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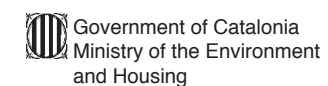
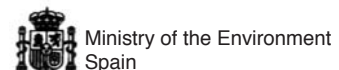
Good environmental  
practises in the  
**Logistics** sector

CLEANER  
production

Regional Activity Centre for Cleaner Production (RAC/CP)  
Mediterranean Action Plan



UNEP





# Good environmental practises in the **Logistics** sector

**Regional Activity Centre for Cleaner Production (RAC/CP)**  
Mediterranean Action Plan



UNEP



Regional Activity Centre  
for Cleaner Production



Ministry of the Environment  
Spain



Government of Catalonia  
Ministry of the Environment  
and Housing



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## 1. INTRODUCTION

The Regional Activity Centre for Cleaner Production (RAC/CP) of the Mediterranean Action Plan (MAP) has prepared this manual of good environmental practises in the logistics sector with the aim of providing methodological criteria and orientation especially for small and medium-sized businesses (generally with fewer resources available for environmental management) in order to incorporate good environmental practises into their daily activities. Introduction of good environmental practises results, in addition to achieving an environmental benefit, in an improvement in overall business management.

Businesses in the logistics sector seek to provide their clients with the best possible services, including a positive environmental attitude and increasing levels of quality. This manual can serve as a useful tool for introducing good environmental practises and gaining an advantageous competitive position.

For firms that have already established an environmental management system, such as EMAS (Regulation (EC) No 761/2001 of the European Parliament and of the Council) and ISO 14001, introduction of a programme of good environmental practices allows them, in addition to decreasing environmental impact, to comply with the training requirements of an environmental management system and provides an instrument for continuous improvement.

### 1.1. STRUCTURE OF THE DOCUMENT

This manual is organized into the following chapters. Chapter 1 describes in general terms the logistics sector in the Mediterranean region and the main trends taking place in the provision of logistics services. Chapter 2 describes how to plan and carry out the introduction of a programme of good environmental practises (PGEP) in accordance with the dimensions and specific nature of a business, ranging from the independent transporter to a complex logistics operator. Chapter 3 describes the environmental impacts created by the sector's activities and good environmental practises (GEPs) that can be introduced to reduce them. Chapter 4 contains a driver's manual, which gathers together good environmental practises for raising quality and decreasing environmental impact and a guide for an initial evaluation of the environmental situation of a business in this sector. Finally, there is a glossary and the bibliography used in preparing this manual.

### 1.2. STRUCTURE OF THE LOGISTICS SECTOR

#### ***General information about the market:***

The main objective of the first chapter of this manual is to describe in broad terms the main future characteristics and trends of the logistics sector in the Mediterranean region. This document deals with the countries participating in the Mediterranean Action Plan (MAP), namely Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Slovenia, Spain, Syria, Tunisia and Turkey. First of all, the scope of this study along with the heterogeneity of the countries analysed should be pointed out, as determined by the following factors:

- Territorial determinants (the area of a country, its remoteness or proximity to large points of consumption, some of the countries being even islands);
- Degree of development (the disparity between ratios of GNP/inhabitant can be seen in figure 1);

- Basic economic activity (the presence and geographical concentration of industrial and agricultural areas, international trade and level of development of infrastructure).

These factors determine the logistical needs of the countries in the Mediterranean region and, as a result, determine the characteristics of logistics operators in every sub-region:

- The type of available transport service is determined by whether a country is primarily an exporter or importer or is self-sufficient with operators that offer international transport services (with a greater percentage of full loads) or domestic transport services (more partial loads).
- The existence of transit operations with other countries can lead to the existence of logistics operators from other countries offering their services.
- The use of a specific means of transport is a determining factor in the type of transport services available; for example maritime transport is more important on the islands.

Figure 1 shows the difference between countries in the Mediterranean region with regard to factors such as population (which directly influences potential consumption), concentration of the population in the capital (which determines the location and distribution of the logistics infrastructure), a country's area, kilometres of coastline (which determines possible means of transport) and the GNP (which is a measure of a country's economic activity).

Country	Population	Capital	Population of the capital (% of total)	Total area (Km <sup>2</sup> )	Coastline (Km)	GNP 2001 (MM €)	GNP/inhab. 2001 (€)
Albania	3,413,904	Tirana	7.2%	28,750	362	4	1
Algeria	28,539,321	Algiers	5.2%	2,381,740	998	51	2
Bosnia and Herz.	3,201,823	Sarajevo	13.0%	5,233	20	4	1
Croatia	4,665,821	Zagreb	15.1%	56,538	385	19	4
Cyprus	736,636	Nicosia	27.9%	9,250	648	8	11
Egypt	62,359,623	Cairo	10.9%	1,001,450	2,450	83	1
France	58,109,160	Paris	3.7%	547,030	3,427	1,220	21
Greece	10,647,511	Athens	29.1%	131,940	13,676	111	10
Israel	5,433,134	Jerusalem	10.4%	21,130	313	104	19
Italy	58,261,971	Rome	4.8%	301,230	4,996	1,013	17
Lebanon	3,695,921	Beirut	40.6%	10,400	225	15	4
Libya	5,648,359	Tripoli	8.9%	1,759,540	1,770	26	5
Malta	369,609	La Valetta	2.5%	320	140	3	9
Monaco	31,515	Monaco	94.8%	2	377	1	28
Morocco	29,168,848	Rabat	5.0%	446,550	1,835	30	1
Slovenia	2,051,522	Ljubljana	15.8%	20,296	32	17	8
Spain	39,404,348	Madrid	7.6%	504,750	4,964	543	14
Syria	16,137,899	Damascus	9.0%	185,180	193	18	1
Tunisia	8,879,845	Tunis	7.1%	163,610	1,148	19	2
Turkey	63,405,526	Ankara	4.0%	780,580	7,200	138	2
<b>Total</b>	<b>404,162,296</b>		<b>7.4%</b>	<b>8,401,519</b>	<b>45,159</b>	<b>3,428</b>	<b>8</b>

Source: Logistics World, Australian Department of Foreign Affairs and Trade and additional information, 2001

Figure 1

It is impossible to compare the potential economic activity of a country such as Turkey, with more than 63 million inhabitants, to that of a country like Malta with only 369,000 inhabitants. Likewise, it is impossible to compare a country like Lebanon, where 40 per cent of the population is concentrated in the capital, to a country like Algeria where the population is dispersed and, therefore, where the logistics infrastructure has to cover the whole country. Freight transport services in a country like Greece, with more than 13,000 kilometres of coastline, are primarily maritime, while in a country with only 32 kilometres of coast, the case of Slovenia, maritime transport plays a very minor role.

The characteristics of a country's freight transport infrastructure are closely linked to trading, that is to say, to the economic activity of that country. In this respect, there are great differences between countries in the Mediterranean region, such as the case of France with a GNP/inhabitant of €21 compared to €1 for Morocco. Another relevant aspect that determines development of a country's logistics is the extent of its logistics infrastructure.

Figure 2 shows large differences between countries in the Mediterranean region of which the most important are:

- France with more than 34,000 kilometres of railroad compared to Morocco with only 1,893 kilometres;
- Spain with almost 330,000 kilometres of paved roads compared to Cyprus with only 11,000 kilometres;
- Morocco with 12 important ports compared to Albania with only 4;
- An island like Cyprus with 15 airports compared to an island like Malta with only one airport.

Country	Railroads (Km)	Roads (Km)		Main ports	Canals (Km)	Airports
		Paved	Not Paved			
Albania	543	17,450	1,000	4	43	11
Algeria	4,733	57,346	38,230	13	-	139
Bosnia and Herz.	1,021	11,436	9,732	1	-	27
Croatia	2,699	22,176	5,192	8	785	76
Cyprus	-	10,972	5,672	5	-	15
Egypt	4,895	34,593	12,794	9	3,500	91
France	34,074	811,200	700,000	16	14,932	476
Greece	2,503	119,210	10,790	12	405	79
Israel	520	13,461	-	7	-	58
Italy	19,503	277,388	28,000	18	2,400	138
Lebanon	222	6,200	1,100	12	-	9
Libya	-	10,738	8,451	9	-	131
Malta	-	1,179	112	2	-	1
Monaco	-	-	-	1	-	-
Morocco	1,893	29,440	30,034	12	-	74
Slovenia	1,201	11,046	3,680	3	-	14
Spain	14,400	328,641	3,320	19	1,045	106
Syria	1,998	27,862	11,381	4	870	99
Tunisia	2,260	17,510	11,673	7	-	31
Turkey	10,413	29,915	290,696	9	1,200	116
<b>Total</b>	<b>102,878</b>	<b>1,837,763</b>	<b>1,171,857</b>	<b>171</b>	<b>25,180</b>	<b>1,691</b>

Source: Logistics World and additional contributions, 2001

Figure 2

Taking into account the heterogeneity mentioned above and because the information gathered about logistics operators in each country is neither homogeneous nor complete, but in several cases even nonexistent, the following information is presented as an example of the logistics sector in five countries: three in the North (Spain, France, Croatia), one in the South (Morocco) and one in the East (Turkey), all with different characteristics.

In **Spain**, the logistics sector has the following characteristics (source: DBK, 2002):

- The total value of the logistics market is estimated at 2,000 million euros;
- Between 1998 and 2002, growth in this sector was 66 per cent, with a very large increase in the subcontracting of logistics operations compared to in-house management of those services;
- The number of businesses in this sector has continued to increase, although that increment has been less each year, until reaching the figure of 180 businesses in 2002;
- The market share of the five largest businesses in the sector was 38.8 per cent in 2002, all of them Spanish.

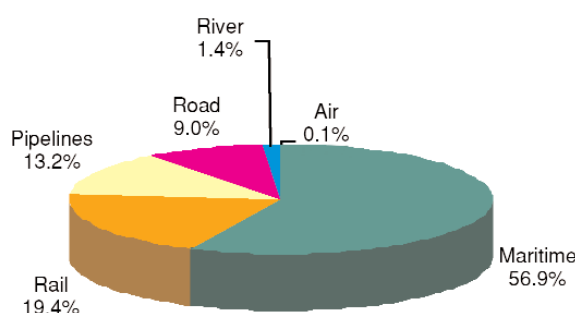
In **France**, the logistics sector has the following characteristics (source: Agence française pour les investissements internationaux, 2003):

- The total value of the logistic market is estimated to be 120,000 million euros;
- During the past few years, this sector has grown at a rate of 10–12 per cent per year;
- In 2003, 30 per cent of French companies subcontracted their logistics activities;
- Foreign companies control about 28 per cent of the subcontracted logistics market.

**Croatia** has a favourable geographic situation, therefore the logistics infrastructure is a key factor in economic and social development.

- The current situation of the transport sector is unsatisfactory, because of adverse conditions in ports and for shipping.
- Freight transport generates about 8 per cent of the GNP and employs 7 per cent of the population.
- In 1999, freight transport was structured in the following way in function of the means of transport.

**Figure 3: Freight transport in Croatia (1999)**



**Figure 4: The structure of freight transport by road and rail in Croatia (2000)**

	Transport by road	Transport by rail
Domestic traffic	77%	24%
Export traffic	10%	16%
Import traffic	11%	15%
Transit	2%	45%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>

Source: Croatian Bureau of Statistics, 2000

In **Morocco**, freight transport constitutes a key element in the chain of economic activities. This sector (source: Ministry of Communication of Morocco, 2003):

- produces roughly 6 per cent of the GNP
- contributes 15 per cent of the income budgeted by the government and
- consumes about 25 per cent of domestic consumption of energy.

**Turkey** is in a favourable strategic position because it is at the epicentre of transport by road, rail, sea and air interconnecting Europe, the Caucasus, Central Asia, North Africa and the Middle East. The logistics sector in Turkey has a great potential for growth (source: Dokuz Eylul University, School of Maritime Business and Management).

- It is estimated that the volume of the logistics sector will reach 6,000 million euros in 2005.
- Domestic transport of freight by road, in terms of tons per kilometre, was 89.1 per cent in 1999, while by rail and air it was only 4.36 and 1.72 per cent respectively.
- In 2000, 91.4 per cent of the foreign trade of Turkey, in terms of volume, was by sea.

### ***Identification of logistics sub-regions:***

The Mediterranean region can be subdivided into four logistics sub-regions. The criteria used to group the countries studied into more-or-less homogeneous sub-regions are:

- Level of economic development (GNP per inhabitant);
- Intensity of trade between similar countries;
- Geographic concentration of consumption and area of the country;
- Available logistics services and degree of incorporated technology and quality of similar services.

These factors determine the starting point when designing and introducing a programme of good environmental practices (PGEP) in the countries of the logistics sector.

According to the factors above, the following Mediterranean logistic sub-regions have been identified (see figure 5):

**Sub-region 1:** France, Italy and Spain are countries with a high GNP/inhabitant, a relatively low degree of geographic concentration of consumption, similar areas, a high level of logistical services and the presence of sophisticated operators.

**Sub-region 2:** Albania, Bosnia and Herzegovina, Croatia, Greece, Israel, Lebanon and Slovenia are countries of similar size and population concentration. Albania and Bosnia and Herzegovina are considered to be in this region because of their geographic proximity to the other countries, although their level of economic development is considerably lower. Israel has a very high GNP/inhabitant compared to the other countries in this sub-region, but is included in this sub-region because of its geographic location.

**Sub-region 3:** Algeria, Egypt, Libya, Morocco, Tunisia, Turkey and Syria are countries with comparable economic development and area.

**Sub-region 4:** Cyprus and Malta are small islands, an aspect that determines their logistics.

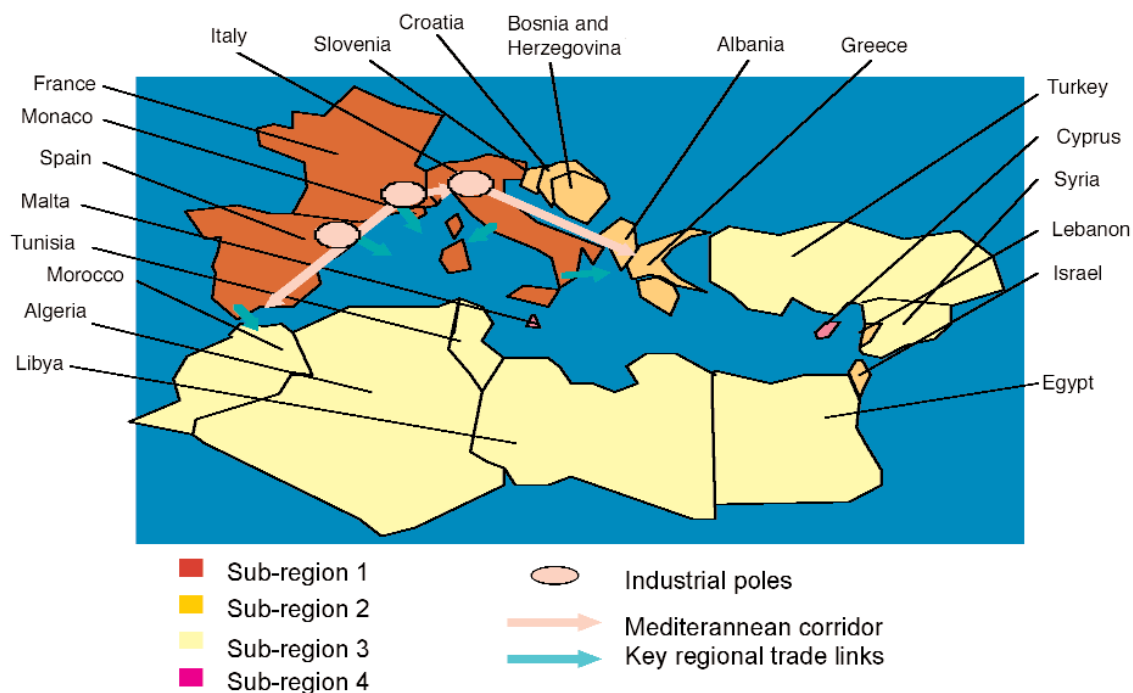


Figure 5: Logistics sub-regions in the Mediterranean region

### ***Organization of the logistics sector in the Mediterranean region:***

The characteristics of the logistics sector in the Mediterranean region are closely linked to the nature of trade for which it provides services. There is a wide range of businesses that offer many freight transport services. The CEL (Centro Español de Logística -Spanish Logistical Centre-) defines a logistics operator as “a business that carries out the planning, implementation and monitoring of the efficient and effective flow and storage of goods, services and related information from a point of origin to a point of consumption with the intention of meeting the requirements of the client”.

Figure 6 shows the various agents that can intervene in logistics operations associated with each of the means of transport (in the following figure from left to right: rail, sea, air and road). These agents can be from businesses that own the infrastructure or fleet of vehicles up to businesses that provide a specific service. The logistics operator acts as an intermediary between the user business and each of these agents. The user business can, depending on its needs, turn directly to each of the agents offering logistics services or to a more global logistics operator.

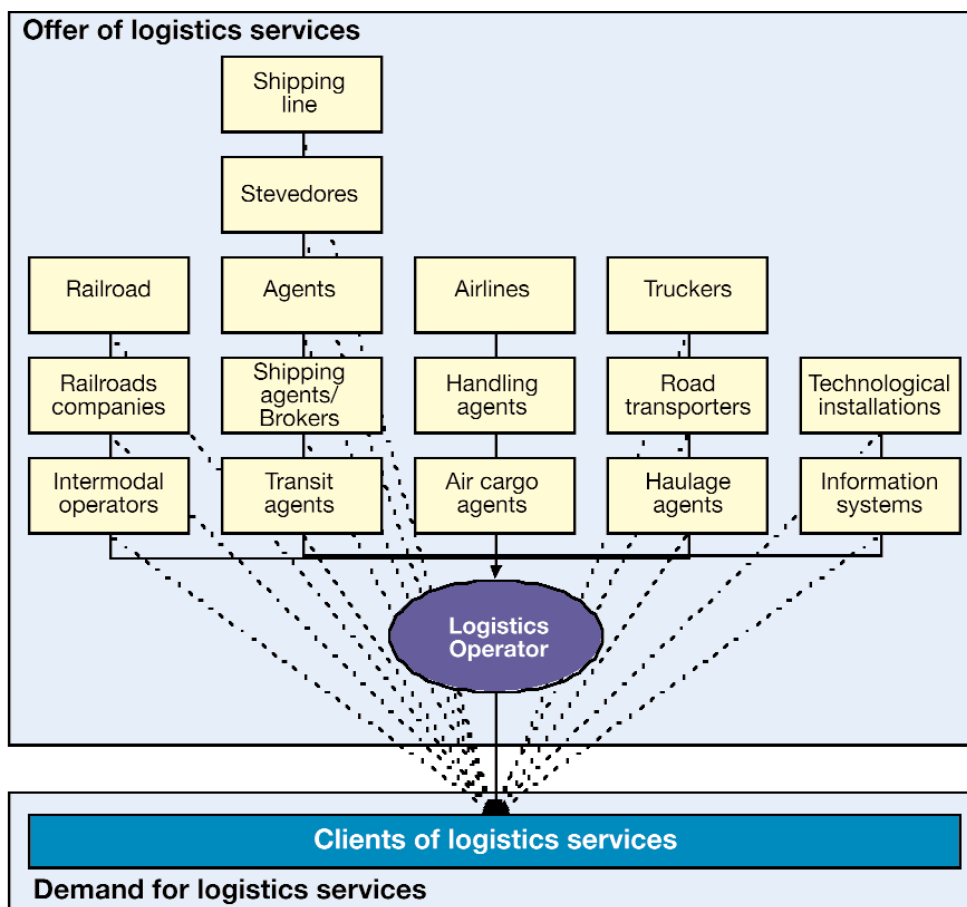


Figure 6: Agents that intervene in logistics operations

There is a large variety in the type of firms that carry out logistics operations. There are state-owned companies, for example the owners of the railroads, firms with private capital that operate at the international level and that are traded on the stock exchange and family-owned firms that operate at the national level with only a small fleet of lorries, etc.

The logistics dictionary below defines the terms in figure 6, as used in the international context.

Figure 7

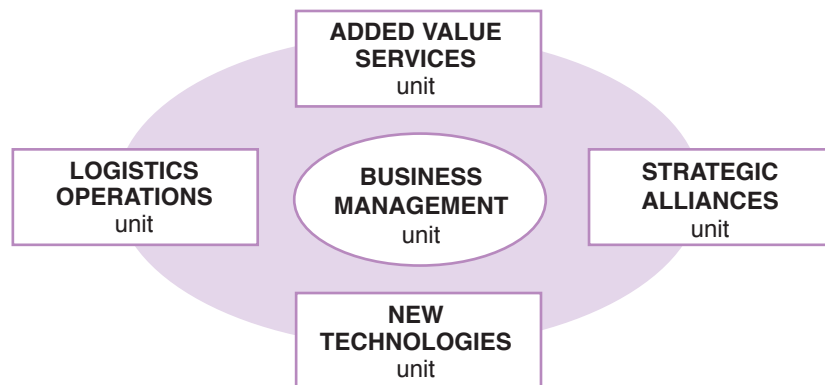
Railway company	A business that transports by rail, for which it has the necessary infrastructure: haulage equipment, wagons, platforms, etc.
Intermodal operator ( <i>ferroustage</i> )	An operator that uses intermodal transport of freight combining transport by road and rail.
Shipping line	An individual or business that is owner of a ship for maritime transport. It is responsible for the provisioning of the ship and provides the resources needed for its maintenance.
Stevedore	A business that carries out loading/off-loading operations of freight in port.



Intermediary	Intermediary business acts as a receiver of freight while it is in a port, assuming its reception, delivery and payment for shipment. An agent provides services to the ship in port. It usually carries out the commercial management of the ships that it represents.
Shipping agent/Broker	An agent that operates between a shipper and the ship owner, mediating between them in order to close contracts.
Transit agent	An agent that organizes international transport of goods, including contracting for transport, customs clearance, packing, consolidation and deconsolidation of goods, warehousing, insurance, bank transactions and obtaining documentation.
Airline	A business that carries out air transport, leaving sales in the hands of air cargo agents.
Air cargo agent	A business that sells freight space on airplanes, forming part of the distribution system for airfreight and coordinating demand for air transport with available space.
Handling agent	An agent that receives goods at an airport and prepares it for later loading and shipping. There is a difference between a terminal handling agent and a loading agent; the first takes care of reception and preparation of the freight and the second of transport to the airplane and loading.
Road transporter	A business providing for the transport of freight, either with its own means or subcontracting the services of another transporter.
Haulage agent	A business specialized in the transport of goods by road.
Source: LogisNet	

**Logistics processes:**

The model of the business of a logistics operator can include the units represented in figure 8, although not all logistics operators have all these activities incorporated into their business.



**Figure 8: Model of the business of the logistics operator**

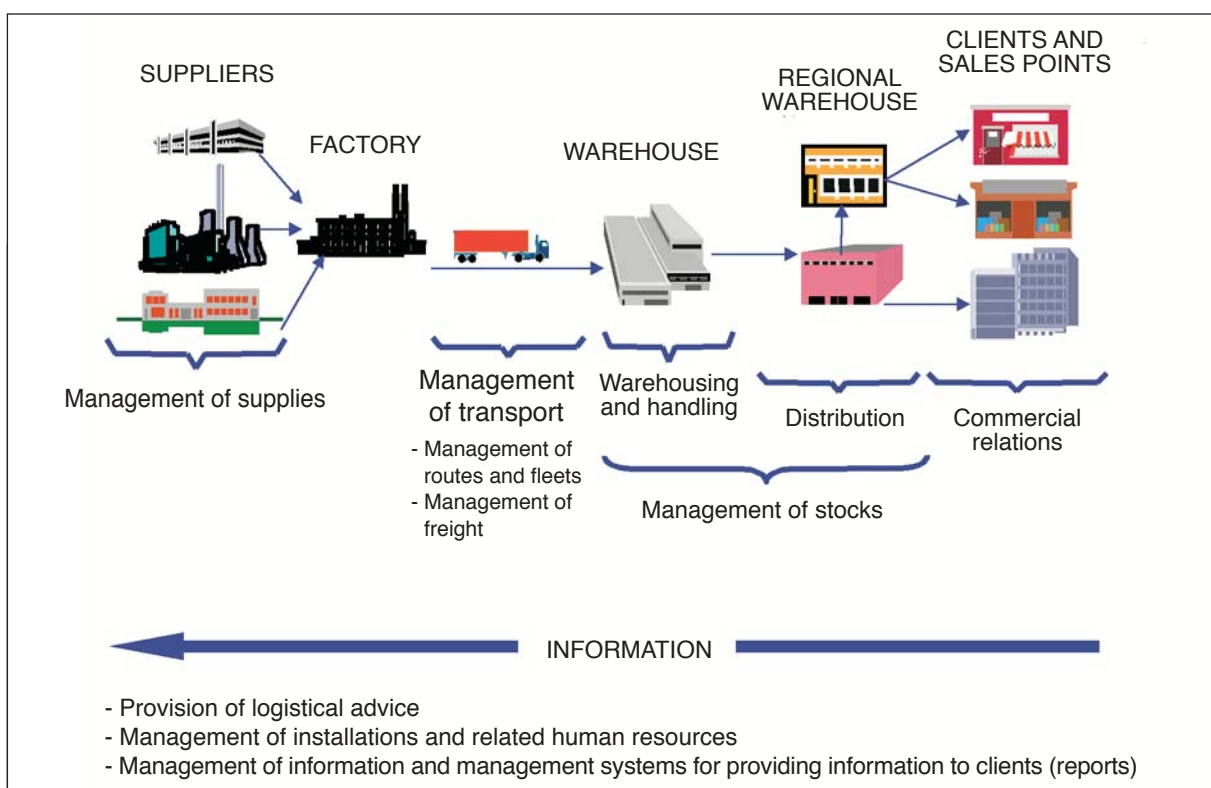
These areas are the backbone and main functions of a logistics operator. A brief explanation of each of these units is given below to facilitate an understanding.

**a) Added value services unit:**

It takes care of the services offered by the logistic operator, which are the following (as presented in figure):



- Transport in all its forms (air, maritime, fluvial, canal, railroad, road, container, intermodal, general freight, perishables and hazardous materials);
- Warehousing and handling, including deposit of goods, handling, preparation of orders, sorting, re-packing, labelling of normal, perishable and hazardous freight;
- Management of supplies;
- Management of stocks;
- Management of transport (management of routes, fleets and cargo);
- Distribution;
- Commercial relations;
- Provision of logistical advice;
- Management of installations and related human resources;
- Management of information and management systems for providing information to clients (reports).



**Figure 9: Services offered by a logistics operator**

Countries in the Mediterranean region offer logistics services in function of the sub-region to which they belong. While in sub-region 1 there is the whole range of logistics services, fewer services are offered in sub-region 2, mainly services with little added value (transport and warehousing). In sub-regions 3 and 4, even fewer services are offered, and they can even be limited to transport operations.

**b) Business management unit:**

The unit that carries out the planning, organization and management.

**c) Logistics operations unit:**

The unit that defines information channels with clients and suppliers, and defines the norms to follow in terms of quality, safety, etc.

#### d) New technologies unit:

The unit that optimizes services offered by the logistics operator. It uses new technologies to carry out the business of:

- Dealing with orders through electronic data interchange (EDI);
- Communicating with agents, markets and businesses by e-mail;
- Managing warehouses through electronic control of stocks and automatic recording of information;
- Handling freight through systems for automatic classification and the use of radio frequencies;
- Providing new technologies onboard vehicles for monitoring and the use of mobile telephones;
- Using transport circuits for programming loads and routes using a geographic information system (GIS);
- Information system for the address (EIS).

Figure 10 presents in chronological order new technologies in the logistics chain.

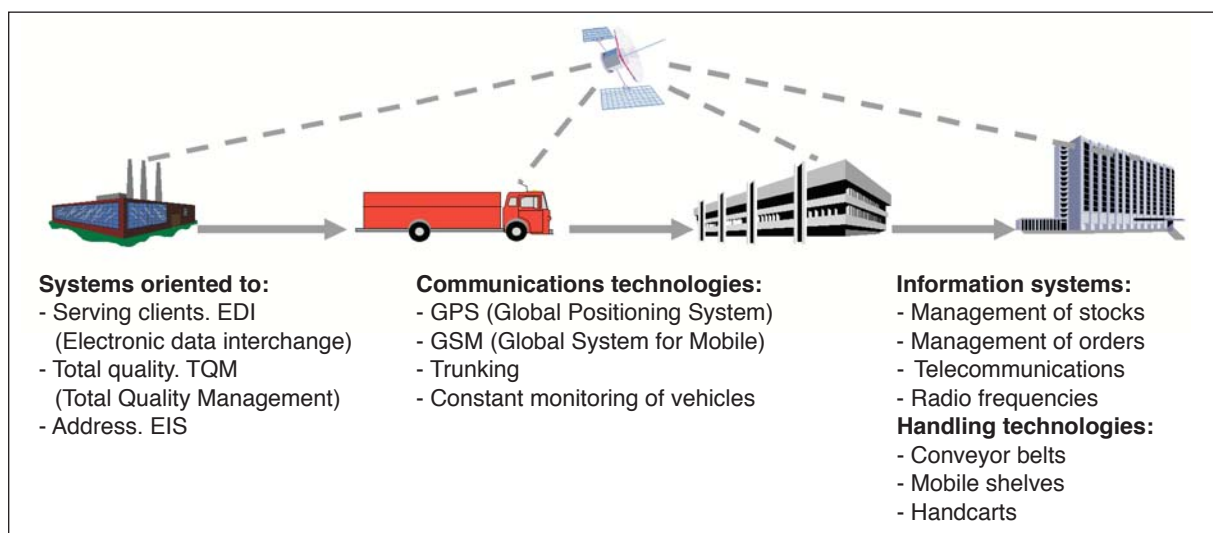


Figure 10

The logistics operator needs information technology in the following specific areas in order to carry out his work:

**Warehouses:** The operator needs to use information programmes that allow him total management, from reception of the freight until its loading on the delivery vehicle. This includes programming arrivals (either for orders or for information to clients), internal information about arrivals, preparation for storage, location systems by type or randomly, systems for repositioning, picking, completing cargo lists, routes and internal and client information.

**Transport:** The operator requires information programmes that make possible overall management, from information from the client that he needs a pick-up or delivery to the moment in which the vehicle has completed its mission. This includes programmes for loading, location in the vehicle, preparing waybills, routes, requirements of an addressee, monitoring, checking, following delivery conditions, measurement of levels of service, internal and external information, billing, control and efficiency of the vehicles.

#### e) Strategic alliances unit:

In order to obtain a market share, it is necessary to establish strategic alliances based on the creation of long-term close ties with many partners, including clients, suppliers and service

businesses or occasional or permanent cooperation with complementary businesses, due to geographical reasons, service reasons, or market reasons.

To conclude this chapter, the main factors affecting the competitiveness of a logistics operator are presented below:

- costs
- compliance with delivery deadlines
- reliability of quality of service
- services provided
- flexibility
- use of on-line information systems.

### 1.3. MARKET TRENDS

Trends in the logistics sector in the Mediterranean region vary in function of the current characteristics of the sector and therefore, will vary according to the sub-regions above.

- In general, there will be a **tendency for logistics activities to increase**. Specialization in manufacturing products and less self-sufficiency in countries increase trade and, therefore, logistics activities.
- The **Eastern countries** (included in sub-region 2) will experience especially strong growth in the logistics sector because of their proximity to Europe, their expected rapid economic growth and low labour costs.
- At the same time, there is a clear **specialization** in certain manufacturing areas, especially for sub-region 1: fresh food, frozen food, automobile parts and pharmaceuticals or in certain logistics functions, such as preparation of orders and distribution, post-manufacturing industrial processes and packaging.
- Given changes in markets and business strategies, **intermodal transport**, the use of more than one means of transport, has grown, especially in sub-region 1, because it requires a high level of coordination and services. A decrease in the average load and an increase in the frequency of shipment have led to an increase of road transport, leading to saturation of roads, an increase in pollution and a waste of energy. This has encouraged, however, the use of other means of transport such as maritime and rail transport with less environmental impact per ton transported (less consumption of resources and energy, reduction in noise, etc.).

A number of studies reveal that for short distances, intermodal transport is not usually recommended because of the handling and transport costs involved. However, each transport case should be studied, because intermodal transport represents an important opportunity for decreasing environmental impact that might be applicable in the future.

- An **increase in subcontracting** can be expected, especially in sub-regions 2 and 3. There is a clear long-term trend to contracting logistics services as part of a business strategy focused on reducing fixed costs, optimising equipment and human resources and concentrating on one core activity. Therefore, manufacturing businesses and distributors tend to subcontract transport of their goods from suppliers to destination, as well as warehousing and handling and the management of logistics platforms. In sub-region 1, there are more and more companies, so-called 4PL companies, that plan and coordinate the flow of information that accompanies the physical flow of goods carried out by subcontractors and transporters.

It can be expected that a large part of the responsibility and possibility for taking steps to improve the environmental impact of freight transport will remain in the hands of independent operators. The success of a programme of good environmental practises depends on integrating the

programme into the operations of independent transporters, through promotion of awareness, which is more feasible than in-house training because the independent transporters work primarily outside the place of business.

- There will be **integration and globalization**, especially for sub-regions 2, 3 and 4 depending on the agents and structures of sub-region 1.
- There will also be an **expansion of the network** in sub-regions 1, 2 and 3 with the objective of developing the business, improving that service and flexibility, optimizing processes and reducing costs.
- **Training** in all sub-regions. The sector's development and giving greater importance to professionalism have allowed for creating several models of specialised training covering all logistics areas, with the objective of having a skilled workforce.

## 2. INTRODUCTION OF A PROGRAMME OF GOOD ENVIRONMENTAL PRACTISES (PGEP)

### 2.1. WHAT ARE GOOD ENVIRONMENTAL PRACTISES AND A PROGRAMME OF GOOD ENVIRONMENTAL PRACTISES?

**Good environmental practises (GEPs)** are a set of personal and collective habits that contribute to minimising the environmental impact of a business activity by means of the action performed by each and every person making up the company.

For the logistics sector, **GEPs** are not based on technological changes or improvements in infrastructures, such as type of vehicle, engines, fuels. These practises do not involve additional expenses and investment, but are based on improved work habits by employees and heightened awareness. Therefore, the **personnel component** and **awareness** are crucial for the application of GEPs.

Good environmental practises should be adopted everyone participating in logistics activities, both **in-house employees** and **external subcontractors**.

The attitude of a business towards the environment is improved through the **personal commitment** of its employees, who are the ones performing activities daily. In addition to decreasing environmental impact, introduction of good environmental practises results in direct economic savings, because fewer natural resources are consumed, tasks (for example transport, preparation of orders and loading/off-loading of goods) are optimized resulting in improvement management and the amount of waste produced (for example atmospheric emissions, wastewater and solid waste) is decreased.

Good environmental practises can be successfully introduced into a business if there is a **commitment to participate** by the employees and management is committed and provides support.

In addition, there must exist a **clear relationship** between what is required in order to incorporate the good environmental practises and their full implementation.

The systematic and organized introduction of good environmental practises is the **programme of good environmental practises (PGEP)**.

This manual presents a working **methodology** that allows a business to plan and introduce a PGEP.

Regardless of the particularities of each company, every process of design and introduction of a PGEP will have to follow the steps shown in figure 11 that allow for planning the PGEP in an effective and coherent manner.

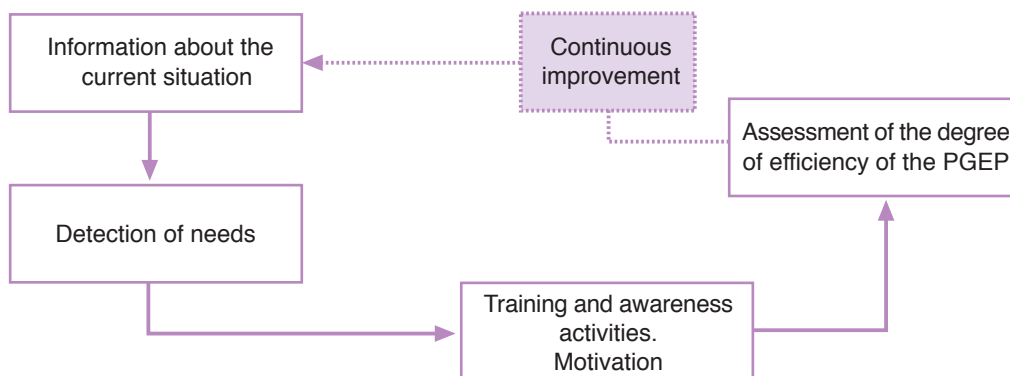


Figure 11

Concepts presented in figure 11:

- *Information about the current situation allows*: identification of applicable good environmental practises
- *Detection of needs*: selection of the GEPs to introduce in the company and indicators related to implementation.
- *Training and awareness activities. Motivation*: planning and carrying out the necessary actions of awareness raising and training of the employees on the selected GEPs and motivation in order to achieve introduction of GEPs in the daily activities.
- *Assessment of the degree of the efficiency of the PGEP*: monitoring and evaluation of the results achieved through GEP application, through observance of changes in chosen indicators.
- *Continuous improvement*: evaluation of the results achieved and knowing the new situation in order to adapt the programme for greater efficiency.

A **PGEP** is not only a set of training activities; indeed, a programme of good environmental practises is a **dynamic process** that should be adapted to the needs of the employees and to the changes in the business's activities.

**Monitoring** of the use of the good environmental practises in daily activities makes it possible to know where awareness should be reinforced and additional training provided or other good environmental practises introduced.

The good environmental practises must be chosen well, and the activities carried out within the framework of the PGEP should be **feasible**, taking into account during the preparation stage human and economic factors and the current level of environmental awareness in the business. This will allow formulation of a programme that is fully adapted to the needs of the business and that can be realistically achieved. It is preferable to have a less-ambitious but well-defined programme, because this will be more effective than one that incorporates many good environmental practises but does not take into account the business's current situation and needs.

Obtaining the cooperation of all employees (internal and external) and sharing results with them will increase their **motivation** and involvement in the programme.

A programme of good environmental practises should take into account the opinions and the contributions of all employees and should continually **adapt** to the **needs** of the business, such as new activities, the hiring of new employees and acquisitions of new technologies.

## 2.2. CONCEPTS TO BEAR IN MIND WHEN INTRODUCING A PROGRAMME OF GOOD ENVIRONMENTAL PRACTISES IN THE LOGISTICS SECTOR

### *a) Involvement of the business's management team*

The size of a business is irrelevant for the success of a programme. What is extremely important is the interest of the person at the head of the business, whether an independent operator or the manager of a company.

A small or medium-sized business has the advantage that obtaining the **commitment** of the manager is more evident to the employees, increasing their motivation. In large businesses, existing channels of communication for carrying out daily activities can be used, or channels established by the company if it has introduced a management system (quality, safety or environmental management system).

The management must be convinced that introduction of the programme will result in tangible benefits, justifying its introduction, and increasing the viability, competitiveness and long-term development of the business. An additional benefit from the programme is improvement of the business's image in the eyes of clients and other parties. A logistics business that takes into account respect for the environment and optimisation of resources stands to gain a great deal indirectly.

Therefore, the person in charge of the company will have to allocate economic resources and personnel to carry out the programme effectively. Employees should be given responsibilities and authority to carry out their work in introducing the programme.

### *b) Active collaboration in the design and introduction of a PGEP*

In the case of a one-person, independent business, the **management** will introduce the most opportune good environmental practises, namely the most interesting and the most viable, using the matrices in section 3.1 as a reference. If a small business wants to introduce good environmental practises, the manager can be in charge of the project, transmit the objectives of the programme to the employees and motivate them to participate actively. In a larger business, management must designate a **coordinator** who introduces the PGEP. This involves:

- Managing the process under the lead of the management
- Identifying possible improvements through application of good environmental practises;
- Proposing these improvements to management;
- Implementing their introduction and checking their effectiveness;
- Disseminating their use;
- Expanding the process of continuous improvement.

The coordinator may require the support of an external adviser who is a specialist in good environmental practises with experience in logistics and training. When planning a programme, the coordinator and management must identify any difficulties resulting from the business's characteristics and prepare strategies for incorporating the good environmental practises under the guidance of the advisor.

Regardless of the size of the business, it is recommended that planning and promoting awareness, training and evaluation of results be carried out in cooperation with a consultant or external expert familiar with the reality of the logistics sector and the methodology of the PGEP. The expert will advise on introduction of the PGEP and will participate in the promotion of awareness, training employees and assessing results.



The success and effectiveness of the programme lies in the business's employees and **collaborators** and their motivation and attitude. Acceptance of the good environmental practises by employees and their suggestions will lead to continuous improvement and updating and adaptation of the programme into the evolution of the business.

***c) What should I know before designing a PGEP adapted to my company***

The following key factors are decisive in facilitating the successful introduction of a PGEP:

- Involvement of the business's management and allocation of resources, manpower, responsibilities and authority to those responsible for introducing the PGEP;
- The employees' awareness about the importance of good environmental practises and recognition of their involvement and motivation;
- Selection, by establishing priorities, of good environmental practises that bring tangible advantages, based on their ease of application and the availability of resources.

The logistics sector presents a series of particularities that should be taken into account when introducing a PGEP.

- This sector is characterized by a high degree of external contracting that must be included in the introduction of the PGEP.
- There are in-house and external employees that work outside the workplace, such as road transporters, spending very little time at the workplace. Therefore, promotion of awareness is more feasible than in-place training.
- Good environmental practises must be fully incorporated into the activities of a logistics business, in order to avoid lacklustre adoption of measures.



### 2.3. STAGES FOR PREPARING AND INTRODUCING A PGEP

The success of a PGEP depends on the attitude of the business's employees and on their awareness and training. The programme should be based on carrying out a series of actions that are coherent with the environmental situation of the business, with its resources and needs and must motivate and involve the employees. The PGEP must be prepared and planned following a logical and ordered sequence. A disorderly programme can result in not obtaining the participation of the employees and, therefore, their awareness, that there are no options of continuity of the programme and that a good channel of communication and information is lost.

A PGEP should be structured as described in figure 12.

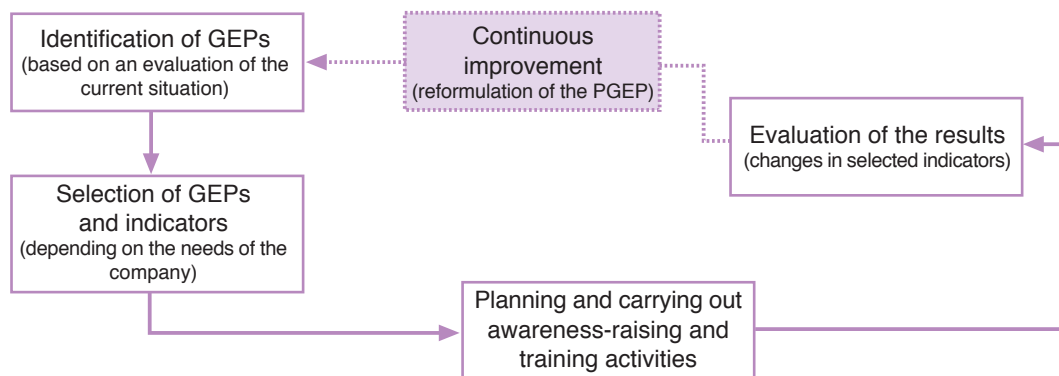


Figure 12

Steps presented in figure 12:

- *Identification of the good environmental practises to consider:* in function of the business's current situation, and with the collaboration of the employees that the management has decided to involve in the process, the GEPs that should be taken into account for improving environmental management will be identified.
- *Selection of good environmental practises that will be introduced:* a correct selection of GEPs, among those identified in step 1, will facilitate their adoption by the employees, and therefore, it will allow continuity of the PGEP. The selection criteria can be:
  - Ease of introduction: The practises are easily included in daily activities without and there is little resistance to their introduction;
  - Obviousness: Employees easily detect the need to apply the good environmental practises;
  - Image: Introduction of good environmental practises gives clients and society in general the impression that the logistics service is concerned about the environmental aspects of its activities;
  - Economic: Good environmental practises can provide tangible benefits by reducing the use of materials and environmental management costs and lead to investment in new technologies or modification of installations.

The indicators that we choose will tell us if we the employees are applying correctly the GEPs.

- *Planning and carrying out awareness-raising and training activities:* Awareness-raising and training should be adapted to the characteristics of the of the business's employees. It should lead to employees becoming conscious of the environmental impact of their activity and that their attitude and behaviour do have an impact on the environment and that their colleagues and third parties also have an impact on the environment. Training should provide clear ideas about how to introduce good environmental practises into daily activities and information about the consequences of not carrying them out and which improvements can be achieved with their introduction.

When planning awareness-raising and training sessions, it will be necessary to take into account external employees and training new personnel.

- *Evaluation of the results:* Monitoring changes in indicators associated with the practises should make it possible to have an idea of the effectiveness of the PGEP and of the results obtained. The indicators should be objective and independent of the number of employees and the evolution of the business. It is recommended that relative indicators be used; for example, use of a parameter per trip, load, vehicle, etc.
- *Continuous improvement:* On the basis of the results obtained, the business should periodically re-evaluate which good environmental practises should be introduced as part of the effort for continuous improvement.
  - There may be practises that have not yet been integrated into daily tasks that should be recalled later.
  - There may be practises that have not been introduced well because they were poorly understood or inappropriate. If those practises are a priority, training could be enhanced, or if it is not the moment to apply them, they should be postponed when the situation is more favourable.
  - There may be practices that, after the re-evaluation, should be communicated to the employees. These GEPs along with new GEPs (if applicable) will be the object of new training and awareness-raising sessions.

A process of continuous improvement will make the PGEP dynamic and adapted to the business's needs, its employees, the environment and society.

When introducing a PGEP in a logistics company, the PGEP coordinator should consider the following steps:

- a) First, the processes of the sector that the company carries out should be identified.

The initial situation will be analysed in order to detect the strong and weak points of environmental behaviour. It is recommended that the "Guide for an Initial Evaluation of the Environmental Situation" (see annex 4.2.) be used.

- b) Once the activities of a business are identified, turn to the matrices in section 3.1, which are organized by activity, for which there is a choice of environmental impacts and good environmental practises to be applied. Determine the good environmental practises that should be implemented, assigning priorities in function of their importance, facility of introduction and the means available, and plan their introduction. There are columns in the tables for each type of logistics business to help identify whether they are affected by the activities carried out by that business. In the last column is given the number of a sheet describing an environmental impact (section 3.2). These sheets describe specific good practises for the environmental impacts to be corrected, and some guidelines for improvement.

**Example:** A transporter carrying full loads (a type-B business) wants to identify good environmental practises in the loading and off-loading activities.

1. Consult the matrices and select matrix no. 2 (loading and off-loading) where the impacts and good environmental practises applicable to a type-B business are indicated.
  2. If more information is required, the last column (N) gives the number of the corresponding sheet of the environmental impact.
- c) After selecting and planning the introduction of the relevant good environmental practises, and the sheets mentioned, a programme of awareness promotion and training should be planned, according to availability of the employees that will have to integrate the practises. Advice for planning this programme can be found in the section on tools for promoting awareness and training below (2.4.).
- d) After the good environmental practises have been in use for some time, it is necessary to evaluate
- the improvement achieved
  - the level of the employees' participation and motivation.

The type of evaluation depends on the type of business involved. An evaluation begins to be significant after the practises have been functioning for a minimum of six months, always making comparisons with the same seasons. After 12 months, the figures monitored consolidate and allow for better data management.

Information should be obtained directly from those involved (when carrying out training activities or during conversations / meetings with the employees concerned) or from questionnaires whenever direct collection is impossible.

The logistical agent has to evaluate savings achieved and the acceptance shown by clients. The benefits will be assessed more easily if records of monitoring indicators chosen for the application of GEPs are kept. To facilitate follow-up, data showing easily evolution in management should be picked out from the register. These "reduced data" or indicators should be followed over a period of time in order to register changes to take into account in setting new objectives within the process of continuous improvement.

- Indicators that must be monitored in any case:
  - Indicators of fuel consumption per kilometre driven during a period
  - Number of kilometres driven on each tyre
- Depending on the type and size of a business, the following indicators can also be of interest:
  - Monthly consumption of water;
  - Pollution load of wastewater;
  - Annual number of deliveries of containers of general waste not sorted at source;
  - Kilos of plastic film for palletization sorted at source compared to the total generated;
  - Kilos of cardboard sorted at source compared to the total generated;
  - Kilos of paper sorted at source compared to the total generated;
  - Number of accidental spills in a year, ranked by their importance (for example, with values of 1 to 5);
  - Measurement of external noise whenever applicable;
  - Number of accidents with hazardous goods compared to the total number of deliveries;
  - Number of accidents with non-hazardous goods compared to the total number of deliveries;
  - Number of kilometres travelled between oil changes (it should be controlled that oil quality has remained uniform – with own tests or with the supplier);
  - Number of incorrect deliveries compared to the total number of deliveries;
  - Amount of damaged packing compared to the total amount of packing handled.

For fuel and tyre consumption, see the example on sheet 1 on atmospheric pollution in chapter 3. The two last columns of the example for recording data on this sheet are the indicators. A business should correlate these indicators with the other data on this form (driver, route, load, tyre pressure, etc.) in an attempt to determine whether this information reflects the results of the good environmental practises that have been introduced, so information obtained corresponds to the objectives of improvement pursued.

Indicators of waste make it possible to see whether non-sorted waste has been reduced and whether the amount of sorted waste has been increased, as well as whether sorted waste is being sorted more correctly. The number of containers is normally used for this measurement.

When assessing wastewater, it is necessary to take into account both the amount and the hazardousness.

Periodical monitoring of changes in these indicators will provide information about the effectiveness of the good environmental practises that have been introduced and the effectiveness of the awareness-promotion and training activities. It will also allow for knowing if the selection of GEP has been appropriate.

Based on this information and a re-evaluation of the business's current situation (under the environmental point of view of its activities), new practises can be introduced or reinforcing measures of the practises that have not been sufficiently integrated into the business activity.

## 2.4. TOOLS FOR PROMOTING AWARENESS AND TRAINING

Introduction of a programme of good environmental practises in a business requires promoting awareness and training the employees directly involved in the logistics operations causing an environmental impact, but it is also recommended to make all employees take part.

The management of the company, together with the coordinator (if appropriate), should consider the possibility of hiring an environmental experts for all or some of the activities to carry out. It will also make resources available so all employees are able to implement the GEPs that will be the focus of the training activities.

Whenever possible, a formal meeting between the management and all employees should be held, by groups, shifts, etc., whatever is convenient, to provide information about the programme of good environmental practises and about what is requested from the employees.

When the training sessions are prepared, it is not necessary to separate the impacts according to the target group of employees receiving the training. It is positive that everyone has an overall picture of the business's environmental impacts.

However, when training is carried out on the good environmental practises, it might be more appropriate to do it in a different manner for every different target group receiving the training. For example, depending on the group, reinforcing the planning practises, or focusing more on vehicle maintenance or on driving characteristics.

### **a) Awareness**

Awareness actions are intended to inform the personnel about the good environmental practises policy established by the management, as well as let all employees know how they can contribute to the efficiency of the good environmental practises.

Awareness can be promoted through:

- a) written communications (posters, communiqués or instructions)
- b) verbal communications (group meetings, personal communications).

Written communications can be used to communicate the general policy of the company regarding environmental practises and specific messages about them. For example, a communiqué can be posted on an existing bulletin board and given to each employee where the company informs of a GEP it wants to carry out, stating the importance of the practise on its contribution to the sustainability of the company's activities, as well as asking for the active contribution of each employee to ensure the success of the practise.

Specific messages recalling the good environmental practises can be the placing of posters at points where certain environmental impacts occur; for example "Be careful, don't run with the trolley: you will avoid accidents and damaged goods" (in the loading and off-loading area); "A badly prepared order is an order that will come back: and we all loose" (in the area where orders are prepared); "Each waste in its place" (placed in areas where waste is likely to be produced). In any case, each company will determine how many posters will be necessary according to the programme established, the GEPs to implement and the impact areas that the company wants to address.

When a business uses written notes to give work instructions, reminders about the introduction of good environmental practises can be incorporated.

Written messages and notes will also have to be used with external collaborators or with employees that normally perform their activities outside the work place, such as autonomous transporters and drivers respectively.

Ideas for messages (written messages and oral communications) can be found in this manual, in:

- the matrices of activities
- the good environmental practises sheets
- the driver's manual

## **b) Training**

The aim of training should be to provide employees with information to introduce the GEPs in their work tasks. The programming and carrying out of training sessions (after information and awareness) will have to adapt to specific needs of each professional post and taking into account the responsibilities each employee.

However, training about GEPs should be part of the general training programme of every business, to ensure permanent training on that issue, be it for new employees or for revising the GEPs as established by the management.

In principle, three levels of training should be established for three levels of responsibility:

- management
- foremen
- operational personnel (personnel present permanently in the working place and employees working outside the company –drivers–)

For every one of these three groups, a different programme of adequate time-length should be prepared with that ensures full understanding of the concepts and practises to be introduced. There should be theoretical and practical training for each level to give clear ideas about how to integrate good environmental practises into daily activities, providing information about the consequences of not carrying them out and about the improvements that will be achieved.

Depending on the professional post, training can be carried out using several models:

- either requiring presence for classes at the workplace, taking advantage of meetings at the beginning of the day, so the personnel can get together and knowledge and experience of the participants can be used.
- or not requiring presence using communications or manuals specific to the professional post.

For training requiring presence, training sessions will have to take into account employees' schedules and whether it is preferable to hold a single training session for several departments or by groups and activities depending on the number of employees.

It is preferable to concentrate training on a few well-explained and reasonable good environmental practises rather than presenting all good environmental practises to introduce in one single session. In order to maintain interest, classes should last no more than one hour and allow for the participation of the employees. The training material should integrate the practises into the daily activities and the different tasks or professional posts, so the employee receiving the information can identify clearly how he or she can integrate the GEP into its professional tasks. Photographs and photocopies of procedures can usefully be included in the training material.

For employees that are not continuously present at a workstation, such as drivers, there is the option of adapting the driver's manual, which is attached as annex 4.1.

If the business does not have the appropriate expert to provide the training, an external expert may be called in to help carry out the training.

Training programmes vary depending on the business and level of responsibility.

### **An Example of a Training Programme about Good Environmental Practises**

#### **1. INTRODUCTION**

1.1 Concept of the environment and sustainable development

#### **2. ENVIRONMENTAL FACTORS IN LOGISTICS**

2.1 Packing, packaging and environmental impact. Risk and pollution factors.

Problems of waste

2.2 Environmental aspects in planning routes

2.3 Return travel and inverse logistics

2.4 Environmental impacts of transport and their minimization

#### **3. GOOD ENVIRONMENTAL PRACTISES**

3.1 Impacts and good environmental practises in logistics operations:

a) Planning routes

b) Loading and off-loading

c) Preparation of orders

d) Transport

e) Maintenance

3.2 Corrective actions

3.3 Prevention and safety measures

3.4 Activities related to suppliers and clients

3.5 Evaluation and revision of the application of the good environmental practises and continuous improvement

#### **4. LEVELS OF ENVIRONMENTAL QUALITY**

4.1 Measuring levels of environmental quality

4.2 Measuring, recording and monitoring environmental impacts

Note: This example corresponds to a complete programme at the level of managers and persons responsible for a business's programme of good environmental practises. For lower levels, specific points that affect different workstations should be selected to make up their training.



## 2.5. MONITORING AND CONTINUOUS IMPROVEMENT

Training should be evaluated in terms of acquired understanding of the content (the good environmental practises) and effectiveness of application at the workstations.

### - Assessment of training

It will be verified through objective tools allowing for evaluating assimilation of contents and capacities of the participants of the training programme, which later will allow them for integrating the good environmental practises in their daily activities.

The evaluation should include an assessment by the participants of the training contents and trainers. This assessment along with possible comments will have to be taken into account in future training sessions.

### - Assessment of results

A second evaluation of training and awareness should be made to see whether the good environmental practises have been incorporated into daily activities by the personnel who received the training, in order to learn if the stages prior to the PGEP have been carried out efficiently: identification of the GEPs, selection of GEPs and training/awareness of the selected GEPs.

Assessment of the efficiency can be done by using changes in the following indicators (which give an idea on the adequacy of the methodology and the resources employed):

- number of cases of non-observance of a practice at a workstation (creating a register by workstation and analysing the results over time)
- decrease in fuel consumption and tyres
- results of evaluation questionnaires on training. In the section about interest, perception of the PGEP to introduce will be assessed (it has to be anonymous in order to ensure credibility). In future training sessions, since GEPs will be the object of continuous training, changes in results of these questionnaires over time will allow for detecting variation in acceptance of the PGEP.
- the creation of working groups for continuous improvement makes it possible to use other indicators, for example the number of proposals for improvement or the number of proposals for improvement applied.

Another indication is any change in indicators used to monitor the good environmental practises selected (some examples of indicators can be found in section 2.3.). This follow-up will allow for seeing if the GEPs have been integrated in the daily activities, and if that is not the case, it will help analysing the reasons why GEPs have not been integrated.

Monitoring will indicate the next objectives for the programme:

- Strengthening the training and awareness activities on the GEPs that have not been assimilated
- Reminding the GEPs that have been partially integrated
- Considering the application of new GEPs

After monitoring, training and awareness on the selected GEPs will continue to take place along with evaluation of results. The objective will be continuous improvement in view of having a dynamic programme that is adjusted to the needs of the business.



Employees must be motivated in order to make them feel part of the programme, and their collaboration will help planning and establishing objectives for the next PGEP. Having the suggestions of the employees will help everybody participate actively in the programme and make the necessary efforts to ensure the success of the PGEP. Informing employees about improvements and environmental benefits achieved through introduction of the programme is one of the means to instil motivation and improve the programme.

## 2.6. MODELS FOR INTRODUCING A PGEP IN ACCORDANCE WITH THE SIZE OF A BUSINESS

There are two basic types of businesses:

- logistics operators: they carry out all activities, therefore, it can be used as the basis for any of the logistical activities.
- independent transporters: we will see how to integrate the GEPs in their daily activities in order to have less environmental impact and at the same time, an economic benefit in developing their daily activities.

Managing transport of dangerous goods concerns any type of logistical business who deals with this kind of goods. This manual does not intend to present the regulations existing on this type of transport, which are already complex. Regardless of the transport being ADR<sup>1</sup> or not, the methodology for introducing a PGEP will be the same since it includes the same stages to follow and the same commitment of continuous improvement. The only difference lies in defining what GEPs have to be applied, since for transport of dangerous goods, ADR guidelines will have to be taken into account.

Regardless of the type of logistical business, introducing a PGEP includes the following stages:

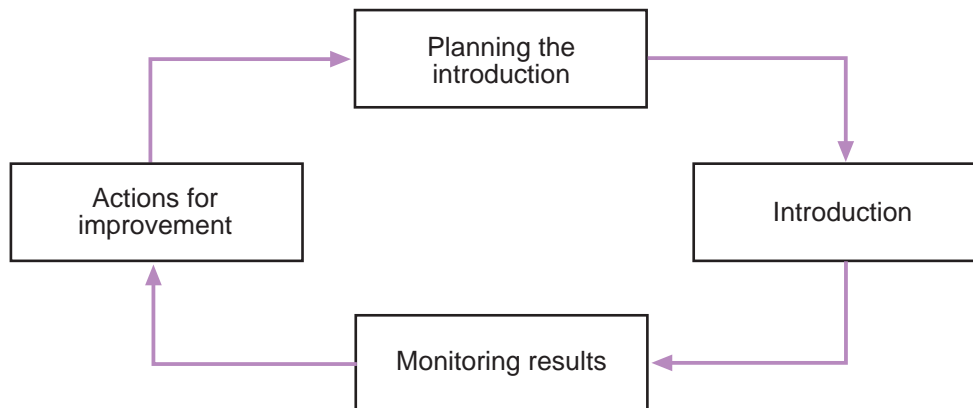


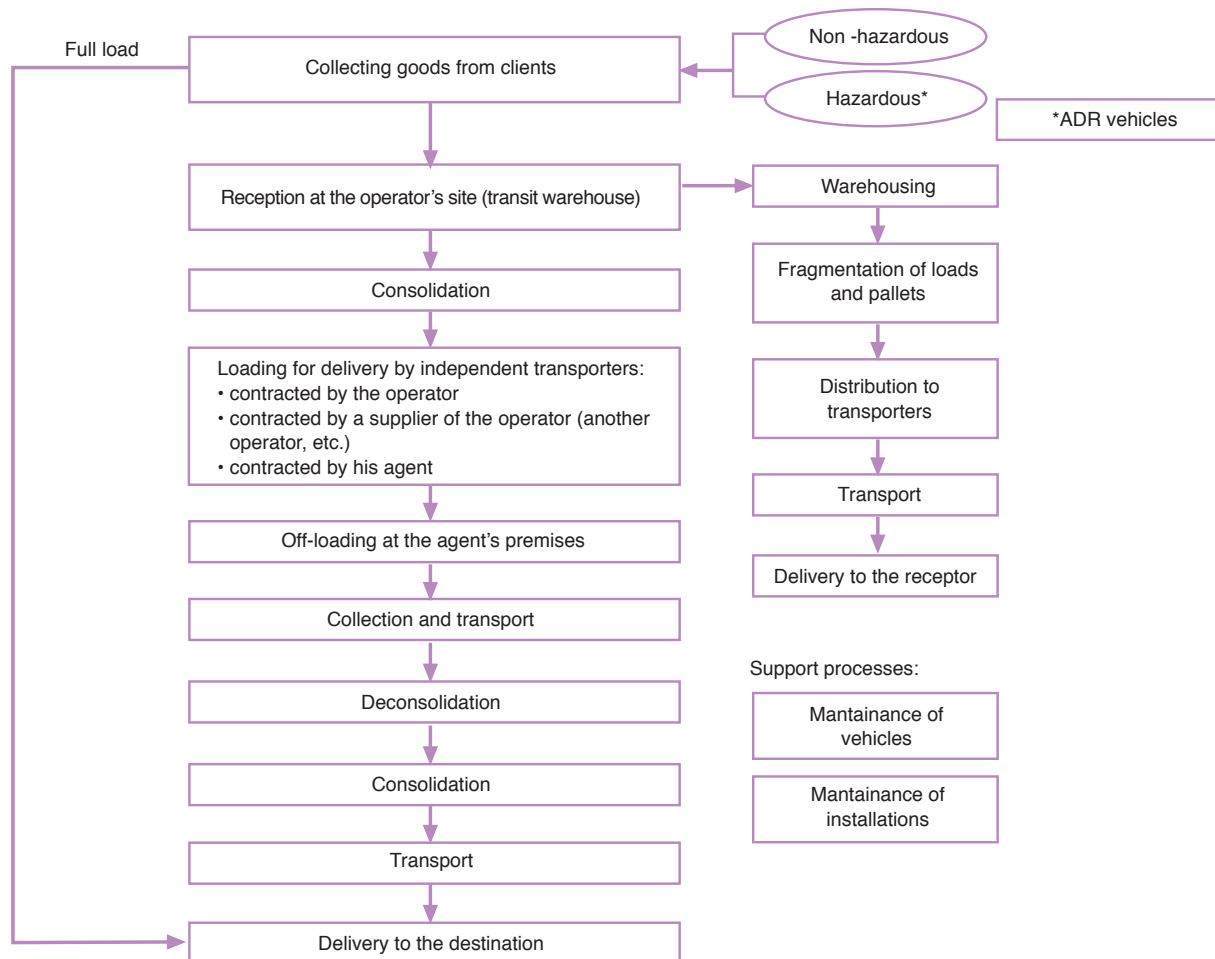
Figure 13

The only difference between the introduction of a PGEP in a logistics operator or an independent transporter is in the instruments used to introduce the programme and the employees involved. The two examples given below indicate how to carry out a PGEP in the two cases.

<sup>1</sup>Transport of dangerous goods by road

**a) Example of a logistical operator**

A logistical operator is considered to be that having a process flowchart as follows:



**Figure 14**

For most logistics operators and similar business, company-owned lorries are usually a small part of the total number of vehicles managed. Logistics operators frequently subcontract to independent transporters in order to have more flexibility, and many independent transporters frequently work regularly with the same operator. A cooperative could be integrated in the second option. When planning a PGEP, this characteristic of the logistics sector should not be forgotten.

**a1. Influence of the operator in applying good environmental practises**

Figure 14 allows for seeing how much direct influence an operator has when applying the GEPs, as well as its capacity of influencing implementation. Therefore, the main labour groups to be trained and made aware are:

- Drivers (in-house and independent subcontractors);
- Maintenance personnel for vehicles;
- Maintenance personnel for the installations;

- Loading personnel:
  - Planning of routes
  - Contracting independent transporters
  - Agreements or contracts with agents
  - Contact with clients
  - Organization of the grouping of freight
- The persons that handle, load, clean and do other related tasks.

All employees, regardless of the their tasks, should become involved in the introduction of the PGEP.

Therefore, when implementing the PGEP the following should be taken into account:

- Introduction of GEPs in operations or processes where the logistical operator has direct influence, mainly its own personnel
- Including environmental issues in the relationship/contracts with the subcontractors, independent transporters, agents, etc., in order to make all collaborators introduce the good environmental practises when possible

Because of the high level of subcontracting, subcontracted personnel should be considered in the organization of the groups that receive awareness promotion and training because they are an active part of the main business. For instance, the GEPs that the business wishes to introduce in the activities of the business' own drivers will also have to be notified to subcontracted drivers. The same applies to the rest of subcontracted services.

## **a2. Methodology for a small business**

In figure 15, is given the sequence of the process for introduction of a PGEP adapted to a small business with, probably, fewer resources in employees or time than a medium or large-sized business.

- Identifying and choosing the GEPs

When the management knows in detail the small business, reading the matrixes related to its processes will facilitate determining the environmental situation of the company.

In the section of environmental impact of the **matrixes** and in the related **sheets**, information can be found for selecting good environmental practises for promoting awareness and training employees.

- Training / awareness raising and monitoring results

Figure 15 presents a possible sequence of steps to carry out when performing the training and awareness raising on the related GEPs and monitoring the results achieved by implementing the GEPs.

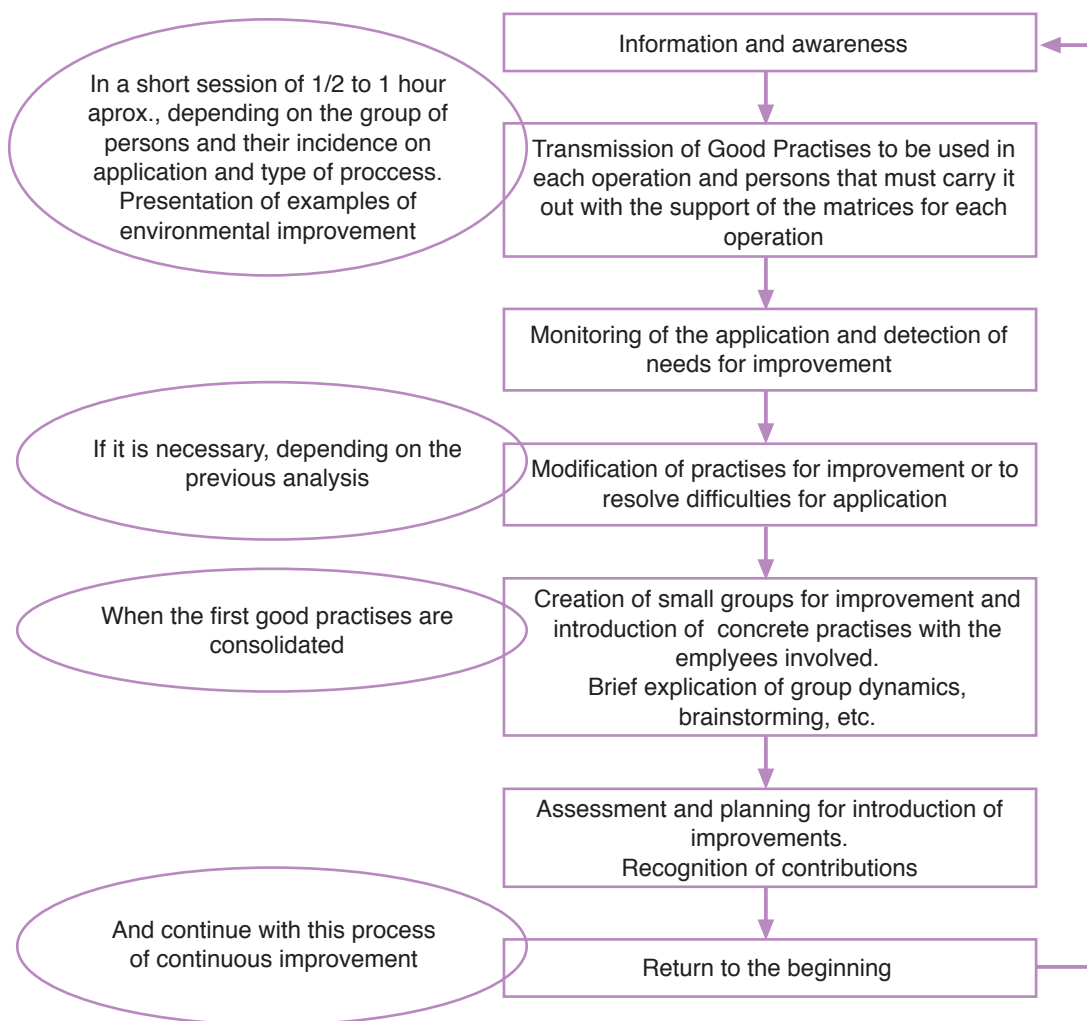


Figure 15

### a3. Methodology for a medium or large-sized business

In order to know which GEPs can be applied in a business, the first thing to carry out will be an assessment of the preliminary situation. Chapter 4.2 in the Annexes proposes an instrument to be used to that purpose (Guide for an Initial Situation of the Environmental Situation).

For a medium or large-sized business, management needs an initial evaluation in order to have a detailed picture of the environmental situation in which the business operates.

A schema of the steps and a sequence proposed for these businesses is given in figure 16.

The management will have to entrust the carrying out of the programme to a valid and skilled individual (Coordinator of the PGEP). The Coordinator of the PGEP will probably need the assistance of an external expert providing advice in identifying and choosing the GEPs, carrying out awareness raising and training and assessing the results as well as proposing actions for continuous improvement.

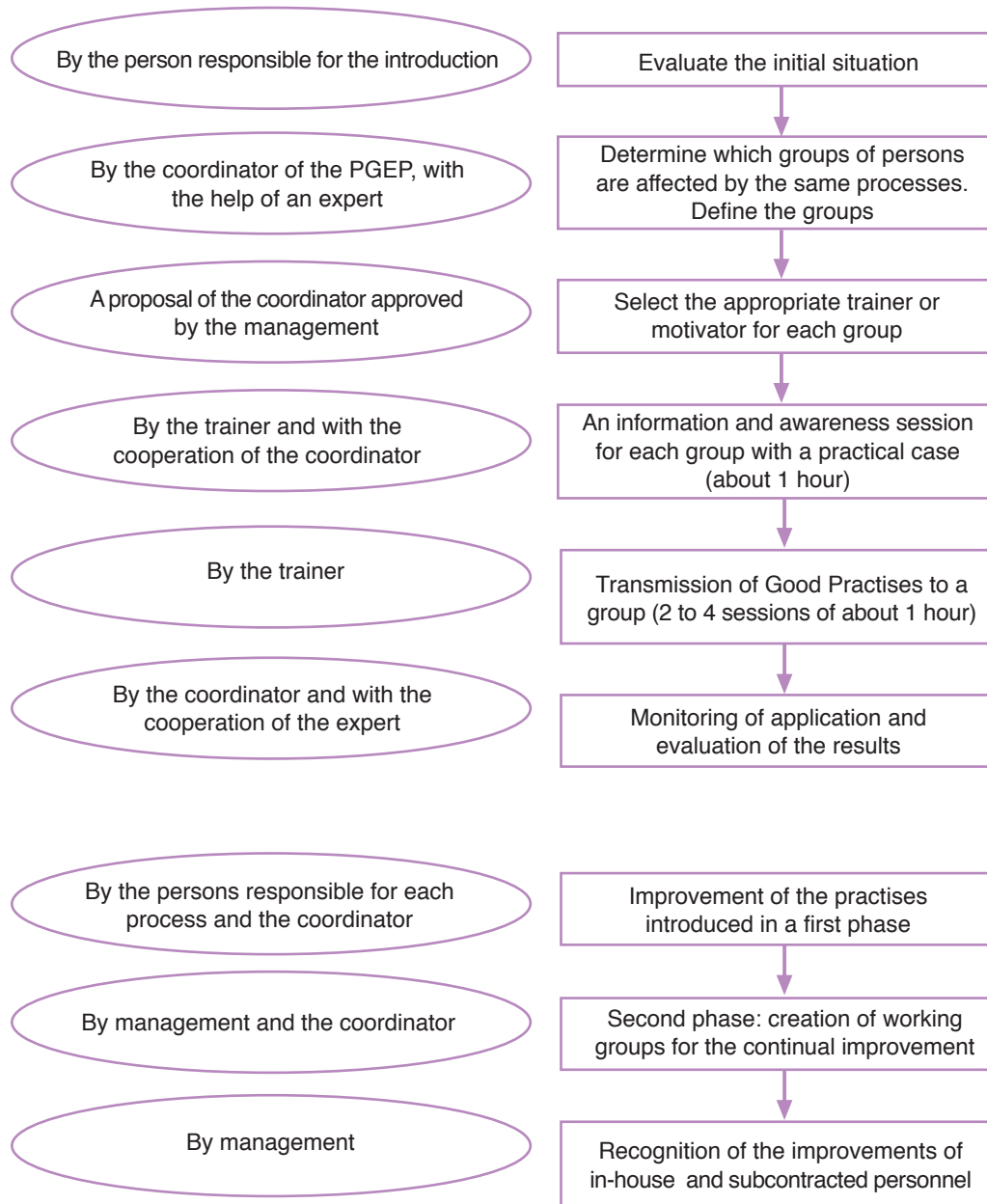


Figure 16

**b) Independent transporters**

An independent transporter can be involved in the introduction of a PGEP because the business with which he cooperates has decided to introduce a PGEP or because he wants to incorporate good environmental practises into his operations.

In the first case, he will be incorporated into the PGEP as one of the business’s drivers.

In the second case, he will have to identify and introduce the good environmental practises into his activities; information for that case is given next. As it has been mentioned above, the stages for implementing the GEPs will be the same, regardless of the transporter carrying dangerous or non-dangerous goods. The difference between both situations will lie in choosing the GEPs to be introduced; at that moment, if the transporter carries dangerous goods will have to bear in mind the guidelines for action as established by ADR regulations.

- Operations with environmental impacts on which independent transporters can act are indicated in the matrices of good environmental practises and environmental impacts (chapter 3). In the first column on the right is indicated the number of the sheet where can be found the description and additional explications for applying the recommended good environmental practises.
- An attempt should be made to incorporate the information on the sheets into each independent business. This provides sound support to improve daily practises, which will produce greater economic results and gradual greater appreciation by clients, since better environmental management becomes progressively more required to suppliers.

Figure 17 shows the schema proposed to follow:

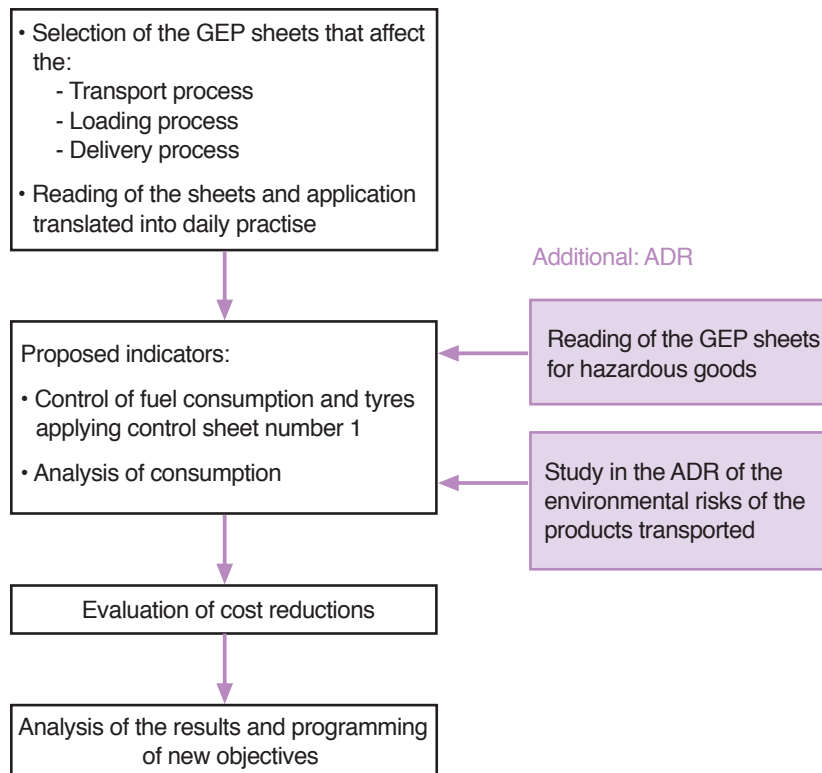


Figure 17

### 3. IDENTIFICATION OF APPLICABLE GOOD ENVIRONMENTAL PRACTISES

#### 3.1. MATRICES FOR IDENTIFICATION OF ENVIRONMENTAL IMPACTS AND GOOD ENVIRONMENTAL PRACTISES BY ACTIVITY

In this section are presented identification matrices for identifying environmental impacts and good environmental practises depending on activities. In order to make these matrices an efficient working tool, it is necessary to follow a systematic approach in interpreting the matrices as described below.

1. Identify the processes that take place in a firm. Each process has an associated matrix:
  - Matrix 1 Planning and managing pick-up and delivery routes
  - Matrix 2 Freight-loading operations at the shipper
  - Matrix 3 Loading operations at logistics centres
  - Matrix 4 Transport
  - Matrix 5 Freight off-loading operations
  - Matrix 6 Location and warehousing of goods
  - Matrix 7 Handling at the warehouse
  - Matrix 8 Preparation of orders, break-down and packaging
  - Matrix 9 Vehicle maintenance
  - Matrix 10 Maintenance of installations
2. Determine the type of logistical company:
  - A – Logistic operator (including all activities)
  - B – Full-load transport agency
  - C – Split-cargo transport agency
  - D – Independent transporter
  - E – Sender and consignee
3. Once these two steps have been completed, analysis of the matrices that correspond to the business's activities can begin to determine the good environmental practises to introduce in each situation.

In the first part of each matrix are listed the **environmental impacts** of each activity. In the second part, are indicated the **good environmental practises** that should be introduced for each impact.

In the columns on the right, both for the environmental impacts and good environmental practises, a cross indicates what affects each type of logistics business (A, B, C, D, E). In the last column, is given the number (N) of the sheet of good environmental practises to go to for complete information.

## 1. PLANNING AND MANAGING PICK-UP AND DELIVERY ROUTES

During this phase, the characteristics of the vehicles in circulation and the planning of the routes have an important influence on environmental impacts because there is probably a need to cross through sensitive urban and residential areas, increasing their importance

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Noise pollution and vibrations	x	x	x	x		5
• Tyre wear is greater when driving on roads with curves and grades than on straight roads or on the motorway	x	x	x	x		3
• Atmospheric pollution is of great importance for the environment because of the high sensitivity of the environment and because urban areas are often saturated	x	x	x	x		1
• Traffic and congestion, especially in urban, high-density peripheral and residential areas have repercussions on all the impacts described by raising sensitivity and the overall level	x	x	x	x		All
• Level of risk of accidents and their consequences in function of the route (spills, fires, etc.)	x	x	x	x		6
<b>GOOD ENVIRONMENTAL PRACTISES</b>						
• Efficient management of the planning of routes	x	x	x	x	x	1
• Choice of most adequate vehicles in function of the operations when it is a question of splitting loads. Make a selection in function of the period of pick-up before consolidation or later delivery after <i>deconsolidation</i>	x				x	1
• Access roads in the loading area facilitate access and reduce congestion	x	x	x	x	x	1
• Plan car parks for waiting and service areas for vehicles	x	x	x		x	1-5
• Select delivery schedules in order to minimize impact, taking into consideration variation in traffic density in order to use non-congested roads	x	x	x	x		1
• Choose the right vehicle in function of the activity	x	x	x	x		1
• Avoid poorly paved roads (producing an increase in fuel consumption, atmospheric and noise pollution and vibrations). Compare total costs (including environmental costs) with alternative routes although these are longer	x	x	x	x	x	1
• Use the intermodal transport system (multimode containers), if appropriate, for transport of full loads. Improve productivity of loading and off-loading operations by planning for combined transport	x	x	x	x		5
• Measure transport noise in critical areas in order to know the impact, and evaluate whether it is acceptable and decide which measures should be taken	x	x	x	x		5
• Define noise limits for each autonomous region in order to know which limit is applicable in an area for transit traffic and pick-up and delivery points	x	x	x	x	x	5
• Respect mandatory routes for dangerous and heavy vehicles	x	x	x	x		1-6



## 2. FREIGHT-LOADING OPERATIONS AT THE SHIPPER

In freight-loading operations at the shipper, the following environmental effects can occur that should be taken into account.

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Atmospheric pollution from fuel consumption because of:						
- Excessive waiting time for vehicles at the site, making operations difficult because of incorrect planning of pickup schedules	x	x	x	x	x	1
- Goods not prepared on time and lack of capacity for loading, generating waiting time and lengthening runs	x		x		x	1
- Errors in identification and references of items, creating a risk of double transport and incorrect delivery	x		x		x	1
- Unnecessary idled engines. Movement with the engine at excessive revolutions	x	x	x	x		1
- Unprepared documentation	x	x	x	x	x	1
- Poor distribution of products on pallets and lack of optimisation of pallets, containers, boxes, etc., which makes poor use of the vehicle's capacity and creates difficulties for handling	x	x	x	x	x	1
• Soil pollution from:						
- Spills of oils or engine fluids or from circuits	x	x	x	x		4
- Loading or off-loading outside the pick-up site (in the street or other public area)	x	x	x	x	x	1
• Noise pollution from waiting time outside the pick-up point, creating traffic congestion, difficulties for parking and inconveniences in the neighbourhood	x	x	x	x	x	1-5
• Generation of waste by:						
- Poor placement, handling with risk of damage to the goods and generation of defective products and waste	x	x	x	x	x	3
- Loading accidents. Falls/waste and the resulting pollution	x	x	x	x		3
- Insufficient information on product data. Lack of traceability in the product data about the products, especially perishable products	x	x	x	x		3

<b>GOOD ENVIRONMENTAL PRACTISES</b>	A	B	C	D	E	N
• Rapidity in the run, without waiting time. Punctually respect delivery hours agreed upon and maintained updated. Programme with the loader (sender) and include the schedules in the contract, in each order or for each delivery in accordance with the needs of the pick-up times. Register delays of the transporter and the waits caused by the loader (sender) efficiently through control records easy to fill out that can be studied. Strengthen these measures for hazardous goods and in function of volumes (tanks, etc.)	x	x	x	x	x	1
• Adequate management of loading equipment in order to have them available whenever necessary: dollies, conveyer belts, forklifts, adequate equipment in the lorry and at the loading site for opening boxes, loading platforms, etc.	x		x		x	3
• Adequate management by the driver of any waiting time in order to prevent unnecessary internal movements	x	x	x	x		1
• Optimisation of pallets, boxes and containers in order to achieve maximum use of the load capacity	x	x	x	x	x	1
• Goods correctly stored and placed on pallets, containers, etc.	x	x	x	x	x	1-3
• Planning of the loading of inverse logistics (pallets, waste, etc.)	x	x	x	x	x	1-8
• Adequate management of information with traceability of the product. Documentation of deliveries, tags and loading, if appropriate, safety guidelines for hazardous goods, etc.	x	x	x	x	x	1
• Analyse records of the time used for loading operations and if the times required are excessive, indicate this to the loader	x	x	x	x	x	1
• Training of the employees involved in these topics	x	x	x	x	x	1
• Set limits for idling the engine, number of revolutions, velocity for driving within and around the place of loading	x	x	x	x		1
• Respect the means for management of the loader's waste	x	x	x	x	x	3
• Prevent and monitor driving in non-paved and sensitive areas that can generate dust and more noise	x	x	x	x		1-5
• If any soil pollution occurs, inform the loader. Be prepared to act in the event of a spill or fire of the lorry at the installations of the loader, following the indications of the loader's emergency plans	x	x	x	x	x	4

Note: Most of these aspects are also included in loading at the shipper's logistics centres. However, it is preferable to maintain them separate, because this emphasizes the importance of each operation.

### 3. LOADING OPERATIONS AT LOGISTICS CENTRES

In loading operations at logistics centres, the following environmental effects can occur that should be considered.

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Atmospheric pollution from fuel consumption because of:						
- Excessive waiting time of vehicles at the logistics centre for loading or off-loading, making operations difficult	x	x	x	x	x	1
- Goods or documentation are not prepared on time and there is a lack of capacity for loading creating waiting time and lengthening runs	x		x		x	1
- Errors in identification and in product references, creating a risk of double transport and incorrect deliveries	x		x		x	1
- Engines at idle and movements with the motor at excessive revolutions at the logistic centre	x	x	x	x		1
• Soil pollution from oil spills, motor fluids or fixed circuits	x	x	x	x		4
• Noise pollution, dust, plastic and paper flyers, etc. from inadequate distribution of the activities of the centre in relation to the dominant wind	x	x	x			3-5
• Generation of waste from:						
- Poor placement, handling with risk of damage to the goods, generation of defective products and waste	x	x	x	x	x	3
- Inexistence of sufficient information on product data. Lack of traceability in the data about products, especially perishables	x	x	x		x	3
- Loading accidents. Falls, spills, waste and subsequent pollution	x	x	x	x		3
- Risk of fire, especially if hazardous materials (ADR) are handled in an area with a large concentration of inflammable goods	x	x	x	x		6

<b>GOOD ENVIRONMENTAL PRACTISES</b>	A	B	C	D	E	N
• Analyse current distribution activities at the centre and improve them in all the above-mentioned ways in order to minimize impact.	x		x		x	All
• Plan the loading and the areas where it will be carried out, identify them and give them maximum efficiency. Check the efficient loading and the suitability and availability of the documentation	x		x	x	x	1
• Measure noise at representative times of the day and night. Record the noise of various areas at the site and during various operations. Internal and external measures and proposals for operation to be carried out when records are available	x	x	x		x	5
• Optimization of loading operations in order to achieve better use of available volume. Correct handling of goods	x	x	x		x	1-3
• Plan and correctly manage inverse logistics at the site (pallets, paper, cardboard, etc.)	x	x	x		x	1-8
• Manage the traceability of information about products, expiration dates, etc., especially for perishable products	x	x	x		x	3
• Prepare and update an emergency plan with measures for prevention and action	x	x	x		x	6
• Ensure cleanliness and order at the site	x	x	x		x	All
• Clean the lorry following established procedures. Preparation of procedures for cleaning of installations and transport operations by those responsible for the business. Distribution of these instructions to in-house and independent employees	x	x	x	x	x	2
• Correct management of waste, deposited in appropriate containers for later delivery to an authorized dealer. Training of the persons involved	x	x	x	x	x	3
• Respect the loading instructions of the safety adviser for hazardous goods	x	x	x	x	x	6
• Awareness promotion, training and later monitoring of drivers' behaviour in surrounding areas (pavement, hard shoulders, trees, etc.) by those responsible for the logistics centre	x	x	x		x	1
• Correct preparation of delivery documentation for goods with risk of environmental impact (safety instructions in ADR transport and delivery notes for general goods)	x	x	x		x	3
• Correct management of pallets and film that can permit disassembly of pallets and transforming them into load	x	x	x		x	3
• Consolidation of compatible loads	x	x	x	x	x	3

## 4. TRANSPORT

During the physical operation of transporting goods, the following environmental impacts can be produced.

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Atmospheric pollution from fuel consumption because of:						
- Insufficient regulation of combustion that does not allow optimum use of fuel	x	x	x	x		1
- Inadequate and imprecise driving. Excessive velocity and braking	x	x	x	x		1
- Inadequate use of the transmission during driving	x	x	x	x		1
- Type of driving that does not optimise the relationship fuel consumption per load/kilometre	x	x	x	x		1
- Bad driving habits and difficulty in introducing changes for improvement (everyone has bad driving habits). The difference lies in that the importance and benefits from correcting them is very high in the case of logistics drivers.	x	x	x	x		1
- Poorly planned routes that do not optimize fuel consumption per kilometre and per tonne through selection of the route	x	x	x	x		1
- Inadequate power for the type of load	x	x	x	x		1
- Runs with incomplete loads that increase fuel consumption for the amount of material transported	x	x	x	x		3
- Routes that contribute to a high density of traffic or saturation that involve congested circulation and bottlenecks for all vehicles, with an increase of consumption and pollution	x	x	x	x		1
- Insufficient use of intermodal transport for reducing environmental pollution and costs	x	x	x	x		1
- Insufficient awareness about the impact caused by location, covering or poorly aerodynamic loads, with consequent increase in fuel consumption and pollution	x	x	x	x		1
- Insufficient maintenance of the exhaust pipe and muffler, increasing fuel consumption and atmospheric and noise pollution	x	x	x	x		1
- Excessive wear (expenditure of resources and pollution):						
- Inadequate tyre pressure	x	x	x	x		3
• Noise pollution from vibrations for poorly planned routes and poor maintenance	x	x	x	x		5
• Source of accidents:						
- Routes that contribute to a high density of traffic or saturation that require congested circulation and bottlenecks for all vehicles, with the probability of accidents and their consequences for persons and the environment	x	x	x	x		6
- Accidents with various degrees of environmental impact, generally high for spills of oil, fuel and their loading	x	x	x	x		6
- Accidents with goods classified as ADR	x	x	x	x		6
• Poor image from dirty or poorly maintained lorries	x	x	x	x		8

<b>GOOD ENVIRONMENTAL PRACTISES</b>	A	B	C	D	E	N
• Records of fuel and tyre consumption for vehicle/driver/route that will allow following changes and minimizing pollution	x	x	x	x		1-3
• Training and recycling of drivers with an efficient driving programme prepared in accordance with the type of vehicle, which define the type of driver appropriate for each traffic situation or type of load (efficient driving) and that make possible:						
- Use the transmission in function of the apparent density of the load in order to obtain the correct engine/gear ratio in each situation in order to minimize pollution	x	x	x	x		1
- Do not warm the engine with the vehicle at stop. Warm under way at a progressive velocity	x	x	x	x		1
- Revolutions and acceleration that ensure fluid and constant driving, without unnecessary acceleration and braking (calm driving compared to aggressive driving)	x	x	x	x		1
- Always stop the engine during stops whenever justified, taking into account the pollution resulting from starting the engine again	x	x	x	x		1
- Observe abnormalities in consumption, wear and other aspects while driving. Carry out controls and determine the frequency of use	x	x	x	x		1-8
• Recognition of drivers in function of results, their capacity and ability to drive with low consumption, the least generation of noise and vibrations and the longest duration of tyres. Establish a success scale (ranking) and announce it	x	x	x	x		1
• During stopovers, check the absence of abnormalities in tyres in order to prevent damage or excessive wear. Register any defects found in order to study the causes	x	x	x	x		3-8
• Establish a preventive maintenance plan for the vehicles	x	x	x	x		3
• Ensure cleanliness and proper painting and maintenance	x	x	x	x		1-3
• Record the noise generated at idle, moving on a flat road and moving on a slope	x	x	x	x		5
• Establish a system for information and communication, preferably electronic, that facilitates optimization of routes, localization and the combining of loads in order to reduce incomplete loads to a minimum.	x	x	x	x		1
• Follow the planned route. Register any changes and propose them as possible alternatives when they are environmentally more recommendable	x	x	x	x		1
• Establish agreements with clients, logistics operators and transporters in order to reduce incomplete loads and prevent duplicated distribution traffic	x	x	x	x		1
• Establish plans for preventing and acting in the event of accidents with ADR goods. Update regulations for vehicles, drivers, documentation and responsibilities. Train the safety adviser for transport of hazardous goods in order to centralize in him the conditions to fulfil	x	x	x	x		6
• Ensure that the vehicle is fully aerodynamic with regard to covers, deflectors, windows, etc.	x	x	x	x		1

## 5. FREIGHT OFF-LOADING OPERATIONS

During off-loading operations the following environmental impacts can occur.

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Atmospheric pollution from fuel consumption because of:						
- Idling engines and reckless driving, which cause unnecessary fuel consumption	x	x	x	x	x	1
- Waiting time for off-loading with fuel consumption during the wait	x	x	x		x	1
- Lack of traceability and information that make off-loading operations difficult and that cause the above-mentioned problems	x	x	x		x	1
- Delivery errors that require unnecessary transport in order to correct the error	x	x	x		x	1
- Non-compliance with delivery schedules that make off-loading impossible and cause unnecessary transport or travel	x	x	x	x	x	1
- Insufficient coordination of inverse logistics (empty packing, pallets, foldable boxes) that require load-less trips that then have to be repeated	x	x	x		x	1-8
- Insufficient planning of delivery routes and optimization of the distribution of transport, causing an increase in distances driven and, therefore, in fuel consumption and pollution	x	x	x		x	1
• Soil pollution from:						
- Waiting time for off-loading at areas near the loading dock with risk of spills	x	x	x		x	4
- Soil pollution by parking or off-loading in a non-paved area not prepared for spills	x	x	x	x	x	4
• Generation of waste:						
- Inadequate off-loading with regard to safety conditions, lack of protection for goods in order to facilitate handling or grouping, causing unnecessary movement of goods and risk of damage or accidents with the consequent generation of waste or spills	x	x	x		x	3
- Damage to goods from incorrect handling	x	x	x		x	3
- Inadequate placement of a load that require unnecessary movements of material with risk of accidents	x	x	x	x	x	3
- Incorrect off-loading from lack of off-loading norms or proper training	x	x	x		x	3
- Incorrect off-loading from lack of available instructions for off-loading with damage to goods	x	x	x		x	3
• Source of accidents:						
- Off-loading outside the centre with risk of accidents from poor handling	x	x	x	x	x	6
- Non-compliance with off-loading regulations of ADR tanks and goods, with risk of accidents and resulting pollution	x	x	x	x	x	6

<b>GOOD ENVIRONMENTAL PRACTISES</b>	A	B	C	D	E	N
• Punctually respect delivery hours. Agree on delivery hours with the off-loader. Register delays that are the fault of the off-loader and also those of the transporter, especially for hazardous goods. Compliance with schedules reduces off-loading times and waiting outside the centre	x	x	x	x	x	3
• Good traceability of information related to the materials at off-loading in order to facilitate operations and safety	x	x	x	x	x	1
• Facilitate management of the means of off-loading and ensure off-loading that does not damage the goods	x	x	x	x	x	1
• Respect the off-loading instructions, especially for dangerous products. Coordination with the safety adviser of the off-loader for transport	x		x	x	x	3
• Careful inspect loading and record incidences	x		x	x	x	3
• Ensure the correct delivery of documentation that prevents delays in the placement of goods, with the consequent risk of accidents or damage to goods	x	x	x	x	x	1
• Stop the engine. Set time limits for turning off the engine, because fuel consumption is greater during time at idle than consumption at starting the engine	x	x	x	x	x	3
• Plan best access for off-loading	x		x	x	x	1
• Plan parking areas for waiting and service areas for the vehicle	x		x	x	x	3
• Schedule runs in order to minimize impacts, keeping in mind variations in traffic density	x	x	x	x	x	1
• Inverse logistics (pallets, boxes, containers, waste, etc.) treated in accordance with specific instructions set by the sender	x		x	x	x	1-8
• Optimize agreements with other businesses in order to organize delivery of split loads in order to prevent transport of incomplete loads and in order to use more adequate vehicles	x	x	x	x	x	1
• Train employees involved in these areas. Respect the measures for management of waste of the off-loader. Follow the environmental procedures established in that business	x		x	x	x	1-3
• If soil pollution occurs, advise the off-loader in order to take action as a result in accordance with the norms of the place of off-loading. Be prepared to act in the event of a spill or fire of the lorry at the installations of the off-loader having the means to act	x	x	x	x	x	1-4



## 6. LOCATION AND WAREHOUSING OF GOODS

Operations for locating and warehousing goods can produce the following environmental impacts.

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Atmospheric pollution from						
- Aspects related with inverse logistics: pallets, packing. Inadequate positioning for facilitating return, leading to fuel consumption because of double trips.	x		x		x	1-8
- Emission of volatile substances from poorly packed or broken products or because of an accidental spill of products	x		x		x	1-3
• Generation of waste:						
- Because unacceptable products resulting from inadequate management of handling and location of goods subject to:						
• Sanitary regulations for incorrect handling	x		x		x	3-8
• Regulation of perishable products: for expired expiration dates	x		x		x	3-8
• Regulation of products at a controlled temperature: from loss of temperature	x		x		x	3-8
• Insufficient specialization of employees in treating food products	x		x		x	3-8
• Insufficient specialization in application of sanitary regulations and pharmaceuticals	x		x		x	3-8
• Falls, etc.	x		x		x	3-8
- Aspects related to non-returnable packaging. Inadequate management of this waste for its correct recycling	x		x		x	3-8
- Inadequate management of first-in-first-out (FIFO), which leads to obsolete or out-of-date products. Lack of traceability and data on expiration. Inadequate management of stocks, rotation of goods and withdrawal of products with an early expiration date (coordination with sales/marketing)	x		x		x	3-8
• Source of accidents:						
- Potential environmental impacts from pollution and risk of fire, etc., resulting from inadequate management with regard to the separation of areas for types of risk and compatibility of products, especially in handling of chemical products	x		x		x	6
- Aspects related to pollution and the risk of fire from the handling of dangerous materials (chemicals, pharmaceuticals, biocides, etc.)	x		x		x	6
- Insufficient protection against fire or environmental accidents such as spills of dangerous products (oil, acids, organochloride compounds, toxic materials, inflammables, etc.)	x		x		x	6
- Insufficient resistance to fire and separation of hazardous goods, with risk of pollution and fire. Ignorance of the situation of risk	x		x		x	6
- Poor planning for protection, insufficient means of prevention and for intervening and lack of means for organization, training and experience through simulations, etc. in order to eliminate or reduce the risk of accidents or minimize the effect if they occur	x		x		x	6

<b>GOOD ENVIRONMENTAL PRACTISES</b>	A	B	C	D	E	N
• Systems for identification and traceability (bar codes). Adequate measures for perishable products and temperature control in accordance with regulations for each product	x		x		x	3
• Manage information system for rotation of products on a first-in-first-out (FIFO) basis that makes it possible to prevent creation of obsolete products	x		x		x	3
• Management information system for location of products in order to prevent loss of time	x		x		x	1
• Prepare areas for storing chemicals (acids, inflammables, toxic materials, etc.) and their adequate management	x		x		x	6
• Maintain the centre in good status of order and cleaning in order to facilitate work and prevent risks	x		x		x	6
• Provide barrels for divided liquids or in bulk in the tanker, depending on the possibilities that can contain important product spills. Check them periodically and maintain them clean	x		x		x	4
• Prepare storage areas for sanitation products, pharmaceuticals and food in accordance with existing legislation	x		x		x	3
• Prepare storage areas for perishable products in accordance with existing legislation	x		x		x	3
• Prepare storage areas for products at a controlled temperature in accordance with existing legislation	x		x		x	3
• Provide adequate training for employees in each of the areas, including certificates for employees that require it	x		x		x	3
• Adequate management of the recycling of pallets, waste, boxes and containers for a single product in order to prevent pollution from inadequate management of wastes	x		x		x	3-8
• Reuse pallets and packaging. Handle adequately in order to achieve a high number of uses	x		x		x	3-8
• Training of forklifts drivers and other loading equipment for the warehouse	x		x		x	3
• Repair pallets and packing (internally or externally)	x		x		x	3-8
• Identify and evaluate risk of fire	x		x		x	6
• Plan prevention through awareness, training and practise. Emergency plan	x		x		x	6
• Adequate protection against fires	x		x		x	6
• System of detection that does not accidentally set off the automatic fire-extinction system	x		x		x	6
• Adequate system for fighting fires according to risk	x		x		x	6
• Adequate system of containing water for fighting fires	x		x		x	6
• Resistance to fire and adequate designation of areas in the warehouse	x		x		x	6

## 7. HANDLING AT THE WAREHOUSE

Handling of goods in the warehouse can produce the following environmental impacts.

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Atmospheric pollution caused by:						
- Errors in location that lead to loss of time and delivery errors with the consequent useless consumption of fuel, etc. by tripling a delivery	x		x		x	1
- Emission of volatile substances from products in poorly sealed or broken packing or because of accidental spilling of products	x		x		x	1-3
• Soil pollution because of uncontrolled spills or because of an accident with risk of water and soil pollution. Products can be hazardous for persons and the environment	x		x		x	4
• Generation of waste:						
- Damage to goods that become waste. Waste can be dangerous depending on the product	x		x		x	3
- Waiting time with products at a controlled temperature that can damage goods, transforming them into waste	x		x		x	3
Source of accidents:						
- Incorrect manipulation of goods with handling equipment with risk of accidents	x		x		x	6
- Risk of fire caused by the spilling of inflammable products or with risk of fire from contact with water. The risk is greater if anti-fire containers are not used and no measures are taken with regard to electrostatic charges	x		x		x	6

<b>GOOD ENVIRONMENTAL PRACTISES</b>	A	B	C	D	E	N
• Ensure correct selection of handling equipment in function of the risk of the products to be handled and their correct use	x		x		x	3
• Ensure proper driving of handling equipment and proper handling of loading, lifting and off-loading in order to prevent damage to freight	x		x		x	3
• Establish procedures and provide adequate training about the instructions regarding treatment of accidentally produced waste and containment	x		x		x	3
• Usual goods: written instructions should be available for the different groups, according to goods characteristics or risk. Action to carry out: - Wastes ➔ how to manage them, necessary measures for personal protection (if applicable), where to store them, record book to be used.	x		x		x	3
- Spills ➔ how to contain them and/or absorb them. Devices for containment and collection. Measures for personal protection. Where to transfer or store them. Record book to use.	x		x		x	3
• Unusual goods: written instructions about whom to inform immediately and how to activate the emergency plan. A solid waste can also be very dangerous because of toxicity, risk of combustion, contact with water (sodium, carbonates, etc.). Liquid products, because of the ease of spreading, the risk is usually greater for inflammables, acids etc.	x		x		x	3
• Prevent errors in location. In a chaotic warehouse, poorly located goods are synonymous with lost goods. They have high risks of going beyond the expiration date and becoming waste, especially in automatic silos. Ensure correct computerized or manual location	x		x		x	3
• Inverse logistics (pallets, boxes, packaging in general). Separate locations and identification of the goods	x		x		x	3-8
• Use separate areas for inverse logistics (returned goods)	x		x		x	3-8

## 8. PREPARATION OF ORDERS, BREAK-DOWN AND PACKAGING

Operations of preparing orders (picking), break-down and packing goods can produce the following environmental impacts.

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Atmospheric pollution from:						
- Errors in preparation of orders that lead to returns and double transport	x		x		x	1
- Dust or vapours occurring during transfer (for example from tanker lorry to barrels). Ensure their capture and proper treatment	x		x		x	1
• Pollution of the soil from spills	x		x		x	4
• Generation of waste from:						
- Division of pallets. Generation of pallets and film for palletization as waste	x		x		x	3
- Changes in packaging and packing for division, preparation of orders or damage. The original packing produces waste, depending on whether the product is a special waste	x		x		x	3
- Products made obsolete by defective management of FIFO or other controls, which then become waste	x		x		x	3
<b>GOOD ENVIRONMENTAL PRACTISES</b>						
• Separate waste film, cardboard and paper adequately in order to facilitate recycling. Give them to an authorized dealer for recycling or reuse	x		x		x	3-7
• Carefully maintain any empty packing in good conditions for reuse	x		x		x	3-7
• Prevent damage to packaging that might lead to spilling of contents and consequent pollution	x		x		x	3-7
• Prevent the creation of obsolete products through management of stocks through adequate FIFO	x		x		x	3-7
• Reuse and repair pallets. Find a good dealer for non-reusable or repairable pallets for management of their destruction	x		x		x	3-7
• Prevent spills in the handling and filling of packaging that could lead to pollution of water or the soil	x		x		x	4
• Establish effective control mechanisms (records kept by the employees involved in the process) in order to prevent errors in shipment	x		x		x	1-7

## 9. VEHICLE MAINTENANCE

In operations of maintenance of vehicles the following environmental impacts can occur.

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Atmospheric pollution because of:						
- Increase in consumption because of poor vehicle maintenance	x	x	x	x		1
- Escape of pollutants from fire extinguishers	x	x	x	x		1
- Escape of highly pollutant refrigerants from cold-storage vehicles or from an air-conditioning circuit	x	x	x	x		1
• Soil pollution caused by:						
- Spills of used oils and hydraulic fluid. High polluting action on water and the soil	x	x	x	x		4
- Spills of liquid pollutants from radiators (containing glycol)	x	x	x	x		4
• Generation of wastes from:						
- Used batteries. The acid in them is corrosive and contaminate with lead						
- Generation of waste metal pieces, scrap metal, etc. from maintenance of the vehicle	x	x	x	x		3
- Used oil and diesel filters and their adequate management as waste	x	x	x	x		3
- Tyres	x	x	x	x		3
- Increases in noise and vibrations from poor maintenance	x	x	x	x		5
• Pollution of wastewater from spills inadequate cleaning water from washing of the vehicle and tankers	x	x	x	x		2
<b>GOOD ENVIRONMENTAL PRACTISES</b>						
• Careful collection of oil and storage in vats (mobile, fixed or even on the collection surface with retention grills towards the deposit). Delivery to an authorized dealer	x	x	x	x		4
• Store the liquids separately and give them to an authorized dealer (the mixing of oils and hydraulic fluids, for example, makes recycling more difficult)	x	x	x	x		3
• When handling used batteries, handle carefully (very corrosive). Make frequent deliveries to the authorized dealer, avoiding their storage because of the risk of spills	x	x	x	x		3
• Used tyres:						
- Send them to an authorized dealer for his assessment (recycling)	x	x	x	x		3
- Correct selection of the tyre in order to find a the balance between duration and service, keeping in mind the total cost, including the environmental cost	x	x	x	x		3
- Maintenance and precise control of tyre pressure, frequent rubbing of the sides, etc. so that the basic tyre can be recapped without risk	x	x	x	x		3
• Maintenance of the engine, filters, etc. in order to insure correct combustion and thus decrease consumption, CO emissions and hydrocarbons	x	x	x	x		1
• Maintenance of the brackets for the exhaust pipe or other elements that contribute to the generation of noise	x	x	x	x		5
• Balancing of elements in order to prevent vibrations	x	x	x	x		5
• Delivery of used filters to an authorized dealer	x	x	x	x		3
• Accumulate liquids from radiators to be given to an authorized dealer	x	x	x	x		3
• Check reloading of refrigerant gases in order to detect increases that indicate possible leaks	x	x	x	x		1
• Maintenance of fire extinguishers by an authorized business	x	x	x	x		6

## 10. MAINTENANCE OF INSTALLATIONS

In operations of maintenance of installations, the following environmental impacts can occur.

<b>ENVIRONMENTAL IMPACTS</b>	A	B	C	D	E	N
• Atmospheric pollution because:						
- Emissions of solvents in the area for reparation of paint, if that exists, for small touch-ups and painting of lettering, etc.	x		x		x	1
- Heating	x		x		x	1
• Soil pollution from spills. For example in the area for taking on fuel	x		x		x	4
• Source of accidents:						
- Risk of fire because of deficient updating of installations to prevent this risk	x		x		x	6
- Risk of explosion of recipients of liquid gases or emissions of gases from loading of batteries (hydrogen)	x		x		x	6
<b>GOOD ENVIRONMENTAL PRACTISES</b>						
• Correct maintenance of the means for protection against fires (fire extinguishers, automatic water sprayers, foam, etc.) and support equipment: such as pumps, electric motors or diesel engines	x		x		x	6
• Check that storage tanks are not filled with rainwater, etc. and that they can be used to collect or retain spills	x		x		x	2
• Have available means for cleaning up spills (absorbent dirt or sawdust, shovels, brooms, etc.)	x		x		x	4
• Area for taking on fuel should have concrete pavement (no tar), with a drain or with a rim drain (in order to collect spilt cleaning water from the area)	x		x		x	4
• Check oil spills, hydraulic fluid, etc. of the forklifts. Maintain joints in order to prevent spills from dripping	x		x		x	4
• Treatment of liquid gas recipients in accordance with safety instructions of the supplier (norms of the association of manufacturers of liquid gas), both full and empty containers. (Explosion is a risk for persons that, because of the domino effect, can have a high environmental impact)	x		x		x	6
• Maintain the intensity of minimum illumination necessary for the safety of circulation. Installation of low-consumption illumination for economic savings	x		x		x	6

## 3.2. GOOD ENVIRONMENTAL PRACTISES BY ENVIRONMENTAL IMPACT AND INFLUENCE AREAS

The relationship between flows and activities that was described earlier, with the corresponding environmental impacts and good environmental practises, are described in greater detail in the following sheets of **good environmental practises**. In the first part of each sheet, good environmental practises to minimize or eliminate negative environmental effects are described. These proposed good environmental practises are those that businesses should consider, apply and monitor. The second part of the sheet provides a description of the impacts or effects that will be corrected with application of good environmental practises. Several sheets are accompanied by an example of tools for monitoring.

### SHEET NO. 1: ATMOSPHERIC POLLUTION

#### **Good Practises**

The following good environmental practises can be introduced to prevent pollution and excessive fuel consumption:

- Use vehicles with the best performance (vehicles type Euro III, Euro IV or above)<sup>2</sup>;
- Drive at a constant speed without sudden accelerations;
- Carry out systematic maintenance of engines in order to achieve low fuel consumption, which will lead to maximum use of fuel and, therefore, lower costs;
- Choose practises that contribute to low fuel consumption and maintain optimum tyre pressure in order to consume less;
- Select routes that minimize consumption (straight and mild slopes) although that might mean a longer route;
- Keep records for the vehicle, conditions, driver, routes, etc. in order to monitor the contribution of each measure introduced to improving results (see the example of monitoring).

#### **An example of monitoring for establishing indicators**

**Table 1: Example of record for recording the conditions and characteristics of each vehicle in accordance with the type of route**

VEHICLE (OR TRACTOR)	DRIVER	ROUTE	TYPE OF TYRE	LOAD (KG)	TYRE PRESSURE (KG.)	DIESEL/ 100 KM.	KM. PER TYRE
A	A	1					
		2					
		3					
A	B	1					
		3					
A	C	2					
B	A	1					
		2					
		3					
C	C	1					

<sup>2</sup>Vehicles that comply with Directive 98/69/EC of the European Parliament and of the Council of 13 October 1998 regarding measures to be adopted against atmospheric pollution caused by the emissions of motor vehicles.



It is recommended to indicate in which season these records were, separating periods of high and cold temperatures because diesel consumption varies.

- **Vehicle:** If the same tractor is used with several trailers this should be recorded.
- **Driver:** This can be used to compare drivers and evaluate changes of results for a driver after a period of training.
- **Route:** For the same vehicle and driver compare, if possible, alternative routes for the same transport.
- **Type of tyres:** Compare tyre wear for several vehicles, drivers, routes, loads and pressures. Also compare various periods and types of recapping.
- **Load:** For the same vehicle, compare heavy loads and little volume (loads in which weight limits the transportable volume) and the opposite (loads for which volume limits the weight).
- **Tyre pressure:** Try variations in function of loads, routes, etc.

Information from these records should be analysed, and **indicators** established in order to optimize fuel consumption and tyre use since both are a source of pollution and consumption of finite resources (petroleum). On one hand, petroleum in the form of diesel fuel is burned by the engine and in another case petroleum is consumed in the manufacture of rubber and soot is the main raw material for manufacture of black smoke (soot is obtained by burning petroleum with very little air, which represents an important consumption of petroleum).

### **Environmental effects**

Diesel, petrol and natural gas are the main fuels consumed in combustion engines that produce atmospheric emissions.

When exploding, the mix with air generates the propulsion force and the combustion gases emitted by the exhaust pipe.

All exhaust gases produce an impact (pollution) on the atmosphere as described in table 2:

**Table 2: Main gases emitted by vehicles and their impact**

<b>Combustion gases</b>	<b>Impact</b>
CO <sub>2</sub> (carbon dioxide)	Accumulation of gases in the atmosphere that do not let heat that reaches the earth escape, causing the earth's warming (greenhouse effect).
	Transport by road is one of the activities that causes this effect.
CO (carbon monoxide)	When combustion is incomplete, carbon monoxide is formed instead of dioxide, which decreases air quality and is toxic because it causes death through asphyxiation.
	Incomplete combustion prevents obtaining full performance from fuel and represents an important economic loss.
Hydrocarbons	Organics products that are produced by incomplete combustion of fuel. Automobile engines are responsible for the emission of 41 per cent of hydrocarbons. In presence of sunlight, these compounds together with nitrogen oxide contribute to the formation of photochemical smog.

Black smoke	Poor combustion not only produces carbon monoxide but also carbon particles and unburned hydrocarbons.
	This causes pollution from black smoke that leads to alteration of the quality of the atmosphere. It is also an indicator of incomplete combustion and, therefore, of excessive fuel consumption.
	In general, diesel engines are less polluting than petrol engines. They produce 25 times less carbon monoxide, 15 times fewer hydrocarbons without burning and two times less nitrogen oxide. This advantage of most lorries can be ruined by poor use of the transmission or by sudden accelerations, given that when the load on a diesel engine reaches the maximum, production of black soot increases drastically.
SO <sub>2</sub> , SO <sub>x</sub> (various types of sulphur oxides)	Several types of petrol can contain small amounts of sulphur, although this is reduced each day a bit more. Petrol and natural gas are practically free of this compound.
	Through combustion, sulphur dioxide is produced that by later oxidation and humidity produces sulphuric acid that, when condensed or washed from the atmosphere by rain, causes the effect known as acid rain that can destroy forests over the long term.
NO <sub>x</sub> (various types of nitrogen oxide)	Air is formed by approximately 70 per cent nitrogen and 21 per cent oxygen. When combustion occurs, oxygen combines with the fuel and gives off energy (explosions) needed to move the engine.
	Part of the nitrogen will form oxides through the same mechanism as in the case of sulphur, also causing acid rain that affects vegetation, in addition to changing air quality for people (incidence of respiratory diseases).
Lead	This is a heavy toxic metal still found in petrol labelled super. It is used to increase the output of older engines.

The information given in this table shows the considerable impact that transport has on the environment. It is very important to follow all the recommendations mentioned, which can lead to reductions of transport costs and, therefore, improve business profits.

### ***Technological improvements***

The progressive evolution of vehicles leads to better combustion and higher yield. In addition, catalysers have been improved to treat and reduce exhaust gases. Other technological improvements come from the type of fuel used. Experimentation with renewable fuels is occurring with the objective of replacing fossil fuel (traditionally petroleum derivatives). Among the most significant alternative fuels are biofuels (combustibles of plant origin), natural gas, hydrogen and biogas. Electric vehicles, sometimes a mixture of photovoltaic cells with gases (natural or liquid petroleum), and, recently, hydrogen could be used for short-distance transport.

## SHEET NO. 2: WATER POLLUTION

### ***Good practises***

Logistics activities with an impact on water are:

1. washing of vehicles
2. washing of tanks
3. cleaning of installations
4. sewage water

All these cases produce a double effect:

- consumption of a scarce resource, namely water
- pollution through water spills

In order to minimize these impacts, the good practises described below should be applied for each activity.

#### **1. Washing of vehicles:**

This must be done in **only** a well-paved area, with preference given to soil covered with cement. In second place, an area with sandstone tiles with a good impermeable seal in the joints can be considered. Last choice should be asphalt over soil, because the soil can become impregnated with hydrocarbons (light hydrocarbons such as diesel or heavy ones such as greases and oils), which degrade the asphalt and create ways for penetration into the soil.

The area should have a slight slope, several central points for drainage and a perimeter drain to collect water that might otherwise leave the area. Likewise, there should be access to a high-pressure spray system for efficient washing but with low consumption of water and a timer to set the duration of the washing. The most adequate washing duration should be established by performing tests (for instance, a too short washing duration should be avoided as this could require repeating activation of the timer and therefore, imply double water consumption).

Detergents should be selected from products with good environmental characteristics certified by the manufacturer and preferably, with some label of environmental quality. It is important that the logistics operator requires its supplier those guarantees in written form. The personnel responsible for the environment within the **logistics centres** having cleaning areas will have to proceed in a similar way.

Polluted washing water should be correctly managed and pollutants, which implies:

- Having the relevant authorisations for releasing wastewater as required for the activity
- Comply with the standard limits of pollutant load, when available corrección a considerar.

Es recomendable estudiar la posibilidad de depurar y reutilizar las aguas de lavado en el mismo centro. Es necesario que un experto realice antes un estudio de viabilidad.

En caso de que se opte por la depuración de las aguas en el propio centro de producción, deberán realizarse controles periódicos analíticos de las aguas, una vez depuradas, para poder evaluar correctamente el funcionamiento del sistema de tratamiento.

The ordinary pollutant load should be monitored, compared with the standard limits and establish preventive or corrective measures to introduce.

The possibility of treating and reusing washing water inside the centre should be studied by an expert, through a feasibility study.

In the event that the wastewater is treated where it is produced, the treated water should be analysed periodically, in order to monitor the functioning of the treatment system.

## 2. Washing of tanks:

This process should be considered a distinct activity that provides a service to the logistics operation, although it is not included in the logistics activity itself. The complexity of the process of washing out tanks requires an adequate procedure that could be certified in the future according to market demand.<sup>3</sup>

The cleaning of tanks implies dealing with a large variety of pollutants, as all industrial sectors use lorries with tanks to transport their products.

Due to this large variety of products for the different industrial sectors, water from washing tanks will have variable pH, high COD, organic pollutants, heavy metals, etc. and therefore, the water from washing tanks will have a high toxicity potential. It is thus important that the cleaning centre has approved measures for environmental management.

The variety of routes and optimization of loads will determine in each case which cleaning centre will be used. The good practise of the logistical agent (operator, independent driver, etc.) will be **selecting, verifying** and **confirming**, when possible, the following in the washing centres:

- Assess the environmental quality of the activities carried out for the washing centre and take advantage of controls on the degree of washing of the tanker by the loader, which can serve as a criterion for assessing the washing centre's quality of service.
- Check and register the cleaning certificates provided.
- Preference should be given to those that have established a certified system of environmental management (EMAS or ISO 14000).

## 3. Cleaning of installations:

High-pressure spray should be used to clean installations, and timers used to define a standard time for carrying out the operation. Cleaning instructions should be available and whenever possible, promote minimum water consumption and the use of detergents. Wastewater have to be treated when necessary and possible, as mentioned in the section on washing vehicles.

After an assessment of the best solution by an expert, provision should be made for containing water used for fighting fires, washing and possible spills. It is best to clean the maintenance area with absorbent materials (sawdust or absorbent products in case there are spills of inflammable liquids) and avoid using water as it would become highly polluted.

<sup>3</sup>Currently, the European chemical industry, through the European Chemical Industry Council (CEFIC), has established norms for transport of tankers by road that include washing. This system is called SQAS Road (Safety Quality Assessment Systems) and can be applied by the logistics agent and obtain certification by various entities for certification accredited. The system has the double objective of raising the level of confidence about the safety of transport by tankers and minimizing the environmental impact on washing.

#### 4. Sewage water:

At the headquarters of the logistical operators, consumption of water for toilets can be high given the number of people using the toilets, showers, etc. It is therefore very important to promote awareness among the persons that use these services, both employees and people external to the company.

The following steps are recommended:

- The most important good environmental practise is economic use of water, based on an awareness of its importance and scarcity as a resource;
- Use timers on taps in washbasins and showers;
- Do not let water run uselessly when soaping up;
- Install toilettes with two-choice flushing;
- Do not flush chemicals, oils and cigarettes through the toilet.

#### 5. Rainwater:

An important aspect that should be kept in mind in the logistics activities mentioned in this sheet (washing of vehicles, washing of tanks and cleaning of installations) is the role of rainwater.

When planning logistics centres or making changes, given the large area they represent, it is very important to plan a separate network for rainwater.

This network should ensure that no pollution is produced from runoff or washing away from areas where polluted water collects from the washing operations or oil changes that will empty into the same system for treatment.

The rainwater system should have a mechanism for diverting water towards the treatment system (if it is polluted) or towards an external system (if it complies with the required parameters for release).

During the first 15 or 30 minutes of rain, depending on the state of the paved surface and pollution estimated of the roof or in case there is washing away of polluted water, rainwater will be directed towards the water treatment installation. Then, when this water is no longer polluted it should be sent towards the external system, in order not to overload the treatment installation.

### ***Environmental effects***

Environmental impacts can be summarized as follows:

- Water is a limited resource in many regions
- Hydrocarbons (fuel, oils and greases) are important pollutants. Hydrocarbons are deposited on the surface of water in very fine layers because they do not mix with water and are lighter than water. A small amount of hydrocarbons can contaminate large amounts of water (one litre of oil can pollute a thousand litres of water). Chlorinated solvents must not be used in cleaning because they are not biodegradable, carry oil into the soil and can penetrate to the water table through percolation.

Important observations for the company:

- The cost of cleaning up soil contaminated by uncontrolled dumping of wastewater with pollutants can be very high.
- In the event of a spill, preference should be given to cleaning with absorbent materials.

In the sheet on the impact of **emergencies**, there is a list of steps to take in the event of accidental spills.

## SHEET NO. 3: WASTE MANAGEMENT

### ***Good practises***

Wise waste management contributes to preventing pollution, a savings of natural resources and prevents the overloading of drains, through management oriented to **reducing, reusing and recycling** waste.

**Reduction** of waste is achieved through a decrease in the production of waste through proper operational practises, the use of more efficient equipment and substitution of potentially pollutant raw materials. In the case of logistics operators, reduction of waste is achieved through adoption of environmentally friendly options; for example by taking care not to damage or break pallets and their loads during storage, loading, transport and off-loading, thus preventing the generation of a large amount of wasted pallets and freight. If the logistics company prepares orders, it should have an efficient system for controlling inventories to prevent stored products from going out of date.

To **reuse** is to use a waste again in its original form for the same or a different use. This implies, for example, using pallets until they are really broken or unserviceable. Inverse logistics should be established with clients for the return of packaging.

To **recycle** is to reuse a waste in a manufacturing process. In the case of logistics operators, recycling takes place away from the site where the waste has been produced. Recycling should be the option of last recourse and should be based on proper collection and separation of the waste (see the table at the end of this section).

The main objectives of waste management and the proposed actions are the following.

**1. Minimization of waste production:** For example, the oil of the vehicles should be changed in function of any loss of viscosity and number of particles instead of in function of a pre-determined number of kilometres, because the useful life of oil varies depending on the route and the type of driving. It is important to organize the warehouse correctly and carefully prepare orders in order to prevent generation of waste because of poor or incorrect storage conditions.

**2. Correct management of packing and waste packaging:** In order to reduce the impact caused by waste pallets, removable film, plastic and cardboard, the waste should be given to an authorized dealer properly separated for reuse, recycling or valuation.

Correct management of waste requires separating waste into:

- plastic film for palletization
- cardboard and paper
- scrap metal
- glass
- special waste
- ...

It is necessary to have appropriate containers for the wastes, as agreed with the personnel collecting the waste.

Each container should be clearly labelled in order to identify easily the type of waste it contains. For more details, see table 3 in this sheet's section on **environmental effects**.

## Environmental effects

Environmental impacts are specific waste generated through:

- Storage
- Splitting of deliveries or damage to freight
- Vehicle maintenance

These three areas have been chosen because the largest amount of waste is produced there. Wise waste management contributes to decreasing pollution and saving natural resources.

## Waste management

The following table lists waste produced in three activities with its code and classification and correct ways to manage it.

**Table 3: Classification, code and management of waste**

<b>WAREHOUSES</b>		
DESCRIPTION OF WASTE	EUROPEAN WASTE CATALOGUE CODE CLASSIFICATION	WASTE MANAGEMENT
Absorbent materials used to collect spills of hazardous substances, sawdust or similar	15 02 02 (Hazardous)	Collect separately and give to an authorized dealer for special treatment
Packaging containing residues of or contaminated by dangerous substances	15 01 10 (Hazardous)	Selective separation in order to facilitate recycling and treatment by an authorized dealer
Paper and cardboard packaging	15 01 01 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Plastic packaging	15 01 02 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Wooden packaging	15 01 03 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer



Metallic packaging	15 01 04 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Glass packaging	15 01 07 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Textile packaging	15 01 09 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer

<b>FRAGMENTATION OF GOODS</b>		
DESCRIPTION OF WASTE	EUROPEAN WASTE CATALOGUE CLASSIFICATION	WASTE MANAGEMENT
Packaging containing residues of or contaminated by dangerous substances	15 01 10 (Hazardous)	Selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Paper and cardboard packaging	15 01 01 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Plastic packaging	15 01 02 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Wooden packaging	15 01 03 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer



Metallic packaging	15 01 04 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Glass packaging	15 01 07 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Textile packaging	15 01 09 (Non-hazardous)	Reuse When reuse is impossible, selective separation should be made in order to facilitate recycling and treatment by an authorized dealer
Waste from spills containing hazardous substances (absorbents, filter materials, wiping cloths, protective clothing contaminated by dangerous substances*)	15 02 02 (Hazardous)	Collect separately and give to an authorized dealer
Waste from spills not containing hazardous substances (Absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02*)	15 02 03 (Non-hazardous)	Collect separately and give to an authorized dealer

<b>VEHICLE MAINTENANCE</b>		
DESCRIPTION OF WASTE	EUROPEAN WASTE CATALOGUE CLASSIFICATION	WASTE MANAGEMENT
Oil filters	16 01 07 (Hazardous)	Collect separately and give to an authorized dealer
Lead batteries	16 06 01 (Hazardous)	Collect separately and give to an authorized dealer
End-of-life tyres	16 01 03 (Non-hazardous)	Collect separately and give to an authorized dealer
Mineral-based chlorinated engine, gear and lubricating oils*	13 02 04 (Hazardous)	Collect separately and give to an authorized dealer

DESCRIPTION OF WASTE	EUROPEAN WASTE CATALOGUE CLASSIFICATION	WASTE MANAGEMENT
Mineral-based non-chlorinated engine, gear and lubricating oils*	13 02 05 (Hazardous)	Collect separately and give to an authorized dealer
Synthetic engine, gear and lubricating oils	13 02 06 (Hazardous)	Collect separately and give to an authorized dealer
Brake fluid	16 01 13 (Hazardous)	Collect separately and give to an authorized dealer
Brake pads containing asbestos	16 01 11 (Hazardous)	Collect separately and give to an authorized dealer
Brake pads other than those mentioned in 16 01 11	16 01 11 (Non-hazardous)	Collect separately and give to an authorized dealer
Antifreeze fluids containing dangerous substances*	160114 (Hazardous)	Collect separately and give to an authorized dealer
Antifreeze fluids other than those mentioned in 16 01 14*	160115 (Non-hazardous)	Collect separately and give to an authorized dealer
Ferrous metal	16 01 17 (Non-hazardous)	Collect separately and give to an authorized dealer
Wastewater from washing vehicles and tanks, containing dangerous substances (oils, solvents, etc.)	-	Treatment of wastewater in the premises
	16 07 08 (Hazardous) 16 07 09 (Hazardous)	Collect separately and give to an authorized dealer
Wiping cloths or paper with oil	15 02 02 (Hazardous)	Collect separately and give to an authorized dealer
Packaging containing residues of or contaminated by dangerous substances	15 01 10 (Hazardous)	Collect separately and give to an authorized dealer
Waste paint and varnish containing organic solvents or other dangerous substances*	08 01 11 (Hazardous)	Collect separately and give to an authorized dealer
Waste paint and varnish other than those mentioned in 08 01 11*	08 01 12 (Non-hazardous)	Collect separately and give to an authorized dealer
Absorbent materials used to collect spills of hazardous substances, sawdust or similar	15 02 02 (Hazardous)	Small spills are collected with absorbents or sawdust, which is treated as special waste and given to an authorized dealer

\*The product label provides information on its composition. This can facilitate classification as hazardous or non-hazardous waste.

## SHEET NO. 4: SOIL POLLUTION

### ***Good practises***

Maintenance activities, loading and off-loading operations and accidents with hazardous goods cause most of the impact on soil. Good environmental practises to prevent soil pollution are directly related to prevention and, therefore, with the carrying out of:

- Good environmental practises in the management of waste:
  - a) Orientation towards the reduction, reuse and recycling of waste;
  - b) Orientation towards minimization of the production of waste and packing waste;
  - c) Separation of waste by type (plastic, paper and cardboard, glass, lubricants, hydraulic fluids, batteries, etc.) in specific containers and delivery to an authorized dealer for treatment.
- Good environmental practises in the management of wastewater:
  - a) Vehicles should be washed on well-paved surfaces or on waterproofed soils with a water collector and management of the polluted waters before dumping. Reuse water whenever possible.
  - b) Tankers should be washed at a centre where there are guarantees of good environmental management, and certification (ISO, EMAS) should be required.
  - c) Installations should be cleaned to minimize consumption of water and detergent, choosing detergents with good environmental effects certified by the manufacturer. Treat wastewater similarly to wastewater for washing vehicles.
  - d) Prepare a plan for dealing with spills.
  - e) Prepare areas for retaining water used to put out fires, washing and from possible spills.
- Good environmental practises in the event of emergencies during transport:
  - a) Quickly inform the police and headquarters about the emergency. Prevent the intervention of unauthorized persons. If possible, park the vehicle far from water systems.
  - b) In the case of hazardous goods, follow the guidelines established in the ADR regulations.
- Good environmental practises in the maintenance of vehicles:
  - a) Maintain correct combustion and prevent vibrations. In the case of refrigerated vehicles, check for possible leaks.
  - b) Collect used oil, hydraulic fluids and radiator liquids in separate tanks for delivery to an authorized dealer.
  - c) Manage used batteries, tyres and filters as waste, handling them correctly and giving them to an authorized dealer.

### ***Environmental effects***

Soil is a component of the natural environment that is essential for human life because it produces most of our means of substance (food, fibres and wood). Degradation of the soil is a process that reduces the capacity and potential of the soil to produce, quantitatively and qualitatively, goods and services (agriculture, industry, housing and recreation).

Protection of the soil and the introduction of good practises in all sectors are vital. Impacts on the soil will affect other fields, because the soil is not an isolated system. Soil pollution leads to:

- pollution of surface water
- pollution of groundwater
- degradation and vulnerability of the soil itself
- risk to human health
- risk to vegetation and animals

**SHEET NO. 5: NOISE POLLUTION**

**Good practises**

Traffic is the most important general source of noise in the environment, and noise is one of the impacts most immediately felt by persons. The following good environmental practises can be introduced to reduce the impact of noise.

- Good vehicle maintenance, especially the transmission, exhaust pipe and all parts that produce vibrations as well as tyre inflation pressure;
- Smooth driving with a minimum of unnecessary acceleration and braking;
- Care when attaching or detaching the trailer;
- Selection of routes that minimize transit through sensitive areas (urban, residential or health-sensitive areas);
- Reduction in the running of engines, especially at idle;
- Selection of a vehicle that causes a lower level of noise;
- Selection of tyres that cause a lower level of noise;
- Do not play radios at high volume during waits;
- Prevent waits and parking outside the logistics centre that can cause noise when starting the engine and manoeuvring;
- Measure the noise level at the periphery of the logistics centre.

**An example of control**

This example is indicated for logistics centres or logistics operators in medium-to-high sensitive areas having to measure noise. These measures can be carried out directly by the company or by subcontracting the service.

**Table 4: Outdoor noise levels**

Usual limits*:		SENSITIVE AREAS: 50-60 dBs		dBs	Excess dBs	Excess dBs (%)
		OTHER AREAS: 60-70 dBs				
Measurements	Day/Hour					
	DAYTIME	NIGHTTIME				

(\*) This refers to the usual limits and not to legal limits because countries have different legal noise limits. The usual noise level is used here as an indicative reference of noise. Measurements should be made during the night and during the hours of greatest activity when more noise is produced. Knowledge about the situation makes it possible to analyse which good environmental practises can reduce noise.

### **Environmental effects**

Noise pollution and vibrations cause disturbances to residents, which can affect their well-being and their quality of life in the form of stress, fatigue, loss of hearing and increase in cardiovascular pathologies.

Motor vehicles are a main source of noise pollution. Therefore, it is important to establish the necessary measures for preventing and reducing pollution by noise and vibration.

Noisy transport causes disturbances, especially when passing through sensitive residential, hospital and school areas. Another less evident but important impact is produced in non-urban areas (motorways, roads, industrial estates), significantly affecting the animals of the area.

Decibels, the unit used to express noise level, are not expressed on an ordinary numerical scale. An increase of three decibels (dBs) represents the doubling of a noise.

Common reference measurements are:

- the noise of a motorbike passing by: 75 dBs
- the ticking of a clock: 20 dBs
- the taking-off of an airplane: 140 dBs

## SHEET NO. 6: TRANSPORT EMERGENCES

### **A. GENERAL GOODS**

Management of general goods in case of accidents or incidents during transport.

#### **Good practises**

Many non-hazardous goods cause environmental impacts that can be dealt with through introduction of the following good practises:

- In the event of an emergency, quickly inform the police about the hazardous nature of the goods being transported, using available information and the waybills.
- If there are no safety sheets available, consult with headquarters or centres that have that information.
- If it is an accident with predictable consequences and there is a risk of a spill, try to park the vehicle far from water systems.
- Inform headquarters and take all necessary measures.
- Prevent unauthorized personnel from intervening.

#### **Environmental effects**

Environmental impacts must be dealt with individually because they differ depending on the type of product transported and the type of accident or incident that occurs.

## B. HAZARDOUS GOODS

Management of hazardous goods and accidents or incidents during transport.

### *Good practises*

Regulations for the transport of hazardous goods, either ADR, RID<sup>4</sup> or IMDG<sup>5</sup>, depending on whether transport is by road, rail or ship, seek to ensure use of good environmental practises.

It is recommended (obligatory in several countries) that businesses designate a safety adviser, who is qualified to deal with hazardous materials<sup>6</sup>. A safety adviser promotes implementation of requirements for dealing with hazardous materials under safe conditions. He also prepares an annual report on accidents with an explication of their probable causes. Businesses that transport hazardous goods should ensure that there are written instructions for each product aboard vehicles<sup>7</sup>.

Good practises are ensured through:

- Requirements regarding packaging and packing in order to prevent spills and accidents with environmental impacts: from small packages up to large containers and stationary or mobile tanks. During the different steps of the process (loading, transport and offloading) requirements have to be controlled (packaging, as specified on the ADR);
- Compliance with regulations should be checked during loading, transport and off-loading;
- There are requirements for vehicles and implementation of safety measures;
- Drivers must be trained in accordance with regulations;
- The obligation of the security adviser that companies must have, of planning and supervising loading, transport and off-loading operations (belonging to the company or subcontracted);
- Instructions should be established to be followed in the event of an accident;
- Internal monitoring of compliance with regulations by the Administration.

Applying a programme of good environmental practises requires:

- Implementing all existing regulations for operations;
- Ensuring that in the logistics chain (upstream and downstream), the requirements above are respected. In addition to being a good practise, this is a legal obligation in most countries. Regulations for hazardous goods require joint control throughout the logistics chain.

ADR regulations emphasizes the following points:

- That a shipper or loader should not load freight if the vehicle, driver or documentation does not meet requirements.
- At the time of loading, the transporter must check that information about the products, CMR contract, safety sheets, labels and the conditions of packaging are correct. He should ensure that the handling and the securing of the load are carried out correctly and check the load's compatibility. Only if all of this is correct should the driver place the proper signs on the vehicle with the corresponding number plates and accept the freight. He should also check during off-loading that the conditions at the site of the destination are correct. In the case of tankers, this includes grounding the vehicle, monitoring the speed of off-loading, checking the functioning of hoses in order to prevent electrostatic loads and checking the suitability of the off-loading area for safety and spills.

<sup>4</sup>Regulations concerning the International Carriage of Dangerous Goods by Rail (RID).

<sup>5</sup>International Maritime Dangerous Goods (IMDG) Code

<sup>6</sup>Council Directive 96/35/EC of 3 June 1996 on the appointment and vocational qualification of safety advisers for the transport of dangerous goods by road, rail and inland waterway requires as a preventive safety measure that the business that carries out such transport and carries out loading or off-loading operations linked to them will have to have one or several safety advisers responsible for preventing risks inherent to the transport of hazardous goods.

<sup>7</sup>For example, in Catalonia there is the Transcat (Emergency and action plan for transport of hazardous goods).

- In turn, the receiver or addressee must check the freight and the vehicle meet all requirements and that safety information is available. Requirements concerning the vehicle, driver and goods related to offloading have to be checked as well. If necessary, the driver must refuse to off-load, especially when there may be a danger to persons, installations or the environment and file a complaint.

To sum up, it could be said that good environmental practises to follow for prevention of accidents and steps to take in the event of an accident are given in the ADR regulations. Employees must be aware of the need to follow regulations and instructions and receive training to ensure compliance. As in all training, it is necessary to consider review training and to take into account any recently hired employees.

### ***Environmental effects***

Possible environmental impacts vary in function of the freight and the situation. ADR defines them. It is impossible to generalize, but it can be said that any impact is always potentially dangerous.

It is important to follow carefully the instructions on the safety sheets during all stages of the process. In all stages of the process, these documents cannot merely be incorporated and transferred without satisfactory study. Risk and action measures have to be known concerning the hazardous goods that will be handled and carried. This is the path to follow for being aware of the potential environmental impacts and derived responsibilities.

## **SHEET NO. 7: PREPARATION OF ORDERS**

### ***Good practises***

The following shortcomings can be encountered by logistics operators in the preparation of orders.

- **Errors in orders:** A reliable system for preparing orders should be established that prevents errors. Preparation with computers and automatic identification of freight can be one solution. The persons involved in preparing orders must be adequately trained in order to prevent errors.
- **Empty packing:** Empty packing should be properly washed for reuse. An agreement should be reached with a waste dealer, defining acceptable delivery conditions in order to facilitate reuse and recycling, depending on the product that it has contained. Empty packing that has contained **hazardous** materials must be separated properly because empty packing itself is a **hazardous waste** and should be managed differently by an authorized dealer.
- **Defects and breakage of packing:** Defects and breakage of packing occur frequently. In order to prevent it or minimize loss, it is necessary to promote awareness of the employees all along the chain on the **triple** consequence it has:
  1. economic losses resulting from a damaged product;
  2. the cost of collecting and treating the lost or wasted product and packing;
  3. consequences of non-delivery.

- **Management of the breaking-down of orders:** Preparation of orders is the full responsibility of the logistics operator, who should enforce respect for the FIFO rule (first in, first out). There should be a warehouse management system that permits easy identification and finding of freight. A labelled or packaged product can become obsolete because of a simple change in price or marketing strategy.
- **Spills at the time of packing:** In order to prevent spills, retention tanks and peripheral drains with storage for manipulation of liquid products should be used and with safety measures in the event that the liquids are dangerous.

### ***Environmental effects***

The following environmental effects of preparing orders are important.

- **Atmospheric pollution:** Errors in the preparation of orders cause returns that are the equivalent of a triple environmental impact (three runs: delivery of the order, return of the incorrect order and re-delivery of the correct order). Furthermore, a delivery error can lead to inadequate use of a product and a chain of environmental impacts.
- **Generation of waste:**
  - 1) **Empty packing** after re-packaging goods (that can be dangerous or not, if the good contained had this classification) or generates waste.
  - 2) **Breakage/imperfections in packing:** Poor packing constitutes a source of waste that should be treated as such.
  - 3) **The preparation of orders** can also generate waste because of obsolescence or expiration of products.
- **Spills:** At the time of packing, spills can occur that result in water and soil pollution, similar to those described in sheets 2 and 4.

## **SHEET NO. 8: INVERSE LOGISTICS**

### ***Good practises***

Inverse logistics is the process of transporting returned goods and packing used to protect goods during delivery to clients. These materials are returned for reuse and contribute to a reduction in the use of resources and the production of waste. Inverse logistics also involves the return of incorrect or defective goods.

The following good environmental practises should be observed in this process.

#### **Inverse logistics of a product's protective material (returning packaging)**

Management should ensure the identification and conservation of packing materials that are the property of the client, in order not to make a mistake in the address and give rise to a greater number of trips.

- Contribute to maintenance of reliable identification of materials that are the property of the client
- Handle materials belonging to the client with the same care as goods
- Ensure a quick and low-cost return that facilitates the clients using this practise, reducing the necessary stock
- Minimize material in circulation (thanks to quick return)
- Treat any material beyond its useful life as waste



### **Inverse logistics concerning returning below-standard or wasted products during transport**

Management should be aimed at recovering products and waste through:

- analysis of the defective logistics, the identification and correction of the causes of the error when possible
- proper management of material that should be eliminated at the end of its useful life

#### **Examples of indicators**

Two examples of indicators of the effectiveness of this process are:

1. the number of trips required to transport returnable packing or packaging
2. the volume of returned packing and packaging transported compared to the total volume of freight.

### ***Environmental effects***

Return of below-standard or defective products during transport has environmental consequences different from inverse logistics for return of packaging and packing because they have their origin in a error or accident, while the return of packaging and packing is because of an environmental policy of minimization.

If good environmental practises are not introduced the following environmental impacts are produced.

#### **Inverse logistics of a product's protective material (returning packaging)**

- increases atmospheric pollution due to additional trips for transport caused by the incorrect planning of routes plus not optimizing return trips
- creates waste from broken packaging and packing.

#### **Inverse logistics for return of below-standard products or products with defects caused during transport**

- generates atmospheric impacts because of incorrect transport of products (and from associated impacts such as co-management of traffic or the waste of it)
- produces wasted products because of obsolescence or expiration
- generates waste (products and packaging) because of breakage during transport or handling

## 4. ANNEXES

### 4.1. DRIVER'S MANUAL

#### Legal note:

The instructions contained in this manual seek to facilitate provision of information and instructions to drivers for improving their contribution to a business's activities and in no way exempt drivers from the obligation to respect existing regulations.

#### *Introductory note:*

*In order to prevent duplication and providing drivers with excess documentation, it has been decided to offer only one example of good environmental practises and to gather together instructions, that are quite similar. Environmental aspects are highlighted in italics.*

#### *The system for quality and environmental management*

All the activities and efforts of those who work in this business<sup>9</sup> seek to satisfy the requirements of clients. Examples of these requirements are:

- punctuality
- conditions of transport
- type and aspect of the vehicle
- safety during transport
- minimum environmental impact
- price of the service
- information provided by the transporter
- treatment received

The importance of these each requirement is different for each client. Our objective is to fulfil the requirements in the clients' order of importance, which means being able to improve the quality of the service provided, guaranteeing the client's satisfaction.

Satisfying clients' requirements at a reasonable cost is called **quality** and determines how activities are carried out: the contracting, driving, purchases, maintenance, control of the service, organization of the traffic, schedules, documentation, detection and correction of errors, training of employees and the image of the business.

Clients choose the business that offers them the service that best meets their needs at the most favourable price. In order to ensure quality service, it is important to use resources efficiently in order to prevent errors before they cause undesired consequences, planning each task and in learning from errors. At the same time, the service should be carried out with great respect for the environment. Employees working in this sector, regardless of their employment ties, should keep in mind this objective and focus their efforts in the same direction.

#### **The programme of good housekeeping practices (PGEP)**

*Good environmental practises (GEPs)* are the set of personal and collective habits that are part of the attitude and work of each person that participates in the business striving to minimize its environmental impact. It is possible to introduce good environmental practises successfully if

<sup>9</sup>Include the name of the company when you consider appropriate

awareness of the environmental impacts of logistics activities and that our attitude and behaviour have an influence on the environment is heightened.

In this manual, several recommendations have been included in *italics* on how to carry out daily activities incorporating respect for the environment and at the same time saving resources; in other words, how to introduce good environmental practises. Many of these recommendations are frequently associated with a quality management system. In the Manual of Good Environmental Practises in the Logistics Sector can be found more and detailed information about the introduction of a programme of good environmental practises.

### *Participation of drivers in the quality and environmental management system*

#### **Who should be responsible for quality and environmental protection?**

Management should make available all necessary resources and be convinced that this is the way to advance. On the other hand, the employees should work as best as possible to move things move forward effectively to achieve the quality and environmental objectives.

Drivers should incorporate quality and respect for the environment into their tasks and observe and participate in the objectives of their department. Each driver should be conscious that good work is vital, because he knows better than anyone the status of his lorry and knows best the problems he encounters. His full participation is absolutely necessary. Furthermore, good environmental practises directly improve the economic results.

#### **What are the points that the driver has to know about quality and environmental management?**

Within the quality and environmental management system, the points directly concerning the driver within the business's quality and environmental policy, are the following.

- **Quality and environmental policy**

It is important that the driver knows the quality and environmental policy of the company. This policy is the organization's objectives and the general interests regarding quality and environmental management, as expressed formally by the management of the company.

- **Training**

In order to put into practise a quality and environment management system, it is necessary to periodically make an effort to train employees. Training is first oriented to ensuring that the level of training necessary for carrying out the work to be done, for example the driver's permit. It is also necessary to follow a plan of continuous training in order that the work is done better each time. Training should also serve to make employees aware of the importance of respect for and the quality of the environment, incorporating good environmental practises into daily activities.

- **Corrective and preventative measures**

Each time that an error is detected in the system (NON-CONFORMITY):

- a corresponding corrective step should be made to provide a short-term remedy to the situation
- a systematic analysis of the errors should be done in order to define a preventive action that would prevent making that mistake again on the medium and long-term

## • **Communication**

In order to achieve participation in the quality management system and the programme of good environmental practises, it should be perfectly understood what the system requires, to be informed about what is happening, how the business is progressing and which changes will be produced immediately.

### ***Suggestions to drivers for improving quality and environmental management***

- Do not criticise mistakes;
- Do not try to lay blame and do not make excuses;
- Seek solutions and help as much as possible;
- Be disciplined with the quality and environmental system. If procedures appear to be inadequate, try to change them by speaking with the head of section, but as long as the change does not occur, continue with it.
- Do not work just mechanically. Think constantly how to do things in order to avoid errors;
- Propose ideas for improvement;
- Show disposition to working in a team;
- Show interest in training;
- Remember that the consideration that the clients or possible clients have about the business is the best guarantee for the future.

### ***Quality and respect for the environment in providing a service***

#### ***At the beginning of the day***

##### **Check the documentation upon entering the vehicle**

- Check the documentation of the vehicle
  - Driver's licence (lorry, tractor, semitrailer);
  - Technical sheet (valid inspections card necessary for the lorry, tractor and semitrailer);
  - Administrative authorization for transport (original);
  - Valid receipt of payment of the insurance for the lorry, tractor, semitrailer;
  - EU license or quota authorization, if appropriate;
  - Contract for International Carriage of Goods by Road (CMR), if applicable;
  - Certificate of inspection of the tachometer.
- Check that the driver's documentation is complete:
  - Identification document or passport, if appropriate;
  - Valid driving permit;
  - Card for emergency assistance;
  - Fuel coupons or trip cards.
- Check that the following are in the vehicle:
  - Forms for no-fault declaration of an accident;
  - Blank sheets for the tachometer;
  - Road maps;
  - Expense sheets;
  - Maintenance records;
  - Inspection certificates for the vehicle.

### Check auxiliary equipment

- Check if the vehicle carries:
  - Fire extinguisher (whose expiration date has not expired and whose pressure is correct);
  - Means for tying down: belts, ropes, straps and tensors;
  - Means for signalling: emergency triangles, red flag, and orange warning lights, if appropriate;
  - Repair tools: toolbox, spare bulbs, hydraulic jack, spare tyre and tyre wrench;
  - Other articles: gloves, torch, clean rags, notebook and pens for taking notes;
  - *Elements for gathering up and containing spills of a general nature. It is convenient to carry a bag of absorbent material (sepiolite or the equivalent), broom, small shovel and adequate container for the storage of the absorbent earth with the remains of this waste. Depending on the product (check the indications on the safety sheet), it may be necessary to carry a cushion to obstruct drains or absorbent barriers for retention.*

### Check the vehicle and semitrailer

- *Check and refill the water for the battery every week, oil, and transmission fluid for losses;*
- *Check oil and air pressures;*
- *Check that the air filter is not dirty;*
- Check the status of the fire extinguisher, the rear-view mirrors, the covers and the bodywork;
- *Check the tyre pressure, the state of the tread and appropriateness of the model to the circumstances;*
- Check the functioning of the brakes, all exterior signals (tractor, trailer) and of the system of lighting;
- *Check the exhaust pipe;*
- Check the general cleanliness of the lorry (inside and out);
- Check the fuel reserve (employees should tank up, whenever possible, at headquarters and write down the number of kilometres);
- Check the functioning and the status of the batteries of the portable communications equipment;
- *Check whether there are any indications of incomplete combustion. This can represent an important increase of the environmental impact during the journey;*
- *Check for any abnormal noise or vibration that could increase environmental impact during the run.*

### Upon receiving an order

- Upon receiving a pick-up order or verbal notification for a service, ensure that it is clear and, if it is verbal, write down the dates and have them confirmed by the person notifying you. Take note of the following:
  - The address, date and time of loading;
  - The address, date and time of off-loading;
  - Names and telephones of persons to contact (loading and off-loading);
  - The type of goods and the suitability of the vehicle;
  - The number of packages, pallets or other forms that have to be transported (measurements or weight).
  - Any special circumstances, if they exist, regarding the load and delivery.
- If there is any doubt about the service, invest a few minutes to ensure what has to be done.
- If there is any reason not to accept the service (because of its poor physical conditions, the vehicle or its functioning are inappropriate or for any other reason) make it known quickly and clearly, especially if it is a question of hazardous goods.
- *Any error caused by imprecision in the documentation causes additional environmental impact: namely useless runs, congestion in the loading/off-loading areas that signify extra consumption, noise and pollution. Any error affects the environment and economic efficiency.*

## **At the place of loading**

### **Upon arrival at the place of loading**

- Identify yourself as the driver for the business and present all documentation necessary for loading.
- Drive and manoeuvre carefully in accordance with regulations and internal indications.
- A loaded vehicle should never weigh more than the maximum authorized weight. If it is thought that this will be the case, consult headquarters for instructions.

### **During loading of goods**

- Once the waybill is signed, the owner of the lorry or the driver becomes responsible for any damage that might occur during off-loading. Therefore, it is essential that he monitor the loading.
  - Count the number of packages and note only the packages that are visible (not the number that are supposed to be there). For example: note "one pallet" if it is impossible to count the number of packages on the pallet.
  - Do not accept damaged goods. However, if you must accept damaged good make a note on the waybill.
  - Check whether the origin, destination, weight of the goods and the hour of the beginning and end of the loading figure on the waybill.
  - Before signing, note any opportune reservations on the waybill, for example: "to the order of the client, the driver has not been able to check the loading".
- Make opportune indications to the person loading so that handling and storage of the goods are correct (in order to facilitate off-loading).
- *Check that the load has been stored (without empty spaces) and is well secured in order to prevent shifting or any incident. Tighten and tie down the covers.*
- Whenever there is any problem, incident or delay, inform headquarters.
- *If the load is hazardous materials, ensure that all the necessary measures are taken: adequate placement in the loading area, grounding, clearing of gases, compatibility of loads and all the indications stated on the labels for each product.*

### **Controls before leaving**

- Check that the load is well tied down, that the cargo doors are well closed and, if the load should be sealed, ensure that the client has sealed the lorry and has noted the number of the seal on the waybill.
- Retain the documentation for the sender and the pick-up orders.
- *In the case of hazardous goods, ensure that the requirements for the goods are respected and that safety sheets have been received for the products in the languages of the countries through which you are passing and that they have no incompatibilities. On the road transport contract, the driver should be authorized to accept the goods, the vehicle and the documentation required. In the event of an accident with hazardous goods, the environmental consequences are usually important. Information and the capacity to act are key.*

## **During the trip**

### **Good driving**

- *Before leaving, ensure that the run or the route is well planned. Avoid crossing through urban or residential areas, especially at night.*
- *When starting the engine, do not warm it while stopped. Drive the first kilometres without forcing the engine (forcing the engine when it is cold causes additional consumption, breakdowns and premature wear).*
- *Remember that good behaviour on the road can lengthen the useful life of the vehicle, save fuel and improve the image of road transport in general. Try to drive at a steady pace without rushing.*

- Drive respecting signs and the traffic code (sanctions for driving in non-compliance with the regulations are the responsibility of the driver or the owner of the lorry).
- Wait patiently for indications from the traffic police. If they stop you, behave calmly and try to give reasonable replies. Do not become violent.
- Regarding speed:
  - *Respect the speed limit, even though it appears inopportune, and be especially prudent if there is a need to cross through urban, school or recreation areas.*
  - *Drive at a constant velocity, without sudden acceleration.*
  - *Monitor the tachometer (it has to stay on the economical zone).*
  - *Use the correct gears (if the vehicle transports heavy or long loads, if transporting large volumes, coordinate the pedals and do not change velocity constantly.*
  - *Stop the engine whenever the stop is expected to be long.*
  - *When driving with the windows down at more than 60 km/hour, fuel consumption increases by 5 per cent.*
- *Keep in mind that the driver's behaviour, both on the road and in urban areas, has an influence on the good image of the business and on road transport in general.*
- If there is any problem or incident call headquarters immediately.
- *Keep in mind that good driving (under the best of conditions) can reduce considerably overall environmental impact.*

### **Rest stops and use of the motorways**

- Respect the minimum required rest stops<sup>9</sup>.
- Always keep the vehicle in sight when stopping to eat, take on fuel, etc. Park in car parks that offer safety.
- Take advantage of rest stops to check
  - *the exterior of the lorry: locks, seals and covers (adjusting the cover allows saving fuel)*
  - *tyre pressure (low pressure increases fuel consumption).*

### **Controls under way**

- Check the functioning of the brakes and all indicator lights.
- Check alarms and indicators on the dashboard.
- If there is any suspicion that there are or could be traffic problems along the planned route, try to keep informed, for example, through radio stations.
- Remember that you can use the toll motorways only with authorization of headquarters. *If the fact of not using them represents a safety risk and produces environmental damage from possible accidents, inform headquarters about these risks (the driver always has an important responsibility).*
- Do not do other activities (eating, reading, telephoning) while driving.
- Always remain alert because you are driving a heavy vehicle and, loosing control could cause a serious accident.

### **Communications with headquarters**

- In the event that a situation requires a delay (accidents, need to go in a convoy, traffic jam, becoming lost), notify headquarters to inform the client.
- Communicate with headquarters after having finished the delivery.
- Communicate with headquarters when there is a problem, emergency or any doubt.

<sup>9</sup>In the case of Spain, current legislation in force about driving and rest times requires 45 minutes rest for each 4 hours 30 minutes of driving, which can be divided into periods of 15 minutes.



## ***At the place of off-loading***

### **Arrival at the place of off-loading**

- Identify yourself as the business's driver and present the documentation necessary for off-loading.
- Drive and manoeuvre within the installation carefully and follow regulations and internal indications.
- Never break the seal without the presence of the person receiving the goods.

### **Off-loading the goods**

- If the waybill specifies that the transport is to be paid upon delivery in cash, the amount should be paid before delivering the goods.
- It is essential to remain near the vehicle, checking the off-loading.
  - Check the number of packages and if they correspond in number and destination with what is on the waybill.
  - Check for possible damage to the goods: breakage, spills, etc.
  - Give any indications felt to be opportune to the person that is off-loading.
  - Before signing, note any pertinent comments on the waybill, for example: "by order of the client, the driver has not been able to check the off-loading".
- When the off-loading is finished, ask the person receiving the goods to sign the original of the delivery waybill (hour, date, name, business and stamp) and give him a copy (and the documentation from the sender, if appropriate).
- If during the off-loading any problem, incident or delay occurs, call headquarters.
- *If the goods are dangerous, ensure that the instructions for off-loading are respected and followed by the recipient.*
- *Do not permit off-loading in conditions that do not comply with the requirements indicated for the product.*
- *Inform headquarters of the situation.*

### **Controls before leaving**

- Check whether the goods indicated on the waybill have been off-loaded. Check whether you have the signed copy and whether the lorry has been well closed.
- Once prepared to leave the installation, call headquarters to inform them of the finalization of the service or the partial delivery of the goods, whichever is the case.
- *If hazardous goods have been transported in a tanker, ensure that treatment (washing, clearing of gases, etc.) has been respected in order to begin the return journey.*
- *If you must collect another product, respect strictly the indications for handling and taking on another product.*

## ***Upon returning to headquarters***

- The driver should hand over to the head of the warehouse:
  - All goods collected together with the corresponding documentation;
  - Goods that have not been delivered to their destination with an explication of the reason;
  - Sheets indicating no-conformity or incidences, if appropriate, or information in order to fill them out;
  - All the delivery waybills duly signed by the recipient of the goods;
  - The amount of the freight charges paid, when that is the case.



## **Miscellaneous**

### **Image of the driver and vehicle**

#### *Image of the driver*

- Be careful of appearances:
  - Try to dress correctly
  - Wear comfortable clothing without spots and appropriate to the circumstances
  - Before leaving the cab, fasten all buttons, the belt and zippers
- Try to give a professional image of the business.
  - Avoid arriving late if there is no justified reason.
  - Speak clearly and slowly with your interlocutor.
  - If there is any suspicion that something is not as foreseen ask for a break in order to contact headquarters and clear up the situation (never say “yes” or “no” in order to get out of a situation quickly).
- *Be respectful of the environment. Do not dump pollutants (oils, detergents, chemicals, waste and packaging) outside the appropriate specific installations for waste disposal.*
- *Ask those responsible for the establishment of the waste area (solids or liquids), where and how to deposit them.*
- *If the business does not have an appropriate place for some waste, transport the waste to an adequate destination or back to headquarters.*
- Respect the indications for prevention of risks (fire, explosion, etc.). An accident by us is the worst image that we can give and usually has important environmental consequences.

#### *Image of the vehicle*

- Take care of the exterior aspect of the vehicle (cleanliness, fastening of covers).
- *Take precautions to produce a minimum of noise, especially when circulating through urban areas.*
- *If the vehicle has any loss of oil or hydraulic fluid, repair the leak at the first opportunity and inform headquarters about the repair.*
- *If any spill has occurred, collect it with absorbent materials, leaving the place where the spill occurred clean and without risk of pollution of the soil or water. Later, correctly dispose of the waste of the polluted materials.*

#### *Behaviour in the presence of the client and his staff*

- Do not confront the client, and remember that if the client sees something that he does not like or loses confidence, it is possible that he will stop using the transporter.
- If there is any doubt, suspicion or problem, inform headquarters.
- Do not criticize the sender, the recipient or the client (because that can affect us negatively).

### **Emergences and mishaps**

#### *Breakdowns*

- Stop where there is no danger to traffic and signal the stop.
- Inform headquarters about any incidence and also about what has happened. Assess whether it is possible to make repairs and how long it will take, inform headquarters again.
- Try to repair the breakdown with your own means (tools and parts). If that is impossible, inform headquarters and wait for instructions.
- Do not abandon goods under any circumstances.
- *If the driver of the vehicle repairs a breakdown, gather up any waste and deal with it correctly, using any possibilities at headquarters.*

### *Accidents*

- Try to stop where there is no danger for traffic and signal the stop.
- Check for possible damage to the vehicle and the goods and assess the possibility of continuing. If the damage prevents normal driving, call headquarters and wait for instructions.
- If there are third parties involved (accidents), fill out the accident report (no-fault declaration of an accident), following the indications on the form and any other forms necessary keeping in mind the country in which the accident occurs.
- Never abandon goods under any circumstances.
- *In the event of transport of hazardous goods, if there is an accident, follow the instructions exactly and quickly as indicated on the transport safety sheets (TREM CARD). Immediately inform headquarters and the competent authorities, depending on the country.*
- *If you can, make yourself immediately available to local authorities.*

### *Mishaps*

- If there is a shift in the load, try to stop where there is no danger to traffic and signal the stop. Try to find the cause of the shift (poor handling, excess weight), check the load and the damage caused and inform headquarters.
- Inform headquarters if it is necessary to stop, change a route or reduce speed because of snow, rain or other adverse conditions.
- If it is impossible to communicate with headquarters by portable telephone or radio, use a public telephone.
- In the event of a robbery, file a complaint immediately and inform headquarters.

## 4.2. GUIDE FOR AN INITIAL EVALUATION OF THE ENVIRONMENTAL SITUATION

The following considerations should be taken into account in assessing a business's current situation for introducing a PGEP.

### 1. Awareness of the employees

For all the employees that participate in each of the business's processes:

- Assess the degree of knowledge and awareness with regard to the environmental impacts of their activity.
- Is the degree of willingness to participate in the PGEP high, sufficient or lacking?

### 2. Training

Have the persons responsible for operations received training about the environmental aspects of their activities and the possibility of decreasing costs and improving the environment?

Training should cover:

- the environmental and economic management of logistics activities
- proper driving of vehicles
- environmental indicators included in the sheets
- maintenance instructions

### 3. Current good practises:

- Which good environmental practises are being applied and to which operations?
- Do maintenance instructions include good practises?

### 4. Control records

- Are there records for consumption of fuel, tyres, oil, etc.? Are they kept up to date?

### 5. Monitoring and analysis

Check:

- Tachometer records in order to evaluate driving
- Fuel consumption
- Tyre consumption
- Oil consumption
- The quality of combustion and emissions
- Monitoring of maintenance criteria

### 6. Waste

- Is waste separated by:
  - Paper and cardboard?
  - Plastic film for pallets?
  - Pallets (distinction between repairable and waste)?
- Are new and used oil drums located on platforms that allow for collecting a spill of a drum (220 litres)?
- Is the soil where this will be stored paved with concrete?
- Are oil drums, paint tins and dirty oily rags sent to a dealer as special waste?
- Are fluorescent tubes and batteries managed correctly?
- Are used tyres and batteries managed correctly?

### 7. Spills

- Is there non-combustible absorbent material for cleaning up spills of transported liquids or for oil or fuel from lorries?
- Are there sand bags or other adequate means in the event of a large spill?

### 8. Washing of vehicles and tankers

- Has the environmental appropriateness of the services that do the cleaning been checked?

## 4.3. GLOSSARY

### ***Definitions concerning the BEPs***

- **Environmental aspects of logistics**

The materials and energies used in logistics and emissions into the atmosphere, waste, spills, noise and vibrations produced in logistics.

- **Environmental impact of logistics**

The consequences or interactions that logistics has on the environment, such as excessive consumption, wasted resources or the impact of emissions on the atmosphere, wastes, spills, noise and vibrations produced by logistics.

- **Good environmental practises (GEPs) in logistics**

GEPs can be summarized as follows:

- Adoption by a business's employees of ways of acting efficient in daily logistics operations.
- Improvement in efficiency can be achieved with only small increases of resources, expenses or investment.
- Planning and carrying out activities. It requires promoting the participation of employees at all levels, based on clear instructions that are easy to carry out.
- Good environmental practises in logistics consist mainly in saving fuel, tyres, oil, packaging, etc., which results in savings of resources and costs.
- Any reduction of consumption is always linked to a reduction of environmental impacts, as explained in this manual.

- **Programme of good environmental practises (PGEP)**

This is a programme for:

- identifying and introducing good environmental practises into a business
- establishing who and how have to introduce de GEPs
- introducing the GEPs obtaining the participation of all employees
- promoting awareness and carrying out training
- improving the GEPs
- measuring results
- monitoring the efficiency of the programme

- **Environmental efficiency in logistics**

This is the result of planning and implementation of logistics activities with a high level of quality, minimum consumption of resources and environmental impact.

### ***Complementary definitions***

- **Authorized dealer**

An individual or business authorized by a competent environmental administration to carry out specific activities of waste management.

- **Emissions (broad sense)**

Release of one or more pollutants into the water, atmosphere and/or soil.

- **Environment**

The environment that humans share with the fauna, flora, air, water and soil. It should be remembered that the capacity of the environment to withstand impacts is limited.

- **Environmental management**

A set of a business's organizational measures, responsibilities, practises, procedures, processes and resources for carrying out an environment policy.

- **Hazardous waste**

Waste that because of its physical, chemical or biological characteristics is toxic or dangerous and requires specific treatment in order to prevent potential harmful effects for health or the environment.

- **Noise pollution**

Changes in noise levels in the environment caused by human beings or the environment itself.

- **Non-hazardous waste**

Waste that is not classified as dangerous.

- **Recycling**

Option of reusing waste in the manufacturing process of the same product or of a product with a similar function.

- **Reuse**

Option of using new waste in its original form for the same or different use.

- **Sewage water**

Water from the equipment and installations of washing of toilets.

- **Valuation**

The set of operations that promote the total or partial reuse of waste. Recycling, recovery, regeneration and reuse are examples of options of valuation.

- **Waste management**

A set of activities that includes the collection, transport, storage, valuation, disposal and marketing of waste.

- **Wastewater**

Water that has been polluted and contains waste. In the logistics sector, wastewater comes mainly from the washing of vehicles, tankers and installations.

## 4.4. BIBLIOGRAPHY

### **Publications**

- EUROPEAN WASTE CATALOGUE. 2001
- EUROPEAN COMMISSION. COMMISSION OF THE EUROPEAN COMMUNITY. DIRECTORATE GENERAL VIII. *Guide of Good Practises (for wise environmental management of logistics platforms)*. 1999
- EUROPEAN COMMUNITY. COMMISSION WHITE PAPER. *The European Transport Policy*. 2001
- CETMO FOUNDATION. *Environmental Management in Transport Organizations*. 2002
- GOUVERNMENT OF CATALONIA. MINISTRY OF THE ENVIRONMENT. WASTE AGENCY. *Manual for Management of Industrial Waste in Catalonia*. 1st edition. Barcelona. 1999
- GOUVERNMENT OF CATALONIA. MINISTRY OF THE ENVIRONMENT. WASTE AGENCY. *Management of Polluted Soils. Causes and Consequences of Soil Pollution*.
- GOUVERNMENT OF CATALONIA. MINISTRY OF THE ENVIRONMENT. *Vehicle Pollution: a Challenge for Everyone*.
- REGIONAL ACTIVITY CENTRE FOR CLEANER PRODUCTION. MEDITERRANEAN ACTION PLAN. *Good Housekeeping Practices. Programme Design and Application in Industry*. 2000
- GOUVERNMENT OF CATALONIA. MINISTRY OF TERRITORIAL POLICIES AND PUBLIC WORKS. DIRECTORATE GENERAL OF PORTS AND TRANSPORT. *Sustainable Transport, an instrument for European Integration. Euro Vehicles*. 2000
- UNECE. Transport Division. *ADR-International Carriage of Dangerous Goods by Road*.  
<http://www.unece.org>
- UNECE. *United Nations Recommendations for the Transport of Hazardous Materials*.  
<http://www.unece.org>

### **Other sources consulted**

- AUSTRALIAN DEPARTMENT OF FOREIGN AFFAIRS AND TRADE ([www.dfat.gov.au](http://www.dfat.gov.au))
- CEL - SPANISH LOGISTICS CENTRE ([www.cel-logistica.org](http://www.cel-logistica.org))
- DBK, S.A. ([www.dbk.es](http://www.dbk.es))
- DISTRIBUTION AND CONSUMPTION
- FCAVN - FEDERATION OF BASQUE AND NAVARRE SAVING BANKS ([www.fcavn.es](http://www.fcavn.es))
- FENADISMER - National Union of Spanish Transport Associations
- ICEX - Spanish Institute of Foreign Trade ([www.icex.es](http://www.icex.es))
- LOGISTICS WORLD ([www.logisticsworld.com](http://www.logisticsworld.com))
- TELECOTRANS ([www.telecotrans.es](http://www.telecotrans.es))

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