements which, within their scope of application, take precedence over all potentially conflicting national laws or regulations within the Member States. These agreements are:

- Regulation (EC) No 561/2006 of 15 May 2006
- Regulation EEC/3821/85 of 20 December 1985.

Outside the European Union, international road transport is subject to the specific rules of the European Agreement concerning the Work of Crews of Vehicles engaged in International Road Transport (AETR).

These regulations, applicable to all crews from EU Member States, have three main objectives:
- Harmonise the conditions of competition between companies
- Protect employees from excessive driving periods that may be required of them
- Improve the safety of all road users by avoiding accidents associated with fatigue.

Regulation (EC) No 561/2006 of 15 May 2006 on driving time and rest periods

Maximum daily driving time	• **Daily driving time** is limited to **nine hours** • This period may be extended to 10 hours, not more than twice during the week • Weekly driving time is limited to 56 hours, with a cumulative limit of 90 for any two consecutive weeks.
Uninterrupted driving	• Maximum of 4 hours 30 minutes
Breaks	• **After driving 4 hours 30 minutes, take a 45-minute break** This break may be split into a break of **not less than 15 min,** followed by a second break of **not less than 30 mn**
"Regular" daily rest period	• Not less than **11 consecutive hours** per 24-hour period following the end of a daily or weekly rest period
Splitting	• In two separate periods, including one of at least 3 hours followed by a second of at least 9 hours (making for a minimum of 12 hours of rest)
Multi-manning	• 9 consecutive hours within the 30-hour period following the end of a daily or weekly rest period
"Reduced" daily rest period	• Any period of between 9 and 11 hours Not more than three times between two weekly rest periods
Weekly rest period	• The regular weekly rest period is 45 hours, potentially shortened to a minimum of 24 consecutive hours over two consecutive weeks, with an obligation to compensate by an equivalent period of rest taken *en bloc* before the end of the third week.

The regulations in question use terms which must be clearly defined to avoid ambiguity or differing interpretations.

"Day" and "Shift"

Day: period of time equal to 24 hours at most, between two daily rest periods or between a daily rest period and a weekly rest period, or vice versa.

Daily work period: period between two daily rest periods or between a daily rest period and a weekly rest period

Start of shift: beginning of a daily work period, regardless of the time of day.
End of shift: end of a daily work period, start of the daily rest period.

Length of daily work period: result obtained by the following subtraction: time of end of shift – time of start of shift

Week:

The week is the period of time between 00.00 on Monday and 24.00 on Sunday.

Weekly driving time is calculated based on the calendar week and cannot include more than six consecutive days of driving. However, driving time over two consecutive weeks can be calculated as a single period of 14 days.

Driving:

Driving period: the accumulated driving time from when a driver commences driving following a rest period or a break until he or she takes a rest period or a break. The driving period may be continuous or broken.

Break:

Break: Any period during which a driver may not carry out any driving or any other work and which is used exclusively for recuperation.

Downtime not spent driving a vehicle is considered a break rather than a rest period. (e.g. the driver is considered on break during an unloading period, provided that he or she neither participates in nor oversees the process).

Rest periods:

Rest period: Period during which the driver may freely dispose of his or her time.

1.2 Monitoring

All freight or passenger vehicles referred to in ESR provisions must be equipped with an approved recording device known as a “tachograph”.

a. Tachograph

The tachograph records driving time, work periods, breaks and rest periods, as well as speed, for vehicles equipped with the device.

There exist two types of tachograph:

- The digital or electronic tachograph, which records data in the VU (“Vehicle Unit”) and on the “driver” card inserted into the device. Vehicles put into service as of 1 May 2006 are equipped with a digital tachograph
- The analogue or mechanical tachograph, which records data related to the driver’s various activities on a record sheet (disc). Vehicles put into service prior to 1 May 2006 are equipped with an analogue tachograph.

The European Union requires use of digital tachographs with a view to aligning social regulations in the various Member States. The device facilitates data monitoring.

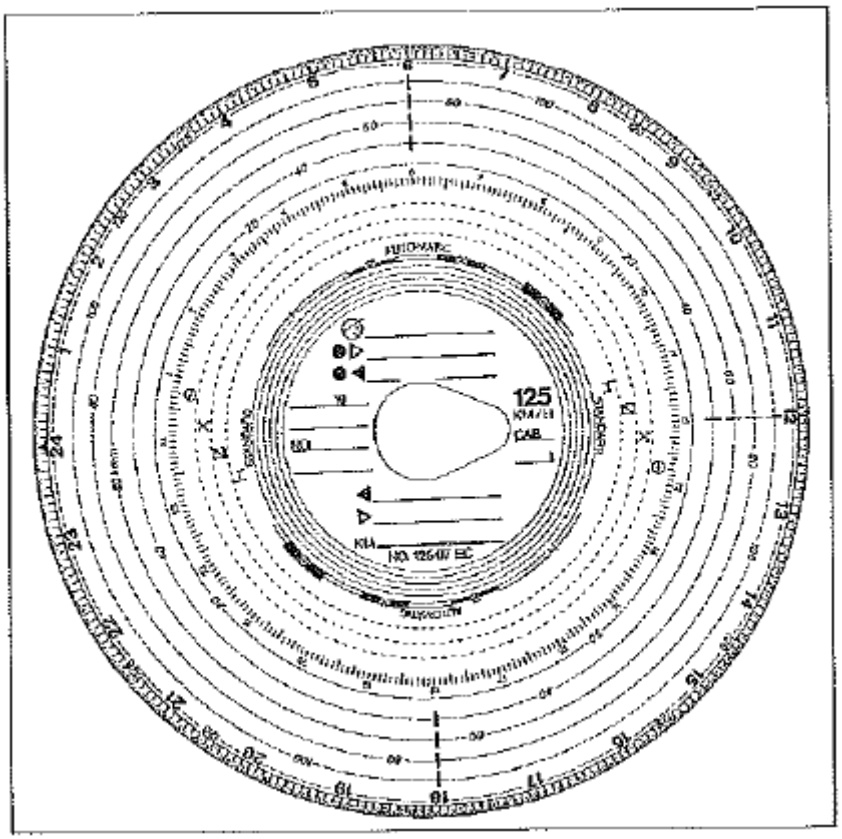


Figure: Tachograph disc

b. Electronic record card

Digital tachographs operate with four smart cards, each of which records the user's own data, although the cards are intended for different uses.

Driver card (white background). Strictly personal. The driver card records all driver activities, regardless of the vehicle used, over a period of at least 28 days.

Company card (yellow background): assigned to the company, it is anonymous but linked to the company via its business registration number.

Inspection card (blue background): identifies the relevant inspection body and the associated agent. This card allows access to data stored in the device memory or on driver cards.

Workshop card (red background): Issued to equipment manufacturers, installers, vehicle manufacturers and approved workshops, it is used for testing, calibration and maintenance of the equipment.

2. International contract of carriage – CMR

2.1 The basics:

CN: Consignment note. Transport document constituting proof of the contract of carriage for all shipments within the country.

CMR: Convention on the Contract for the International Carriage of Goods by Road. This official document serves as an international consignment note. It provides for monitoring and regulation of the load, the transport itself and the delivery.

SDR: Special drawing rights (SDR). Artificial international currency available to IMF member countries to settle deficits in their balance of payments.

International contract of carriage

The international road transport contract is governed by the CMR convention, which dates back to 1961. The convention is intended to regulate the conditions of the contract of carriage in a uniform manner, "particularly with respect to the documents used for such carriage and to the carrier's liability". Its purpose is to regulate all transport to or from a country that has ratified it, even if the sending or receiving country is not a party to the convention.

The CMR governs any contract of carriage of goods involving:

- road transport,
- payment,
- collection and delivery in different countries,
- at least one of which is a signatory to the Convention
  (*Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Greece, Hungary, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Yugoslavia).*

The CMR does not apply to postal carriage, funeral consignments or furniture removal.

The CMR applies to all parts of relevant transport operations, including domestic sections of a journey.

a. Formation of the contract

The contract of carriage is evidenced by a consignment note.

- ✓ The consignment note must be draw up in three copies and signed by both the shipper and the carrier.
- ✓ The CMR sets out the information that must be included in the consignment note.
- ✓ The consignment note does not engage any person not having signed it.

However, the CMR remains applicable:

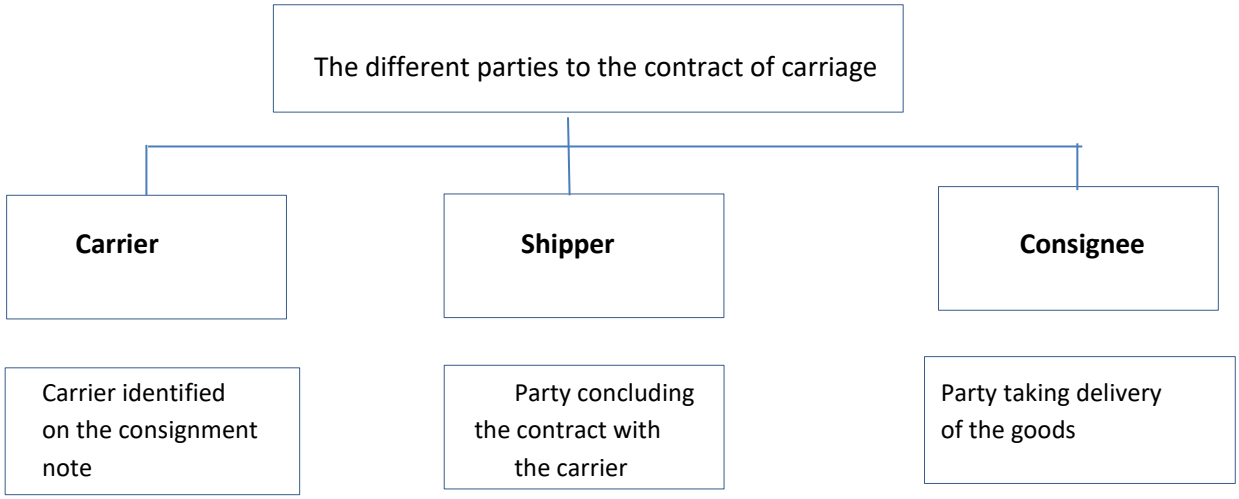
- ✓ In the absence of a consignment note
- ✓ Despite any irregularities in the information contained in the consignment note.

Information required in the CMR:
The CMR contains the same mandatory information as the domestic consignment note, with addresses specifying the country of origin and destination.

No specific format is required, but certain clauses must be included:

- Date when consignment note was drawn up;
- Carrier's name, address and national or European identification number;
- Date of taking over of the goods;
- Nature and quantity, or weight, or volume of the goods for the consolidated loads;
- Name of sender or shipper;
- Full address of place of loading;
- Name of consignee;
- Full address of place of unloading;
- Customs formalities.

b. Parties to the contract of carriage



c. Performance of the contract

Remember:

- ✓ The rightful claimant of the goods is either the sender or the consignee;
- ✓ The claimant of the goods may unilaterally modify certain clauses of the contract of carriage. It is thus necessary to determine who has a rightful claim on the goods;
- ✓ All modifications to clauses of the international contract of carriage must be referenced on the consignment note;
- ✓ The carrier must be compensated for the consequences of such modifications.

Unless otherwise specified in the consignment note, the sender is the rightful claimant of the goods. The sender may therefore modify certain conditions of carriage of the goods.

The sender retains a rightful claim on the goods until such time as the second copy of the consignment note is delivered to the consignee.

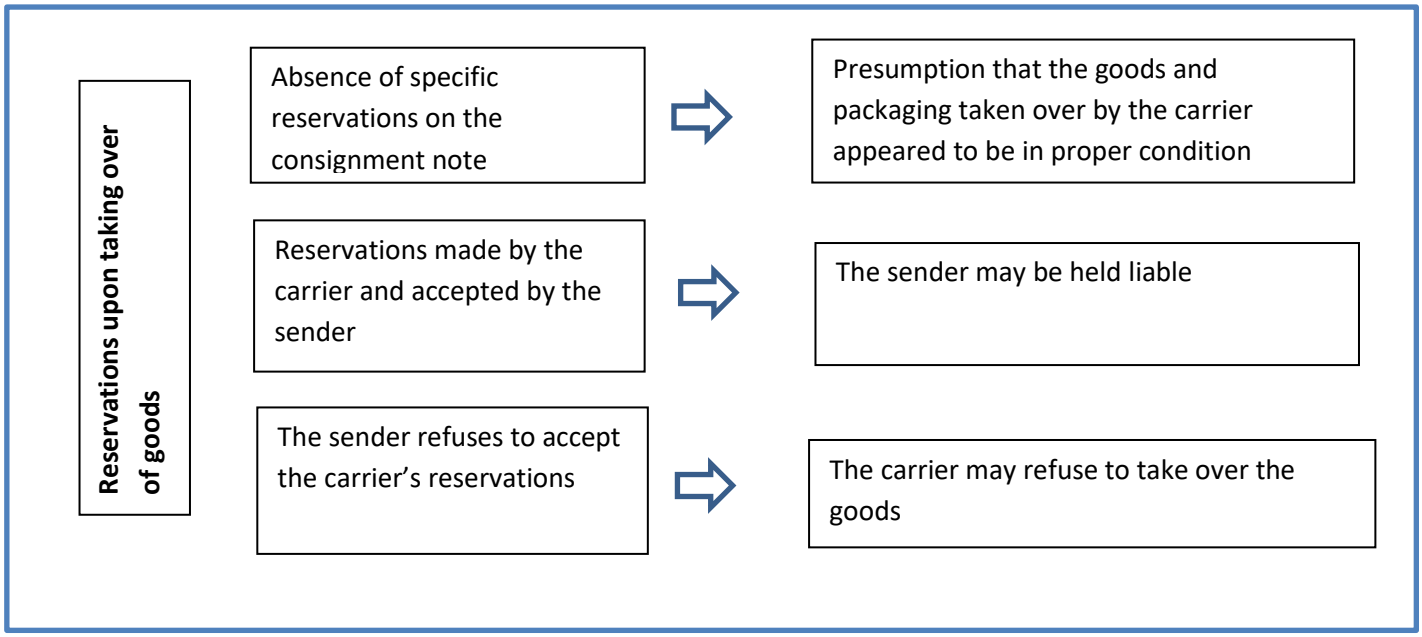
Taking over of the goods:

Upon taking over the goods, the carrier must verify:

- ✓ The accuracy of information in the consignment note regarding the number of packages, as well as their marks and numbers
- ✓ The visible condition of the goods and packaging

This verification is limited to an inspection of the external quality of the goods; in the event of refrigerated transport of perishable foodstuffs, the carrier must also verify the temperature of the goods.

Absent any specific reservations on the consignment note, it is presumed that the goods and associated packaging were in proper condition upon being taken over by the carrier.



The CMR convention contains no provisions concerning loading, securing and unloading. As such international private law applies:

- ✓ Loading → law of the country of performance or law in force where the contract was concluded;
- ✓ Unloading → law of the country of destination

Moving goods

The carrier defines the itinerary taking into account the constraints specific to each country crossed, e.g. authorized weight and dimensions, driving bans, parking safety, etc.

Route planning and distance calculation tools are available to help in this regard:
- Maps
- Route planning software that displays the route on a map, calculates total mileage and establishes a route map (e.g. Map&Guide, PTV Group, Microsoft Auto Route)
- Internet-based services: Mappy, Michelin, Infotraffic.
- Distance calculators: These can be established city to city or area to area. They take the form of a dual-entry table.

The CMR does not specify delivery times, but the carrier is nevertheless required to comply with a "reasonable" schedule based on the distance to be covered, the route, the duration of customs formalities, etc.

A delivery time is generally set by the parties and must be adhered to.

Customs formalities:

- ✓ Customs clearance is carried out by the sender; the carrier is obliged to evidence the conformity of the transit operation by presenting or having the customs documents presented at the border offices and at the office of destination.
- ✓ Customs clearance is carried out by the consignee; the carrier's only obligation is to evidence the conformity of the transit and deliver the goods DAP.

Remember:
- ✓ The sender must provide the carrier with the information and documents necessary to complete customs and other formalities;
- ✓ The carrier is not required to determine whether such documents or information are accurate or sufficient;
- ✓ The carrier is liable for any misuse of these documents and information.

If it becomes impossible to perform the carriage of the goods under the conditions provided for in the consignment note, the carrier must so inform the claimant of the goods and comply with the latter's instructions.

The carrier is released from contractual liability upon delivery.

Delivery is made:

- ✓ Upon presentation of the second copy of the consignment note by the carrier to the consignee;
- ✓ Upon discharge provided by the consignee to the carrier

If it becomes impossible to deliver the goods under the conditions provided for in the consignment note, the carrier must so inform the claimant of the goods and comply with the latter's instructions.

d. Non-performance of the contract

Liability is presumed to lie with the carrier!

The carrier may be relieved from liability by proving:

- ✓ The fault of the claimant;
- ✓ Instructions emanating from the claimant not resulting from a fault of the carrier;
- ✓ Inherent vice of the goods;
- ✓ Circumstances which the carrier could not avoid and the consequences of which he was unable to prevent.

The consignee must comply with the formalities provided for with regard to:

- ✓ Noting reservations upon delivery for any apparent damage

- ✓ Sending a letter within 7 days for any non-visible damage
- ✓ Total loss of the goods is presumed in the absence of delivery:
  - Within 30 days of the agreed delivery date
  - Within 60 days of the goods being taken over if no delivery date has been agreed.

Legal limits of liability:

- ✓ The CMR only provides for compensation for material damage;
- ✓ Compensation due by the carrier corresponds to the loss of value suffered by the goods on the basis of the value upon departure + the price of the transport, customs duties and other costs incurred during the disputed transport operation.
- ✓ Compensation paid is limited to SDR8.33 per gross kg of goods;
- ✓ To obtain higher compensation, the client may issue:
  - A declaration of value
  - A declaration of special interest in delivery.

Period of limitation:

The CMR provides for a one-year period of limitation;
This period shall be extended to three years in the event of wilful misconduct or a default considered as equivalent to wilful misconduct in accordance with the law of the court seised of the case.

The period of limitation begins to run:
- in the case of partial loss, damage or delay in delivery, from the date of delivery,
- in the case of total loss, on the day on which the goods are deemed lost as per the CMR,
- in the case of claims for payment, three months after the conclusion of the contract;

The period of limitation may be interrupted or suspended under the conditions provided for by the law of the court seised, as well as by a written claim made to the carrier;

A right of action which has become barred by lapse of time may not be exercised by way of counterclaim.

2.3 Customs transit

Principle: The Customs Transit procedure allows for the temporary suspension of duties, taxes and foreign trade control measures from a customs office of departure to a customs office of destination.

This procedure makes it possible to cover goods either leaving, entering or crossing the European customs territory. Depending on the type of transport, operators may choose between several transit regimes.

EU transit is applicable to goods moving between two points in the European Union (this procedure is extended in a similar way to the EFTA countries – Iceland, Norway, Lichtenstein – and Switzerland, under the name of common transit).

Two cases

External Union transit (T1)

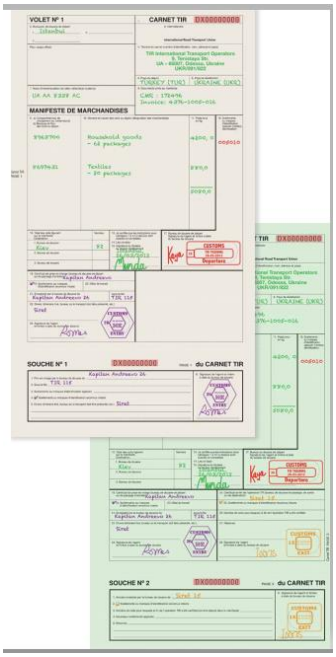
Covers the movement of non-Union goods within the European customs territory, between EFTA and EU countries

Internal Union transit (T2)

Covers the movement of Union goods in the European customs territory, between special fiscal territories or between special fiscal territories and the EU, or if said goods pass through an EFTA country or Switzerland

All external Union transit declarations are computerised (either by EDI or DTI, an internet-based solution).

TIR procedure



The TIR transit (International Carriage of Goods by Road) procedure is based on the "Customs Convention on the International Transport of Goods under Cover of TIR Carnets".

This procedure applies to all road transport operations carried out without intermediate reloading across one or more borders.

It is based on the use of a carnet, known as the TIR carnet, on which the transit declaration is made at the office of departure. Each journey and each vehicle is covered by a single TIR carnet with two sheets per country crossed (the EU is considered a single country), as well as loading and unloading points. The carnet is then stamped at each office of transit, which keeps a voucher. The procedure ends at the Customs office of destination, which provides the certificate of termination of the TIR operation.

The TIR Carnet serves as a guarantee, on behalf of the professional associations that publish it, and is valid for all Customs administrations party to the Convention and located along the route taken by the road transport portion of the journey.

For Customs, the physical guarantee is based on the affixing of seals, reflected in the TIR plates fastened to the rear of the vehicles.

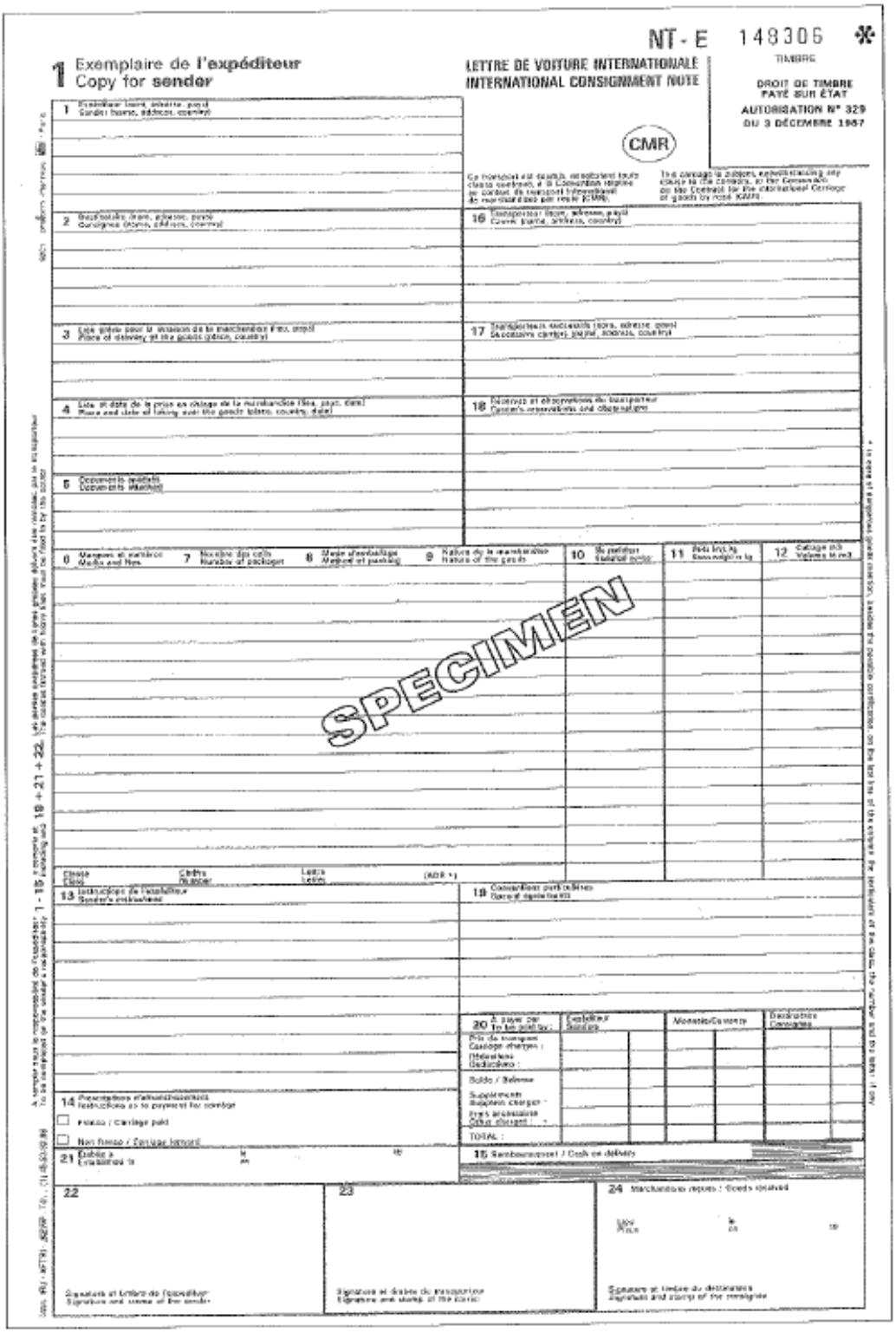
Transport authorisations

Transport authorisations are required to cross borders. A distinction should be made between different categories of authorisations:

- ✓ The Community licence required for international transport and internal transit within the European Economic Area;
- ✓ IFT (International Transport Forum) multilateral authorisation for international transport outside the European Union, exclusively reserved for transport for hire or reward;
- ✓ Bilateral authorisation (between two countries), valid both for own-account transport and transport for hire or reward;

In Europe, road taxes and tolls differ among Member States, both in terms of the amounts and the way they are levied.

2.4 Example of international consignment note (CMR)



3. Transport management

Planning and optimisation of rounds are two distinct processes. Planning is a time-based method for organising rounds, while optimisation of rounds is a logistics process aiming to guarantee the best service at the lowest cost, in compliance with legal and business constraints.

3.1 Planning

Depending on the size of the company, each level of planning is handled by a specific person or department. In the field of road transport, the operator's mission is to carry out all activities necessary to maintain a balance between customer demands and the company's overall capacities. The operator's activity is focused mainly on organization, planning and monitoring of transport routes. As such, the operator is in charge of choosing the vehicle according to the nature of the goods, managing driver assignments and setting departure and arrival times. The operator also sets time frames for deliveries and the order of passage when several consignees are involved in a single round.

Transport planning is structured around 3 levels:

- Strategic: This level serves to determine the pricing policy, target customers, reduce or increase the company's capacities (equipment purchases, etc.)

- Tactical: tactical planning concerns the most efficient use of resources, choice of road networks, development of routes and anticipation of future orders.

- Operational: Short-term local management in a dynamic environment, such as route planning, dispatching, driver assignment or vehicle maintenance schedules.

There are various tools to facilitate planning:

- ✓ Planning diagram: visual aid for the Operations department serving to assign vehicles and drivers to customer transport requests
- ✓ Computer software such as TMS

TMS (Transportation Management System) is a transport management software programme with the following functions:
- Entry and management of transport orders,

- Organisation and monitoring of transport,

- Pricing

- Management and issuance of transport documents

- Data consolidation in decision support dashboards.

3.2 Transport monitoring

During transport, the operator acts as a supervisor by remaining in constant contact with drivers to provide support or new instructions, following up on orders with customers and managing unforeseen events of any

type. This last dimension is particularly important as transport takes place in a dynamic environment subject to many developments outside of the operator's control (accidents, breakdowns, weather conditions, etc.).

4. Material resources

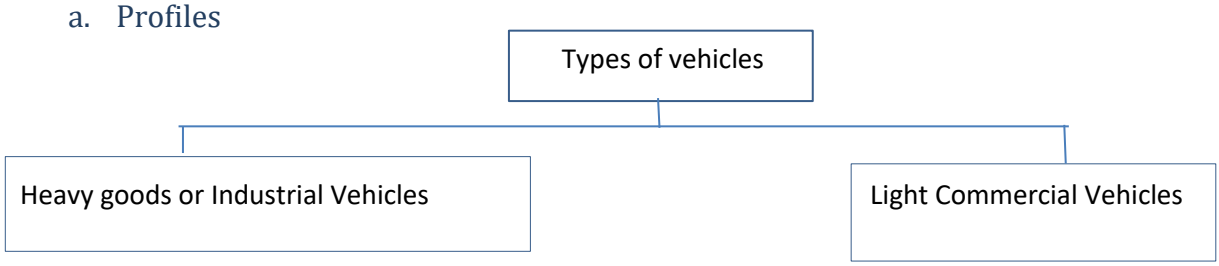
4.1 Vehicle

Road transport vehicle fleets are extremely diverse. Vehicles are characterised by two factors:

- ✓ Profile: isolated or articulated vehicles
- ✓ Body type: part of the vehicle intended to hold goods according to the nature of said goods.

There are two types of vehicles for freight transport

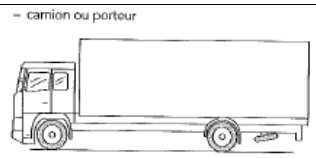
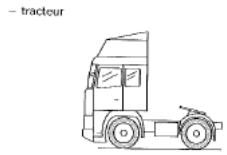
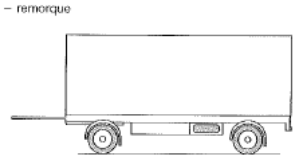
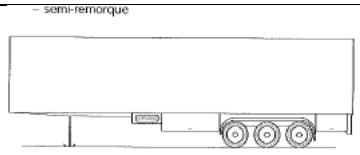
a. Profiles



Industrial Vehicles: Road freight vehicles with Gross vehicle weight > 3.5 tonnes

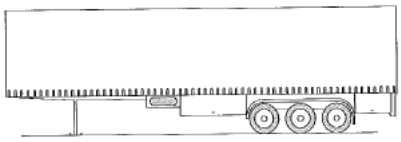
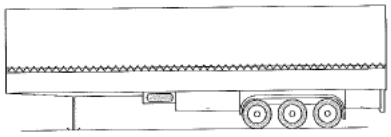
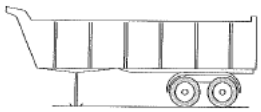
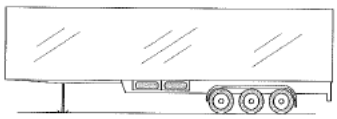
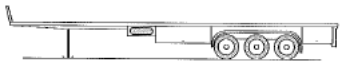
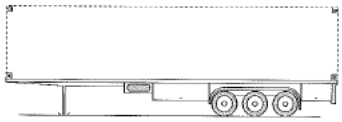
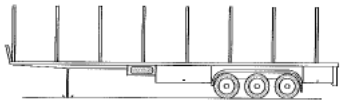
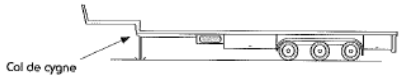
Light Commercial Vehicles: Freight vehicles with Gross vehicle weight ≤ 3.5 tonnes

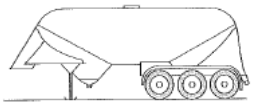
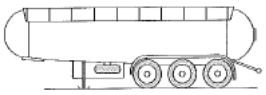
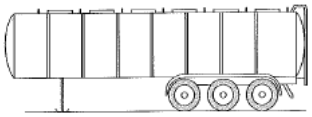
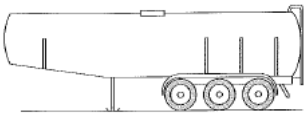
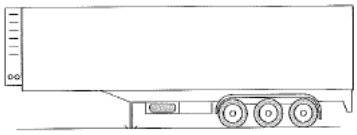
There are four distinct types of rolling stock:

	**Truck or lorry**, vehicle carrying a charge under its own power. The cab and body (or flatbed) for transporting goods are built on the same chassis. This type of vehicle is used essentially for deliveries.
	**Road tractor**: motor vehicle with no body, independent and equipped with a traction device for semi-trailers. Road tractors do not transport goods. All goods are transported in the semi-trailer.
	**Trailer**: Unpowered vehicle. Unlike semi-trailers, trailers have both front and rear axles. A trailer may be attached to a road tractor, the complete assembly known as a road train.
	**Semi-trailer**: Trailer without front wheels; the front of the trailer rests directly on the tractor via a fifth-wheel coupling. A road tractor and semi-trailer together form an **articulated vehicle**.

b. Body types

The body is the part of the vehicle intended to hold goods. Carriers or road transport operators choose body types based on the nature of the goods to be transported, the use to be made of the vehicle and loading and unloading conditions.

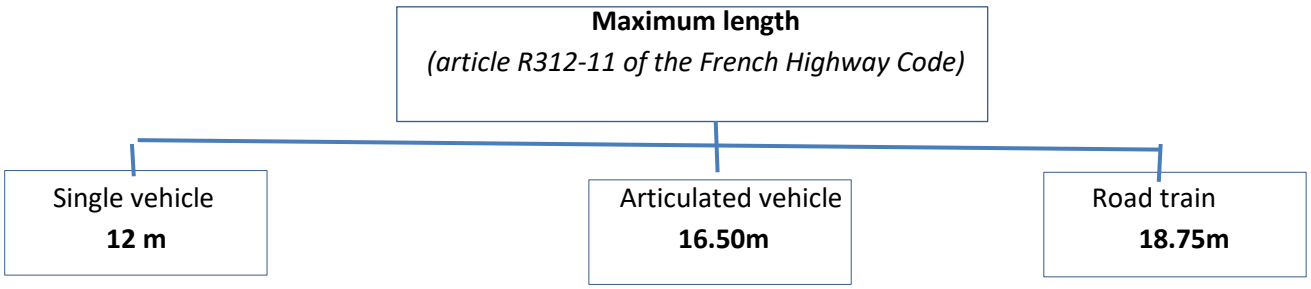
	**Tautliner or Curtainsider**. Flatbed equipped with runner-mounted curtains on the top and sides
	**"Savoyard":** Flatbed equipped with a metal framework to which curtains are attached. The framework can be entirely removed, making the Savoyard suitable for any type of goods.
	**Open-box bed ("Dumpster")**: Body intended to transport bulk goods (grain, rubble, etc.)
	**Box**: Vehicle with rigid walls, waperproof and sometimes equipped with tail lifts. They can be fitted with sliding panels for side loading.
Flatbeds: Suitable to transport non weather-dependent goods. One part of the flatbed may be lower (sunken with a gooseneck) to allow for taller loads.	
	**Straight flatbed**
	**Container flatbed**
	**Stake flatbed**
	**Low-bed flatbed**

	**Bulk tanker**: for flour, grain and Styrofoam balls. The tanker is top-loaded. Unloading is carried out with a compressor and/or by tipping
	**Gas or hazmat tanker**: The tanker must be degassed once empty. Use of this type of vehicle requires particular equipment and special authorisation to transport dangerous goods.
	**Fuel tanker**
	**Food tanker**: Exclusively reserved for transporting bulk liquid foodstuffs (oils, drinks)
	**Temperature-controlled vehicle** (insulated or refrigerated)

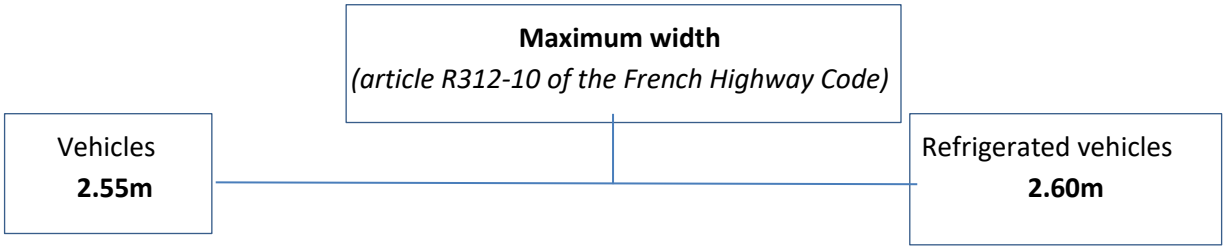
4.2 Standards

a. Regulatory dimensions

Regulatory dimensions (length, width, height) are set out in the Highway Code. Regulatory dimensions are not the same for all road vehicles. Concerning road freight transport:



In most cases (excluding exceptional transport and some particular transport operations), the total width of a vehicle, including the load and all projections, must not exceed:



Maximum height *(no limit imposed by the French Highway Code)*
European Union: In practice, road vehicle manufacturers in the European Union observe a maximum height of 4m

b. Authorised weight

Definitions:

Actual mass or weight: mass or weight of the empty vehicle + load weight

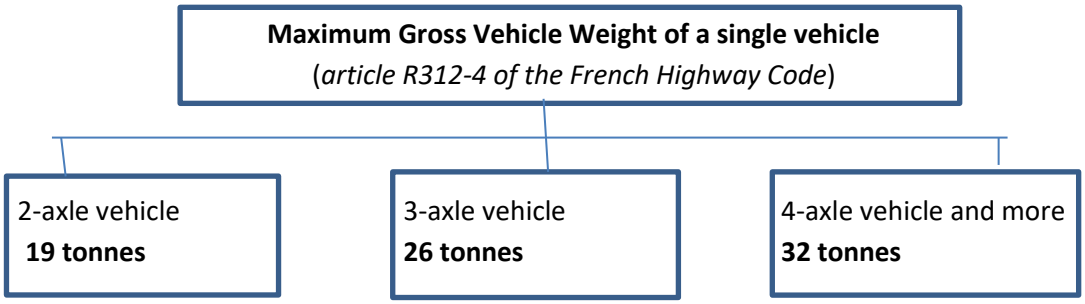
Payload: maximum regulatory weight of the load a vehicle can transport.

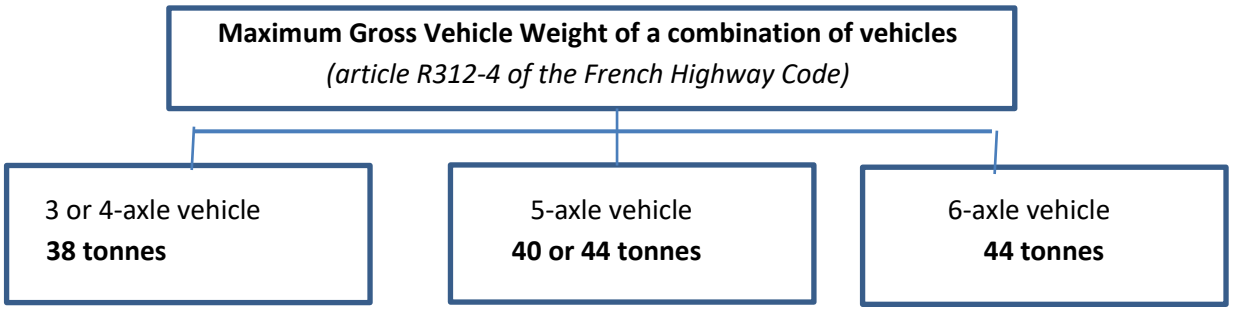
Gross Vehicle Weight (GVW): Maximum weight of a single vehicle and load.

Gross combination weight rating (GCWR): maximum allowable combined weight of a combination of vehicles (articulated vehicle, road train or B-train).

Empty Weight: Unladen vehicle in running order

Maximum vehicle weight:





Calculating Maximum Authorised Mass (MAM) and Payload

For road tractors:

MAM = **Gross Vehicle Weight**

Payload = Maximum Authorised Mass – Empty weight of the road tractor

For articulated vehicles (tractor + semi-trailer):

MAM = The lowest of the following weights:

Tractor GCWR	Tractor EW + GVW of semi-trailer	Highway Code (depending on # of axles)

Payload = Maximum Authorised Mass – Sum of EW (tractor + semi-trailer)

For road trains:

MAM = The lowest of the following weights:

Tractor GCWR	Tractor EW + GVW of trailer	Highway Code (depending on # of axles)

Payload = MAM – Sum of EW (tractor + trailer)

For double road trains (tractor + semi-trailer + dolly + semi-trailer 2)

MAM = The lowest of the following weights:

Tractor GVW	Tractor EW + GVW of semi 1 + Dolly EW + GVW of semi 2	Highway Code (depending on # of axles)

Payload = MAM – Sum of EW (tractor + semi-trailer 1 + dolly + semi-trailer 2)

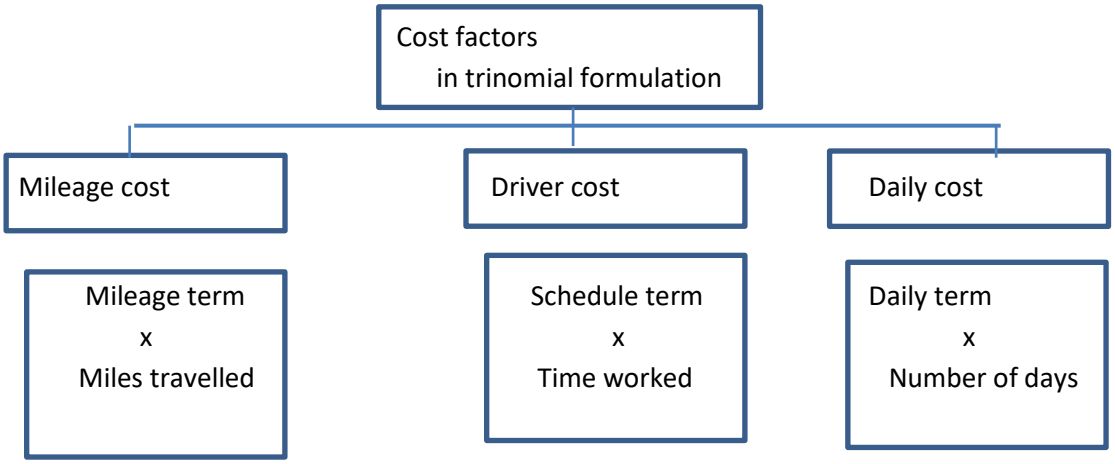
5. Establishing sales price

Prior to 1989, transport sales prices were regulated (Compulsory Road Pricing). Today, prices are freely negotiated. However, when a company is free to set its own sales price, it must be aware of its costs, as selling a service below cost is prohibited.

In France, the National Road Committee (CNR) has developed a tool to calculate costs for shipments greater than 3 tonnes.
The CNR calculates the cost of road transport based on:
- actual data collected from carriers
- "standardised" data incorporating the cost of complying with all security and labour regulations.
It publishes "reference costs" as a trinomial formulation by vehicle type (www.cnr.fr)

5.1 Trinomial formulation

Trinomial formulation of costs makes it possible to calculate the cost of a transport operation quickly and easily. It incorporates:



Mileage term or mileage cost (MC): The mileage term is made up of the cost of fuel, tyres, maintenance and tolls.

Note: The amount of tolls is identified and added to the toll-free mileage term to calculate the cost price.

Driver term or driver cost (DC): Cost of driving staff based on one 9.8-hour work day. The driver term is made up of the driver's wages, payroll taxes and travel expenses (daily average).

Daily term (VC + SC): Made up of vehicle and structural costs for one day of business.

5.2 Methodology for calculating costs with the trinomial formulation

Step 1: Calculation of units

Mileage = Number of laden miles + Number of unladen miles

Work time = Length of journey (mileage/average vehicle speed) + Length of downtime (loading and unloading in hours and 1/100 of an hour)

Number of days = Result of the following equation: Calculated work time/average daily work time (result to 2 decimal points)

Step 2: Calculation of cost (excl. tax)

Mileage cost = Mileage term x number of miles

Driver cost = Driver schedule term x work time

Daily cost = Daily term x number of days

} = Cost price (excl. tax)

Cost price x Margin = Sales price (excl. tax)