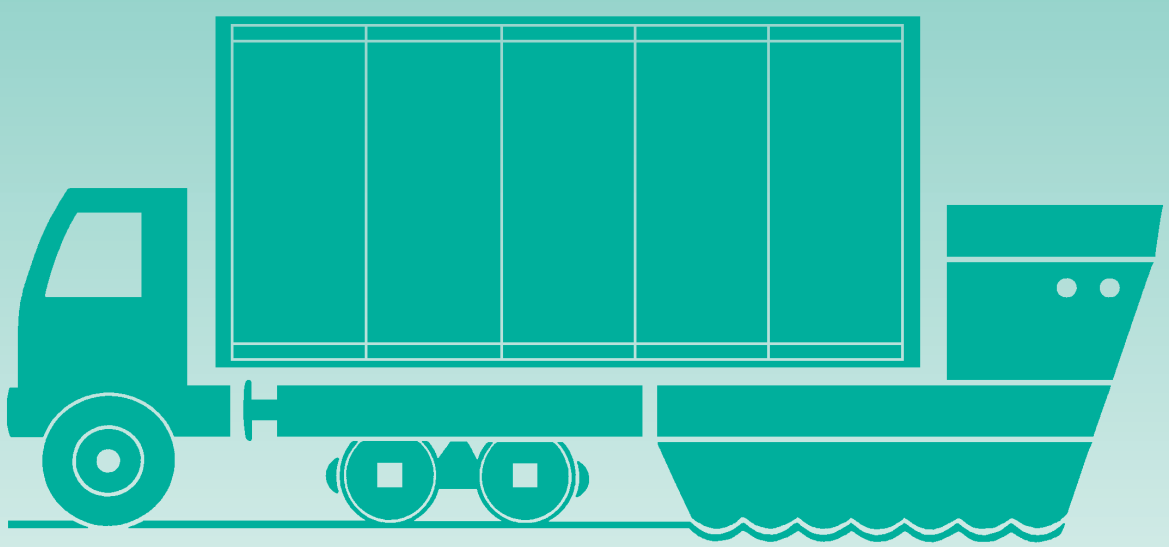
EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT

Report on the Current State of Combined Transport in Europe



EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT

REPORT ON THE CURRENT STATE OF COMBINED TRANSPORT IN EUROPE

ECMT

EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT (ECMT)

The European Conference of Ministers of Transport (ECMT) is an inter-governmental organisation established by a Protocol signed in Brussels on 17 October 1953. It is a forum in which Ministers responsible for transport, and more specifically the inland transport sector, can co-operate on policy. Within this forum, Ministers can openly discuss current problems and agree upon joint approaches aimed at improving the utilisation and at ensuring the rational development of European transport systems of international importance.

At present, the ECMT's role primarily consists of:

– helping to create an integrated transport system throughout the enlarged Europe that is economically and technically efficient, meets the highest possible safety and environmental standards and takes full account of the social dimension;

– helping also to build a bridge between the European Union and the rest of the continent at a political level.

The Council of the Conference comprises the Ministers of Transport of 39 full Member countries: Albania, Austria, Azerbaijan, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, the Former Yugoslav Republic of Macedonia (F.Y.R.O.M.), Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Moldova, Netherlands, Norway, Poland, Portugal, Romania, the Russian Federation, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine and the United Kingdom. There are five Associate member countries (Australia, Canada, Japan, New Zealand and the United States) and three Observer countries (Armenia, Liechtenstein and Morocco).

A Committee of Deputies, composed of senior civil servants representing Ministers, prepares proposals for consideration by the Council of Ministers. The Committee is assisted by working groups, each of which has a specific mandate.

The issues currently being studied – on which policy decisions by Ministers will be required – include the development and implementation of a pan-European transport policy; the integration of Central and Eastern European Countries into the European transport market; specific issues relating to transport by rail, road and waterway; combined transport; transport and the environment; the social costs of transport; trends in international transport and infrastructure needs; transport for people with mobility handicaps; road safety; traffic management; road traffic information and new communications technologies.

Statistical analyses of trends in traffic and investment are published yearly by the ECMT and provide a clear indication of the situation in the transport sector in different European countries.

As part of its research activities, the ECMT holds regular Symposia, Seminars and Round Tables on transport economics issues. Their conclusions are considered by the competent organs of the Conference under the authority of the Committee of Deputies and serve as a basis for formulating proposals for policy decisions to be submitted to Ministers.

The ECMT's Documentation Service is one of the world's leading centres for transport sector data collection. It maintains the TRANSDOC database, which is available on CD-ROM and accessible via the telecommunications network.

For administrative purposes the ECMT's Secretariat is attached to the Organisation for Economic Co-operation and Development (OECD).

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Further information about the ECMT is available on Internet at the following address:

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TABLE OF CONTENTS

1. INTRODUCTION

This report on the current state (April 1998) of combined transport in Europe needs to be set within the general context of the ECMT's development as an organisation.

From the early 1990s, the ECMT gradually expanded to include the countries of Central and Eastern Europe, which became new partners of the Conference in preparing and implementing a pan-European transport policy.

This process is today nearly complete. Following the accession of Hungary, Poland and the former Czechoslovakia in 1991, and then the Baltic States, Bulgaria, Moldova, Romania and several States of the former Yugoslavia (Bosnia Herzegovina, Croatia and Slovenia), the ECMT welcomed three other countries from the region in 1996, namely the former Yugoslav Republic of Macedonia, Belarus and Ukraine. Since 1 July 1997 the Russian Federation, which was previously an associate Member, has also been a full ECMT Member.

Practically all Europe is now represented within the ECMT, with two notable exceptions whose situation is under examination: Albania, currently an observer, and the Yugoslav Federation.

Secondly, this report should be seen as a further contribution by ECMT in the field of combined transport.

It is based on the report entitled "Improvements in main international piggyback links" published in 1992, which updated the analysis of "Shortcomings in important international piggyback transport links" in 1988.

Since 1992, ECMT has adopted many resolutions concerning the promotion of combined transport, including recommendations and agreed principles on how to improve the competitiveness of combined transport.

It was therefore necessary to update the 1992 report for two reasons: first, to evaluate the development of combined transport in the "old" Member countries and to ascertain to what extent the resolutions adopted by Ministers had been effective; second, because the ECMT's new members were not covered by that report and the development of combined transport in those countries is not faced with the same problems and challenges as in the "old" ECMT countries.

Rail transport is considered to be the most important form of combined transport in Europe. Much less attention is given to the possibilities of inland and coastal shipping. In the past decade, coastal shipping has become increasingly important in the intra-European combined transport chain. Door-to-door operators increasingly use a combination of the three modes, with road transport being used for initial and terminal hauls only. Experts have pointed out that the potential of coastal

shipping in the combined transport chain has hardly been exploited in Europe. Its role therefore deserves more attention. Additional research in this area is necessary.

The land and air interface is not discussed since the loading units between these two modes still remain incompatible, no form of combined transport has been developed.

2. DEFINITION AND MAIN FEATURES OF COMBINED TRANSPORT

2.1. Definitions

Many of the publications dealing with combined transport use different terminology, such as:

- intermodal transport;
- multimodal transport;
- combined transport.

The European Conference of Ministers of Transport has agreed on a clear terminological framework for combined transport. This was drawn up with the full accord of the experts of the European Union and the UN/ECE in Geneva, and is now used by all ECMT Member Countries.

The European Conference of Ministers of Transport adopted a DECLARATION ON COMBINED TRANSPORT at the Council session in Budapest on 29-30 May 1996 *[Document CEMT/CM(96)16]*, which read as follows:

"At the European level, combined transport has to be understood as an individual mode of transport which makes maximum use of the advantages of the various modes of land transport and short sea shipping, choosing those modes most suitable. Combined transport thus implies the organisation of intermodal door-to-door transport by transferring goods from one mode of transport to another without changing the loading unit. To be more precise, combined transport is based on an Intermodal Transport Unit (ITU) in which the goods are transported from door to door by using the most adequate modes of transport:

- the road for initial and terminal hauls only;
- rail and/or inland waterways and/or short sea for the major part of the journey, the choice of modes depending on the itinerary, whereby the transfer between the different transport modes must be handled as efficiently as possible."

2.2. Main features of combined transport

Like any other transport system, combined transport consists of:

- infrastructure (roads, waterways, tracks, dedicated transfer areas);
- superstructure (safety, power supply and transfer equipment);
- vehicles (road and rail rolling stock, ships);
- information systems;
- human actors.

As far as **infrastructure** is concerned, combined transport mainly needs -- in addition to the modal infrastructure -- terminal areas for switching from one mode to the other. Roads, tracks and waterways are designed to carry the vehicles of the specific mode, and combined transport is *per se* "intermodal", *i.e.* its techniques and loading units are designed to operate with existing modes. The main infrastructure problem posed by combined transport is thus the network of transhipment terminals, the efficiency of existing terminals and the need to modernise and enlarge the network in the future.

Combined transport can give rise to specific needs with regard to rail infrastructure, especially the railway gauge. A combined transport loading unit on a railcar must be carried safely through tunnels, under bridges, and other infrastructure of limited dimensions. Over the past few years, the trend has been to use higher and higher combined transport loading units. Today, more than 10 per cent of the ISO container fleet is 2.9 m high, and the first European swap bodies over 3.3 m high came into service in 1997. This makes it necessary either to enlarge tunnel gauges or to use special low-platform railcars. Both possibilities need careful consideration: it can be expensive to enlarge the gauge though very often only a few tunnels will need it; a larger gauge can also offer additional advantages for other types of traffic. The operation of low-platform railcars, on the other hand, may result in additional rolling stock costs, and limit train capacity in terms of lower mass (weight) and shorter loading length for combined transport loading units.

In particular, Alpine tunnels could pose problems for very high combined transport loading units such as 3.3 m high swap bodies. A major enlargement of the Alpine tunnel gauges would be very costly, not to speak of the time it would take and the inevitable disruption of traffic that would ensure while they were being enlarged. The better solution would therefore be to purchase railcars with very low platforms. In addition, UIC must review its system of classification of European rail gauges in the light of such developments.

Transport operators have to understand that public infrastructure sets a general limit to the size of vehicles and combined transport loading units, and that any developments in this area must comply with the fundamental rules for this type of infrastructure.

Similar constraints exist on inland waterways. Limits apply to bridge clearances, the depth of rivers and canals, and the size of locks. These limits may, in addition, vary over the year according to the water level. The Rhine, for example, normally has sufficient water and bridge clearances large enough to allow the operation of vessels with a capacity of more than 200 TEU. Freight containers are stacked four layers high. Once the vessel sails upstream towards the river port of Frankfurt am Main, a first set of locks and slightly lower bridges reduces the draught, so that a layer of containers has to be removed *i.e.* the height of the stack is reduced by 25 per cent. As the ship moves further upstream into the Rhine-Main-Danube Canal, the bridge clearances are even smaller, and only two layers of containers can be carried. Compared with the Rhine passage, the vessel has lost 50 per cent of its capacity, while its overall operating costs have, by and large, not decreased. In other words, due to the lower bridge underpasses, the transport costs per unit have practically doubled.

Infrastructure improvements are possible in order to increase the capacity. But in very many cases, the cost of reshaping all the bridges and locks on an inland waterway may be prohibitive compared with the productivity gains, because any such improvements would improve the productivity only of inland waterway container transport, which represents only a small proportion of total inland waterway traffic. The main inland waterway cargoes -- coal, ore, oil products and building materials -- would normally not benefit from bigger bridge clearances.

The road network seems to pose the fewest constraints, mainly because road vehicle manufacturers are able to offer chassis and trucks with relatively low platforms if the operator is willing to pay extra for the special design and small-diameter tires.

Combined transport involving air transport is not very common. Air transport uses containers of a very specific shape that for many reasons do not lend themselves to surface transport. The containers are therefore loaded and unloaded in most cases in the airport area and very seldom travel intermodally.

The infrastructure needed for coastal shipping does not require large investment and has an almost unlimited capacity. Sea transport takes up hardly any space. It is also safe and relatively environment-friendly. Combined transport involving coastal shipping and inland shipping or rail is heavily dependent on adequate terminal infrastructure. To become more competitive, ports should offer good connections with rail and inland waterways.

Again, structures above and adjacent to tracks are primarily designed for traditional transport modes, and combined transport normally has to adapt to them. Usually, this does not create a problem -- with one exception: as almost all high-capacity European railway lines are electrified, the transfer of a combined transport loading unit by traditional lift on/lift off methods is difficult. Either the railcar has to be removed from the electrified network (necessitating a change of locomotive) or special transfer equipment that can operate safely under the high-voltage electrical wire has to be constructed. Given that this is so difficult to do, such equipment is practically nowhere in use. Combined transport freight trains are therefore moved to a non-electrified part of the network before any lifting operation is performed.

For in-line hauls, combined transport will use the installations specific to the mode on each leg. In addition, it needs facilities to change from one mode to the other. These will be found mainly in the terminals; combined transport cannot thus do without terminal equipment.

Many European States have decided to offer investment grants for combined transport, mainly for the building and upgrading of terminals. Very often, the costs of the terminal infrastructure are covered by such public aid, while the operators have to finance and install the superstructure, *i.e.* the cranes for lifting combined transport loading units, the special vehicles to move such units within the terminal area, the gate installations, the administrative buildings and similar investments.

Specialised combined transport vehicles consist of platform cars for rail and road container transport. Manufacturers are trying to design such cars with a platform as low as (economically) possible in order to allow the highest containers to be moved through tunnels and under bridges. Specialised ships for combined transport have cell guides that secure the containers while the ship is at sea and moving. As there is very little movement of this kind during most inland waterway journeys, vessels for inland waterway container transport do not need cell guides or similar securing features for the stacked containers.

An overview of **terminal installations** in Europe is given in Annex A.

The **information systems** used in transport are very often traditional -- most communication is by telephone and fax, while the traditional telex seems to be disappearing.

Combined transport operation has added some specific problems to information system design, which have not been completely solved.

The first problem arises from the intermodal nature of combined transport. An information system which aims to keep track of the entire operation from door-to-door must cover more than one mode of transport. But most traditional information systems were designed to cover only one specific mode. Furthermore, many rail operators' information systems are confined to one rail network, and do not connect with the systems of other rail networks on the same route. Future information systems should therefore be designed with an eye to achieving full intermodality permitting internationally-compatible operation.

The other problem is connected with the fact that most combined transport is "unaccompanied" *i.e.* the loading unit is not accompanied by a driver. In road transport on the other hand, the driver accompanies the load, can easily report incidents and react to unforeseen events, etc. In combined transport, the information system has to incorporate the basic features of such functions. It has to be much more sophisticated than that of road transport, while offering the same quality of logistic information so as to enable combined transport to compete with this mode. Many national and international projects have been initiated to develop, test and install such information systems.

The **human actors** -- whether personnel, commercial partners, local firms and bodies, and political decision-makers -- are the cornerstone of the combined transport system. This report cannot give a detailed analysis of the role and behaviour of all the actors involved and will confine itself to a few general remarks:

- To be competitive, combined transport has to serve the same markets, and to obey the same market conditions, as any other form of freight transport.
- Combined transport is confronted with the same environmental problems and constraints as any other mode.
- In many European countries, there is a marked political preference for combined transport, reflected in programmes of public aid and legislation to promote combined transport.

While combined transport is subject to the laws of supply and demand in the same way as its competitors, it can, under some circumstances, offer **additional logistical services** that will give it a competitive edge. Its main advantage stems from the simple fact that a combined transport loading unit can wait for some time before the next stage of transit without the economic cost being too high, unlike a vehicle. As the daily cost of a vehicle is much higher than that of a container, hauliers seek to turn forces round as quickly as possible. When the vehicle arrives at the consignee, it must be immediately unloaded and prepared for the next haul. A freight container or a swap body can be left at the shipper's for a few days without incurring too many additional costs. Combined transport can in some cases thus combine the transport function and the warehouse function.

This can be illustrated by an example: a pharmaceutical company receives its packing material -- for example, glass containers -- by container. It does not empty the container, but leaves it on the ground and takes out the glass containers as needed. After some days, the container will be emptied and, in an optimal round-trip configuration, be loaded with its products ready for export. This type of operation needs well-co-ordinated internal factory logistics but can provide significant competitive advantages that only combined transport can offer.

3. INTERNATIONAL ACTIVITIES IN COMBINED TRANSPORT

3.1. ECMT activities

The European Conference of Ministers of Transport has been working for many years on joint European policies to improve the conditions for combined transport. The Committee of Deputies of the European Conference of Ministers of Transport set up a Combined Transport Group that works on specific programmes in this field.

The Combined Transport Group conceived and drafted the present report and decided to include the following main issues in its programme of work:

- equal conditions of competition between the various modes of transport (true costs): the Working Group on Combined Transport will continue to co-operate with the Task Force on Internalisation of Social Costs and also present its own findings concerning road and combined transport prices on specific links;
- situation regarding border controls, especially at the external borders of the European Union;
- interoperability-achievements and bottlenecks;
- report/conclusion/resolution on inland waterway and short sea shipping;
- overview of existing studies and -- possibly -- comparison of the most important results;
- necessity, practicability and impact of new technologies in combined transport.

The European Conference of Ministers of Transport promotes the development of combined transport for the policy reasons given in the Declaration on Combined Transport adopted by the Council of Ministers at the session in Budapest on 29-30 May 1996 *[Document CEMT/CM(96)16]*:

"Combined transport therefore is an example for a rational network which combines the benefits of the various transport techniques and can be understood as a candidate for all evaluations or adaptations which help to improve the transport chain. Since combined transport is a means of shifting traffic off the road, it also helps to achieve the aim of sustainable mobility, as already pointed out in the White Paper on Transport issued by the European Union."

The Council of Ministers sees combined transport as an integrated element of transport policy, which in turn plays an active and important role in the development of Europe.

The Council of Ministers adopted the Annecy Resolution in 1994. This Resolution contains general recommendations such as the need to take action to establish true costs in transport. Furthermore, it recommends that national programmes to promote combined transport be reviewed and updated regularly. In addition to these recommendations, the Resolution made the following points:

- liberalisation of access to initial and terminal road hauls in combined transport;
- the introduction of higher weight limits for road vehicles operating in such terminal hauls;
- the exemption of combined transport from road infrastructure taxes;
- tax incentives for combined transport;
- investment grants for combined transport.

A further Resolution on combined transport was adopted by the Council of Ministers at its meeting in Berlin in 1997 [document CEMT/CM(97)22/Final]. It refers to Directive 92/106/EEC of the Council of the European Communities on the establishment of common rules for certain types of combined transport of goods between Member countries, widening its scope to ECMT Member countries, having regard to the political will to harmonise as widely as possible the conditions governing the performance and operational aspects of combined transport in Europe, and considering that for the economic development of the states at the periphery of Europe, combined transport increases necessary mobility and offers a reliable and safe form of transport to markets in Central and Eastern Europe.

3.2. UN/ECE activities: the AGTC/AGN

The Economic Commission for Europe of the United Nations (UN/ECE) is also supporting the development of combined transport in Europe.

UN/ECE has a Working Group on Combined Transport that meets regularly and, *inter alia*, works on international instruments to promote combined transport.

UN/ECE has played an active role in the preparation of various international conventions that have greatly facilitated international combined transport level, thereby contributing to the growth of combined transport.

In particular, the:

- Customs Convention on Containers (Geneva 1956, revised 1972);
- Convention on Safe Containers (Geneva 1972).

The most recent agreement in this field was concluded in 1991:

THE EUROPEAN AGREEMENT ON IMPORTANT INTERNATIONAL COMBINED TRANSPORT LINES AND RELATED INSTALLATIONS (AGTC)

The main purpose of this Agreement is to develop a common infrastructure quality standard for combined transport on the main European transport corridors. Door-to-door combined transport is only as strong as its weakest link. Even if only a small part of a corridor places major constraints on combined transport, this will negate the efforts to improve the quality of transport on the route as a whole. The smallest tunnel gauge on a 1 000 km-long rail link will dictate the size of the combined transport loading unit used for the whole journey.

This being so, it might be useful to consider a new approach to the combined transport gauge classification of the International Railways Union (UIC). For example, the longest section of a route with a certain gauge could be identified, such as:

- Rotterdam-Milan P/C 45,
- Rotterdam-Gioia Tauro P/C 32.

Bearing in mind that the shortest distance over which combined transport is competitive is normally 300 km, the definition of sections with a certain gauge could be limited to sections at least 300 km long.

Similar economic considerations apply to terminal facilities. If the terminal lifting equipment at one end of a European corridor cannot handle 40 ft. containers, this will automatically rule out the use of such units on the entire corridor, even if the terminal at the other end can handle such containers.

For this reason, the European States that signed the AGTC agreed on a set of minimum standards for combined transport infrastructure, including both rail lines and terminals. The AGTC contains an annex that lists all the lines and corridors to which this minimum standard will apply. The annex is updated regularly in the light of the information received from the States concerned.

Admittedly, the AGTC does not provide for a Pan-European high-quality combined transport network immediately. But it forms a common framework for transport infrastructure planning in almost all European States. The AGTC standards will be achieved on all the major European transport corridors as countries gradually modernise their infrastructure.

While the AGTC concentrates on rail networks and road/rail terminals, a similar instrument for inland waterways is in preparation. In December 1996, the UN/ECE Working Party on Combined Transport published a:

PROTOCOL ON COMBINED TRANSPORT IN INLAND WATERWAYS
TO THE EUROPEAN AGREEMENT ON IMPORTANT INTERNATIONAL
COMBINED TRANSPORT LINES AND RELATED INSTALLATIONS
(AGTC) of 1991

This Protocol has the same policy aim as the AGTC. It lays down minimum standards for inland waterways and terminals for transfer between road, rail and inland waterway transport. Furthermore, it lists in an Annex all the waterways to be covered by the agreement, on the basis of information supplied by governments. Basically, it extends the concept of the AGTC Agreement on combined transport to inland waterways, laying down specific standards for this mode.

At the Regional Conference on Transport and the Environment (Vienna, 12-14 November 1997), the Protocol to the AGTC was signed by 12 countries.

The European Agreement on transport by inland waterways (AGN) agreement was finally concluded at the Third Pan-European Transport Conference in Helsinki in June 1997; it was signed by 17 countries.

3.3. European Union activities in the area of combined transport

EU transport policy and combined transport

The central goal of EU transport policy is sustainable mobility. The objective of the free movement of goods, people, services and capital, which has been the basic goal of the European Community from the outset, should be achieved at the least cost to society as a whole and in an environmentally-friendly way. To this end, the framework of the transport market needs to be modified in order to ensure that every transport mode handles only that transport which it can perform most efficiently.

The Common Transport Policy endeavours to contribute to the elimination of the handicaps from which combined transport still suffers and to encourage users to choose combined transport, by the following means:

- General policies like fair, efficient pricing, making combined transport an essential part of the trans-European network, and improving the quality of rail services.

- Removing technical and regulatory barriers to combined transport; Directive 92/106 on the establishment of common rules for combined transport of goods between Member States should be mentioned in this connection. The Commission is currently drafting a revision of this Directive. The following improvements to it are being considered:

    - vehicle tax rebates every time combined transport is used, and not only for the use of rolling road services;
    - 44 t maximum gross weight to be allowed everywhere in the EU for road haulage which is part of combined transport;
    - exemptions to weekend driving restrictions for road haulage that is part of combined transport.

- Creating financial incentives to use combined transport, and allowing Member States to give aid to combined transport; Article 3 of Regulation 1107/70 allows Member States to grant, until the end of 1997, aid to investment in combined transport equipment and infrastructure. The Commission is currently preparing a complete overhaul of the framework. In the beginning of 1998, experts from the Member States and professional organisations will be consulted about the revision. In the meantime, State aid to combined transport will have to be notified to the Commission, and the Treaty will be directly applicable.

- The PACT programme: pilot projects to promote combined transport were launched in 1992. The PACT Programme, which is based on a Commission decision, came to an end on 31 December 1996. In July 1996, the Commission proposed to continue the Programme from 1997 to 2001, on the basis of a Council Regulation. The programme comprises financial start-up assistance for innovative projects which are likely to increase the use of international combined transport by improving its competitiveness vis-à-vis road. The Commission hopes that the Council will adopt the Regulation in spring 1998. Meanwhile, the PACT programme will continue in 1998 with a budget of at least 6 million ECU.

The Trans-European Network and the Crete Corridors

In line with the ideas set forth in the AGTC, the European Union has drawn up a system of Trans-European Networks for combined transport. These networks are designed to provide high-capacity, high-quality infrastructure for combined transport on a European scale.

Unlike the AGTC, which can only recommend that the States strive to achieve common quality standards as soon as possible, the Trans-European Networks are co-financed out of the EU budget so that bottlenecks can be removed even if full national financing is not available.

While the Trans-European Networks are mainly situated within the European Union, another network, which would also serve for combined transport in Europe, was drawn up by the Council of Ministers of the European Union at their meeting in Crete. These so-called "Crete corridors" are outside the European Union, in Eastern Europe. They will serve the future needs of East-West traffic and international traffic flows inside Eastern Europe. A follow-up International Conference in Helsinki added some more corridors. The European Union has set up a special programme, within the PHARE Programme, to conduct research on future market needs, the current state of the infrastructure in these corridors, and ways of improving the situation, together with an estimate of cost and the time scale involved.

3.4. Other International Governmental Agencies

Other international agencies, in particular the United Nations Conference on Trade And Development (UNCTAD), also deal with combined transport. UNCTAD sees combined transport as an important means of developing the transport infrastructure and trade of developing nations.

3.5. International Professional Associations

Various international associations and agencies deal with combined transport. Most international road, rail, sea and inland waterway transport and forwarders' associations have combined transport committees, and other associations have been set up specifically for the purpose of promoting combined transport or promoting the interests of certain actors in the field.

In Europe, three associations are active:

- The Bureau International des Containers (BIC), founded in 1933 under the auspices of the International Chamber of Commerce, is located in Paris. BIC has more than 500 member companies from all over the world. Its main current activity is the maintenance of the ISO container owners' code that underpins much of the technology of the container transport system.
- The European Intermodal Association (EIA) was set up some years ago. It is located in Brussels and comprises almost 100 member companies. Its main role is to promote combined transport and create a common platform for its members, who come from the entire combined transport industry.

- The International Union of Combined Transport Road-Rail Operators (UIRR) is also located in Brussels. Until recently, its members were primarily combined transport road-rail operators owned mainly by road hauliers and forwarders (more details in section 4.4.). All the main operators in this sector belong to the UIRR. UIRR defends their interests vis-à-vis transport policy and the railways. It also seeks to harmonise commercial practices, information interfaces and related aspects of European combined transport.

In addition to these three organisations which are directly involved in the development of combined transport, mention may also be made of the work carried out within the International Road Transport Union (IRU) and the International Railways Union (UIC), both of which have set up permanent working groups on combined transport.

The OSJhD (Organisation for Railways Co-operation) has made a big effort to promote combined transport by encouraging the harmonisation of transport legislation, the simplification of customs and border controls, and the development of railway technologies to reduce delivery times.

4. GENERAL ANALYSIS

4.1. Main routes used in combined transport

Transport volumes are rising in line with the growth of international trade in Europe; at the same time, some high-volume trade routes are developing. While most large international trade flows tend to be concentrated on certain routes and crossing points, this is not always the case. Some countries trade with neighbouring countries via very many routes, all of them carrying only a small amount of total trade. For example, part of the trade between France and Germany, moves through very many small border crossing points. But in most cases, however, flows are more concentrated.

The concentration of traffic on certain routes lends itself particularly to combined transport. Combined transport creates efficiency gains by concentrating small loads such as truck loads into larger units such as block trains, inland waterway barges or coastal (container) ships. Larger units make possible savings on infrastructure use, operating costs and energy consumption, and are less polluting than multiple single units. For combined transport to be cost-effective and competitive, the savings must at least offset the costs of terminal transfer. The larger the volume of freight moved on a given route, the easier it is to concentrate loads. For this reason, large-scale European transport flows are conducive to the development of combined transport.

In addition, most European international transport flows are longer than national ones. This too is conducive to combined transport. The additional costs of combined transport, *i.e.* the cost of the handling terminals at either end of the transport chain, must at least be offset by the savings accruing from the concentration of loads. As the savings increase with distance, while the additional costs are independent of the distance covered, the greater the distance the more economic combined transport becomes. The minimum distance over which combined transport is competitive is usually considered to be 300-500 km. Some European countries have only a few -- if any -- national high-volume routes of this length. Combined transport is thus most competitive on international European routes because the distances are longer. But international transport also takes place over much shorter distances which are not suitable for combined transport. Large tonnages of gravel and other building materials are carried between France and Germany in the upper Rhine valley, but over distances of less than 100 km. These international traffic flows obviously do not lend themselves to combined transport.

Not all the European routes carrying large volumes of freight over distances of 500 km and more have efficient combined transport services. Indeed, on some of the busiest routes there is practically no combined transport. For example:

- The North-South route in Western Europe: Benelux and Germany/Spain and Portugal.

  The potential of combined transport on this route is not exploited. Coastal shipping via Rotterdam is increasingly important in intra-European trade with Portugal and Spain. The door-to-door combined transport services offered by short-sea operators are a cheap

alternative to road transport over long distances. Combined transport including a coastal shipping leg is already very important in European trade with Portugal.

A shuttle has just come into service between the port terminals at Rotterdam and Antwerp; it is a direct train hauled door-to-door by NS and SNCB-approved locomotives driven by drivers of the two networks without any change-over at the border.

- Britain to Europe via the Channel Tunnel, Channel (freight) ferries and container ships.

  Door-to-door operators are playing an important role in the development of combined transport in the trade between Britain and the continent, with road transport used only for initial and terminal hauls. On the continent, rail and inland shipping services are directly connected to short-sea container services. Combined transport trains go as far as North Italy.

On the latter route, the combined transport carrier NDX amended a combined transport road/rail operation in spring 1997 but have had considerable difficulty breaking into the market, at least during the start-up period.

On the other hand, combined transport already has a very large market share on some European trade routes. On some routes between Central Europe and North Italy, it is estimated to account for as much as 40 per cent of the total volume. Some reasons for this are given in section 4.6.

The main routes on which the volume of freight carried by combined transport is high or increasing rapidly are listed below, moving from Western Europe to Eastern Europe:

- Britain (mainly from the Midlands and London metropolitan are) to Europe via the Channel Tunnel and Channel ferries. Combined transport trains go as far as Northern Italy and Spain.

- The North-South axis in Western Europe: Amsterdam-The Hague-Rotterdam-Antwerp-Brussels-Paris-Irùn-Northern and Central Spain or Port Bou to Catalonia and Valencia. This very busy route does not carry much combined transport. Traffic has reached saturation point, mainly because of the limits on rail capacity.

- The United Kingdom, Netherlands, Belgium and France to Italy, crossing Switzerland via the Simplon, and the United Kingdom, Netherlands, Belgium and France to Italy through the French Italian Alps via Modane, account for a considerable share of the combined transport market, due to the excellent services on the trans-Alpine routes and Switzerland's restrictive transit policy.

- Central Europe to Italy via Switzerland: Hamburg-Cologne-Mannheim-Basel-St. Gotthard or Lötschberg and Simplon-Milan. This is one of the busiest combined transport routes. Several operators offer daily fast block trains services on this route. In addition, road transit through Switzerland can be avoided by using several rolling road services. Swiss Rail is increasing capacity considerably on these routes, and costly new tunnels are under construction with a view to improving quality and capacity still further.

- Central Europe to Italy via Austria. This route runs from Scandinavia through North and Western Germany to Nuremburg and Munich, then via Innsbruck-Brenner to Verona and Milan for local distribution or shipping on to the south of Italy. It is one of the busiest

combined transport routes in Europe. But apart from the section in Switzerland, this route also carries a large volume of road transport in addition to combined transport. A rolling road service has been introduced to replace some of the road transit through Austria by combined transport.

- Scandinavia to Central Europe via the Baltic. Currently, there are several Baltic Sea crossings, but the construction of fixed links -- bridges and tunnels -- between Sweden, the Danish Islands and the mainland, is likely to change the pattern of trade flows radically. Norwegian trade is via Denmark, Sweden's is partly via Denmark and partly by ferry to German Baltic ports (Kiel, Lübeck, Rostock). Finnish trade to the continent uses the same Baltic ports. From there, this route then heads south, either towards the Rhine valley or via Berlin to South-East Germany. Part of this trade continues to Italy via the Central European routes. Combined transport is now used to ship a growing share of this trade south from German ports.

- Belgium/Netherlands to the South-East via Cologne and Mannheim, then on to Switzerland and Italy, or via Cologne and Munich to Austria and South-East Europe. Most of this trade stops in Germany. Combined transport is limited to the large-scale use of sea containers on Rhine barges that go as far as Basel. Only a very small proportion of the freight on this very busy route is carried by rail or combined transport. It should be noted that Benelux-Italy traffic uses several routes which go through Germany or France.

- Central Europe via France to Spain and Portugal: via Irùn to Navarre and Castille, via Port Bou to Catalonia and Valencia. Road transport is dominant on these routes but combined transport is growing rapidly and a number of daily combined transport trains are currently operated by various companies.

- Central Europe to Eastern Europe: Berlin-Warsaw-Moscow. This trade route has grown rapidly since the East European countries made the transition to a market economy. While road transport completely dominates this market, the first combined transport services were launched recently and are growing rapidly. It would be appropriate to extend this link further east so that it joins up with the Trans-Siberian route.

- Central Europe to South-East Europe: from western and northern Central Europe via the Czech Republic, and from southern Central Europe via Austria and Hungary to Romania, Bulgaria, Turkey and Greece. Until 1990, the main transit country on this route was Yugoslavia, but as a result of the political unrest in this area, traffic flows were diverted via Hungary and Romania. The Czech Republic carries, in addition to national import and export flows to Germany, considerable transit traffic. A rolling road service has been set up on some transit routes in order to divert some of the trucks from the local road network. This concerns Czech-German border traffic and transit traffic to Austria and Hungary. Container block trains run from seaports in North-Western Europe to Austria and Hungary, accounting for a considerable share of their exports and imports. The first swap-body and container services to Turkey (the Turkish border or Istanbul) and Romania were introduced recently; most of this traffic is then carried by road to Turkey. This service is growing satisfactorily. Some of these traffic flows go to Slovenia and the Adriatic ports. There is scope for further growth of combined transport on corridor 7 on the Danube, by connecting the Central European countries with Greece and Turkey and also with the Community of Independent States (CIS), the Caucasus and Asia via Black Sea ports.

In addition to these international trade routes, some national trade routes have well-developed combined transport services, mainly in the larger European countries such as: Great Britain, France, Germany, Sweden, Italy and Spain.

4.2. Standards of related infrastructure

Practically all West and Central European countries have road and motorway networks in excellent condition though some of the main highways are often congested. Most countries in Eastern Central Europe and Eastern Europe have started to modernise their road networks. All this has helped to make international road transport the dominant mode in European trade.

The standards of rail infrastructure differ in some minor but crucial ways. The tunnel gauges on the main lines of the European rail networks differ considerably. The Central and North-European railways have a fairly generous gauge. Italy and France have very small gauges. Some trans-Alpine routes also have small tunnel gauges, but work is being done to enlarge them. The British rail network has traditionally had a very small tunnel gauge that is a major impediment to the use of high loading units. Moreover, because of gauge differences, traffic between Central Europe and the Iberian Peninsula creates bottlenecks in the Pyrenees.

Besides having different gauges, the European railways also have different power supplies. Some neighbouring railways have developed dual-power locomotives to allow borders to be crossed quickly and easily and have purchased a limited number of such locomotives. On other routes, the locomotive has to be changed at the border. This is particularly true of the busiest combined transport route, that to Italy. All combined transport trains moving between Italy and Central European rail networks have to change locomotive at borders.

Another problem is that some of these routes are so busy that it is difficult to schedule trains in line with customers' wishes. Some of these constraints will be eased gradually as more high-speed lines come into service and fast passenger traffic is transferred from traditional track to the new lines, freeing up capacity for freight trains. Computer-guided signalling and train monitoring will also help to increase capacity per line.

As regards inland waterways, only the Rhine and the Danube have substantial combined transport capacity. Ro-Ro ships are of limited efficiency over long distances, so this mode primarily uses lift-on/lift-off stackable sea containers.

Bridge clearances and the width of locks are the crucial determinants of the capacity of an inland waterway to handle combined transport of containers. The Rhine offers the best capacity. Containers can be stacked 4 layers-high on a vessel, and 4 containers each of 2 440 mm can be stowed side-by-side on a Rhine barge. A barge operating on the Rhine can thus easily carry more than 100 TEU, *i.e.* the capacity of two block trains. On the canal and tributary network, bridge clearances are considerably lower so that a vessel can carry only two layers of containers, *i.e.* half its capacity. If stackable European swap bodies 2 550 mm or 2 600 mm-wide are carried on such vessels, the reduction in capacity will be even greater. While existing locks can accommodate a barge with a width of 4 x 2 440 mm (= 4 ISO containers) stacked side-by-side with a free area of deck on either side, they cannot handle 4 x 2 550 mm plus a free area of deck on either side. Vessels will have to reduce the number of units to three side-by-side, *i.e.* a 25 per cent reduction in capacity.

In addition to capacity constraints, the Central European river and canal network -- outside the Rhine and Danube -- poses additional constraints. Water levels are unpredictable. Many locks are closed at night, as a result of which a barge arriving slightly late may have to wait up to 8 hours. Rivers tend to meander, adding miles to the journey. A block train is thus often more efficient than a barge. The best example of this is the current container operation from Rotterdam to Linz/Vienna/Budapest. The containers are carried by barge to Mannheim-Ludwigshafen, transferred onto a block train, go by rail to Regensburg and are then loaded onto a Danube barge. This is obviously more efficient than going by barge directly from Rotterdam to Austria and Hungary, via the river Main and the Rhine-Main-Danube Canal with all their constraints.

4.3. Transit time and reliability

The quality standards which are demanded by shippers today have been set by road transport; they relate principally to:

- flexibility;
- speed;
- reliability.

Combined transport must offer similar levels of quality in order to compete with door-to-door road transport.

As far as flexibility is concerned, the road haulier normally forms a buffer between market demand and combined transport. He receives an order and decides whether it can be executed within the framework of the combined transport routes and schedules currently available, or whether he has to use a road vehicle.

The speed factor must not be understood as an absolute speed in kilometres per hour. Normally, the customer asks for:

- overnight delivery, or a
- dispatch day A, delivery day C
  or similar.

For most national consignments, the customer usually requires “overnight” delivery. This is where difficulties arise with combined transport. When the consignor delivers the consignment to the loading bay at 17.00, the haulier may find it difficult to reach the terminal before it closes, which may be 18.30 for a given train. Similar problems may occur on arrival. If the combined transport loading unit cannot be transferred to the arrival terminal to be picked up before 09.00 it may be too late to deliver it to the customer.

Most combined transport operators and railways try to speed up the service for full-truck load consignments. German Rail (Deutsche Bahn AG) has announced that it is going to increase the speed of their trains to 140 km/h.

The biggest problems are posed by part-truck loads. Smaller consignments are usually first picked up at the shippers by a short-haul truck, and taken to the forwarder’s sorting centre. The forwarder takes care of the documentation and consolidates the small consignments into complete truck loads. The consignments are then loaded into swap bodies according to the region of delivery.

If the last consignment for dispatch arrives at the forwarder's at 18.00, a complete total truck load cannot be prepared before 19.00/19.30. If the lorry leaves the sorting centre after this time, the forwarder usually has no chance of delivering the swap bodies by the departure time from the combined transport terminal. The same constraint applies on arrival. The combined transport train may arrive at 06.50 but the crane may not be allowed to start up before 07.00 (otherwise residents around the terminal area would complain), and the swap body cannot be loaded onto the truck earlier than 08.00 on the truck that will carry it to the forwarder's premises. The truck will arrive there at 09.00 and the de-consolidation can then start. The first deliveries to customers can be made at 11.00 -- which in many cases is too late for the market.

For this reason, most small consignments are still carried by road. This is an obstacle to the growth in combined transport. Part-truck load traffic is the fastest growing segment of the freight transport market and more profitable than the full-truck load business. Combined transport must become more efficient in order to increase its market share and revenue.

Only the very big groupage firms are able to organise their loads in such a way that by late afternoon they have already sorted their first complete truck load or swap-body load for a given area, and are able to reach the combined transport terminal in time. The second load -- *i.e.* those consignments that arrive in the evening at the sorting centre -- is shipped by road.

Appropriate town planning can also help to overcome this problem. Forwarders can be offered sites for their sorting centres directly adjacent to the combined transport terminal area. So even if a swap body is loaded relatively late, it can be moved in a few minutes to the combined transport terminal and still be delivered on time. Another advantage of locating sorting centres near the terminal is that, as pick-up and delivery account for quite a large part of the total combined transport cost, the costs of moving a swap body from the forwarder's centre to the combined transport terminal are almost nil. However, it takes many years to implement this kind of town planning, and the market may require short-term solutions.

Another way of increasing the commercial potential of combined transport could be to differentiate the quality of service provided. A survey might show that many shippers ask for overnight delivery only because road hauliers offer it, not because they really need it. In other words, in many cases, combined transport is virtually excluded from the market for no obvious economic reason. Of course, it will not be easy to identify such cases and to persuade the shippers concerned to accept a lower level of quality in order to promote combined transport. In return, a lower price can be offered, made possible by the savings that can be achieved with combined transport. If the shipper dispatches the swap body from the loading bay at noon (and not in the late afternoon, as is usually the case), the operator can organise an early pick-up and arrive at the terminal in early afternoon. This could improve terminal capacity utilisation and reduce the overall costs of combined transport, enabling the combined transport operator to offer lower prices.

The marketing aspect can also be exploited. Many companies seek to project a "green" image. They often do this by commissioning an audit from a neutral agency. Combined transport can be presented to them as a more environmentally-friendly mode of transport.

On many international routes, combined transport can match the "speed" of road transport. Shippers will ask for departure day A and delivery day C or day D, and this is normally possible on most European routes, at least when block trains are used. Over very long distances, the "speed" advantage of road transport time decreases.

For distances of 600 km and over, road transport encounters a specific problem. Normally, a driver will be able to cover that distance in one shift, *i.e.* 8 hours. If the road transport company wishes to remain within the law, it has:

- to change drivers doing the journey;
- or break the journey for at least 8 hours;
- or employ and pay a second driver to take over from the other one.

While it is often possible to change drivers on domestic hauls, it is not so on international journeys. A German road operator going to Spain cannot maintain a pool of drivers in Southern France. An 8 hour break increases delivery times and is detrimental to efficient use of the vehicle fleet. A second driver means a second salary, *i.e.* Ecu 130-150 per shift. For all these reasons, international road haulage costs rise steeply for journeys of over 600 kms, assuming that the law is respected; combined transport is thus competitive over such distances.

Unfortunately, some road operators do not respect the law and ask their drivers to work a considerable amount of overtime. This is all the easier in that it is difficult to check how long a driver has been driving on international hauls. The European Commission has launched a programme to deal with this problem.

To sum up, transit time and speed is not as big a problem for combined transport on international routes as on national ones.

While transit time can be negotiated with the shipper, "reliability" is a must. Modern just-in-time logistics necessitates it.

Combined transport involves two terminal transfers, *i.e*. two nodes, giving rise to the risk of:

- delay: if there is a small delay in picking up a load which prevents the combined transport train from being caught, the delay can increase to 24 hours;
- damage: because of the additional handling by crane, there is risk of damage to the cargo;
- mistakes: the wrong swap body might be loaded onto a train, while the right one is left in the terminal.

These are the kind of risks which arise when loads are transferred between modes. Door-to-door transport does not usually pose such risks. Of course, with road transport there is the risk that the load will arrive late, due to heavy traffic, hold-ups at border controls, etc.

It could be said, therefore, that combined transport is currently less reliable than door-to-door road transport. But all combined transport operators are currently working on systems which will allow them to keep track of their combined transport loading units, *i.e.* tracking and tracing systems, and to monitor the quality of their services. Once these systems are fully operational, combined transport will be able to reduce the "intermodal" risks. In contrast, the risks which arise with road transport are mainly due to external factors largely outside the control of road hauliers.

"Status reporting" is essential to ensuring reliability. Many carriers are trying to put in place real-time information systems that will enable them to inform shippers about any incidents or accidents as they occur. More and more shippers are demanding this kind of service. A transport operator must be able:

- to inform his client (shipper or forwarder) in real time, and on request, about the status of his consignment;
- or at least to inform him whenever a delay has to be expected for a given consignment.

Both road transport and combined transport are establishing systems to meet this demand. Road transport, at least in western and central Europe, is well-placed in this respect: most drivers now have cellular telephones and can immediately inform their head office about any delay, accident or other problem. The head office can then decide whether it is necessary to inform immediately the shipper or forwarder.

Combined transport cannot establish such status reporting systems so easily because the loading unit is not accompanied by a driver who can take such an initiative. Combined transport reporting and information systems are much more complicated to design and install. Nevertheless, most combined transport operators in Europe are now trying to set such systems in order to compete with road transport.

4.4. Organisation

European combined transport is mainly provided by two different types of enterprises:

- companies set up by a co-operative of forwarders and road hauliers to organise jointly the rail part of the operation;
- subsidiaries either of a single railway or a partnership of several railways.

At the same time, more and more operators are entering the market. Most of them co-operate with one of the two types of established companies, but some of them try to go it alone.

The largest and most successful operators are those set up by road hauliers and forwarders, generally with a minority participation of the national railway undertaking and other similar operators. The basic idea is to form a co-operative to buy rail transport services at wholesale prices, and to sell them on to shareholders and other interested customers.

The activity of these companies is confined to terminal transfer and main line carriage. They never deal directly with shippers, which enables them to assure their clients that they never will compete with them on long-distance hauls, for example, by approaching shippers directly. This is an important reason for their success. The undertaking not to compete creates trust, and road hauliers are giving them more and more cargo because they are not afraid of being ultimately ousted from the market.

Another basic principle of their business is that they do not provide pick-up and delivery between the shipper's loading bay and the combined transport terminal. All contact with the shipper is thus via the road haulier.

Some of these companies have their own fleet of railcars. Other have built and operate their own terminals. Some of them concentrate on transport organisation only and do not invest in rolling stock or transfer systems.

Their main investment is in developing new markets for combined transport. But there is a big difference between serving a certain market, for example on a certain route, and operating a block

train. It is a long and costly process to bring a block train into operation. Combined transport operators first have to pay for market research. They then have to negotiate prices and services with all the rail companies on the route. They must set up terminal transfer facilities in the destination area, and a transport tracking system. And once the combined transport service has started, they have to bear the risk that it will be under-utilised initially. Normally, this risk is shared with the railways concerned.

Traditionally, these companies have offered terminal-to-terminal services only for European loading units and have not carried sea containers between seaports and the hinterland. This is now changing: some of them have started to offer combined transport services to and from seaports with ISO containers for export and import by sea.

Most of these companies belong to a European Association, the UIRR (International Union of Road-Rail Operators).

The other type of combined transport company is run by railway companies, the biggest being InterContainer-interFrigo (ICF), which is jointly owned by most European railway companies. ICF has broken into three main markets:

- two-way international European transport of sea containers between seaports and the hinterland;
- international European domestic door-to-door services, with their own containers supplied to the shippers; these services are often organised with the help of national container transport operators which are owned by the national railway company and act as their agents;
- international European domestic door-to-door or terminal-to-terminal services for forwarders, using the forwarder's swap bodies.

In the past, the railways used to divide the combined transport market into two: all international traffic was given to ICF, while all national traffic was handled by their own specialised combined transport companies. This has since been abandoned.

In addition to ICF, some railways have set up their own combined transport subsidiaries. The oldest are Freightliner in Great Britain, *Compagnie Nouvelle des Containers* in France, and Transfracht in Germany. Until the early 1990s, these companies could operate only on the national network and had to give international business to ICF *i.e.* they acted as national agents for ICF. As mentioned earlier, this strict separation of business has ended. The national companies now offer both domestic and international services, partly on their own partly in co-operation or in joint ventures with neighbouring railways.

Unlike the UIRR companies, these combined transport operators offer services in all markets, *i.e.:*

- door-to-door transport for shippers;
- hinterland transport of freight containers for ocean carriers and seaport forwarders;
- terminal-to-terminal services for forwarders supplying their own equipment.

ICF and some of the combined transport companies owned by national railways have their own fleet of combined transport wagons. Others leave the ownership and operation of rolling stock and terminals entirely to the railways.

The latest development in the market has been the emergence of independent combined transport operators that normally are not (or are not totally) owned by railways and that do not belong to the UIRR. Some of these new carriers were set up by port terminal companies to handle combined road-rail transport from the port to destinations inland. Some of them have set up their own block train services. Others prefer to buy in services from a UIRR company or an operator owned by a railway.

Some railways offer combined transport services directly as part of their general freight business and do not have a specialised subsidiary.

Inland waterway carriers are often "non-vessel-operating". They offer all-in packages such as:

- carriages from the seaport to the shipper's loading bay;
- a sea container inland depot service;
- return of empty containers.

Often they do not own specialised inland waterway vessels but charter them. The ship operator can then spread the risk of under-utilisation and share the profits from high utilisation. Inland waterway operators normally concentrate on the inland waterway terminal operation. Pick-up and delivery by road is offered as part of the package, but the capacity for this activity is hired locally.

Short-sea operators offering door-to-door transport between Britain and the Continent and between the Iberian Peninsula and North-North-West Europe usually deal directly with shippers. They exploit to the maximum the advantages of the various modes of (land) transport. Mostly they use existing services of rail, inland shipping and road haulage operators. Short-sea operators are at a disadvantage to road or rail carriers because they cannot always carry as much cargo in their transport units (40-foot containers compared with 13.6 metre trailers). Compatible units for all transport modes are important for interchangeability between modes and to ensure fair competition between the various transport chain options.

4.5. Border crossings

Border crossings are sometimes the weak link in combined transport; that said, however, they can also be an incentive to use combined transport.

Since the free movement of goods was instituted within the framework of the European Union, virtually everywhere in Europe, lorries no longer experience delays at border crossings. This gives road transport a big advantage and one to which rail has not yet found the answer.

As mentioned earlier, European railways have different tunnel gauges, different signalling systems and different electrical traction systems, so that a change of locomotive and driver at each border is almost inevitable. In addition to this daily operational problem on international routes, rail has to cope with:

- pricing of jointly-provided services;
- joint railcar management;
- joint tracking, tracing and information flow management.

For this reason, border crossings constitute a handicap to combined transport in Western and Central Europe.

In Eastern Europe, the picture is usually very different. Border controls for road vehicles are time-consuming as well as increasing costs and transit times considerably. At the eastern borders of the European Union in particular, waiting times of 24 hours and more are frequent. In contrast, combined transport trains are designed to cross borders without hardly any delay. Combined transport thus offers an additional advantage on such routes.

A minor problem is the control of sub-standard road vehicles. Most EU countries are worried about road hauliers from East European countries entering their territory with sub-standard road vehicles, *i.e.* vehicles that do not comply with EU road safety and pollution standards. Some of them do not check vehicles at congested road border crossings, preferring to do so at the combined transport terminals where the foreign trucks are unloaded and enter the national road network. This is hardly an incentive to use combined transport, since road hauliers know that they can enter the European Union with sub-standard road vehicles without being checked, whereas if they use combined transport they are likely to be checked.

Veterinary and plant health controls applicable to non-EU freight are also an obstacle to the growth of combined transport. The problem is all the greater when several containers or swap bodies are loaded on the same railcar. There is a similar problem with rolling road services, since the checks cannot be carried out while the road vehicles are on the train. The controls are often complicated and time-consuming and slow down border transit considerably -- including that of the combined transport units that do not need to be checked but which have been loaded on the same train. Rolling road transport cannot currently handle vehicles carrying commodities that have to be checked. Combined transport would certainly benefit if such checks were, as far as possible, carried out at the point of loading and unloading of the combined transport loading unit, and the border crossing effected under customs seal.

4.6. Factors determining the competitiveness of combined transport vis-à-vis road transport on selected European routes

As mentioned earlier, combined transport has carved out a sizeable market share on certain European routes, while on other routes the volume of combined transport is virtually nil. Despite these differences in the volume of combined transport, the main characteristics of some of the routes -- distance, transport volume, etc. -- are similar.

The analysis of the main international links in Chapter 5 will show that there are three main requirements if combined transport is to acquire high freight volumes and substantial market share:

- a distance of over 400/500 km, given current specifications and regulations;
- a certain amount of concentration of freight on the route;
- considerable barriers to road transport.

Large volumes on a given route are essential if rail transport is to be economic. A high-quality logistics service needs to offer one departure per working day, *i.e.* 5 per week. The most efficient and most reliable form of rail connection is the block train. But a daily block-train service moving some 40-60 Class C swap bodies, each of which laden with 12 tonnes of cargo, would need a traffic volume of 120 000 to 180 000 tonnes per year. On the rule of thumb that combined transport can, at best,

corner half of the potential freight volume on a given route, this would mean a volume of 240 000-360 000 tonnes per year, each way. Even on the busiest routes in Europe, the volumes are seldom that high. For this reason, various types of incomplete block trains have been introduced on the rail part of combined transport. Usually, half- or quarter-trains are assembled or separated at certain meeting points. The "gateway" is another concept: combined transport units are carried to a gateway terminal, unloaded from the train and loaded onto other outgoing trains. This concept has been successfully introduced at major nodal points where large domestic and international flows meet. Two methods of re-arranging combined transport loading are currently used when a block train cannot be operated: either the railcars together with the units are added to another train, or the units are lifted from one train to another.

The barriers to road transport can take various forms:

- geographical: the terrain is not suited to road transport without upgrading of the road infrastructure;
- border crossings: considerable delays for commercial road vehicles;
- high road-use fees and taxes;
- a legislative framework which is unfavourable to road transport: excessive restrictions on commercial road vehicle operation and on vehicle size and/or weight.

The analysis of the various routes will show that there is a whole set of factors which operate to the disadvantage of road transport but which are conducive to combined transport. But a restrictive road transport regime may be noted whenever combined transport services are being operated successfully.

5. COMBINED TRANSPORT ON MAIN INTERNATIONAL LINKS

5.1. Criteria on which links were selected

The largest study on European combined transport was carried out on behalf of the Association of European Railways and co-financed by the European Commission in 1988/1990. In their conclusions, the authors of the study, A.T. Kearney of Brussels, emphasised that long-distance European routes with high traffic volumes were the biggest potential markets for combined transport. They identified 15 European routes that offered the biggest opportunities for international combined transport. Unfortunately, they reached their findings only a few months before the "iron curtain" came down in 1989/1990. They could thus not foresee the considerable growth of East-West traffic which has resulted from the shift in the pattern of trade of many countries in the Centre-East of Europe and Eastern Europe towards Central and Western Europe. The pattern of trade and traffic has undergone major changes since the study was published.

Nevertheless, the forecast and the figures in the study are the best available.

This analysis concentrates on three international links in Western and Central Europe with the largest volume of traffic or potential traffic.

The route between Greece and Turkey, and Central Europe, was also selected. This is, on the one hand, a link with a high volume of traffic, and, on the other, one that encapsulates the possibilities of, and prerequisites for, successful combined transport. On this particular route, the transit problems were caused by the political unrest in Yugoslavia.

The East-West European link is still under-developed. But all the countries concerned place great hopes in the ability of combined transport to resolve some of the serious traffic problems that exist on this route. In particular, border controls are very long and there is a lot of congestion on transit roads which were designed and built at a time when it was not possible to foresee such a growth of traffic.

The last link examined is an inland-waterway one. It includes the Rhine -- the busiest European inland waterway, the Rhine-Main-Danube Canal -- as an example of the impact of a man-made inland waterway on the development of combined transport, and the Danube -- the other great international European inland waterway.

Four criteria were thus used to select the links:

- high traffic volume;
- high traffic potential;
- severe problems with road transit traffic;
- possibility of using inland waterways in combined transport.

5.2. North-West to South-East Europe: UK/Netherlands/Belgium/Luxembourg through Germany and Austria to Hungary/ Bulgaria/Romania/Greece/Turkey

As mentioned earlier, this route contains in a nutshell all the problems besetting European combined transport and the solutions currently under discussion.

It starts at the extreme Western tip of Europe, in the Republic of Ireland. As Ireland has practically no transit traffic and no international rail link, international road/rail transport does not play a role in Irish transport policy. Irish export and imports are moved mainly by freight container and trailer on Roll on/Roll off ferries between Ireland and Great Britain and the European continent.

Freight is carried between Great Britain and the European continent by three main methods:

- cellular vessels with lift-on/lift-off containers;
- roll-on/roll-off ferry boats carrying chassis and swap bodies on chassis;
- trains through the Channel Tunnel, carrying containers and swap bodies.

Another technique -- the transfer of laden railcars from continental railheads by specialised ferry boats onto the British rail network -- has been abandoned.

Most sea traffic ends in a port on the continental side of the English Channel. The combined transport loading units are then carried -- mainly by road -- to German combined transport gateway terminals such as Duisburg or Cologne, and hence via Munich and Salzburg to South-Eastern Europe. Some units are carried all the way by through trains. Some go by inland waterway to Duisburg or even upstream to Mannheim, and from there by train to South-Eastern Europe. The Danube offers -- downstream from Regensburg -- considerable scope for efficient transport of containers. A growing share of combined transport from the South-East German border to Austria and then to South-Eastern Europe, is being moved in this way.

Road competition on the continental section of this route, at least in Central Europe, is very tough because:

- the countries concerned have an excellent highway network;
- EU hauliers are subject to practically no restrictions;
- there are no border delays and controls within the European Union;
- the highway network can be used toll-free, and current road use fees are fairly low.

The real problems for road transit vehicles start at the borders of non-EU transit countries. These countries do not have well-developed highway networks, and they are under no political obligation to give free, unrestricted access to vehicles from other countries. They are entirely sovereign regarding customs and police border controls, and hauliers can expect lengthy delays, document controls and other time-consuming procedures.

Finally, the busiest road route to South-Western Europe in the 1970s and 1990s, the route via Zagreb-Belgrade-Nis, has been practically closed since the political unrest in the former Yugoslavia. This has diverted most of the traffic going to Greece and Turkey, to Central Europe, via Romania and Hungary, or by ferry to Italy and then by the road to Central Europe.

Some countries, especially Hungary, have been inundated with transit road traffic and have had to take short-term political measures to deal with the situation. In the early 1990s, some 100 000 Turkish trucks were travelling through Hungary per year, usually on roads that were not up to motorway standard.

Some countries on this transit route have introduced restrictions and additional charges for third-country vehicles crossing their territory in order to limit transit traffic to a sustainable level and to generate revenue to finance road infrastructure building and maintenance. As a result, some traffic has switched to other, less costly routes.

Many Turkish trucks cross by ferry to Adriatic ports in Northern Italy and continue via the Brenner to Central Europe; many Greek trucks go by ferry to Southern Italy and continue either to the road or by combined transport train to the north.

Many road vehicles use the rolling road service offered by Hungarocombi and Ökombi for transit via Hungary and Austria, in order to avoid the high road transit taxes and because transit licences are in short supply.

The German "*Kombiverkehr*" operates a combined transport train from Germany to Romania, which shows promising traffic growth.

5.3. North to South-West Europe: UK/Netherlands/Belgium through France to Spain/Portugal

This route carries much less combined transport than the Central European route which is parallel to it. This is mainly due to:

- the rather liberal environment for road transport;
- smaller traffic flows, especially in the southern part of the route;
- the difficult border crossing between France and Spain, mainly due to the fact that the French and the Spanish railways have different gauges, making it necessary to transfer combined transport loading units or to change axles at the border.

Nevertheless, this is not the entire problem. A very large volume of freight is carried by the Amsterdam-Rotterdam-Antwerp-Brussels-Paris route, but there is hardly any combined transport. This could be due to the fact that hauliers in Spain, Belgium and the Netherlands are very competitive, and that there are no tolls on the Dutch and Belgian motorway networks. The study of the Rotterdam-Bilbao route shows that combined transport including a coastal shipping leg is a realistic alternative to long-distance road transport, subject to changes in internal and external logistics.

Furthermore, both the Dutch and Belgian Railways concentrate on passenger transport, so that, at least in a day, very little capacity, if any, is left for freight trains. All these factors together form an environment that is not favourable to combined transport.

5.4. North to South-Central Europe: Sweden/Norway/Finland/Denmark through Germany/Austria Switzerland to Italy

This route carries the largest volume of combined transport -- almost half of all international combined transport within Europe.

The main reasons for the success of combined transport in this area are:

- Scandinavian industry, conscious of its precarious position at the northernmost tip of Europe, is very active in promoting innovative logistics systems.
- All three main transit countries -- Austria, Germany and Switzerland -- have been promoting combined transport for many years as an alternative to road transport, especially to road transit.
- All three transit countries and Italy have very active, experienced combined transport operators that currently move large volumes of freight.
- Switzerland does not allow large HGVs to travel through it; they have to transfer to combined transport.
- Austria charges high motorway tolls on the main north-south itinerary.
- Both Austria and Germany have a policy of restricting access and transit of non-EU commercial road vehicles by limiting the number of permits issued; further restrictions apply to "sub-standard" trucks *i.e.* which are very polluting and not up to safety standards.
- For EU-registered vehicles and vehicles registered in specific non-EU countries, the "ecopoint system" was introduced to limit the number of emissions from HGVs travelling through Austria.

This route encapsulates the two main prerequisites for successful combined transport: an excellent combined transport service, and a restrictive policy towards road transport and transit.

In the Scandinavian part of the route, the combined transport loading units are usually moved by road to the Baltic ports. A rolling road service introduced between Oslo and a Kattegat port in the south of Sweden was not a success. The units go by roll-on/roll-off ships from northern Baltic ports to southern Baltic ports. Swap bodies are loaded onto rolling platforms and semi-trailers are towed on board by special terminal trucks. The main southern Baltic port is Lübeck. A special combined transport service operates from this port: the combined transport loading units unloaded from the ship at the Lübeck-Skaninavienkai terminal and shipped further south by block train.

As regards ISO containers, most of them come from overseas, and are unloaded in North Sea ports, mainly Hamburg. From there, they are shipped :

- by road and roll on/roll off ferry;
- by block trains;
- by feeder ships;
- by road to Lübeck and from there by feeder ships.

There is a service to Russia via Finland. The ISO containers are carried by feeder ship from North-Western Europe to Finnish ports, and from there by rail or road to Saint Petersburg and onwards. The service exploits the fact that the Finnish railway network has the same wide track gauge as the Russian network, so that no axle change is necessary at the border.

Combined transport block trains also run south from Scandinavia, mainly to Germany. Most of them take the traditional north-south route across the Öresund (Helsingborg-Helsingör or Malmö-Copenhagen), and travel further south across the Danish islands Själland, Falster and Lolland, and then cross the Fehmarn Belt, to the European mainland.

As Denmark opens new bridges and tunnels to speed up and facilitate north-south transport, the direction of some of these flows is likely to change.

Germany has two main north-south routes. One goes from Lübeck or the Danish and German provinces Jylland/Jütland to Hamburg, and then to the industrial heartland in the Rhine valley. From there, it goes to Switzerland via the St. Gotthard or Lötschberg-Simplon to northern Italy, mainly to the Milan area.

Some of these flows take a more eastern route from Lübeck to Munich. A new itinerary is being developed via the Baltic port of Rostock and the east German rail network, via Berlin to Munich. Some of the flows go on to South-Eastern Europe, while others go via the Brenner in Austria to northern Italy. The main hub on the southern side of the Alps is Verona. Flows going further south in Italy are normally re-organised in Milan or Verona.

Switzerland bans the transit of lorries with a gross weight of over 28 tonnes and imposes further restrictions on night-time and weekend driving, so all vehicles over 28 tonnes have to use either combined transport or make a detour through Austria. Switzerland operates a wide range of combined transport services from terminals near Milan to many destinations in Germany. There are also rolling road services that carry road trains and articulated units over 28 tonnes gross weight through Switzerland.

All full-size vehicles are allowed to travel through Austria, so the competition for combined transport is greater. Nevertheless, the Brenner railway line carries a lot of combined transport trains. Daily block trains operate, for example, between Nuremberg and Munich, and Verona. In addition, a rolling road service operates between Manching (100 k north of Munich) and Brennersee (1 km from the Austria-Italy border). This train carries principally vehicles that do not have a permit to cross Austria. Austria has a policy of limiting the number of transit permits for non-EU vehicles.

With regard to EU-registered vehicles, the ecopoint system was set up by protocol No. 9 of the Treaty of Austria's Accession to the EU. Under this system, any heavy goods vehicle (TOW > 7.5 t) crossing Austria requires a number of ecopoints equivalent to its No_x emissions according to the value authorised on the certificate of Conformity of Production (COP). The Commission distributes to Member States the number of ecopoints to which they are entitled, and they in turn distribute them to their hauliers (Slovenia has participated in the ecopoint system since 1996, and Norway since 1995). The number of ecopoints available is reduced every year so that by 2003 only 40 per cent of the ecopoints allocated in 1991 will still be available, equivalent to a 60 per cent reduction in NO_x emissions.

This transit route illustrates the weak point of combined transport. When Austria joined the EU, the road user fees for vehicles were lowered considerably, due to EU legislation, which, through the play of market forces, led to a substantial reduction of road transport prices on this route. As a result, a considerable share of combined transport traffic reverted almost immediately to road. Austria therefore had to raise motorway tolls to retain the initial volume of combined transport and to ensure that in the minds of the people living along this transit route, Europe was not associated with a steep increase in transit traffic.

5.5. Western Europe to Eastern Europe

Once the East European and the Eastern-Central European countries decided to organise their economies in accordance with market economy principles, their transport markets changed very rapidly. Rail lost considerable market share, while road transport boomed. This has led to economic and political frictions which have called those changes into question. The main roads are heavily congested. Road border crossings are over-stretched and long delays are frequent. In contrast, rail has a considerable amount of spare capacity. For this reason, most of these countries are seriously considering strengthening the role of combined road/rail transport and transferring some international traffic flows to combined transport.

It will not be easy to do this quickly. Combined transport needs good organisation and plenty of experience, and a high-quality, reliable rail operation. Furthermore, unaccompanied combined transport, the most efficient form of combined transport, necessitates investment in specialised rolling stock, swap bodies and terminals. All this cannot be created over night.

On the other hand, rolling road services are rather easy to organise and necessitate no major investment in terminals and practically no investment in adaptation of the rolling stock. For this reason, they have pioneered combined transport in most countries on this route.

But a rolling road is a very costly form of combined transport. A rough calculation of the costs of rail track use, traction and specialised railcars gives a cost of approximately 0.65 ECU/km per road unit (road train or articulated unit) carried. The maximum price which road operators are prepared to pay for such services can be estimated at 0.30 ECU per km and road vehicle. The difference of 0.35 ECU has to be met either by subsidies, road use fees or tolls, which represents quite a lot.

Some rolling road services are operated on the East-West route, financed either by government subsidies or high user fees and tolls.

The government of the Slovak Republic has approved a rolling road project for a temporary period of three years (1998-2000). During this period, it will be subsidised by the government, and the conditions will be put in place for unaccompanied combined transport containers and swap bodies.

A rolling road service will be operated from the border with Ukraine to Bratislava in order to protect the Tatra mountain nature reserve.

Most rolling road services make it possible to avoid the lengthy delays at border crossings. Furthermore, some Central European countries grant additional transit permits when foreign trucks use rolling road services. These two incentives can compensate for some of the additional costs of this transport mode, so that the subsidy, fee and toll level should not fully offset the additional costs.

More and more unaccompanied combined transport services are being introduced on East-West routes, as more specialised equipment becomes available, experience grows and terminals are upgraded or built. This is the case of traffic flows between Germany and Poland, Belarus and Russia, and further south, flows from Germany to and through the Czech Republic, Slovak Republic and further east.

As markets are still in a state of flux, it is difficult to say exactly how combined transport will develop. But the broad pattern is already clear:

– Phase 1: Road transport is developing rapidly.
– Phase 2: Rolling road services are being put in place.
– Phase 3: Unaccompanied combined transport services are being developed.

5.6. Inland waterway transport:

-- North Sea to Black Sea

-- Other inland waterway links used in combined transport

Compared with rail and road, inland waterway carriers have only a minor share of combined transport, consisting almost entirely of the carriage of ISO containers between sea ports and their hinterland. Other types of combined transport with inland waterway vessels account for only a very small part of current freight volumes.

Inland waterway vessels can easily accommodate stackable containers in stacks of up to four layers. Given that inland waterway vessels are not usually subjected to heavy swells or waves, the container stacks do not even need to be stowed in a cellular structure. This type of transport can thus be provided fairly cheaply, with rather high capacity. An inland waterway vessel can currently carry up to 120 TEU, practically the capacity of two block trains. By combining several vessels in a single convoy, capacity can even be increased to more than 200 TEU for a single propulsion unit; furthermore, only one captain is required. When one also allows for the fact that, usually, there are hardly any infrastructure charges, or even none at all, for river use, it is easy to understand that this mode is highly competitive.

But there are two drawbacks: inland waterway transport is very profitable if stackable containers are used but much less so with non-stackable loading units. Either the vessel can carry only one layer of combined transport loading units, *i.e.* one-quarter of the capacity of a vessel with stacked containers -- but the operating costs remain the same! -- or it has to be fitted -- at high cost -- with decks and ramps. This has been done, and sometimes proved to be very cost-effective. But the technology had not really made a breakthrough.

The other weak point is that ISO containers -- the only stackable combined transport unit available -- are not compatible with the logistic distribution system used by European industry, and are thus not competitive for transport between European shippers. They are used only for overseas import and export trade, and only exceptionally for intra-European domestic cargo. European combined transport increasingly concentrates on swap bodies. As these are not stackable, they are unsuited to inland waterway transport. This is the main reason why virtually all inland waterway transport is confined to carrying ISO containers.

However, some changes are in sight. Technical Committee 119 of the European Standardisation Committee (CEN), is currently drawing a set of standards for European stackable swap bodies in order to reconcile the need for easy handling and stacking of containers with the needs of European logistics. The manufacturing and tare costs of these containers will be only slightly higher than those of the units currently used. When they come onto the market, the present picture regarding the limited scope for inland waterway transport in combined transport could change.

Another handicap of inland waterway transport is draught and bridge clearances. The water level of a river depends, among other factors, on the amount of rainfall, which can vary considerably. If the level is too high, there is not enough clearance under the bridge for a vessel loaded with containers to pass. If it is too low, it may be insufficient for the vessel's draught.

Very few European inland waterways have a standard bridge clearance that allows an inland waterway vessel laden with four layers of containers to pass. In western Europe, only the Rhine and some waterways giving access to sea ports have such a clearance. Further inland, the bridge clearances on rivers and canals usually allow only two layers to be carried. For this reason, a large inland waterway vessel will carry only the same number of containers as a block train. There are other obstacles too: most European rivers meander considerably. For a given destination an inland waterway vessel has to cover more than twice the distance as a railway, which is laid out in a straight line. Rivers and canals also have locks, which add time to the journey and are often closed at night. For example, an inland waterway vessel has to collect the cargo of a container ship in a sea port, and the ship is late; the vessel may then fail to reach a lock before nightfall and have to wait to the following morning, disrupting its schedule. The containers may thus arrive late.

On the face of it, therefore, inland waterway container transport is very competitive only on high-capacity inland waterways with generous bridge clearances. On other routes, it will be in stiff competition with rail. When rail capacity on such routes is over-stretched, inland waterway transport may, however, be an economic alternative. But if the railway has ample spare capacity, it will normally be more competitive than inland waterway transport.

The basic economics will not change when the new standardised stackable European containers come into service. These units will have an overall width of 2 550 or 2 600 mm, the width of a pallet. They can only be stowed lengthways in rows of three side-by-side, because current design techniques for inland waterway vessels and the width of most locks do not allow wider vessels to be built. In consequence, the vessel will lose another 25 per cent of its container-carrying capacity. This will certainly not improve the competitiveness of inland waterway transport.

The most important inland waterway transport routes are formed by the Rhine and Danube river system. The Rhine, with its system of canals for sea-going ships arriving at the North Sea coast, is connected to the main ports in the Antwerp-Rotterdam-Amsterdam area. From there, inland waterway vessels can carry 4 layers of containers upstream through the industrial heartland formed by western Germany, Alsace and North-West Switzerland. Tributaries with inland waterway vessel capacity extend into Lorraine and the industrial centres of the Ruhr-Lippe area and South-West Germany. Another tributary of the Rhine, the Main, connects via the Rhine-Main-Danube Canal into the River Danube system, which goes as far as the Black Sea.

But only the Rhine and the lower Danube allow inland waterway vessels to be used at full capacity. Tributaries and canals normally allow only two-high stacking of containers, which reduces the cost-effectiveness of inland waterway container transport.

Other inland waterway container services have been introduced, partly on an experimental basis:

- within the Benelux area, from Antwerp to Rotterdam;
- from Hamburg to the outskirts of Prague, via the river Elbe;
- from Le Havre-Rouen up the Seine to Paris;
- from northern France to Valenciennes.

Ro-Ro services have been launched on the lower Danube between Bulgaria and Ukraine on the Russe-Reni itinerary, and between Bulgaria and Germany on the Vidin-Passau itinerary. Furthermore, ro-ro services are operated between Bulgaria and Romania at various places on the Danube.

5.7. Coastal shipping

5.7.1. General remarks

European coastal shipping consists of three main types of services:

- Ro-Ro ships which carry all kinds of units on wheels, such as road vehicles and unaccompanied semi-trailers. Swap bodies and containers are loaded onto platforms with wheels.
- Some of these ships and services specialise in the transport of railway rolling stock, *i.e.* passenger and freight cars, which may be carried with road haulage units.
- Short-sea container ships. These are used for feeder transport and/or intra-European container transport. Short-sea transport is usually part of a longer transport chain.

Currently, these services are operated separately.

Technical Committee 119 of the European Standardisation Committee CEN has drawn up draft standards for stackable containers and swap bodies corresponding to European logistical dimensions. These European units will be stackable and will meet all strength requirements so that they can be used for any kind of sea transport. However, because of their standardised dimensions they will not fit into existing feeder ship cells.

An overview of short-sea services gives only a snapshot of the situation at any one given moment. Such services are very flexible, and a service may be started and discontinued after a short time. The following overview represents the situation as at the end of 1996.

5.7.2. Coastal shipping routes

Promising routes for coastal shipping within or between port areas are shown in the following tables, which are based on a study of coastal shipping and combined transport carried out in 1994 by ECE/UN (TRANS/R397; TRANS/WP24/R71).

ROUTES BETWEEN EUROPEAN PORTS ON WHICH COASTAL SHIPPING CAN BE EXPECTED TO BECOME COMPETITIVE RELATIVE TO INLAND TRANSPORT

Features: Good access to the hinterland
Certain minimum transport distances
Not too far away from direct road corridors
Connections between important European economic centres
Links to European deep-sea ports

The routes in the table below give a rough idea of potentially competitive routes for coastal shipping services between European port areas. The port areas are defined and illustrated in the table and map below.

Potentially competitive routes for coastal shipping between European port areas A to H

(as defined and depicted below)

	To port area:							
From port area:	A	B	C	D	E	F	G	H
A	o	o	x	x	x	-	-	-
B	o	o	o	o	x	x	-	x
C	x	o	o	o	x	x	-	x
D	x	o	o	o	x	x	-	x
E	x	x	x	x	x	o	o	o
F	-	x	x	x	o	o	o	o
G	-	-	-	-	o	o	o	x
H	-	x	x	x	o	o	x	o

Symbols used:

x = Potential market for coastal shipping, *i.e.* markets which today are largely held by road and/or rail transport but on which coastal shipping ought to be competitive.

o = Existing coastal shipping market with little potential for growth vis-à-vis inland modes.

- = Market which offers little potential for coastal shipping, *i.e.* inland transport is too competitive.

Origin-destination of European coastal shipping

	Port area	Countries covered
A	Baltic Sea	Denmark (Baltic Sea), Germany (Baltic Sea), Sweden, Finland, Estonia, Latvia, Lithuania, Poland, Russia
B	North Sea	Norway, Denmark (North Sea)
C	Hamburg-Le Havre area	Germany, Netherlands, Belgium, Northern France
D	United Kingdom-Ireland	United Kingdom, Ireland
E	Western Europe	France (Atlantic), Spain (Atlantic Ocean), Portugal
F	Western Mediterranean	Spain (Mediterranean), France (Tyrrhenian Sea), Italy, Malta
G	Adriatic Sea	Albania, Croatia, Slovenia, Italy (Adriatic Sea)
H	Levant-Black Sea	Greece, Turkey, Bulgaria, Romania, Cyprus, Ukraine, Georgia, Russian Federation (Black Sea)

This border and names shown on this map do not imply official recognition or acceptance by the United Nations.

6. PRICE COMPETITION BETWEEN ROAD AND COMBINED TRANSPORT

6.1. General

Any comparison of long-distance road haulage with road/rail combined transport in terms of cost and performance must be based on market prices. The following analysis therefore examines the prices currently charged in the freight transport and related services markets.

There are two reasons for this. Firstly, road haulage prices in Europe are currently depressed as a result of the rapid liberalisation of the road transport haulage sector in Europe, leading to overcapacity and rapidly falling prices in European road transport markets. Secondly, this decline has been accelerated by an economic slowdown that has resulted in a contraction in the volume of transport flows.

In addition, East European road haulage firms offering very low prices have started operating in a number of European markets. In the early 1990s, prices for full truck load services fell by around 30 per cent and have yet to recover to previous levels. This overcapacity should be gradually reabsorbed as the current economic cycle progresses, and the economic upswing in Central Europe in 1997/1998 should help to boost transport flows and drive prices slightly higher. At all events, current price levels in most European markets would seem to be too low to cover the long-term costs of long-distance road haulage services.

One of the major factors in the calculation of any combined transport price is the price charged by the railway operator for its services. Given that the railways tend to have large overheads, they may be tempted to charge the highest prices they feel the market can bear. Very little information is available on the breakdown of operating costs in the rail sector and the railways have never provided detailed breakdowns of the prices charged for certain services.

In addition, some railways offer price and service packages for combined transport operations. Such packages might include, for example, two terminal transfers, supply of wagons, traction, network use, as well as train marshalling or shunting. The prices charged by the railways do to some extent reflect their share of the capacity risks, *e.g.* in a combined transport train, the railways will only charge for those wagons actually carrying a combined transport unit.

Ultimately, nobody outside the rail sector can really judge whether rail prices genuinely reflect the costs of operation or whether they include a margin for profit or an internal cross-subsidy. Most railways claim that combined transport operations do not fully cover their costs. If this is true, then the railways should use their price or performance advantage to increase revenue rather than to lower price levels in the combined transport sector.

One telling example of the wide disparity in rail prices may be seen in the fact that the prices charged by the railways for combined transport operations on the Verona-Brenner-Munich route are

three times higher than those charged for rail services on the Munich-Cologne route, despite the fact that the two routes are exactly the same length.

In short, the following comparison is based on actual long-distance road haulage prices in Central and Western Europe which, although currently depressed, may well start to rise over the next few years.

Rail services and the prices of such services in combined transport operations largely reflect the sales and marketing policy of railway operators and therefore cannot be incorporated into customary cost-accounting systems long used outside the rail sector.

6.2. Case studies

6.2.1. Prices of long-distance road haulage

Road haulage prices have fallen substantially. The prices currently quoted by haulage operators vary from 0.70 to 0.85 ECU per km, if not less; it is rare for hauliers to be able to charge rates as high as 1 ECU per km.

These prices include all taxes normally payable, as well as the cost of diesel fuel (including excise duties). The road usage fees charged in Germany, the Netherlands, Belgium, Luxembourg, Denmark and Sweden amount to 1 250 ECU per year. Heavy goods vehicles operating on international road haulage routes in Europe can cover distances of 130 000 km to 150 000 km a year, which means that the average additional cost attributable to the road usage fee amounts to less than 0.01 ECU/km. As a result, current road usage fees have only a minor impact on road transport haulage costs.

Road haulage costs may also be affected by high fees or tolls levied on certain transit routes. In such cases, the easiest way of calculating costs is to take the basic figure of 0.70 to 0.85 ECU/km and add on any supplementary toll or fee payable. This primarily applies to transit routes through Austria, Bulgaria, Hungary and Romania, where relatively high tolls and transit fees are charged, and to traffic in France, Italy and Spain where a distance-related toll must be paid for use of the highway network (except on certain sections).

An additional cost component may need to be factored in for all distances over 600 km. It is assumed that in the course of a normal 8-hour shift, a driver can travel approximately 600 km on a European highway. In accordance with current legislation on drivers' hours and conditions of employment, the driver must then interrupt his journey for a mandatory and lengthy rest period. This leaves haulage operators with three options. They can either:

- Provide a second driver, which at Western and Central European wage levels will cost an additional 120-180 ECU;
- Halt the transport operation during the 8-10 hour rest period. This will slow down vehicle movements and reduce fleet availability, and in many cases will prevent operators from meeting agreed deadlines for delivery; the additional cost varies but can reasonably be assumed to amount to 30 per cent (disregarding the adverse impact on marketing), resulting in a final figure of 0.80-1.10 ECU/km.

– Organise a driver-relief scheme either by arranging for a southbound vehicle to meet with a northbound vehicle at the mid-point in a trip, with each driver driving 300 km in one direction and then 300 km back in the other vehicle, or by providing relief drivers at 600 km intervals to take over the vehicle. Such arrangements are usually confined to large transport companies operating regular services on given routes. Further constraints apply to international routes. While it is relatively easy for a German company operating between Hamburg and Munich to organise a driver change-over at, say, Kassel or Fulda, a Belgium haulier operating services to Portugal would have to provide relief drivers at a location somewhere in the Loire valley and also somewhere in Galicia -- a far more difficult proposition.

The simplest (and probably the most common) solution is to ignore the legal requirements and operate services without making provision for rest periods, second drivers or relief driver systems. At present, relatively few checks are made at border crossings of the number of hours worked by drivers, with the result that the risk of hauliers being fined or prosecuted is relatively minor. The European Commission is currently drafting regulations to strengthen such controls.

It is therefore reasonable to assume that once a Europe-wide control scheme enters into force, the cost of international road haulage over distances of more than 600 km may well rise substantially, possibly by as much as 30 per cent.

6.2.2. Pick-up and delivery costs

Unaccompanied combined transport movements consist of five operations:

1. transport of combined transport unit from the shipper's or forwarder's freight centre to the combined transport terminal ("pick-up or initial road leg");
2. transfer from road to rail mode in departure terminal ("terminal transfer");
3. long distance rail transport ("main run");
4. transfer from rail to road vehicle in arrival terminal ("terminal transfer");
5. transport from arrival terminal to receiver ("delivery or terminal road leg").

The cost of pick-up and delivery will vary according to the specific nature of such operations. The rule of thumb is that a short-haul road haulage company needs to earn at least 300 ECU a day in order to be able to cover its costs and pay its drivers at the statutory wage rates applicable in Western and Central Europe. If transport movements are properly co-ordinated, drivers can combine a delivery run with a pick-up run. In addition, a driver should be able to move either two class C swap bodies of 7.15 m or 7.45 m together, one class A swap body or a semi-trailer per trip. In view of this, it would be optimistic to assume that a road vehicle engaged in terminal pick-ups and deliveries would be able to make three pick-ups and deliveries per day. The cost per pair of class C swap bodies in a properly co-ordinated operation of this kind would amount to 50 ECU for pick-up and an additional 50 ECU for delivery.

This cost calculation nonetheless remains optimistic in that it is based on the following assumptions:

– all class C swap body movements are ordered in pairs, which is precluded in the case of laden tank containers with a gross weight of 30 tonnes;
– each delivery run is matched to a pick-up run.

In practice, however, the cost of pick-up and delivery of two 7 m containers or one larger combined transport loading unit amounts to 2 x 65-75 ECU.

6.2.3. Cost of terminal transfer

A properly organised combined transport terminal will charge around 18 ECU for container transfer, *i.e.* 36 ECU for the terminal transfer of two 7 m swap bodies at the beginning and end of each leg. Furthermore, the cost to the combined transport operator's agent at the departure terminal will amount to around 5-10 ECU/consignment (consisting in most cases of two 7 m swap bodies).

Analysis of terminal charges and the costs of setting up and operating a combined transport terminal shows that operating revenues are sufficient to cover transfer charges provided that the authorities make land and infrastructure available to the terminal operator free of charge. However, if combined transport operators were obliged to pay the market price for land on the outskirts of a metropolitan area on which to build a terminal, the cost of operating the terminal would be prohibitively high. Experts have calculated, for example, that the Munich-Riem combined transport terminal would have to increase its transfer charge by DM 70 (ECU 36) if the cost of purchasing land for the site were to be factored into its costs.

To conclude, the cost of a terminal transfer at the beginning and end of the transport leg, plus agency charges, would amount to a total of 77 ECU for a pair of 7 m swap bodies and 41 ECU for a 13.6 m combined transport loading unit.

Terminals are usually operated by the railways, which charge a unit price for terminal transfer and rail carriage. This price scheme does not always fully reflect the cost differential between two 7 m combined transport loading units and a single 13.6 m combined transport loading unit. In such cases, the difference in costs is offset in the railways' internal accounts.

6.2.4. Costs of rail transport

Section 6.2.1. has already dealt with the problems involved in calculating rail costs. No detailed breakdown of rail costs is available; all that can be said with any certainty is that the railways often claim that combined transport operations do not cover their costs. In many cases, railway transport pricing includes a wide variety of cost components, such as:

- terminal transfer;
- wagon movements;
- network use;
- traction.

6.2.5. Case study: Unaccompanied combined transport

A study carried out by Transcare and *Studiengesellschaft für den kombinierten Verkehr e.V.* on behalf of the Austrian Ministry of Transport provides some interesting figures with regard to unaccompanied combined transport which show how restrictions on transit traffic through Switzerland can affect the competitiveness of combined transport on North-South routes in Central Europe. The example given consists of:

- carriage of heavy goods -- wine in bulk -- from Brescia to Cologne,
- carriage of light goods -- furniture -- from Brescia to Cologne.

Price and cost comparison of a shipment of 100 tonnes (100 000 litres) of wine in bulk from Brescia to Cologne (ECUs)

	Road Transport		Combined transport	
Transit via	Austria	Switzerland	Austria	Switzerland
Number of trips required	4	7	4	4
Per diem cost of tank container rental			15	15
Pick-up run to next terminal (Verona for transit via Austria; Milan for transit via Switzerland)			360	465
Charge per unit for main run	1 444	1 444	550	553
Total cost of main run	5 776	10 110	2 200	2 212
Delivery run in Cologne (per unit)			155	155
Total cost of delivery in Cologne			620	620
Total cost of tank container rental			236	236
Total cost of transport	**5 780**	**10 113**	**4 500**	**4 930**

Source: Strategiekonzept für den kombinierten Verkehr in Österreich, 1995.

An articulated tanker lorry with a maximum total weight of 38 tonnes was used for the road transport leg of the trip, and 20 ft. tank containers with a unit capacity of 25 000 litres for the combined transport portion.

Price and cost comparison of shipment of 100 tonnes of furniture from Brescia to Cologne (ECUs)

	Road Transport		Combined transport	
Transit via	Austria	Switzerland	Austria	Switzerland
Number of trips required	10	10	20	20
Per diem cost of renting a 7.15 m swap body			7.40	7.40
Pick-up to next terminal (per unit) (for transit via Austria; Verona, for transit via Switzerland; Milan)			310	361
Total cost of pick-up runs			3 100	3 610
Charge per unit for main run	1 135	1 135	247	247
Total charge for main run	11 350	11 350	4 940	4 940
Delivery run in Cologne (per unit)			155	155
Total cost of delivery in Cologne			1 550	1 550
Total cost of swap body rental			590	590
Total cost of transport	**11 350**	**11 350**	**10 166**	**10 682**

Source: Strategiekonzept für den kombinierten Verkehr in Österreich, 1995.

An articulated lorry with a maximum total weight of 38 tonnes was used for the road leg of the trip, and a combination of 2 x 7.15 m swap bodies for the combined transport portion.

6.2.6. Case study: Accompanied combined transport

The following figures are taken from a case study carried out by *Studiengesellschaft für den kombinierten Verkehr e.V.* on behalf of the European Bank for Reconstruction and Development. The subject of this study was a 648 km rolling-road service between a border post in south-eastern Hungary and a terminal in western Austria near to the German border.

The purchase price of an 8-axle low-loader wagon for piggyback operations is 129 905 ECU.

Each train requires two adapters between the normal wagon coupling and that on the low-loaders. Each adapter costs 16 967 ECU.

Annual maintenance and repair costs amount to 10 604 ECU per wagon.

The low-loader wagons are depreciated over a period of 15 years.

The total cost of rolling stock must be increased by at least 10-25 per cent to allow for time when wagons cannot be used in commercial operations because they are undergoing maintenance or are in transit to or from the maintenance workshops. The best result to date has been an increase of merely 11 per cent.

In this particular case study of a 648 km rolling-road operation, the cost per wagon and per trip amounts to 74.74 ECU.

Each rolling-road train consists of 18 low-loaders, two of them fitted with an adapter, and 1 sleeping car providing accommodation for 18 drivers. The cost of this sleeping car per trip is 75-144 ECU, or 4-8 ECU per bed.

For this form of accompanied combined transport (rolling-road service), the railways charge 0.43 ECU/km per loaded wagon transported, including the relatively low charge for terminal transfer.

As a general rule the combined transport operator offering the service must open an agency at the rolling-road terminal. Agency costs may be as high as 7 ECU per unit (road train or articulated unit) carried.

Since the railways share the risk of capacity use in the case of accompanied combined transport, the cost of rail operations is not affected by variations in capacity use.

The operator does, however, share the risk of fluctuations in capacity usage with regard to the rolling stock he provides (low-loaders and sleeping car). The cost of a train composed of 18 low-loaders and 1 sleeping car for the 648 km trip is therefore as follows:

Capacity usage	60 %	80 %
Number of road vehicles carried	11	14
Rail charge in ECU for total train per km	3 009	4 012
Cost in ECU of 18 low-loaders per trip	1 345	1 345
Average cost in ECU of *couchette* per trip	100	100
Agency charges in ECU	77	98
Total cost per train	4 531	5 555
Cost per road train/art. unit carried and trip	412	397
Cost per road train/art. unit carried per km	0.64	0.61

Road hauliers using the rolling-road service can make savings on the following costs compared to transport solely by road:

- fuel and oil;
- tyre wear;
- the portion of vehicle depreciation linked to mileage.

Furthermore, road hauliers are legally entitled to count the time spent by their drivers on the rolling-road as a rest period. This may allow hauliers to save on the cost of a second driver or on the cost of immobilising their vehicles should they wish to comply with all legal requirements (which is highly unlikely given that no international system of controls on drivers' hours is currently in place on routes in South-Eastern Europe and operators therefore run little risk of being fined for failure to meet regulations).

The case study from which these figures have been taken estimates that the total saving on a 650 km trip through use of the rolling-road amounts to 233.28 ECU (*i.e.* 0.36 ECU/km). Calculations by German road hauliers indicate a slightly lower saving of 0.30 ECU/km for use of rolling-road services.

The comparative costs on the basis of these figures are therefore as follows:

	(In ECUs)	
Rolling-road train capacity use	60%	80%
Rail operating costs in ECU per trip	412	397
Savings by road haulier in ECU per trip	233	233
Difference	179	164

In 1994, Hungary and Austria followed a policy aimed at reducing the volume of transit traffic by road. A limited number of vehicles (each country set different quota levels) received a transit licence free of charge, subject to payment of certain road usage fees. In Hungary, hauliers who were not granted a free transit licence were obliged to purchase additional transit licences and pay a transit fee based partly on the tonnage of the road vehicle concerned. All these fees were waived in the case of rolling-road operations, *i.e.* the use of Hungarian roads between the border with Romania and the terminal were free of charge for vehicles using rolling-road services. In Austria, road use charges must be paid for every vehicle (of over 12 tonnes total permissible weight) using the Austrian road network; however, if rolling roads are used, then the road use charges are deducted from the price charged for the rolling-road service and are thus effectively reimbursed.

In 1994, road hauliers without a free transit licence had to pay a transit fee of 232 ECU to cross through Hungary and Austria. Since the price of a ticket on the rolling-road was just slightly over 400 ECU and the savings on fuel and other consumables when using the combined transport service amounted to approximately 233 ECU, an additional outlay of 400 ECU afforded hauliers a total potential saving of 460 ECU. The rolling-road motorway service was therefore seen as an acceptable alternative by hauliers and could be operated without government subsidy. With regard to the price of rail traction, however, it needs to be borne in mind in some countries, rolling roads are considered to be of public interest for environmental reasons. Consequently, the provision of rail traction for these rolling-roads is considered also as a public service and as such ordered and remunerated on the basis of a private contract between Austrian railways (ÖBB) and the Austrian government.

A key component of the system was the introduction of a strict quota on free transit licences. Once this limited number of free transit licences had been issued (*i.e.* once the annual quota had been distributed to foreign road haulage associations), use of the rolling-road service fell sharply. After some time, once almost all the new licences had been used, capacity use of the rolling-road service recovered to the previous level of approximately 80 per cent.

In general terms, the cost of accompanied combined transport, provided that it is properly organised, amounts to 0.63 ECU/km. The maximum potential savings for those using this mode of transport amount to 0.36 ECU/km, thus leaving a difference of 0.27 ECU/km which will have to be covered by means of a subsidy, an additional road usage charge on the transit route, or a mix of the two.

6.2.7. Case study: Italy

A shift in favour of combined transport is expected in Italy as a result of measures, currently being drafted, aimed at optimising the use made of road and combined transport.

In order to gain a better understanding of the relative costs of the two modes, a comparative study was made of the cost of transport on the Brenner route between Verona QE terminal and Munich RIM terminal based on the assumption that freight would be loaded and unloaded within a radius of 50 km of each terminal.

The following table is based on the tariffs applied in December 1997 by intermodal and road haulage companies respectively.

Piggyback service (40 ft container)	Lorry
926 ECU	723 ECU

(1 ECU = 1937 Italian Lira)

These prices, which clearly favour road transport, need to be adjusted, however, to take account of social costs, particularly those relating to safety. In this respect, an analysis of accident statistics relating to road and rail transport carried out by the POC Directorate of the Ministry of Transport revealed significant differences between the two modes.

This analysis, which compared data relating to a period of several years, showed that rail transport was far safer than transport by road.

The data for 1995, for example, are as follows (in thousands).

Road			Rail		
Accidents	Killed (7 days)	Injured	Accidents	Killed	Injured
194.8	6.9	276.6	1.95	0.26	1.40

While this difference may seem enormous, it is primarily the number of *motorway accidents* that is relevant to the present discussion. In this respect, the statistics for 1995 were as follows.

Motorways			Rail		
Accidents	Killed (7 days)	Injured	Accidents	Killed	Injured
n.a.	0.73	19.12	1.91	0.26	1.40

6.3. Conclusions

The case studies show that unaccompanied combined transport is capable of competing on prices with road transport, especially in cases where road haulage costs are increased by transit charges, road usage fees, or motorway tolls, as in the case for transit through Switzerland and Austria. Unaccompanied combined transport operations that include an inland waterway and coastal shipping haul are also able to compete with long-distance road transport. The biggest challenge, however, is to provide the level of service which shippers require, and in this respect changes in internal and external logistics can often provide acceptable solutions.

At present there are no combined transport services through other European corridors such as Amsterdam/Rotterdam to Bavaria, despite the fact that the volume of road transport traffic is large enough to accommodate commercial combined transport operations. As long as the Netherlands and Germany continue to allow their highway networks to be used practically free of charge, combined transport will be unable to compete with road haulage in terms of prices.

Furthermore, the case studies show that high-tonnage shipments such as bulk liquids offer greater price advantages to combined transport than lightweight commodities. This is particularly the case on routes that include transit through Switzerland, which has a 28-tonne limit on the gross weight of road vehicles.

The competitiveness of combined transport operations on north-south routes in Central Europe is further enhanced by the quality of the services provided. In view of the high tonnages transported, combined transport operators can in many cases offer high average running speeds and reliable services by operating block trains or shuttle services.

The statistics for accompanied transport clearly show that this type of combined transport operation can almost never compete with road transport in terms of prices. Combined transport operations can only be commercially viable if the governments concerned are prepared to grant considerable subsidies or if relatively high additional road usage costs are charged on parallel routes.

Due to the geographical position of Rotterdam and Antwerp, Belgium and the Netherlands are also major transit countries for intra-European trade. Good rail connections and cheap inland waterway services offer scope for a rapid increase in short-sea combined transport between Germany and Britain/the Iberian Peninsula. Specialised agencies in the Netherlands have considerable experience in promoting the use of short-sea and inland waterway shipping in combined transport operations.

The regulatory regime governing combined transport operations in Europe varies from one country to another. Annex A to this report illustrates the differing approaches to combined transport adopted by ECMT countries at the national level. Since combined transport is used to move goods over long distances, which in Europe usually means that border crossings will be involved, each trip may be subject to regulations in force in at least two or possibly more countries. A combined transport chain, like any other transport chain, is only as strong as its weakest link. In other words, it is often the leg subject to the most restrictive regulatory regime that will determine the level of performance of a combined transport operation on a given route. It is for this reason that combined transport, possibly more than any other policy issue, requires international co-operation.

7. SUMMARY OF FINDINGS AND COMPARISON WITH THE CONCLUSIONS OF THE 1992 REPORT

7.1. General analysis

In 1992 the ECMT published a comprehensive report on combined transport entitled "Improvements in Main International Piggyback Links". This report contained some major findings and made a number of recommendations. In order to gain an insight into the changes that have since taken place, this chapter compares the findings and recommendations of the 1992 report with the current situation in the combined transport sector, *i.e.* 5 years later, and draws a number of conclusions that might provide a basis for policy action.

Coastal shipping is already a major component of intra-European transport. The use of combined transport services that include a short-sea leg is currently growing on certain routes. However, the potential for growth in combined transport operations that include a short-sea or inland waterway leg remains virtually untapped in Europe. In addition, very little is known about the possibilities offered by such modes in Europe or about potential obstacles to their use. Relatively few people have any clear idea of the potential scope for such services in intra-European trade flows. Furthermore, it is important to take account of the impact of improvements to investments in certain rail routes on the development of combined coastal shipping (and vice-versa). How can public money be spent most efficiently?

Recommendation:
Additional research is needed into combined transport to take account of the use of short-sea and inland waterway legs

7.1.1. Overall journey time

Combined transport continues to be a time-sensitive operation and the only way in which combined transport operators can compensate for the delays caused by terminal transfers at both ends of shipping movements is to exploit the competitive advantage of rail in terms of running speeds or to make use of train slots that are not needed for logistical purposes.

Both the techniques used and the time lost in terminal transfers have remained unchanged and continue to be a serious obstacle to growth in the use of combined transport in certain markets. Combined transport, for example, is often unable to provide the services required by the highly time-sensitive market for small consignments (Less than Container Load, Less than Truck Load). Small consignments are normally picked up by short-haul trucks during the day and then assembled to a full truck load in the forwarder's groupage depot in the late afternoon. More often than not, the assembled full truck load cannot be dispatched before 18.00-19.00. Under normal conditions, the swap body containing the consolidated load must be transferred to the next combined transport terminal, which may be located up to 15 km away. It must then be checked in and prepared for

transfer. Normally, the time frame offered by combined transport is too narrow to accommodate such a schedule.

A similar situation will arise the following day when the consignment reaches its intended destination. The combined transport train may arrive at 07.00, meaning that the combined transport units would be ready for transfer by 07.30 at the earliest. The units must then be transferred to the forwarder's groupage depot, unloaded and small consignments prepared for delivery to the client. Many clients expect goods to be delivered to their premises by no later than 09.00/10.00. A combined transport service cannot meet this deadline, while a road haulage operation a distance of 600 km can easily pick up a consignment from the dispatching groupage depot at 21.00 and deliver it to the receiving depot at 06.00 -- a perfect timetable for such operations.

The fact that combined transport has almost completely lost the LTL market gives cause for concern in that the LTL market segment is growing relatively quickly and eroding the market for full truck load transport. Furthermore, price competition in the full truck load market is currently extremely fierce. In order to compete with road transport, combined transport must be capable of responding to price trends. As a result of its failure to do this, combined transport has lost a growing market segment offering higher potential revenue yields. This is an alarming development.

There are two strategic developments that might help in this area:

1. If a large number of forwarders' groupage centres were to be located at the same site (*i.e.* a cluster), and if the combined transport operator were to offer a direct terminal service to that location, then combined transport would be able to attract some of these very time-sensitive services because there would be no delay in moving consignments from the forwarders depot to the combined transport terminals (at either end of the movement). Indeed, not only would this reduce the delay inherent in combined transport, it would also reduce the cost of pick-up and delivery operations and thus give a second advantage to combined transport. Unfortunately, such a change in regional planning takes time to put in place and so the advantages for combined transport may come too late. However, the authorities should encourage such strategies in areas where they wish to improve the marginal operating conditions for combined transport.

   Recommendation:
   When concentrating commercial freight traffic activities in loading or dispatching centres, regional planning authorities should attempt to integrate combined transport terminal facilities into the same area.

   New technology may help to speed up combined transport operations. The industry has developed highly automated transfer equipment that can significantly reduce handling times.

   Recommendation:
   Governments are invited to promote technical solutions based on the new high-performance transfer equipment proposed by the combined transport industry.

2. Another solution might be to "widen the logistical time frame". Many experts in logistics believe -- and a recent study sponsored by the German Federal Ministry for Transport bears this out -- that the deadlines imposed on most freight do not actually reflect the needs of forwarders but are simply a result of the way in which the human actors involved respond to given situations. When a transport operator asks a freight manager when a consignment is needed, the latter will automatically reply: "as soon as possible". Since road hauliers can normally offer an overnight schedule for domestic and international door-to-door deliveries, logistics managers will usually ask for this service even if it is not actually required. Cases have been reported, for example, of chemical plants that, when advised that tank containers containing liquid chemicals for delivery to their premises had arrived at the sea-port and asked when the shipment needed to be delivered almost invariably replied "tomorrow". The next day, the tank container would arrive and its contents would be emptied into a stationary tank that was still half-full -- a delivery three days later would have been more than adequate.

   The problem is that combined transport operators cannot say to their clients: "We are well aware that a road haulier can move the shipment overnight and that it will take us 6 hours longer, but we also know that the shipment is not as urgent as he claims. So, please phone him and tell him he will get delivery slightly later". Such an approach would be unrealistic. On the other hand, managers in industry must be made to realise that their inconsiderable demands for speed and urgency ultimately leads to single-load road shipments and thus to unnecessary pressures on infrastructure, environment and energy resources. A policy aimed at ensuring that logistics services are used more rationally would in many cases enhance the competitiveness of rail and combined transport operations and would also make combined transport more efficient by allowing more units to be grouped together into larger block trains.

   Recommendation:
   Industrial and trade enterprises are invited to review their demand for logistical services in the light of their actual needs. In many cases, they may find that their deadlines do not actually require "overnight" delivery and that by allowing transport operators to make full use of the transit time which is often available they can play a major role in helping to create a more efficient and environmentally-friendly transport sector.

   The time required for the rail leg between two combined transport terminals depends, *inter alia*, on how the rail transport is organised. A block train can travel at a constant speed of around 100 km/h and is faster than transport by road. The main delays will be those resulting from intermediate train management, *i.e.* shunting operations. Separating and then reassembling combined transport trains into new units is a time-consuming process. In view of this fact, combined transport will primarily be able to achieve satisfactory transit times on routes on which the volume of freight is large enough to allow efficient block train operation. Since it is on such routes that combined transport services are likely to be most competitive, these are the ones on which operators and policy-makers should concentrate.

   Recommendation:
   Transport policy-makers and operators should concentrate on the routes in Europe which carry the largest volumes of freight.

7.1.2. Dimensions of intermodal transport units

In 1992 the European Union introduced a coherent system of regulations on the maximum permissible dimensions for commercial road vehicles, thus putting an end to the efforts made by countries to give their national hauliers a competitive advantage over their European rivals by authorising the use of larger lorries. Today, all road hauliers know precisely what size lorries they can operate in Europe. Combined transport has been quick to implement the new European rules on unit sizes. The European Standards Committee (CEN, Technical Committee 119) has incorporated the new European regulations into a system of swap body standards (EN 284 and EN 453) to which no changes will be made for a period of several years in order to safeguard investments in the new system.

At the same time, road-rail combined transport operators have adapted the design of their new low-loaders to the sizing requirements of these standards.

Furthermore, the AGTC Agreement, to which virtually all European countries are signatories, provides for the adoption of a single performance standard for combined transport. The scope of the AGTC is currently being broadened to include inland waterways.

While the problems arising from differences at national level in Europe have largely been overcome over the last five years, the main discrepancy has yet to be addressed and will probably not be resolved for quite some time to come. The standard length of an ISO container is 20 ft. (6.1 m), while that of a swap body is 7.45 m for the main unit and 13.6 m for a trailer. While swap bodies designed to European Standards can readily accommodate the palletised unit loads most commonly used in Europe (basic dimensions of 0.8 m x 1.2 m and 1.0 m x 1.2 m), the specifications for ISO containers do not meet the requirements of this form of modular organisation. ISO's attempt to develop a series 2 container better suited to standard European palletised unit loads was rejected, mainly because the container was almost 15 m in length and therefore deemed to be too long for European road infrastructure. Furthermore, consideration should be given to developing smaller sub-units of currently standardised ITUs with a view to increasing market efficiency.

> ***Recommendation:***
> ***European governments are invited to continue to work towards establishing a European system of maximum road vehicle dimensions that will remain stable over time and that can serve as a legal basis for commercially accepted standards for combined transport units. Furthermore, they are invited to accede to the AGTC (unless they have not already done so) and to apply the principles of the AGTC to the planning of combined transport infrastructure***.

7.1.3. Informatics

The 1992 ECMT report called for an efficient communication system to be established for the tracking, tracing and monitoring of combined transport flows.

It is a matter of grave concern that, to date, virtually no progress has been made in this area, other than the systems put in place by one or two individual operators.

While the road transport sector continues to introduce real-time information systems that can report on the status of any consignment being shipped to clients, combined transport and rail transport have virtually nothing comparable to offer.

The decision by the UIC to adopt a technical standard for a wagon tracking and tracing system was followed by almost five years of discussions of its relative merits and the system has yet to be installed. Although in 1997 Swiss and French railways eventually decided to install this system, other railway administrations apparently prefer diversity and have decided to adopt different technical solutions.

For many years, the European railways have been involved in similar discussions regarding standard data formats and transmission networks without achieving any practical results at the international level.

Combined transport operators have installed information systems designed to meet their specific requirements, and their European Association, the UIRR, has attempted to ensure some degree of harmonisation. The exchange of data between most combined transport operators and the railways continues to be made in hard-copy form, although some combined transport operators have established EDI communication interfaces with their major clients.

Some major combined transport operators have decided to harmonise their communication interfaces with clients, a project to which the European Commission has granted financial support.

Apart from these isolated attempts to modernise communications systems and adopt new technologies, there has been no concerted, large-scale effort to introduce IT into the sector, and once again it would seem that the road haulage sector will take the lead in implementing new technology.

> ***Recommendation:***
> ***Governments are invited to give priority to the application of modern information and communications technologies in the combined transport and rail sectors, and to promote initiatives that will ensure compatibility at the European level.***

7.1.4. Rolling roads

As the 1992 ECMT report had already stated, the rolling road is a combined transport option only to be adopted in certain specific cases.

As the case study given in Chapter 6 clearly shows, the cost of operating a rolling-road service can almost never be covered by revenues.

At present rolling-road services are primarily operated on the following routes:

- North-south transit through Switzerland;
- North-south and east-west transit through Austria;
- East-west transit through Hungary;
- The 100 km border route between the Czech Republic and Germany.

All of these services have been set up under certain specific circumstances, including either:

- severe restrictions on commercial road operations;
- high road tolls, usage fees or other additional charges for road haulage operations; or
- large subsidies from the governments concerned.

Recommendation:
Governments should bear in mind that a rolling road operation may only be viable under certain highly specific circumstances that may not apply to a given European route. For such operations to be viable, governments must either introduce severe administrative restrictions on road transport, charge high fees for road usage, or grant large subsidies to combined transport operators.

7.2. Analysis of rail operations in combined transport

7.2.1. Loading gauges

The problems arising from the differing, and very often inadequate, loading gauges of European railway networks remain a serious obstacle to efficient combined transport in Europe. A number of gauge improvements are currently under way and will be completed over the next few years, especially on routes through the Alps. This will enable rail operators to carry semi-trailers of up to a full 4 m in height on pocket wagons through the Alps between Italy and neighbouring countries.

Unfortunately, the West European, South European and British rail networks have such limited bridge and tunnel clearances that any major improvement of long-distance lines would require extremely costly and time-consuming construction work. In view of this, a gauge improvement programme for all these routes would be unrealistic. There are nevertheless other measures which could be taken to improve the competitiveness of combined transport on such routes:

- use of low-loaders to transport containers of up to 2 900 mm or even 3 300 mm in height;
- measures by the railways (and government incentive programmes) to promote the use of swap bodies and European containers in place of the semi-trailers currently used.

Such measures would be cheaper in overall terms than a massive upgrading of bridge and tunnel clearances on long-distance routes. On the other hand, careful investigations might reveal that the obstacles to increased clearances on some lines are relatively few in number and could be easily overcome, which would argue in favour of improvement.

Since all European Union Member States and most other European countries currently authorise a maximum width of 2 550 mm and a maximum height of 4 000 mm for commercial road vehicles, all loading gauge considerations must take these dimensions into account. While in the past many combined transport operations involved the carriage of heavy units that did not necessarily make use of the full cubic volume that road hauliers were legally entitled to transport, the situation is now rapidly changing. Many international long-haul combined transport services consist in the transportation of automobile parts to assembly plants. Almost all of these consignments take up the full cubic volume available, so full use of the loading gauge of the combined transport unit is a vital issue in planning bridge and tunnel clearances.

European Union regulations authorise a maximum width of 2 600 mm for refrigerated and controlled-temperature road vehicles, as does the European Standard on insulated swap bodies. Bridge and tunnel clearances that can accommodate combined transport units of 2 550 mm can normally accommodate 2 600 mm units as well. In the rare cases where a clearance can accommodate a 2 500 mm, but not a 2 600 mm wide unit, the question of whether clearance enlargement would be justified simply to be able to move, in addition to normal freight flows, commodities that need temperature control needs to be given careful consideration.

7.2.2. Rail infrastructure

Many combined transport services need to operate within very tight schedules in order to be competitive, and therefore require the use of specific slots. The need for such slots may conflict with the needs of other rail services such as express passenger or commuter trains. New electronic track control systems may enable operators to increase the capacity of the existing network and thus avoid the cost of building additional track.

When prioritising slot use, the railways should not lose sight of the fact that combined transport is a fast growing market segment offering good prospects for rail services and should therefore treat it accordingly. The railways should also bear in mind that competitive combined transport will grow and that the volume of freight carried will eventually justify the use of daily block trains. The operation of block trains will require far less slot capacity than the current practice of moving groups of wagons marshalled at gateway points. Providing combined transport with an attractive slot can lead to a volume increase that will ultimately result in better use of rail capacity.

The freight freeway system proposed in the European Commission's White Book opens up interesting possibilities for the commercial management of infrastructure capacity. The Community of European Railways and the UIRR have also made suggestions in this area. All the parties concerned are invited to continue this debate and to reach a consensus on slot management that would help to promote the competitiveness of combined transport. It is worth noting that the initial proposals more or less corresponded to the main international combined transport links currently in operation.

7.2.3. Terminals and terminal operation

Combined transport needs terminals, and terminal planning and building is often a very time-consuming activity. Lead times of 10 years between the decision to establish a terminal on a given site and the first day of operation are common in some countries. Terminal capacity may therefore become a critical issue if, in the long term, growth in combined transport proves to be higher than expected. All forecasts must therefore allow for a possible three-fold increase, according to the experts, in the volume of marine container trade over the next 15-20 years, in addition to the growth in domestic combined transport flows.

Combined transport terminals offer great scope for the development of commercial freight transport and logistic services, whose development can be to promote regional business interests. Local chambers of commerce and economic development agencies could be asked to participate in the promotion or even the financing of terminals. Other activities, such as container warehousing, small consignment consolidation and customs processing will enhance the economic importance of terminals and attract customers, thus adding to the volume of freight carried by combined transport.

If the railways are given responsibility for building and operating terminals, they should work in partnership with third parties who wish to make sure that the terminals are a commercial success.

Cost analyses of the kind made in this report clearly show how important the cost of pick-ups and deliveries are in the total cost of a combined transport chain. One of the long-term objectives in the development of combined transport is to reduce such costs. One way to do this is to ensure that terminals are located at an appropriate site. The nearer a combined transport terminal is to the main area of industrial activity and forwarders' warehouses, the cheaper the cost of pick-ups and deliveries.

Although this may be a long-term issue, it is nonetheless one that must be taken into account when choosing a site for a terminal.

7.2.4. Border crossings

Border crossings in combined transport chains are mainly organised by the combined transport operator and very rarely by the co-operating rail organisations. Although transport movements in Europe which require border crossings usually involve long distances over which rail should be more efficient and therefore at an advantage, the railways have lost market share in this type of transport over the past few years. The market share of rail in international European traffic has fallen from 32 per cent in 1970 to less than 15 per cent in 1995.

The delays caused by border crossings could be reduced by:

- making greater use of locomotives that are adapted to the railway signalling and energy supply systems on both sides of the border concerned;
- eliminating unnecessary border checks under bilateral agreements;
- establishing information links between the railways on either side of the border;
- encouraging operators, in terms of marketing and revenues, to look upon international routes as a "single market".

7.2.5. Administration and control

As has already been noted, road transport, the main competitor to combined transport offers shippers increasingly detailed information regarding the real-time status of the consignments carried. Combined transport must do the same if it is to remain competitive.

One major source of such information consists in the railways' own information systems. The first step in this area must be to improve the flow of information from rail operators -- who are normally aware of the real-time position and composition of freight trains -- to major clients such as combined transport operators. This flow of information must be improved with regard to both national and international traffic.

7.3. Analysis of national and international regulatory measures

7.3.1. General

In order to be competitive, combined transport requires:

- a reliable and flexible service produced through close co-operation between all partners;
- a price level that matches that of road transport;
- a policy environment that encourages the use of combined transport.

All international combined transport links cross the territory of several European countries and are therefore subject to different regulatory regimes. Any government wishing to promote combined transport must be aware that the strength of a chain will be determined by that of its weakest link. Many regulatory measures to promote combined transport will end at the border unless similar measures are in place in the neighbouring country. Consequently, combined transport, more than any

other freight transport activity, requires close co-operation between neighbouring states along the main European freight corridors.

Most regulations and exemptions to promote combined transport will concentrate on movements by road, namely:

- pick-up and delivery runs to and from a combined transport terminal;
- road movements to a rolling road terminal or from such a terminal to the final destination.

Governments may wish to prevent abuse of such exemptions by limiting the length of road movements allowed in special combined transport operations. Such movements are usually limited to:

- the distance to the nearest suitable rail terminal, for combined transport terminals providing unaccompanied services;
- distances within a radius of 150 km, for combined transport terminals providing accompanied services (rolling roads) and for terminals serving maritime and inland waterway/road combined transport combinations.

It is recommended that governments keep the number of administrative documents required to a minimum, while ensuring that adequate safeguards are provided to prevent the abuse of exemptions. The accompanying documents for a combined transport operation may consist of:

- a fax from the combined transport operator to his client confirming the reservation for a given departure day;
- a receipt issued by the initial terminal upon pick-up of the unit.

7.3.2. Tax regime

The calculation of the taxes and road usage fees applicable to commercial road haulage operations is based on the premise that goods vehicles use the highway network frequently and over very long distances. Commercial heavy goods vehicles operating on long-distance routes currently cover distances of up to 150 000 km a year.

Combined transport makes far less use of the road infrastructure, and in this respect it is both necessary and justifiable to exempt combined transport from taxes and fees that are primarily aimed at intensive users of the road network. To the extent that such taxes and fees reflect the use made of road infrastructure by vehicles, it would be appropriate to introduce some form of sliding scale to reflect the lower use made of roads by combined transport vehicles and units.

The cost of rail infrastructure use is already included in the price of the services provided by the railways and therefore does not need to be taken into account in this context.

The main issues in this area are:

- road vehicles used mainly or exclusively for terminal pick-up and delivery runs should be partially or totally exempt from road vehicle taxes and road usage fees; such provisions have already been incorporated into the Eurovignette;
- a sliding scale for road usage fees should be applied to road vehicles that use rolling road for large parts of their journeys.

Some countries wishing to develop the use of combined transport on their territory may find that the main obstacle at present is the lack of terminals and specialised transport equipment. Such countries are invited to consider promoting combined transport, at least for an initial period, by allowing combined transport terminal equipment and specialised rolling stock to be imported free of customs duty or other import restrictions and fees.

7.3.3. Liberal environment for combined transport

Another means of promoting combined transport is to make this type of transport exempt from a number of restrictions normally applicable to international road transport.

Such liberalisation and exemptions could include:

- allowing *cabotage* to be used for terminal pick-up and delivery runs, *i.e.* the combined transport client of country A, having carried his swap bodies to a terminal in country B, would be allowed to organise the final delivery by road using his own vehicle and drivers (licensed in country A);
- granting users of combined transport exemptions from bilateral quotas and other restrictions on foreign transport operators;
- rewarding frequent users of combined transport services by granting them additional bilateral transport licences. Such a reward scheme would have to take account of the fact that, to be effective, additional licences would have to be issued solely to those who actually used the combined transport service.

Commercial road transport is subject to further restrictions, at both the national and international level, aimed at limiting the number of heavy goods vehicles on the roads at peak traffic periods and at curbing noise from vehicles driving at night. Once again most of these restrictions are aimed at long-distance traffic and should, therefore, provide exemptions for combined transport pick-up and delivery runs, as well as runs to rolling road terminals or from such terminals to the final destination. Combined transport could be granted exemptions from:

- bans on Sunday and weekend driving;
- bans on driving at night.

7.3.4. Increased maximum gross weight limit for road vehicles.

All EU Member States authorise a maximum laden weight of 40 tonnes for road vehicles; in some countries this limit is even higher. Many other European countries make similar provisions.

The specialised rolling stock used in combined transport operations poses a problem in this respect. The combination of a platform truck + swap bodies is some 1 000-2 000 kg heavier than a standard road train of similar capacity. A semi-trailer equipped for vertical lifting may weigh up to 1 000 kg more than a unit without such equipment.

Such increased tare weights would result in lower loading capacities if the maximum weight limits were to be applied to all road vehicles.

Some countries have decided to maintain the competitiveness of combined transport by allowing some extra gross weight for combined transport operations, mainly on runs to and from terminals. Some countries limit this allowance to the carriage of 40 ft. ISO containers. Countries which impose a 40 tonne weight limit in general road haulage operations normally raise this limit to 44 tonnes for short trips of this nature. To be consistent, such regulations should apply to all combined transport units, *i.e.* swap bodies, containers, and semi-trailers for initial and terminal haulages.

There has been some debate as to what those governments which currently authorise a maximum gross weight of 44 tonnes, or even more for general road haulage operations, should do to promote combined transport. Should they add a further allowance of, say, 4 tonnes, to their existing weight limit? It is still too soon to reach any firm conclusions in this matter.

ANNEX A
COUNTRY REPORTS

The information in these country reports was compiled from the replies to the questionnaire received by the end of June 1997. For those countries that did not return the questionnaire, the information was taken from the Pan-European Report on Combined Transport.

1. AUSTRIA

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	38 t
Vehicles registered in a EU State[1] are allowed with:	40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?

– Yes, if the terminal of departure or arrival is located in Austria.

A maximum gross weight of 39 t is allowed for initial and terminal road hauls in combined transport for semi-trailers which can be handled by crane. This weight limit is increased by 5 per cent for vehicles registered in the EU. A maximum gross weight of 42 t is allowed for initial and terminal road hauls in combined transport for the carriage of containers and swap bodies. This limit is increased to 44 t in the case of road vehicles registered in a EU country.

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:

– Licences are issued by the local administration.

Transit licences for non-EU operators: availability and issue scheme:

– A limited number of transit licences for bilateral transport and transit is granted per country. To receive a licence, vehicles are often required to have environment-friendly features such as low noise and exhaust emissions (so-called “green lorries”).

Transit licences for EU operators

– With regard to vehicles registered in EU Member countries, the ecopoint system was laid down in Protocol No. 9 of Austria’s Treaty of Accession to the EU. Under the ecopoint system, any heavy goods vehicle (TOW> 7.5 t) travelling through Austria requires a certain number of ecopoints equivalent to its NO_x emissions authorised under the Conformity of Production (COP) value or type approval value. The quota of ecopoints available is distributed by the Commission among the Member states, which then distribute them to their hauliers. (Slovenia has also been part of the ecopoint system since 1996, and Norway since 1995). The number of ecopoints available is reduced every year so that by 2003 only 40 per cent of the ecopoints originally allocated in 1991 will still be available, implying a 60 per cent reduction in NO_x emissions.

[1] The limit values indicated for vehicles registered in an EU State are also valid for vehicles registered in countries which have a transport agreement with the EU and where full reciprocity is granted.

Special licences available for combined transport clients?

– For lorries registered in the EU, pick-up and delivery to combined transport terminals do not require a licence. On the basis of reciprocity, liberalisation of initial and terminal hauls can also be negotiated with third countries. For all rolling road connections, specific routes for initial and terminal hauls have been liberalised, while areas within a radius of 70 km around certain terminals do not require a licence. "Bonus" licences are also given to operators who use rolling road services for transit through Austria.

Vehicle tax in ECU for a 40 t road train and articulated vehicle:

– Per tonne and month ATS 85, maximum 3 230 ATS *i.e.* a maximum of ATS 38 760 or 2 873 ECU per year. For trailers, the monthly tax is 2 450 ATS maximum.

Vehicle tax exemptions:

– For vehicles used exclusively in terminal pick-up and delivery operation: Full tax exemption
– For vehicles moved partly in rolling road traffic: Tax refund according to the number of trips
– The maximum refund may not exceed 100% of the annual vehicle tax.

Road usage fees and tolls:

– 1 250 ECU per year road usage fee
– Some small mountain sections of the motorway network also charge a toll

Exemptions from road usage fees and tolls for combined transport:

– For accompanied (rolling road) and unaccompanied combined transport, road usage fees for initial and terminal hauls are refunded. The refund amounts to 80 ATS per transport of each motor vehicle, semi-trailer or a swap body at least 12 m long or a 40 foot and over container. It amounts to 40 ATS per transport of a motor vehicle , semi-trailer or a swap body under 12 m, or a container over 20 foot but under 40 foot. The refund is shown separately on the combined transport invoice and directly credited to the transporter (which means, for example, that the price paid by the transporter for the rolling road service is reduced by 80 ATS).

Fuel taxation in transport:	0.29 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?

– Yes, on the existing rolling road connections.

Is piggy-back transport of semi-trailers with 4 000 mm height possible?

– Yes, but not on all lines.

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes
Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length[1]:	500-700 m
Maximum mass of combined transport trains[1]:	950-2 100 t

1. Depending on the itinerary and the mode of traction.

Maximum speed for combined transport trains: 100 km/h

Is any important improvement of the rail system planned and decided on?
When does the work start?
Are works for gauge improvement planned?

– Infrastructure improvements (including gauge improvements) are planned on all main axes for railway and combined transport according to Protocol No. 9 of the Accession Treaty Austria-EU:
  - Brenner axis: München-Brenner-Verona
  - Tauern axis: München-Salzburg-Villach-Tarvisio-Udine/Rosenbach-Ljubljana
  - Pyhrn-Schoberpass axis: Regensburg/Prag-Linz-Graz-Maribor-Zagreb
  - Danube axis: München/Nürnberg-Vienna-Budapest/Bratislava
  - Pontebbana axis: Praha/Warsaw-Vienna-Tarvisio-Pontebba-Udine.

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?
– Hall in Tyrol
– Krems (33 t)
– Linz
– Messendorf/Graz
– St. Michael
– Wels
– Vienna-Freudenau Hafen
– Vienna-Nordwest
– Bludenz
– Wolfurt
– Salzburg
– Villach Süd

Terminals offering rolling road services:
– Brennersee
– Graz
– Salzburg
– Villach
– Wels
– Wörgl

Political environment for combined transport: Financial aids, special regulations

Austria has introduced a raft of political and legislative measures to promote combined transport. Financial aids for terminal building, purchase of rolling stock and specialised combined transport equipment are made available. The relevant scheme is currently revised. Certain combined transport operations are considered to be of public interest and as such ordered and remunerated.

Road transport is subject to various restrictions such as transit licences for non-EU vehicles, bans on driving at weekends and on noisy trucks driving at night, etc. Combined transport is exempted from most of these restrictions.

2. BELARUS

Road transport features

Maximum length for road trains:	20 000 mm
Maximum length for articulated units:	24 000 mm
Maximum width for road vehicles:	2 500 mm
Is the EU Directive on maximum road vehicles dimensions applied?	No
Maximum mass (weight) in general operation:	36 t
Is any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	No
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	No

Transit licences for non-EU and EU operators and special licences for combined transport clients: Availability and issue scheme :

- Negotiated on a bilateral basis.

Vehicle tax in ECU for a 40 t road train and articulated vehicle:	No (??)
Vehicle tax exemptions:	Not decided

Road usage fees and tolls:

- Road vehicles weighing over 24 t pay 80 US$ (= 77 ECU) for entry into Belarus, and 155 US$ (147 ECU) for transit through Belarus. Additional fees are charged for oversized and very heavy vehicles. Furthermore, a toll is charged on the Brest - Minsk - Russian border motorway. The toll for a single trip is 20 US$. Weekly, monthly and annual tickets available.

Exemptions from road usage fees and tolls for combined transport	None
Fuel taxation in transport	None (??)

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	No (??)
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	No (??)

Maximum axle load for railcars:	23 t
Maximum combined transport trains length:	850 m
Maximum mass of combined transport trains:	3 000 t
Maximum speed for combined transport trains:	80 km/h

Any important improvement of the rail system planned and decided on?	No
When does the work start?	--

Are works for gauge improvement planned?	No
When does the work start?	--

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Brest
- Minsk-Koliaditchi

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

Credits are given on the general conditions in force in Belarus.

3. BELGIUM

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 600 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	44 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	Not necessary
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	Not necessary

Transit licences for non-EU operators: Availability and issue scheme:
Special licences available for combined transport clients?

- Almost no EU transit traffic.

Vehicle tax in ECU for a 40 t road train and articulated vehicle:

- 1 110 ECU.

Vehicle tax exemptions:

- For vehicles used exclusively in terminal pick-up and delivery operation: Tax refund according to degree of use is possible.
- For vehicles moved partly in rolling road traffic: Not applicable.

Road usage fees and tolls:	1 250 ECU annual usage fee, no tolls
Exemptions from road usage fees and tolls for combined transport:	No
Fuel taxation in transport:	0.30 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	No
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes

Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	550-700 m
Maximum mass of combined transport trains:	1 600-2 000 t
Maximum speed for combined transport trains:	100 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

Are works for gauge improvement planned?

- Major improvements including gauge enlargement on the axis Athus-Meuse are under way.

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Antwerp
- Zeebrugge
- Brussels
- Muizen
- Bressoux
- Renory
- Ghent,
- Athus
- Mouscron
- Genk

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

Belgian Railways gets some aid for terminal building and purchase of specialised rolling stock and handling equipment.

4. BULGARIA

Road transport features

Maximum length for road trains:	18 350 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 500 mm

Is the EU Directive on maximum road vehicles dimensions applied? No

Maximum mass (weight) in general operation: 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport? No

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted: No

Transit licences for non-EU operators:
Availability and issue scheme:

- Transit licences are negotiated bilaterally.
- A fixed number of licences is distributed every year to the transport ministry of the country concerned, which then hands them out to hauliers.

Special licences available for combined transport clients?

- Yes, for users of rolling road service.

Vehicle tax in ECU for a 40 t road train and articulated vehicle:

- 36.4 ECU.

Vehicle tax exemptions:

- For vehicles used exclusively in terminal pick-up and delivery operation: No
- For vehicles moved partly in rolling road traffic: No

Road usage fees and tolls:

- Foreign vehicles pay transit tax and motorway usage fees. Exemptions from such fees may be granted under bilateral agreements. Otherwise a trip through Bulgaria costs approximately 108 ECU + 0.43/km motorway use.

Exemptions from road usage fees and tolls for combined transport:
Exemption for users of rolling road service:

Fuel taxation in transport: 0.27 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes
Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	500 m
Maximum mass of combined transport trains:	1 200 t
Maximum speed for combined transport trains:	80 km/h
Any important improvement of the rail system planned and decided on? When does the work start?	Rail improvement planned
Are works for gauge improvement planned? When does the work start?	No

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Dimitrovgrad
- Dimitrovgrad-Sever (with grappler arms for swap bodies)
- Sofia
- Plovdiv
- Pleven
- Gorna Orjahoviza
- Vraza
- Stara Zagora

Terminals offering rolling road services: n.a.

Political environment for combined transport: Financial aids, special regulations

A “Programme for the development of combined transport in the Republic of Bulgaria till 2010” was adopted recently. The programme includes studies, infrastructure modernisation and adaptation to EU standards.

5. CROATIA

Road transport features

Maximum length for road trains:	16 500 mm
Maximum length for articulated units:	16 000 mm
Maximum width for road vehicles:	2 500 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	40 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	No
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	Allowances are easy to obtain
Transit licences for non-EU operators: Availability and issue scheme:	Very restrictive scheme
Special licences available for combined transport clients?	No
Vehicle tax in ECU for a 40 t road train and articulated vehicle:	2 000 ECU
Vehicle tax exemptions:	
– For vehicles used exclusively in terminal pick-up and delivery operation:	No
– For vehicles moved partly in rolling road traffic:	No
Road usage fees and tolls:	n.a.
Exemptions from road usage fees and tolls for combined transport :	No
Fuel taxation in transport:	n.a.

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	n.a.
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes

Maximum axle load for railcars:	20 t
Maximum combined transport trains length:	600 m
Maximum mass of combined transport trains:	1 500 t
Maximum speed for combined transport trains:	80 km/h

Any important improvement of the rail system planned and decided on?
When does the work start? n.a.

Are works for gauge improvement planned?
When does the work start? Not necessary

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Zagreb
- Rijeka
- Nasice (Osijek)
- Split

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

Some financial aid is given to the railway.

6. CZECH REPUBLIC

Road transport features

Maximum length for road trains:	18 350 mm
Maximum length for articulated units	16 500 mm
Maximum width for road vehicles	2 550 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	48 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	No
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	Special regulations

Transit licences for non-EU operators:
Availability and issue scheme:

- Limited number of licences issued under bilateral treaties. Licences issued in addition to this quota for a two-way journey cost 143 ECU.

Special licences available for combined transport clients?

- There is a "bonus" quota for Austrian users of rolling road services between Austria and the Czech Republic, and for German users of the rolling road between Germany and the Czech Republic.

Vehicle tax in ECU for a 40 t road train and articulated vehicle:

- 1 280 ECU, and 1 440 ECU in specific cases.

Vehicle tax exemptions:

- For vehicles used exclusively in terminal pick-up and delivery operation and for vehicles moved partly in rolling road traffic: tax reduction of up to 100% depending on the number of trips for both types of combined transport.

Road usage fees and tolls: motorway usage fee for vehicles over 12 t:	108 ECU per year
Exemptions from road usage fees and tolls for combined transport:	No
Fuel taxation in transport:	0.25 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes, on some lines
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes, on some lines
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes, on some lines
Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	600-650 m
Maximum mass of combined transport trains:	1 000-1 400 t
Maximum speed for combined transport trains:	100 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

- The main East-West line from the German border via Decin-Praha-Ceská Trebová-Brno-Breclav to the Austrian and Slovak Republic border is being modernised to permit speeds of up to 160 km/h; work should be completed by the year 2000.
- The Breclav-Prerov-Petrovice u Karviné and Prerov-Ceska Trebova line will be completed by the year 2005 and will allow trains to operate at speeds of up to 160 km/h.

Are works for gauge improvement planned?
When does the work start?

- The main modernisation work involves bringing the gauge into line with the UIC C gauge.

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Brno
- Ceské Budejovice
- Praha-Uhrineves
- Praha-Zizkov
- Zelechovice-Lipa

Terminals offering rolling road services:

- Lovosice
- Ceske Budejovice

Political environment for combined transport: Financial aids, special regulations

Czech Railways receive financial aid for the purchase of specialised rolling stock and for the operation of the rolling road service between Lovosice-Dresden.

Combined transport pick-up and delivery operation is exempted from the Sunday and weekend driving ban.

7. DENMARK

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	48 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	Not necessary
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	Allowances are easy to obtain

Transit licences for non-EU operators:
Availability and issue scheme; special licences available for combined transport clients?

- Denmark carries only a small amount of Norwegian transit traffic, the rest are EU vehicles.

Vehicle tax in ECU for a 40 t road train and articulated vehicle:
Varying according to axle configuration: Max. 700 ECU

Vehicle tax exemptions:

- For vehicles used exclusively in terminal pick-up and delivery operation: No
- For vehicles moved partly in rolling road traffic: Not applicable

Road usage fees and tolls: No toll. Road usage fee 1 250 ECU per year

Exemptions from road usage fees and tolls for combined transport: None

Fuel taxation in transport: 0.30 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	No
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes

Maximum axle load for railcars:	20/22 t
Maximum combined transport trains length:	835 m
Maximum mass of combined transport trains:	2 500 t
Maximum speed for combined transport trains:	120 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

- The Danish Islands are being connected to Sweden and the European mainland by rail tunnels and bridges

Are works for gauge improvement planned? No
When does the work start?

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Alborg
- Arhus
- Esbjerg
- Herning
- Höje-Taastrup
- Copenhagen
- Padborg
- Taulov

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

No specific programme.

8. ESTONIA

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	40 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	No
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	Yes[1]
Transit licences for non-EU operators: Availability and issue scheme:	Not currently
Special licences available for combined transport clients?	No
Vehicle tax in ECU for a 40 t road train and articulated vehicle:	No
Vehicle tax exemptions:	
– For vehicles used exclusively in terminal pick-up and delivery operation:	
– For vehicles moved partly in rolling road traffic	No
Road usage fees and tolls:	No
Exemptions from road usage fees and tolls for combined transport :	No
Fuel taxation in transport:	0.10 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	No
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	No

1. Regulation of large-scale and/or heavy motor transport authorised by the Ministry of Transport and Communications, Decree No 32 of 22nd December, 1995. Large and/or heavy loads are allowed to be transported with lorries, tractors and special rolling-stock only when it is not possible to transport them in parts or by other means of transport.

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes
Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	850 m
Maximum mass of combined transport trains:	<400 t (differs)
Maximum speed for combined transport trains:	<60-90 km/h
Any important improvement of the rail system planned and decided on? When does the work start?	No
Are works for gauge improvement planned? When does the work start?	No

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Tallin-Paljassaare

No lifting of semi-trailers

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

No specific programme for combined transport.

9. FINLAND

Road transport features

Maximum length for road trains:	25 250 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 600 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	60 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	Not necessary
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	Not necessary
Transit licences for non-EU operators: Availability and issue scheme Special licences available for combined transport clients?	No transit traffic
Vehicle tax in ECU for a 40 t road train and articulated vehicle:	1 480 ECU
Vehicle tax exemptions:	
– For vehicles used exclusively in terminal pick-up and delivery operation:	No
– For vehicles moved partly in rolling road traffic:	Not applicable
Road usage fees and tolls:	No
Exemptions from road usage fees and tolls for combined transport:	Not applicable
Fuel taxation in transport:	0.30 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes

Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	725 m
Maximum mass of combined transport trains:	2 800 t
Maximum speed for combined transport trains:	100 km/h

Any important improvement of the rail system planned and decided on? New tracks towards the Russian border
When does the work start?

Are works for gauge improvement planned? No
When does the work start?

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Passila/Helsinki
- Hamina
- Kotka,
- Helsinki
- Turku
- Rauma
- Tampere
- Oulo
- Tornino

Terminals offering rolling road services:

- Passila/Helsinki
- Tampere
- Turku
- Oulu
- Kemi

Political environment for combined transport: Financial aids, special regulations

No specific programme.

10. FRANCE

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	40 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	Yes, 44 t vehicles are allowed

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:

- Allowances for out-size vehicles are difficult to obtain

Transit licences for non-EU operators:
Availability and issue scheme:
Special licences available for combined transport clients? No specific scheme exists

Vehicle tax in ECU for a 40 t road train and articulated vehicle:

- 60 ECU (an axle duty of 530 ECU per year is levied on heavier vehicles)

Vehicle tax exemptions:

- For vehicles used exclusively in terminal pick-up and delivery operation: 75% reduction of axle duty
- For vehicles moved partly in rolling road traffic: Not applicable

Road usage fees and tolls:

- Tolls are charged on parts of the motorway network

Exemptions from road usage fees and tolls for combined transport:	No exemption
Fuel taxation in transport:	0.36 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	No
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	No

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?

- In some important axes such as Le Havre-Paris: Yes

Maximum axle load for railcars: 22.5 t

Maximum combined transport trains length:

- 750 m at speeds up to 120 km/h, 550 m at higher speeds.

Maximum mass of combined transport trains:

- 1 800 t up to 100 km/h speed.
- 1 400 in international operation
- 1 500 t in national operation at
- 120 km/h and more

Maximum speed for combined transport trains: 160 km/h

Any important improvement of the rail system planned and decided on?
Are works for gauge improvement planned? When does the work start?

- Gauge improvements are under way to adapt infrastructure to GB1 gauge; they are due to be completed by the year 2000 at the following routes:
  - Les Aubrais (Orléans)-Montauban
  - Lyon-Avignon
  - Kehl-Besançon
  - Paris-Le Havre

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?
The main terminals are in

Paris: (Valenton, Noisy, Maison-Alfort, Rungis, Paris-Chapelle, Gennevilliers)
Dunkerque
Lille
Amiens
Le Havre
Cherbourg
Rouen
Nancy
Strasbourg
Mulhouse
Rennes
Le Mans
Angers
Orléans
Tours
Vesoul
Dijon
Nantes
Chalon-sur-Saône
Mâcon
Cognac
Limoges
Clermont-Ferrand
Lyon
Grenoble
Bordeaux
Agen
Avignon
Nice
Dax
Hendaye
Pau
Toulouse
Montpellier
Marseille
Sète
Perpignan

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

Public funds have been made available for:

- Gauge improvement,
- Construction of terminals*,
- Operators wishing to invest in swap body systems *.

* *Financial aids are given by both central government and regional authorities.*

11. GERMANY

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm

Is the EU Directive on maximum road vehicles dimensions applied? Yes

Maximum mass (weight) in general operation: 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?

- Yes, for 44 t.

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:

- The scheme is being simplified and enlarged.

Transit licences for non-EU operators. Availability and issue scheme:

- Non-EU vehicles carrying loads in transit for import/export are subject to some restriction in order to avoid dumping and use of sub-standard vehicles. Licences are issued under bilateral agreements. Further licences can be issued for "green" vehicles.

Special licences available for combined transport clients?

- Special licences are given for users of rolling road services into Germany

Vehicle tax in ECU for a 40 t road train and articulated vehicle:

- 1 490-1 700 ECU

Vehicle tax exemptions:

- For vehicles used exclusively in terminal pick-up and delivery operation:
  Such vehicles can be fully exempted from road vehicle tax.
- For vehicles moved partly in rolling road traffic:
  Partial or full refunds according to the number of trips.

Road usage fees and tolls:

- Usage fee 2 400 ECU.
- No tolls.

Exemptions from road usage fees and tolls for combined transport:

- None at present but it is planned to introduce them.

Fuel taxation in transport: 0.33 ECU

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes
Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	600 m
Maximum mass of combined transport trains:	1 500 t
Maximum speed for combined transport trains:	140 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

- Speed improvement to operate at 140 km/h on some lines from June 1997.

Are works for gauge improvement planned?
When does the work start? No

Terminals offering a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms) and terminals offering rolling road services:

- All terminals are equipped with spreaders to handle freight containers up to 40 ft. (12.2 m) long and up to 30.5 t gross weight. Most of them also have grappler arms to lift swap bodies and intermodal trailers. Some also offer "*Rollende Landstrasse*" services, and are equipped exclusively for this type of intermodal transport. Some are seaport terminals which provide an interface between deep sea transport and rail and road transport of containers.

Location	Terminal name	Remarks
Aachen	Aachen-West	
Augsburg	Augsburg-Oberhausen	
Basel	Basel-Bad Gbf	German operator on Swiss territory
Beiseförth	Beiseförth	
Berlin	Berlin Hbf, Frankfurter Allee Hamburg und Lehrter Bhf	
Bielefeld	Bielefeld-Ost	
Bochum	Bochum-Langendreer	
Braunschweig	Braunschweig-Hgbf	
Bremen	Bremen-Roland	Inland terminal
Bremerhaven	Bremerhaven-Seehafen	Deep sea terminal
Chemnitz	Chemnitz-Kappel	
Crailsheim	Crailsheim	
Deggendorf	Deggendorf-Hafen	Danube inland waterway
Dorpen	Dorpen	
Dortmund	Dortmund-Westerholz	
Dresden	Dresden-Neustadt	

Düsseldorf	Düsseldorf-Hafen	Rhine inland waterway
	Düsseldorf-Bilk	
Duisburg	Duisburg-Ruhrort-Hafen	Rhine inland waterway
Kaiserslautern	Einsiedlerhof	
Emden	Emden-Außenhafen	
Eisenach	Eisenach	
Erfurt	Erfurt	
Frankfurt am Main	Frankfurt Main-Ost	
	Osthafen	Main inland waterway
Freiburg	Freiburg (Brsg)	+ Rolling road
Fulda	Fulda	
Gießen Gießen	- Anschluß Flughafen	
Göttingen	Göttingen	
Hagen	Hagen Hbf.	
Halle	Halle	
Hamburg	Hamburg-Billwerder	Inland road/rail
	Hamburg-Waltershof	Deep sea
	Hamburg-Süd	Deep sea
	Hamburg-Rothenburgsort	Inland road/rail
Hanover	Hannover-Linden Hafen	
	Hannover-Linden	
Ingolstadt	Ingolstadt-Nord	
	Manching	Only rolling road
Karlsruhe	Karlsruhe Hbf.	
Kassel	Kassel-Unterstadt	
Kempten	Kempten (Allg.)	
Kiel	Kiel-Ostuferhafen	Deep sea
	Kiel-Nordhafen	Road/rail
	Kiel-Hgbf. (Bollhoernkai)	Deep sea
Koblenz	Koblenz-Rheinhafen	
Cologne	Köln-Eifeltor	
Kulmbach	Kulmbach	
Landshut	Landshut (Bay) Hbf.	
Leipzig	Leipzig-Stötteritz	
Lübeck	Lübeck-Skandinavienkai	Deep sea
	Lübeck Hbf (Nordlandkai)	Deep sea
Ludwigsburg	Ludwigsburg	
Mainz	Mainz-Gustavsburg	+ Rolling road
Magdeburg	Magdeburg-Sudenburg	
Mannheim	Mannheim Hgbf	
	Mannheim-Handelshafen	
	Mannheim Rbf	
Marktredwitz	Marktredwitz	
Mühldorf	Mühldorf (Obb)	
Munich	München-Riem	+ Rolling road
Münster	Münster (Westf.)	
Nagold	Nagold	
Neubrandenburg	Neubrandenburg	
Neu-Ulm	Neu-Ulm	
Neuss	Neuss	

Nordhorn	Nordhorn	
Nuremberg	Nürnberg Hgbf.	
Offenburg	Offenburg	
Osnabrück	Osnabrück	
Paderborn	Paderborn Hbf	
Ravensburg	Ravensburg	
Regensburg	Regensburg Hbf.	+ Rolling road
Rheine Rheine		
Rielasingen	Rielasingen	Only rolling road
Rostock	Rostock	Deep sea + road/rail
Saarbrücken	Saarbrücken-Hgbf	
Salzburg	Salzburg Hbf.	German-Austrian Operation
Schwelm	Schwelm	
Schweinfurth	Schweinfurth Hbf.	
Singen Singen	(Htw)	
Sonneberg	Sonneberg Ost	
Staßfurth	Staßfurth	
Stuttgart	Stuttgart-Hafen	
Wuppertal	Wuppertal-Langerfeld	

Some terminals offer additional services such as cleaning, repair and storage of containers.

Political environment for combined transport: Financial aids, special regulations

Germany has a long tradition of public aid to combined transport. Currently, a budget of more than DM 4 billion (more than 2 000 million ECU) has been earmarked for terminal construction and modernisation.

Combined transport pick-up and delivery operations to and from terminals are exempted from some restrictions that apply to road transport.

12. GREECE

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	40 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	44 t for ISO containers allowed
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	It is complicated to obtain them
Transit licences for non-EU operators: Availability and issue scheme: Special licences available for combined transport clients?	No transit traffic in Greece
Vehicle tax in ECU for a 40 t road train and articulated vehicle:	340 ECU
Vehicle tax exemptions:	
– For vehicles used exclusively in terminal pick-up and delivery operation:	No
– For vehicles moved partly in rolling road traffic:	Not applicable
Road usage fees and tolls:	Tolls on major roads
Exemptions from road usage fees and tolls for combined transport:	No
Fuel taxation in transport:	0.26 ECU

Rail and terminal infrastructure

No details available.

Political environment for combined transport: Financial aids, special regulations

No specific programme for combined transport.

13. HUNGARY

Road transport features

Maximum length for road trains:	18 350 mm with 1 trailer, 22 000 mm with 2 trailers
Maximum length for articulated units	16 500 mm
Maximum width for road vehicles	2 500 mm

Is the EU Directive on maximum road vehicles dimensions applied? Yes

Maximum mass (weight) in general operation: 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?
- 44 t allowed.

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:
- They are easy to obtain but there is a charge.

Transit licences for non-EU operators:
Availability and issue scheme:
- A quota of transit licences is negotiated with each country on a bilateral basis. There is no charge for them. For additional transit trips, a transit tax must be paid which usually amounts to about 130 ECU for a full transit journey through Hungary with a 40 tonne vehicle.

Special licences available for combined transport clients?
- Users of the Kiskunduroszma-Wels rolling road and combined transport rail services do not need a licence and do not have to pay transit fees.

Vehicle tax in ECU for a 40 t road train and articulated vehicle: 390 ECU

Vehicle tax exemptions:
- For vehicles used exclusively in terminal pick-up and delivery operation: Yes
- For vehicles moved partly in rolling road traffic: Yes

Road usage fees and tolls: No fees and tolls other than the transit tax

Exemptions from road usage fees and tolls for combined transport: Not applicable

Fuel taxation in transport: 0.60 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes
Maximum axle load for railcars:	21 t
Maximum combined transport trains length:	600 m
Maximum mass of combined transport trains:	1 000 - 1 350 t
Maximum speed for combined transport trains:	80-90 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

- Upgrading of the Vienna-Budapest-Belgrade route is planned. This would permit a combined transport train speed of 120 km/h.

Are works for gauge improvement planned?
When does the work start? Not necessary

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Budapest-Józefudrof
- Debrecen
- Sopron
- Szeged
- Miskolc
- Békéscsaba
- Záhony
- Pécs

Terminals offering rolling road services:

- Kiskundoroszma
- Sopron
- Budapest
- Berettyóújfalu

Political environment for combined transport: Financial aids, special regulations

Some investment grants for combined transport terminals and for purchases of special combined transport rolling stock are planned.

Road transport legislation provides exemptions from weekend driving bans for combined transport.

14. IRELAND

Road transport features

Maximum length for road trains:	18 350 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm

Is the EU Directive on maximum road vehicles dimensions applied?
- Yes, to be applied by September 1997.

Maximum mass (weight) in general operation: 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?
- Special permit to operate with 44 t

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:
- A special permit allows for the use of public roads of vehicles normally used other than on public roads, and which do not satisfy certain requirements of the regulation concerning the construction of vehicles (*e.g.* weights, *etc*.). It allows for the use of public roads of vehicles carrying abnormal indivisible loads. The scheme is devolved to local authorities.

Transit licences for non-EU operators: No transit traffic.

Vehicle tax in ECU for a 40 t road train and articulated vehicle: 1 860 ECU

Vehicle tax exemptions:
- For vehicles used exclusively in terminal pick-up and delivery operation: No
- For vehicles moved partly in rolling road traffic Not applicable

Road usage fees and tolls: None

Exemptions from road usage fees and tolls for combined transport: Not applicable

Fuel taxation in transport: 0.31 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible? No

Is piggy-back transport of semi-trailers with 4 000 mm height possible? No

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	No
Maximum axle load for railcars:	20 t
Maximum combined transport trains length:	600 m
Maximum mass of combined transport trains:	No specific limit
Maximum speed for combined transport trains:	100 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

- The Cork - Dublin - Belfast axis is being improved.

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Ballina
- Belfast
- Cork
- Dublin
- Dundalk
- Limerick
- Mallow
- Sligo
- Waterford

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

Due to its geographical position, Ireland has no road transit traffic, and forms the start or end of any combined transport axis. In consequence, no specific programme on combined transport has been set.

15. ITALY

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm

Is the EU Directive on maximum road vehicles dimensions applied? Yes

Maximum mass (weight) in general operation: 44 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport? Not necessary

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:

- Availability restricted, applied by local authorities.

Transit licences for non-EU operators:
Availability and issue scheme:

- Italy carries very little non-EU transit.

Special licences available for combined transport clients? No

Vehicle tax in ECU for a 40 t road train and articulated vehicle: 937 ECU

Vehicle tax exemptions:

- For vehicles used exclusively in terminal pick-up and delivery operation: No
- For vehicles moved partly in rolling road traffic: No

Road usage fees and tolls: Tolls on most motorways, no road usage fee

Exemptions from road usage fees and tolls for combined transport : No

Fuel taxation in transport: 0.51 ECU /1 diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?

- Currently only on the Italy-Hungary itinerary, on the Pordenone line via Gorizia. However, from 1999 onwards the following itineraries should be able to take rolling road traffic with full corner height:

- from Novara to the North via Simplon,
- from Verona to the North via Brenner,
- from Trieste to the North via Tarvisio.

Is piggy-back transport of semi-trailers with 4 000 mm height possible?
- Only on specific routes in North Italy.

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?
- Only on specific routes in North Italy.

Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	N.A.
Maximum mass of combined transport trains:	N.A.
Maximum speed for combined transport trains:	120 km/h

Any important improvement of the rail system planned and decided on?
When does the work start? Capacity improvement on the Brenner rail link

Are works for gauge improvement planned?
When does the work start?
- Gauge improvements on the Gotthard axis have been completed. Work is under way to improve the southern access to the Simplon to permit operation of a Novara-Freiburg rolling road service, and gauge improvements are also under way on the southern access to the Brenner.

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Bari
- Bologna
- Brindisi
- Busto Arsizio
- Cagliari
- Castelguelfo
- Catania
- Falconara Maritima
- Florence
- Fiorenzuola
- Foligno
- Gela
- Genoa
- Lamezia
- La Spezia
- Latina
- Leghorn
- Luino
- Marcianise
- Melzo
- Messina

- Milan
- Milazzo
- Novara
- Naples
- Oleggio
- Padua
- Palermo
- Pescara
- Piedimonte
- Piacenza
- Pomezia/Roma
- Roma
- Sassari
- Torino
- Trento
- Trieste
- Udine
- Vercelli
- Verona

Terminals offering rolling road services:

- Milano Greco
- Pordenone

Political environment for combined transport: Financial aids, special regulations

Some aid is provided for the construction of combined transport terminals. Furthermore, combined transport pick-up and delivery are exempted from the weekend driving ban.

16. LATVIA

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 600 mm

Is the EU Directive on maximum road vehicles dimensions applied?
- Partly.

Maximum mass (weight) in general operation:	40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	No

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:
- A special permit must be obtained in advance from the Road Traffic Safety Directorate.

Transit licences for non-EU operators:
Availability and issue scheme:
- Bilateral agreements.

Special licences available for combined transport clients?	No

Vehicle tax in ECU for a 40 t road train and articulated vehicle:	520 ECU

Vehicle tax exemptions:

– For vehicles used exclusively in terminal pick-up and delivery operation:	No
– For vehicles moved partly in rolling road traffic:	Not applicable

Road usage fees and tolls:	None
Exemptions from road usage fees and tolls for combined transport :	Not applicable

Fuel taxation in transport:	n.a.

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	No

Is piggy-back transport of semi-trailers with 4 000 mm height possible?	No

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes

Maximum axle load for railcars:	22.5 tonnes
Maximum combined transport trains length:	850 m
Maximum mass of combined transport trains:	2 400 t
Maximum speed for combined transport trains:	90 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

- Rail improvements planned to start in 1997.

Are works for gauge improvement planned?
When does the work start? No

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Riga Krasta (Riga commercial port terminal).
- Ventspils (Ventspils port terminal).

Terminals offering rolling road services:

- Station Riga Precu - 2 terminals.

Political environment for combined transport: Financial aids, special regulations

It is planned to build a new container terminal in Ventspils port by 2002, which should be able to handle up to 150 000 containers per year. Once the plan to upgrade the rail connections with Ventspils has been implemented, at least part of that volume could be shipped to other destinations by rail.

17. LITHUANIA

Road transport features

Maximum length for road trains:	18 350 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 500 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	40 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	44 t
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	Special regulations apply

Transit licences for non-EU operators:

– A limited number of transit licences is negotiated annually on a bilateral basis

Availability and issue scheme: Special licences available for combined transport clients?	No
Vehicle tax in ECU for a 40 t road train and articulated vehicle:	213 ECU

Vehicle tax exemptions:

– For vehicles used exclusively in terminal pick-up and delivery operation:	No
– For vehicles moved partly in rolling road traffic:	No
Road usage fees and tolls:	18-92 ECU (according to vehicle weight)
Exemptions from road usage fees and tolls for combined transport :	No
Fuel taxation in transport:	0.06 ECU/1 diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes

Maximum axle load for railcars:	22.5 tonnes
Maximum combined transport trains length:	850 m
Maximum mass of combined transport trains:	<4 000 t (differs)
Maximum speed for combined transport trains:	80-90 km/h

Any important improvement of the rail system planned and decided on?

- Repairs on the section Klaipeda-Šumskas and Kaišiadorys-Kybartai, 1st stage

When does the work start?

- Work has started and will be completed by the year 2000. Modernisation of signalling and telecommunications equipment on the Kaišiadorys-Radviliškis line, 1st stage.

Are works for gauge improvement planned?

- Design and construction of European rail gauge on the Polish border-Kaunas line.

When does the work start?

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Palemonas (Kaunas)
- Paneriai (Vilnius)
- Šeštokai (22 km from the Lithuanian-Polish border)

Terminals offering rolling road services: No

Political environment for combined transport: Financial aids, special regulations

A new draft Law on Transport Activities, based on EC Directive No. 107/70, contains provisions designed to promote combined transport infrastructure, in particular the provision of State aid (subsidies, guarantees for loans from international financial institutions).

18. LUXEMBOURG

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 600 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	44 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	Not necessary
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	Not applicable

Transit licences for non-EU operators:
Availability and issue scheme:
Special licences available for combined transport clients?

- Almost no transit by non-EU vehicles.

Vehicle tax in ECU for a 40 t road train and articulated vehicle:	700 ECU

Vehicle tax exemptions:

– For vehicles used exclusively in terminal pick-up and delivery operation:	No
– For vehicles moved partly in rolling road traffic:	Not applicable
Road usage fees and tolls:	1 250 ECU road usage fee, no toll
Exemptions from road usage fees and tolls for combined transport :	No
Fuel taxation in transport:	0.25 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	No
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes

Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	700 m
Maximum mass of combined transport trains:	1 250 t
Maximum speed for combined transport trains:	100 km/h

Any important improvement of the rail system planned and decided on?
When does the work start? No

Are works for gauge improvement planned?
When does the work start? No

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Bettembourg

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

No specific programme for combined transport.

19. MOLDOVA

The following combined transport terminals are in service:

- Kishinev
- Tiraspol
- Ungheni

20. NETHERLANDS

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	50 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	Not necessary
Availability and issue scheme for special allowances for larger and heavier road vehicles than legal permitted:	Not necessary

Transit licences for non EU operators: Availability and issue scheme:
Special licences available for combined transport clients?

- No transit by non-EU vehicles.

Vehicle tax in ECU for a 40 t road train and articulated vehicle:

- 1000 ECU.

Vehicle tax exemptions:

– For vehicles used exclusively in terminal pick-up and delivery operation:	No
– For vehicles moved partly in rolling road traffic:	Not applicable
Road usage fees and tolls:	Road usage fee 1 250 ECU per year
Exemptions from road usage fees and tolls for combined transport :	No
Fuel taxation in transport:	0.32 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes

Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	600 m
Maximum mass of combined transport trains:	1 600 t
Maximum speed for combined transport trains:	120/140 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

- It is planned to build a new railway line exclusively for freight transport from Rotterdam to the German border.

Are works for gauge improvement planned? When does the work start? No

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Blerik/Venlo
- Ede
- Rotterdam
- Roosendaal
- Coevorden
- Hoek van Holland.

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

No specific programme for combined transport. Some studies are financed.

21. NORWAY

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 000 mm
Maximum width for road vehicles:	2 550 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Not yet
Maximum mass (weight) in general operation:	50 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	Not applicable
Availability and issue scheme for special allowances for larger and heavier road vehicles than legal permitted:	Yes
Transit licences for non EU operators: Availability and issue scheme: Special licences available for combined transport clients?	No transit traffic
Vehicle tax in ECU for a 17 + 23 t road train:	1 580 ECU

Vehicle tax exemptions:

- For vehicles used exclusively in terminal pick-up and delivery operation: None
- For vehicles moved partly in rolling road traffic: Not applicable

Road usage fees and tolls:

- A toll must be paid to drive into the city centres of Oslo, Bergen, and Trondheim. Some minor road charges.

Exemptions from road usage fees and tolls for combined transport:	No
Fuel taxation in transport:	0.47 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	No
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Partly, on request
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes
Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	500 - 700 m

Maximum mass of combined transport trains:	680 - 1 090 t
Maximum speed for combined transport trains:	80/90 km/h

Any important improvement of the rail system planned and decided on?	No
When does the work start?	

Are works for gauge improvement planned?	
When does the work start?	No

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Alnabru (Oslo)
- Kristiansand
- Trondheim
- Bergen
- Stavanger
- Rolsvoy

Terminals offering rolling road services: Not applicable

Political environment for combined transport: Financial aids, special regulations

No special programme.

22. POLAND

Road transport features

Maximum length for road trains:	18 350 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 500 mm

Is the EU Directive on maximum road vehicles dimensions applied? Not fully

Maximum mass (weight) in general operation: 42 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport? No

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:
- Special allowances exist but must be paid for.

Transit licences for non-EU operators: availability and issue scheme:
- A limited number of transit licences (some of which free of charge) is annually negotiated on a bilateral basis.

Special licences available for combined transport clients?
- For Austria, Polish combined transport clients can get extra licences.

Vehicle tax in ECU for a 40 t road train and articulated vehicle: 715 ECU with local variations

Vehicle tax exemptions:
- For vehicles used exclusively in terminal pick-up and delivery operation: No
- For vehicles moved partly in rolling road traffic: No

Road usage fees and tolls:
- None. A system of road usage fees and tolls is in preparation and will be introduced in 1998.

Exemptions from road usage fees and tolls for combined transport: No exemptions planned

Fuel taxation in transport: 0.18 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?
- Yes, but there is none for the moment due to the lack of specialised rolling stock and the necessary coding system.

Is piggy-back transport of semi-trailers with 4 000 mm height possible?
- Yes, on some lines where the gauge is adequate and safety standards are met.

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible? Yes, after special agreement with Polish Rail.

Maximum axle load for railcars:21.5 t on the AGTC lines, 22.5 t on the modernised part of the network
Maximum combined transport trains length: 600 m
Maximum mass of combined transport trains: 1 600 t
Maximum speed for combined transport trains: 80-100 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?
- Some major lines are being upgraded to allow passenger trains to operate at 160 km/h and combined transport trains at 100 km/h.

Are works for gauge improvement planned?
When does the work start?
- Gauge improvement on the whole C-E 20 line. The Kunowice-Poznan-Warsaw section is currently being modernised.

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?
- Terminals owned by PKP:
  - Gliwice Kontenerowa, Malaszewicze, Zurawica
- Open access private terminals:
  - Warsaw-Glowna-Towarowa, Warsaw-Praga, Pruszkow, Plonsk, Gdansk
  - Poludniowy, Gdynia Port, Lodz-Olechow, Sosnowiec-Poludniowy, Slawkow
  - Poludniowy, Poznan Gadki.

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

Subsidies were granted to PKP for the first time in 1997.

23. PORTUGAL

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm

Is the EU Directive on maximum road vehicles dimensions applied? Yes

Maximum mass (weight) in general operation: 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?
- 44 t allowed for the carriage of ISO 40 ft. containers.

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:
- Allowances are rather easy to obtain.

Transit licences for non-EU operators: Availability and issue scheme:
Special licences available for combined transport clients?
- No non-EU transit traffic.

Vehicle tax in ECU for a 40 t road train and articulated vehicle: 380 ECU

Vehicle tax exemptions:
- For vehicles used exclusively in terminal pick-up and delivery operation: None
- For vehicles moved partly in rolling road traffic: Not applicable

Road usage fees and tolls: Tolls on most parts of the motorway network

Exemptions from road usage fees and tolls for combined transport: No

Fuel taxation in transport: 0.30 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible? No

Is piggy-back transport of semi-trailers with 4 000 mm height possible? n.a.

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible? n.a.

Maximum axle load for railcars:	n.a.
Maximum combined transport trains length:	n.a.
Maximum mass of combined transport trains:	n.a.
Maximum speed for combined transport trains:	n.a.

Any important improvement of the rail system planned and decided on?	No
When does the work start?	

Are works for gauge improvement planned?	No
When does the work start?	

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Lisbõa
- Porto
- Sines
- Leixões

Terminals offering rolling road services:	None

Political environment for combined transport: Financial aids, special regulations

No specific programme.

24. ROMANIA

Road transport features

Maximum length for road trains:	18 300 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 600 mm

Is the EU Directive on maximum road vehicles dimensions applied? Yes

Maximum mass (weight) in general operation: 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport? No

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:
- Such allowances can be requested at the customs offices at the border for a fee.

Transit licences for non-EU operators:
Availability and issue scheme:
- Negotiated bilaterally by the Ministry of Transport, a limited number is granted free of charge.

Special licences available for combined transport clients?
- No, but some licences are given free of charge to users of rolling roads or certain ferry boat services to Romania.

Vehicle tax in ECU for a 40 t road train and articulated vehicle: n.a.

Vehicle tax exemptions:
- For vehicles used exclusively in terminal pick-up and delivery operation: No
- For vehicles moved partly in rolling road traffic: Yes

Road usage fees and tolls: A road usage fee has been introduced

Exemptions from road usage fees and tolls for combined transport:
- Users of rolling road services are exempted.

Fuel taxation in transport: 0.30 ECU/l diesel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?
- Yes for trucks 2 500 mm wide. Trucks 2 600 mm wide and with a corner height of 4 000 mm can be loaded only on special railcars with a platform height of 410 mm.

Is piggy-back transport of semi-trailers with 4 000 mm height possible?
- No terminal handling devices exist, but it is planned to introduce them.

Is rail transport of containers and swap bodies with a height of 2 900 mm
on standard railway platform cars possible?
- Yes, but a special one-year permit must be obtained against a fee.

Maximum axle load for railcars: 20 t, increase to 22.5 t is underway
Maximum combined transport trains length: 550 m
Maximum mass of combined transport trains:
- 1 100 t for single traction, 1 800 t for double traction, 950 t for rolling road trains.

Maximum speed for combined transport trains: 60-100 km/h

Any important improvement of the rail system planned and decided on?
When does the work start? n.a.

Are works for gauge improvement planned?
When does the work start?
- No work planned as the gauge of the Romanian railways is sufficient for most types of traffic. Only the transport of 2 900 mm high containers on railcars with a platform height of 1 250 mm is not possible.

Which terminals offer a 34 t lifting capability for containers (spreader) and
for swap bodies (grappler arms)?
- Apart from the Bradu de Sus terminal (near Pitesti), which has a grappler arm with a maximum capacity of 32 tonnes, Romanian terminals are not equipped with grappler arms. Bucharest will get such equipment in 1999, Craiova, Constantza and Semenic in the year 2000.

Terminals offering rolling road services:
- Bucharest-Progresu (only for traffic to Bulgaria)
- Bradu de sus
- Glogovat (Arad)

Political environment for combined transport: Financial aids, special regulations

No specific programme.

25. SLOVAK REPUBLIC

Road transport features

Maximum length for road trains:	18 000 mm
Maximum length for articulated units:	15 500 mm
Maximum width for road vehicles:	2 550 mm

Is the EU Directive on maximum road vehicles dimensions applied? Yes

Maximum mass (weight) in general operation: 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?
- A 44 t allowance is available

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted: Special regulations

Transit licences for non-EU operators:
Availability and issue scheme:
- Issued under bilateral agreements.

Special licences available for combined transport clients?
- Not applicable.

Vehicle tax in ECU for a 40 t road train and articulated vehicle:
- 1 315 ECU.

Vehicle tax exemptions:
- For vehicles used exclusively in terminal pick-up and delivery operation: Yes
- For vehicles moved partly in rolling road traffic: Tax refund according to number of trips

Road usage fees and tolls: 52 ECU per year

Exemptions from road usage fees and tolls for combined transport: No

Fuel taxation in transport: 0.52 ECU/l diesel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible? Yes

Is piggy-back transport of semi-trailers with 4 000 mm height possible? Yes

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes
Maximum axle load for railcars:	20/22.5 t
Maximum combined transport trains length:	600 m
Maximum mass of combined transport trains:	1 500 t
Maximum speed for combined transport trains:	120 (100) km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

Are works for gauge improvement planned?
When does the work start?

- Modernisation of the Kúty - Bratislava - Nové Zámky - Štúrovo and Zilina - Cadca - Skalité lines has started. It includes an adjustment of the gauge.

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Port of Bratislava
- Cierna nad Tisou
- Dobrá pri Ciernej nad Tisou

Terminals offering rolling road services:

- Rolling road services can be provided using metal ramps. A rolling road service will be launched and subsidised by the State. A subsidy of 20 million Sk has been earmarked for this service in 1998.

Political environment for combined transport: Financial aids, special regulations

Credit guarantees and interest subsidies are provided for construction of combined transport terminals. The government has adopted a "Programme to Support Combined Transport", under which the State will guarantee loans by commercial banks to businesses. The State will also reimburse up to 70 per cent of interest payments on these loans, which are for a maximum of 5 years.

Since 1997, combined transport pick-up and delivery has been exempted from holiday and weekend driving bans.

26. SLOVENIA

Road transport features

Maximum length for road trains:	18 000 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 500 mm

Is the EU Directive on maximum road vehicles dimensions applied? Yes

Maximum mass (weight) in general operation: 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport? No

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:
- Special allowances can easily be obtained.

Transit licences for non-EU operators:
Availability and issue scheme: Limited number of transit licences

Special licences available for combined transport clients?
- "Bonus" licences are given to users of the rolling road service

Vehicle tax in ECU for a 40 t road train and articulated vehicle: Approx. 2 000 ECU

Vehicle tax exemptions:
- For vehicles used exclusively in terminal pick-up and delivery operation: 50 % reduction
- For vehicles moved partly in rolling road traffic: No

Road usage fees and tolls:
- A transit fee for large vehicles is charged that can go up to 35 ECU for 1 transit trip.

Exemptions from road usage fees and tolls for combined transport:
- Users of this service do not have to pay the transit fee.

Fuel taxation in transport: Approx. 0.30 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible? Yes

Is piggy-back transport of semi-trailers with 4 000 mm height possible? Yes

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes
Maximum axle load for railcars:	22 t
Maximum combined transport trains length:	500 - 600 m
Maximum mass of combined transport trains:	1 300-1 800 t
Maximum speed for combined transport trains:	80 km/h
Any important improvement of the rail system planned and decided on?	
When does the work start?	Some major transit lines will be modernised
Are works for gauge improvement planned?	
When does the work start?	Planned on some transit lines

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Ljubljana
- Koper
- Maribor
- Celje

Terminals offering rolling road services:

- Ljubljana
- Sezana

Political environment for combined transport: Financial aids, special regulations

Combined transport equipment can be imported duty-free.

Combined transport pick-up and delivery are exempted from the weekend driving ban.

27. SPAIN

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm

Is the EU Directive on maximum road vehicles dimensions applied? Yes

Maximum mass (weight) in general operation: 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?

- 44 t allowed for the carriage of ISO 40 ft. containers and swap bodies.

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted: Allowances are rather easy to obtain

Transit licences for non-EU operators:
Availability and issue scheme; special licences available for combined transport clients? Practically no non-EU transit traffic

Vehicle tax in ECU for a 40 t road train and articulated vehicle: 410 ECU

Vehicle tax exemptions:

- For vehicles used exclusively in terminal pick-up and delivery operation: None
- For vehicles moved partly in rolling road traffic: Not applicable

Road usage fees and tolls: Tolls on most parts of the motorway network

Exemptions from road usage fees and tolls for combined transport: No

Fuel taxation in transport: 0.25 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible? No

Is piggy-back transport of semi-trailers with 4 000 mm height possible? No

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible? No

Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	450 m
Maximum mass of combined transport trains:	1 100 t
Maximum speed for combined transport trains:	120 km/h

Any important improvement of the rail system planned and decided on?
When does the work start? Not for freight trains

Are works for gauge improvement planned?
When does the work start? No

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Alicante
- Almusafes
- Barcelona, Morot
- Bilbao
- Huelva
- Irùn
- Madrid
- Port Bou
- Saragossa
- Sevilla
- Silla
- Tarragona
- Vigo
- Villareal
- Algeciras Port
- La Nava de Puertoblano
- La Coruña
- Cadiz
- Valladolid
- Merida
- Aviles
- Cartagena
- Cordoba
- Granollers
- Leon
- Lugo
- Barcelona Port
- Santurce Port
- Valencia Port
- Malaga
- Linares
- Murcia
- Pamplona
- Puerto de Santa Maria

- Torrelavega (Santander)
- Vittoria
- San Roque

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

No specific programme.

28. SWEDEN

Road transport features

Maximum length for road trains:	24 000 mm
Maximum length for articulated units:	24 000 mm
Maximum width for road vehicles:	2 600 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	56 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	Not necessary
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	Not necessary
Transit licences for non-EU operators: Availability and issue scheme: Special licences available for combined transport clients?	No transit traffic
Vehicle tax in ECU for a 40 t road train and articulated vehicle:	1 720 ECU
Vehicle tax exemptions:	
– For vehicles used exclusively in terminal pick-up and delivery operation:	No
– For vehicles moved partly in rolling road traffic:	Not applicable
Road usage fees and tolls:	No
Exemptions from road usage fees and tolls for combined transport:	Not applicable
Fuel taxation in transport:	0.28 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	Yes
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	Yes
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes

Maximum axle load for railcars:	22.5 t
Maximum combined transport trains length:	600 m
Maximum mass of combined transport trains:	1 300 t
Maximum speed for combined transport trains:	130 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?

– Introduction of computer systems under way.

Are works for gauge improvement planned?
When does the work start? No

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

– Stockholm
– Göteborg
– Malmö
– Hälsingborg
– Trelleborg
– Jönköping
– Älmhult
– Örebro
– Norrköping
– Gävle
– Borlänge
– Sundsvall
– Umeå
– Luleå

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

No specific programme.

29. SWITZERLAND

Road transport features

Maximum length for road trains:	18 350 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 500 mm

Is the EU Directive on maximum road vehicles dimensions applied? Legislation in preparation

Maximum mass (weight) in general operation: 28 t + 5 % tolerance

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?

- 44 t allowed in a radius of 30 km round the terminal

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:

- For transport in the border area (normally within a 10 km strip along the border), it is easy to obtain allowances for 40 t vehicles or, in the case of 40 ft. containers, for 44 t vehicles. Switzerland has concluded an agreement with the European Union under which it authorises the exceptional transit of 50 vehicles over 28 t per day on the (shortest) transit route Basel-Chiasso under certain conditions.

Transit licences for non-EU operators:
Availability and issue scheme:

- Transport to places outside the 10 km border zone or transit through Switzerland may be allowed for EU and non-EU vehicles (for example, when the load cannot be divided).

Special licences available for combined transport clients? No

Vehicle tax in ECU for a 40 t road train and articulated vehicle:

- 40 t vehicles are not allowed. A 28 t vehicles tax is levied, which varies from canton to canton; the minimum is 940 ECU per year, the maximum 2 470 ECU.

Vehicle tax exemptions:

- For vehicles moved partly in rolling road traffic:
  Swiss vehicles get a tax refund according to the number of days spent outside Switzerland. Transport by rolling road is counted as a day outside Switzerland.

Road usage fees and tolls:

- Vehicles up to 3.5 t pay a road usage fee of SF 40 (25 ECU) per year. Larger vehicles pay according to weight and time spent in Switzerland, up to 2 500 ECU per year. A normal north-south transit trip through Switzerland (1 day's drive from Basel to Chiasso) costs about 15 ECU.

Exemptions from road usage fees and tolls for combined transport:
If the vehicle is used in combined transport: No fee is charged

Fuel taxation in transport: 0.53 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?
- A clearance above the rail of 4 670 mm will be provided on the Lötschberg transit route, and a clearance of 4 630 mm on the St. Gotthard link. Today, the St. Gotthard link is limited to vehicles with a corner height of 3 850 mm, while the Lötschberg will be able to take 4 000 mm-high vehicles as from 1999.

Is piggy-back transport of semi-trailers with 4 000 mm height possible? Currently not
- Dimension appropriate to P/C 80 on Lötschberg and P/C 60 on St. Gotthard.

Is rail transport of containers and swap bodies with a height of 2 900 mm
on standard railway platform cars possible? Only on the Lötschberg route after 1999

Maximum axle load for railcars: 22.5 t
Maximum combined transport trains length: currently 750 m
Maximum mass of combined transport trains: 1 800 t
Maximum speed for combined transport trains:
- The St. Gotthard and the Lötschberg routes can be used with a speed of 75/80 km/h.
- Otherwise, the maximum speed of rail in the Swiss network is 120 km/h.

Any important improvement of the rail system planned and decided on?
When does the work start?
- Trains and capacity on one of the two major north-south links, the Lötschberg-Simplon route, has been doubled in recent years. A master plan which would add new base tunnels and line capacity on both main links has been decided. The centre-piece of the plan is a new base tunnel under the St. Gotthard mountain range and on the Lötschberg route (NEAT/NLFA). This will greatly increase capacity and performance offered on these routes. If work progresses according to schedule, the first sections of the NEAT/NLFA (new Alpine rail crossing) will come into service in 2006. Though there is considerable debate about whether the two projects are necessary, the government has declared its intention to go ahead with both of them.

Are works for gauge improvement planned?
When does the work start?
- Gauge improvement on the Lötschberg-Simplon route is under way and will come into service in 1999. The gauge on the St. Gotthard has been enlarged and upgraded, and now has the specifications mentioned above.

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Aarau
- Chiasso
- Basel
- Buchs
- Zurich
- Birrfeld
- Lugano
- Geneva
- Embrach

Terminals offering rolling road services:

- Basel
- Lugano-Vedeggio

Political environment for combined transport: Financial aids, special regulations

Swiss Federal Railways have received a block subsidy of 66 million ECU.

Switzerland has a long tradition of transit traffic between the North and South of Europe. For many years, the government has had a policy of transferring as much freight as possible from road to rail. The limit on vehicle weight (28 t) and the ban on driving at night and on Sundays were introduced to limit the number of vehicles crossing the Alps. But this has led to traffic being diverted through other countries. Switzerland intends to bring its regulations into line with those of the European Union and has started negotiations with a view to harmonising gradually weight its limit with European legislation. However, this will have to be accompanied by an increase in road taxes and fees so that they reflect the true cost of road transport.

30. TURKEY

Road transport features

Maximum length for road trains:	18 000 mm
Maximum length for articulated units:	15 500 mm
Maximum length for motor vehicles:	12 000 mm
Maximum length for trailer:	12 000 mm
Maximum width:	2 500 mm

Is the EU Directive on maximum road vehicles dimensions applied? Yes

Maximum mass (weight) in general operation: Road trains and articulated vehicles 40 t

Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?
When carrying a 40 ft. container 44 t

Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:

Transit licences for non-EU operators:
Availability and issue scheme:

Special licences available for combined transport clients?

Vehicle tax in ECU for a 38 t road train and articulated vehicle:

Vehicle tax exemptions:
- For vehicles used exclusively in terminal pick-up and delivery operation:
- For vehicles moved partly in rolling road traffic.

Road usage fees and tolls:

Exemptions from road usage fees and tolls for combined transport:

Fuel taxation in transport:

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible? No

Is piggy-back transport of semi-trailers with 4 000 mm height possible? No

Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Yes
Maximum axle load for railcars:	20 t
Maximum combined transport trains length:	400 m
Maximum mass of combined transport trains:	1 500 t
Maximum speed for combined transport trains:	90 km/h
Any important improvement of the rail system planned and decided on? Are works for gauge improvement planned?	To start in 1998

Which terminals offer a 34 t lifting capability for containers (spreader) and for swap bodies (grappler arms)?

- Terminals in operation :
  - Haydarpasa
  - Derince
  - Bandima
  - Izmir
  - Mersin
  - Iskenerun
  - Samsun
  - Halkali
  - Ankara
  - Konya
  - G. Antep
  - K. Maras
  - Denizli
- Container terminals planned:
  - Kayseri
  - Balikesir
  - Türkeli

Terminals offering rolling road services:

Political environment for combined transport: Financial aids, special regulations

Investment incentives are provided for road/rail combined transport.

31. UNITED KINGDOM

Road transport features

Maximum length for road trains:	18 750 mm
Maximum length for articulated units:	16 500 mm
Maximum width for road vehicles:	2 550 mm
Is the EU Directive on maximum road vehicles dimensions applied?	Yes
Maximum mass (weight) in general operation:	38 t
Any special treatment as far as maximum dimensions and weight is concerned in force for vehicles moving in combined transport?	44 t to an from approved terminals
Availability and issue scheme for special allowances for larger and heavier road vehicles than legally permitted:	n.a.
Transit licences for non-EU operators: Availability and issue scheme:	Almost no transit traffic
Special licences available for combined transport clients?	n.a.
Vehicle tax in ECU for a 38 t road train and articulated vehicle:	3 300 - 3 750 ECU
Vehicle tax exemptions:	
– For vehicles used exclusively in terminal pick-up and delivery operation: Tax reduced to 1 500 ECU.	
– For vehicles moved partly in rolling road traffic:	n.a.
Road usage fees and tolls:	None
Exemptions from road usage fees and tolls for combined transport:	Not applicable
Fuel taxation in transport:	0.39 ECU/l diesel fuel

Rail and terminal infrastructure

Is rolling road operation with road vehicles of 4 000 mm height possible?	No
Is piggy-back transport of semi-trailers with 4 000 mm height possible?	No
Is rail transport of containers and swap bodies with a height of 2 900 mm on standard railway platform cars possible?	Only exceptionally

Maximum axle load for railcars:	25 t
Maximum combined transport trains length:	600-750 m
Maximum mass of combined transport trains:	1 500 t
Maximum speed for combined transport trains:	120 km/h

Any important improvement of the rail system planned and decided on?
When does the work start?
Are works for gauge improvement planned?
When does the work start? Certain improvement in connection with the Channel Tunnel

Which terminals offer a 34 t lifting capability for containers (spreader) and
for swap bodies (grappler arms)?

- Birmingham
- Glasgow
- Harwich
- Liverpool
- Manchester
- Willesden (London)
- Belfast
- and further terminals with 30 t lifting capacity

Terminals offering rolling road services: None

Political environment for combined transport: Financial aids, special regulations

Grants (Freight Facilities Grants) are provided towards the capital cost of all types of railway equipment, and Railtrack also receives Track Access Grants.

ANNEX B

TRAFFIC VOLUME OF INTERNATIONAL EUROPEAN COMBINED TRANSPORT ROAD-RAIL IN 1996

1. General

European combined transport is normally not subject to official statistics. Various governmental and non-governmental authorities collect data and partly publish them, but it seems almost impossible to set this puzzle together to a meaningful picture. Some of the main shortcomings will be dealt with in this chapter.

Combined transport receives its main efficiency by concentrating small consignments traffic in large units such as block trains or inland waterway barges. This concentration process is not normally efficient when carried out on widely distributed networks, but it is if used on traffic axes. All statistical figures available report on total traffic per network, or between national networks, and do not differentiate as regards axes; an axis analysis normally is executed only within a detailed market analysis and not in official statistics. Although some statistics on international transport country by country assume a given axis, such as the Netherlands to Hungary; there is almost no other way than to transit via Köln - München - Salzburg. Other international transport statistics do not offer such assumptions: the border between France and Germany is rather long, and the traffic flows pass over various axes.

The other problem relates to volume counting. The most popular counting method in combined transport is to count the TEU (twenty foot equivalent unit) that correspond to the transport volume of a 20 ft. container. But some parties count laden units only, while others include the carriage of empty units as well. Some statistics differentiate between laden and empty units. Some companies count all units with less than 4 000 kg payload as "empty" (often this count is based on a special tariff offered for such units), others count only really empty units as "empty". Today most operators give their transportation figures in TEU or in consignments only, without differentiating between laden and empty, this creates considerable problems when trying to generate a figure related to transport volume in tonnes. Moreover, including transit traffic in traffic statistics is difficult to achieve (e.g. Benelux).

We could assume that a laden 20 ft. container normally contains on average 12 000-16 000 kg of cargo, and a laden 40 ft. container 18 0000 - 22 000 kg on average. If a trade route has considerable amounts of liquids being transported by tanker, these averages rise considerably. Before assuming a figure "average load per TEU" we must first undertake assumptions on the proportion of 20 ft. containers to 40 ft. containers, and the average proportion on empty hauls. According to the statistics of the world count of ISO containers, a proportion of 70 : 30 on 20 ft. containers to 40 ft containers could be assumed. The empty haul proportion is more difficult to determine as it differs according to the type of operator. For example, some operators offer special low transport prices for an empty run linked with a laden run. These operators attract unbalanced traffic into their commercial environment and have, in the end, a larger proportion of empty hauls as others, that offer only unit prices per TEU-km, whether laden or empty. Finally, road hauliers in container hinterland transport offer often a per km rate for the transport of a 40 ft. chassis with a load up to some 28 tonnes. They might move either

a partly laden 40 ft. container, or a fully laden 20 ft. container plus an empty 20 ft. container. Finally, UIRR operators have a completely different traffic scheme than those carriers that concentrate on sea-borne container hinterland traffic.

All these assumptions result in a possible value of some 11 (metric) tonnes average cargo per container, or 8.5 tonnes per TEU carried in container hinterland transport. This conversion is based on assumptions that may be, in the case of some large European operators, misleading. In domestic European transport, other figures will apply, as the rate of empty hauls is usually lower. But as considerable variations exist on the various axes, we cannot even apply realistic assumptions. In the end, no values in tonnes carried in combined transport are given, but we suggest a value of 8.5 to 11 tonnes per TEU carried might be a realistic figure.

The next problem is created by the counting method of the UIRR operators: They do not count "TEU", but "consignments", *i.e.* units defined as:

- either a complete semi-trailer,
- or a pair of swap bodies both smaller than 8.3 m in length, and both less than 16 t actual gross mass,
- or one swap body larger than 8.3 m in length and/or more than 16 t actual gross mass,
- or any vehicle in case of a transport on "*Rollende Landstrasse*" (rolling road).

As the most popular unit with UIRR operators is the 7 m swap body, and as some 90 per cent of these swap bodies have a outside length of 7.15 m, we convert 1 consignment of 2 x 7.15 m = 14.3 m against 1 TEU being 6.1 m length, at a factor 1 UIRR consignment equals 2.3 TEU.

This conversion figure is used as well by experts from UIRR and *Studiengesellschaft für den kombinierten Verkehr e.V.*, so it is a well established value.

Summing up

- Due to the type of statistical data available, we do not show axis figures but international transport by country.
- We do not calculate the tonnage carried because of too many variations in the figures. However, we suggest assuming an average cargo mass per TEU in the case of container hinterland transport carrying 8.5 t; and a figure slightly higher in the case of domestic combined transport.
- We calculate 1 UIRR consignment with a conversion rate of 2.3 TEU per consignment.

2. International Road-Rail Combined Transport in Austria (A)

To/from country		1 000 TEU	
B	Belgium	27	
BG	Bulgaria	0.4	
CH	Switzerland	6	
CZ	Czech Republic	26	including Slovak Republic
D	Germany	467	
DK	Denmark	2	
E	Spain	0.1	
FIN	Finland	1	
F	France	8	
UK	United Kingdom	1	
GR	Greece	0.3	
HR	Croatia	9	including Slovenia
H	Hungary	198	
I	Italy	34	
L	Luxembourg	-	
NL	Netherlands	40	
N	Norway	0.2	
PL	Poland	1	
P	Portugal	0.0	
RO	Romania	1	
RUS	Russia	0.3	
S	Sweden	0.3	
SLO	Slovenia	9	including Croatia
SK	Slovak Republic	ref. CZ	
TR	Turkey	3	
UA	Ukraine	0.0	
YU	Yugoslavia	0.0	

Notes:

The figures indicated above include bilateral rolling road operations with Germany, Hungary and the Czech Republic.

In addition to this international traffic, Austria also has:

- some domestic combined road/rail traffic,
- an increasing amount of combined road/rail transport and road/rail/inland waterway transport on the Danube, mainly with Germany upstream and Hungary downstream,
- a considerable amount of transit traffic carried by combined transport trains, both accompanied (*Rollende Landstrasse*) and unaccompanied (swap bodies and semi-trailers).

3. International Road-Rail Combined Transport in Belgium (B)

To/from country		1 000 TEU	
A	Austria	27	
BG	Bulgaria	0.2	
CH	Switzerland	60	
CZ	Czech Republic	1	including Slovak Republic
D	Germany	37	
DK	Denmark	1	
E	Spain	19	
FIN	Finland	0.0	
F	France	52	
UK	United Kingdom	0.0	
GR	Greece	1	
HR	Croatia	2	including Slovenia
H	Hungary	0.2	
I	Italy	306	
L	Luxembourg	0.2	
NL	Netherlands	58	
N	Norway	0.1	
PL	Poland	2	
P	Portugal	0.0	
RO	Romania	1	
RUS	Russia	0.4	
S	Sweden	49	
SLO	Slovenia	0.2	including Croatia
SK	Slovak Republic	ref. CZ	
TR	Turkey	0.0	
UA	Ukraine	0.1	
YU	Yugoslavia	0.0	

Notes:

- The large volume of traffic between Belgium and the Netherlands consists to a large extent of freight containers, laden or empty, transported between the seaports Amsterdam, Antwerp, Rotterdam and Zeebrugge.
- In addition to combined road/rail transport, Belgium also has a considerable volume of combined transport using inland waterway barges. Almost all of this traffic originates in Antwerp and Zeebrugge and goes via the Rhine into Germany, France and Switzerland, and over the canal network to the Netherlands. Virtually all of the cargo consists of sea containers.

4. International Road-Rail Combined Transport in Bulgaria (BG)

To/from country		1 000 TEU
A	Austria	0.4
B	Belgium	0.2
CH	Switzerland	0.0
CZ	Czech Republic	0,0
D	Germany	1
DK	Denmark	-
E	Spain	-
FIN	Finland	-
F	France	0.1
UK	United Kingdom	-
GR	Greece	0.2
H	Hungary	1
I	Italy	0.421
L	Luxembourg	-
NL	Netherlands	0.0
N	Norway	-
PL	Poland	0.0
P	Portugal	-
RO	Romania	0.0
RUS	Russia	-
S	Sweden	0.1
SLO	Slovenia	-
SK	Slovak Republic	-
TR	Turkey	-
UA	Ukraine	-
YU	Yugoslavia	-

5. International Road-Rail Combined Transport in Switzerland (CH)

To/from country		1 000 TEU
A	Austria	6
B	Belgium	60
BG	Bulgaria	0.0
CZ	Czech Republic	0.4
D	Germany	136
DK	Denmark	6
E	Spain	1
FIN	Finland	1
F	France	12
UK	United Kingdom	1
GR	Greece	0.1
H	Hungary	1
I	Italy	81
L	Luxembourg	0.1
NL	Netherlands	24
N	Norway	0.5
PL	Poland	0.0
P	Portugal	0.0
RO	Romania	0.0
RUS	Russia	0.0
S	Sweden	7
SLO	Slovenia	0.0
SK	Slovak Republic	0.0
TR	Turkey	-
UA	Ukraine	-
YU	Yugoslavia	-

Notes:

- Part of the international combined road/rail traffic with Switzerland does not originate or terminate in Switzerland but goes from terminals near the border into Italy or Germany, *i.e.* it is transit traffic.
- Some terminals are situated on Swiss territory but operated by companies situated on the other side of the border. In some cases, the traffic handled by these terminals is counted as being Swiss, in other cases it is assigned to the country of the operator.
- In addition, the Swiss railways carry a very large amount of transit traffic in combined transport trains. Some combined transport traffic also goes by inland waterway to the Rhine port of Basel, Switzerland.

6. International Road-Rail Combined Transport in the Czech Republic (CZ)

To/from country		1 000 TEU	
A	Austria	26	including the Slovak Republic
B	Belgium	1	
BG	Bulgaria	0.0	
CH	Switzerland	0.4	
D	Germany	41	
DK	Denmark	-	
E	Spain	0.1	
FIN	Finland	1	
F	France	1	
UK	United Kingdom	0.0	
GR	Greece	0.2	
HR	Croatia	0.1	
H	Hungary	3	including the Slovak Republic
I	Italy	4	including the Slovak Republic
L	Luxembourg	-	
NL	Netherlands	0.0	
N	Norway	0.0	
PL	Poland	2	
P	Portugal	0.0	
RO	Romania	0.2	
RUS	Russia	-	
S	Sweden	0.0	
SLO	Slovenia	0.1	
SK	Slovak Republic	0.3	
TR	Turkey	0.1	
UA	Ukraine	-	
YU	Yugoslavia	-	

Notes:

- A considerable proportion of Czech combined transport is carried by the rolling road between Dresden (Germany) and Lovosice.
- A certain amount of inland waterway container traffic between the Czech Republic and Hamburg is reported.

7. International Road-Rail Combined Transport in Germany (D)

To/from country		1 000 TEU	
A	Austria	467	
B	Belgium	37	
BG	Bulgaria	1	
CH	Switzerland	136	
CZ	Czech Republic	241	including the Slovak Republic
DK	Denmark	68	
E	Spain	137	
FIN	Finland	3	
F	France	3	
UK	United Kingdom	1	
GR	Greece	2	
H	Hungary	54	
I	Italy	657	
L	Luxembourg	0.0	
NL	The Netherlands	9	
N	Norway	6	
PL	Poland	45	
P	Portugal	0.2	
RO	Romania	6	
RUS	Russia	3	
S	Sweden	39	
SLO	Slovenia	31	including Croatia
SK	Slovak Republic	ref. CZ	
TR	Turkey	0.0	
UA	Ukraine	0.1	
YU	Yugoslavia	0.0	

Notes:

- In addition to international combined transport, Germany has a very large volume of domestic combined road/rail transport.
- Some of the international combined road/rail transport between Germany and the Czech Republic, and Germany and Austria, is by rolling road.
- In addition, *Deutsche Bahn* carries a considerable volume of transit traffic in combined transport trains.
- A large volume of combined transport between Germany and the Netherlands and Belgium is carried by inland waterway. The volume of traffic is estimated at more than 800 000 TEU.

8. International Road-Rail Combined Transport in Denmark (DK)

To/from country		1 000 TEU	
A	Austria	2	
B	Belgium	1	
BG	Bulgaria	-	
CH	Switzerland	6	
CZ	Czech Republic	-	
D	Germany	68	
E	Spain	0.1	
FIN	Finland	0.0	
F	France	2	
UK	United Kingdom	-	
GR	Greece	0.0	
H	Hungary	0.0	
I	Italy	69	
L	Luxembourg	-	
NL	Netherlands	1	
N	Norway	0.0	
PL	Poland	0.0	
P	Portugal	-	
RO	Romania	0.0	
RUS	Russia	-	
S	Sweden	2	
SLO	Slovenia	0.3	including Croatia
SK	Slovak Republic	0.0	
TR	Turkey	-	
UA	Ukraine	-	
YU	Yugoslavia	-	

Notes:

- Denmark also has some domestic combined transport. Kombidan carries some 5 000 TEU domestically.
- As bridge and tunnel links between Sweden, the Danish Islands and the European mainland are under construction and will soon come into service, a major reshaping of Danish combined transport is to be expected.

9. International Road-Rail Combined Transport in Spain (E)

To/from country		1 000 TEU
A	Austria	0.1
B	Belgium	19
BG	Bulgaria	-
CH	Switzerland	1
CZ	Czech Republic	0.1
D	Germany	136
DK	Denmark	0.1
FIN	Finland	0.0
F	France	8
UK	United Kingdom	45.4
GR	Greece	-
H	Hungary	0.0
HR	Croatia	-
I	Italy	16
L	Luxembourg	0.0
NL	Netherlands	5
N	Norway	0.0
PL	Poland	0.1
P	Portugal	37.3
RO	Romania	-
RUS	Russia	0.0
S	Sweden	1
SLO	Slovenia	0.0
SK	Slovak Republic	-
TR	Turkey	-
UA	Ukraine	-
YU	Yugoslavia	-

Note:

- Besides international combined transport, Spain has also an important national traffic in combined transport for which Spanish Rail (RENFE) carried 362 000 TEU in 1996.

10. International Road-Rail Combined Transport in Finland (FIN)

To/from country		1 000 TEU
A	Austria	1
B	Belgium	0.0
BG	Bulgaria	-
CH	Switzerland	1
CZ	Czech Republic	1
D	Germany	3
DK	Denmark	0.0
E	Spain	0.0
F	France	1
UK	United Kingdom	-
GR	Greece	-
HR	Croatia	-
H	Hungary	0.0
I	Italy	1
L	Luxembourg	-
NL	Netherlands	0.0
N	Norway	0.1
PL	Poland	-
P	Portugal	-
RO	Romania	-
RUS	Russia	-
S	Sweden	0.2
SLO	Slovenia	-
SK	Slovak Republic	0.1
TR	Turkey	-
UA	Ukraine	-
YU	Yugoslavia	-

Note:

- Rapidly growing flows of freight containers from North-West European seaports are reported. The containers are carried by coastal vessels and gateways to Finnish Baltic ports and then mainly by rail to Russia.

11. International Road-Rail Combined Transport in France (F)

To/from country		1 000 TEU
A	Austria	8
B	Belgium	52
BG	Bulgaria	0.1
CH	Switzerland	12
CZ	Czech Republic	1
D	Germany	3
DK	Denmark	2
E	Spain	4
FIN	Finland	1
UK	United Kingdom	26
GR	Greece	0.0
HR	Croatia	0.0
H	Hungary	0.4
I	Italy	127
L	Luxembourg	0.0
NL	Netherlands	22
N	Norway	0.1
PL	Poland	1
P	Portugal	0.1
RO	Romania	0.1
RUS	Russia	1
S	Sweden	1
SLO	Slovenia	0.0
SK	Slovak Republic	0.0
TR	Turkey	-
UA	Ukraine	0.0
YU	Yugoslavia	-

Notes:

- France also has a considerable volume of domestic combined transport. Novatrans reports some 337 000 TEU carried domestically.
- Furthermore, large volumes of combined transport transit across France, mainly between Germany and Spain.
- Some commercial centres in Alsace are served by inland waterway container transport. Similar operations have been launched in the north of France.

12. International Road-Rail Combined Transport in the United Kingdom (UK)

To/from country		1 000 TEU
A	Austria	0.1
B	Belgium	-
BG	Bulgaria	-
CH	Switzerland	1
CZ	Czech Republic	0.0
D	Germany	0.1
DK	Denmark	-
E	Spain	0.4
FIN	Finland	-
F	France	26
GR	Greece	0.0
HR	Croatia	-
H	Hungary	-
I	Italy	77
L	Luxembourg	1
NL	Netherlands	0.0
N	Norway	-
PL	Poland	0.0
P	Portugal	-
RO	Romania	0.0
RUS	Russia	-
S	Sweden	-
SLO	Slovenia	-
SK	Slovak Republic	-
TR	Turkey	-
UA	Ukraine	-
YU	Yugoslavia	-

Notes:

- There are also large flows of domestic combined transport.
- A large increase in combined transport volume between the United Kingdom and France, and between the United Kingdom and Italy, is reported. It may be assumed that is due to the new international rail service through the Channel Tunnel.

13. International Road-Rail Combined Transport in Greece (GR)

To/from country		1 000 TEU
A	Austria	0.3
B	Belgium	1
BG	Bulgaria	0.2
CH	Switzerland	0.1
CZ	Czech Republic	0.2
D	Germany	0.2
DK	Denmark	-
E	Spain	-
FIN	Finland	-
F	France	0.0
UK	United Kingdom	0.0
HR	Croatia	-
H	Hungary	1
I	Italy	0.0
L	Luxembourg	-
NL	Netherlands	0.2
N	Norway	-
PL	Poland	0.0
P	Portugal	-
RO	Romania	0.0
RUS	Russia	0.0
S	Sweden	-
SLO	Slovenia	0.0
SK	Slovak Republic	0.0
TR	Turkey	0.0
UA	Ukraine	-
YU	Yugoslavia	-

Note:

- Because of the political unrest in the former Republic of Yugoslavia, the rail connection between Greece and Central Europe has been interrupted, making an efficient rail/road operation impossible.

14. International Road-Rail Combined Transport in Croatia (HR)

To/from country		1 000 TEU	
A	Austria	9	including Slovenia
B	Belgium	2	including Slovenia
BG	Bulgaria	-	
CH	Switzerland	-	
CZ	Czech Republic	0.1	
D	Germany	31	including Slovenia
DK	Denmark	0.3	including Slovenia
E	Spain	-	
FIN	Finland	-	
F	France	0.0	
UK	United Kingdom	0.0	
GR	Greece	-	
H	Hungary	20	including Slovenia
I	Italy	3	
L	Luxembourg	-	
NL	Netherlands	0.1	
N	Norway	0.0	
PL	Poland	0.0	
P	Portugal	-	
RO	Romania	-	
RUS	Russia	-	
S	Sweden	-	
SLO	Slovenia	0.2	
SK	Slovak Republic	0.1	
TR	Turkey	-	
UA	Ukraine	-	
YU	Yugoslavia	-	

Notes:

- Due to developments in the former Republic of Yugoslavia, rail traffic from Croatia to South-Eastern Europe is currently interrupted.
- Some Croatian combined transport is counted in Slovenia's figures.

15. International Road-Rail Combined Transport in Hungary (H)

To/from country		1 000 TEU	
A	Austria	198	
B	Belgium	0.2	
BG	Bulgaria	1	
CH	Switzerland	1	
CZ	Czech Republic	3	including the Slovak Republic
D	Germany	54	
DK	Denmark	0.0	
E	Spain	0.0	
FIN	Finland	0.0	
F	France	0.4	
UK	United Kingdom	-	
GR	Greece	1	
HR	Croatia	20	including Slovenia
I	Italy	11	
L	Luxembourg	0.0	
NL	Netherlands	5	
N	Norway	0.0	
PL	Poland	1	
P	Portugal	-	
RO	Romania	4	
RUS	Russia	-	
S	Sweden	0.1	
SLO	Slovenia	20	including Croatia
SK	Slovak Republic	1	
TR	Turkey	2	
UA	Ukraine	-	
YU	Yugoslavia	0.2	

Notes:

- In addition to this international traffic, Hungary also has some combined transport transit traffic.
- Furthermore, a growing volume of combined transport is carried by inland waterway vessels on the Danube.

16. International Road-Rail Combined Transport in Italy (I)

To/from country		1 000 TEU	
A	Austria	34	
B	Belgium	306	
BG	Bulgaria	0.2	
CH	Switzerland	81	
CZ	Czech Republic	4	including the Slovak Republic
D	Germany	657	
DK	Denmark	69	
E	Spain	10	
FIN	Finland	1	
F	France	127	
UK	United Kingdom	77	
GR	Greece	0.0	
HR	Croatia	3	
H	Hungary	11	
L	Luxembourg	3	
NL	Netherlands	127	
N	Norway	4	
PL	Poland	10	
P	Portugal	0.2	
RO	Romania	0.3	
RUS	Russia	1	
S	Sweden	48	
SLO	Slovenia	6	
SK	Slovak Republic	2	
TR	Turkey	0.2	
UA	Ukraine	0.0	
YU	Yugoslavia	0.0	

Notes:

- Due to the restrictions on road traffic in some Alpine transit countries, a considerable proportion of Italian import and export freight traffic is now going by combined transport.
- In addition to this international traffic, Italy also has a considerable volume of domestic combined transport.
- Freight containers are also carried by coastal vessels between the Italian mainland and the islands, and along the Italian coast.

17. International Road-Rail Combined Transport in Luxembourg (L)

To/from country		1 000 TEU
A	Austria	-
B	Belgium	0.2
BG	Bulgaria	-
CH	Switzerland	0.1
CZ	Czech Republic	-
D	Germany	0.0
DK	Denmark	-
E	Spain	0.0
FIN	Finland	-
F	France	0.0
UK	United Kingdom	0.1
GR	Greece	-
HR	Croatia	-
H	Hungary	0.0
I	Italy	3
NL	Netherlands	0.1
N	Norway	-
PL	Poland	-
P	Portugal	-
RO	Romania	-
RUS	Russia	-
S	Sweden	-
SLO	Slovenia	-
SK	Slovak Republic	-
TR	Turkey	0.0
UA	Ukraine	-
YU	Yugoslavia	-

18. International Road-Rail Combined Transport in the Netherlands (NL)

To/from country		1 000 TEU	
A	Austria	40	
B	Belgium	58	
BG	Bulgaria	0.0	
CH	Switzerland	24	
CZ	Czech Republic	0.0	
D	Germany	9	
DK	Denmark	1	
E	Spain	4	
FIN	Finland	0.0	
F	France	22	
UK	United Kingdom	0.0	
GR	Greece	0.2	
HR	Croatia	1	including Slovenia
H	Hungary	5	
I	Italy	127	
L	Luxembourg	0.1	
N	Norway	-	
PL	Poland	7	
P	Portugal	0.0	
RO	Romania	1	
RUS	Russia	1	
S	Sweden	0.1	
SLO	Slovenia	1	including Croatia
SK	Slovak Republic	0.1	
TR	Turkey	0.3	
UA	Ukraine	0.0	
YU	Yugoslavia	0.0	

Note:

- In addition to road/rail combined transport, the Dutch transport system also moves considerable volumes of freight by inland waterway from Amsterdam and Rotterdam into the Rhine valley, almost entirely in ISO containers.

19. International Road-Rail Combined Transport in Norway (N)

To/from country		1 000 TEU
A	Austria	0.2
B	Belgium	0.1
BG	Bulgaria	0.0
CH	Switzerland	1
CZ	Czech Republic	0.0
D	Germany	6
DK	Denmark	0.0
E	Spain	0.0
FIN	Finland	0.1
F	France	0.1
UK	United Kingdom	-
GR	Greece	-
HR	Croatia	0.0
H	Hungary	0.0
I	Italy	4
L	Luxembourg	-
NL	Netherlands	-
PL	Poland	0.0
P	Portugal	-
RO	Romania	0.0
RUS	Russia	-
S	Sweden	10
SLO	Slovenia	0.0
SK	Slovak Republic	0.0
TR	Turkey	-
UA	Ukraine	-
YU	Yugoslavia	-

20. International Road-Rail Combined Transport in Poland (PL)

To/from country		1 000 TEU
A	Austria	1
B	Belgium	2
BG	Bulgaria	0.0
CH	Switzerland	0.0
CZ	Czech Republic	2
D	Germany	45
DK	Denmark	0.0
E	Spain	0.1
FIN	Finland	-
F	France	1
UK	United Kingdom	0.0
GR	Greece	0.0
HR	Croatia	0.0
H	Hungary	1
I	Italy	10
L	Luxembourg	-
NL	Netherlands	7
N	Norway	0.0
PO	Portugal	-
RO	Romania	-
RUS	Russia	-
S	Sweden	0.1
SLO	Slovenia	0.0
SK	Slovak Republic	0.0
TR	Turkey	-
UA	Ukraine	-
YU	Yugoslavia	-

21. International Road-Rail Combined Transport in Portugal (P)

To/from country		1 000 TEU
A	Austria	0.0
B	Belgium	0.0
BG	Bulgaria	-
CH	Switzerland	0.0
CZ	Czech Republic	0.0
D	Germany	0.2
DK	Denmark	-
E	Spain	13
FIN	Finland	-
F	France	0.1
UK	United Kingdom	-
GR	Greece	-
HR	Croatia	-
H	Hungary	-
I	Italy	0.2
L	Luxembourg	-
NL	Netherlands	0.0
N	Norway	-
PL	Poland	0.0
RO	Romania	-
RUS	Russia	-
S	Sweden	0.0
SLO	Slovenia	-
SK	Slovak Republic	0.0
TR	Turkey	-
UA	Ukraine	-
YU	Yugoslavia	-

22. International Road-Rail Combined Transport in Romania (RO)

To/from country		1 000 TEU
A	Austria	1
B	Belgium	1
BG	Bulgaria	0.0
CH	Switzerland	0.0
CZ	Czech Republic	0.2
D	Germany	6
DK	Denmark	0.0
E	Spain	-
FIN	Finland	-
F	France	0.1
UK	United Kingdom	0.0
GR	Greece	0.0
HR	Croatia	-
H	Hungary	4
I	Italy	0.3
L	Luxembourg	-
NL	Netherlands	0.1
N	Norway	0.0
PL	Poland	-
P	Portugal	-
RUS	Russia	-
S	Sweden	0.0
SLO	Slovenia	0.0
SK	Slovak Republic	-
TR	Turkey	0.0
UA	Ukraine	-
YU	Yugoslavia	-

Note:

- A newly combined transport service carries units from Central Europe to Romania and further east.

23. International Road-Rail Combined Transport in Russia (RUS)

To/from country		1 000 TEU
A	Austria	0.3
B	Belgium	0.4
BG	Bulgaria	-
CH	Switzerland	0.0
CZ	Czech Republic	-
D	Germany	3
DK	Denmark	-
E	Spain	0.0
FIN	Finland	-
F	France	1
UK	United Kingdom	-
GR	Greece	0.0
HR	Croatia	-
H	Hungary	-
I	Italy	1
L	Luxembourg	-
NL	Netherlands	1
N	Norway	-
PL	Poland	-
P	Portugal	-
RO	Romania	-
S	Sweden	-
SLO	Slovenia	0.0
SK	Slovak Republic	-
TR	Turkey	0.0
UA	Ukraine	-
YU	Yugoslavia	-

Note:

- Russia moves a considerable volume of domestic traffic by combined transport, mainly in medium- sized containers.

24. International Road-Rail Combined Transport in Sweden (S)

To/from country		1 000 TEU
A	Austria	0.3
B	Belgium	49
BG	Bulgaria	0.1
CH	Switzerland	7
CZ	Czech Republic	0.0
D	Germany	39
DK	Denmark	2
E	Spain	1
FIN	Finland	0.2
F	France	1
UK	United Kingdom	-
GR	Greece	-
HR	Croatia	-
H	Hungary	0.1
I	Italy	48
L	Luxembourg	-
NL	Netherlands	0.1
N	Norway	10
PL	Poland	0.1
P	Portugal	0.0
RO	Romania	0.0
RUS	Russia	-
SLO	Slovenia	0.0
SK	Slovak Republic	0.1
TR	Turkey	0.0
UA	Ukraine	-
YU	Yugoslavia	-

Note:

- Sweden also has some domestic combined transport.

25. International Road-Rail Combined Transport in Slovenia (SLO)

To/from country		1 000 TEU	
A	Austria	9	including Croatia
B	Belgium	22	including Croatia
BG	Bulgaria	-	
CH	Switzerland	0.0	
CZ	Czech Republic	0.1	
D	Germany	31	including Croatia
DK	Denmark	0.3	including Croatia
E	Spain	0.0	
FIN	Finland	-	
F	France	0.0	
UK	United Kingdom	-	
GR	Greece	0.0	
HR	Croatia	1	
H	Hungary	20	including Croatia
I	Italy	6	
L	Luxembourg	-	
NL	Netherlands	1	including Croatia
N	Norway	0.0	
PL	Poland	0.0	
P	Portugal	-	
RO	Romania	0.0	
RUS	Russia	0.0	
S	Sweden	0.0	
SK	Slovak Republic	0.3	
TR	Turkey	0.1	
UA	Ukraine	-	
YU	Yugoslavia	0.0	

Note:

- Part of the combined transport in Croatia is counted in the figures for Slovenia.

26. International Road-Rail Combined Transport in the Slovak Republic (SK)

To/from country		1 000 TEU	
A	Austria	26	including the Czech Republic
B	Belgium	1	including the Czech Republic
BG	Bulgaria	-	
CH	Switzerland	0.0	
CZ	Czech Republic	0.4	
D	Germany	241	including the Czech Republic
DK	Denmark	0.0	
E	Spain	-	
FIN	Finland	0.1	
F	France	0.0	
UK	United Kingdom	-	
GR	Greece	0.0	
HR	Croatia	0.1	
H	Hungary	1	
I	Italy	2	
L	Luxembourg	-	
NL	Netherlands	0.1	
N	Norway	0.0	
PL	Poland	0.0	
P	Portugal	0.0	
RO	Romania	-	
RUS	Russia	-	
S	Sweden	0.1	
SLO	Slovenia	0.3	
TR	Turkey	0.1	
UA	Ukraine	-	
YU	Yugoslavia	-	

27. International Road-Rail Combined Transport in Turkey (TR)

To/from country		1 000 TEU	
A	Austria	3	
B	Belgium	0.0	
BG	Bulgaria	0.0	
CH	Switzerland	-	
CZ	Czech Republic	0.3	inc. the Slovak Republic
D	Germany	0.0	
DK	Denmark	-	
E	Spain	-	
FIN	Finland	-	
F	France	-	
UK	United Kingdom	-	
GR	Greece	0.0	
HR	Croatia	-	
H	Hungary	0.2	
I	Italy	0.2	
L	Luxembourg	0.0	
NL	Netherlands	0.3	
N	Norway	-	
PL	Poland	-	
P	Portugal	-	
RO	Romania	0.0	
RUS	Russia	0.0	
S	Sweden	0.0	
SLO	Slovenia	0.1	
SK	Slovak Republic	0.1	
UA	Ukraine	-	
YU	Yugoslavia	-	

Note:

- A considerable volume of Turkish international road traffic to Central Europe goes by rolling highway through Hungary and Austria. Another part goes by coastal ship to Northern Italy, and from there by road to the Austrian border, from where it goes north by rolling road through Austria.

28. International Road-Rail Combined Transport in Ukraine (UA)

To/from country		1 000 TEU
A	Austria	0.0
B	Belgium	0.1
BG	Bulgaria	-
CH	Switzerland	-
CZ	Czech Republic	-
D	Germany	0.1
DK	Denmark	-
E	Spain	-
FIN	Finland	-
F	France	0.0
UK	United Kingdom	-
GR	Greece	-
HR	Croatia	-
H	Hungary	-
I	Italy	0.0
L	Luxembourg	-
NL	Netherlands	0.0
N	Norway	-
PL	Poland	-
P	Portugal	-
RO	Romania	-
RUS	Russia	-
S	Sweden	-
SLO	Slovenia	-
SK	Slovak Republic	-
TR	Turkey	-
UA	Ukraine	0.0
YU	Yugoslavia	-

Note:

- The table shows ICF traffic only. It can be assumed that a considerable amount of freight is carried in medium-sized containers between Ukraine and Russia.

29. International Road-Rail Combined Transport in Yugoslavia (YU)

To/from country		1 000 TEU
A	Austria	0.0
B	Belgium	0.0
BG	Bulgaria	-
CH	Switzerland	-
CZ	Czech Republic	-
D	Germany	0.0
DK	Denmark	-
E	Spain	-
FIN	Finland	-
F	France	-
UK	United Kingdom	-
GR	Greece	-
HR	Croatia	-
H	Hungary	0.2
I	Italy	0.0
L	Luxembourg	-
NL	Netherlands	0.0
N	Norway	-
PL	Poland	-
P	Portugal	-
RO	Romania	-
RUS	Russia	-
S	Sweden	-
SLO	Slovenia	0.0
SK	Slovak Republic	-
TR	Turkey	
UA	Ukraine	-

Note:

- For political reasons, international rail traffic with Yugoslavia has ceased almost completely.

CONCLUSIONS AND RECOMMENDATIONS ADOPTED AT THE COUNCIL OF MINISTERS HELD AT COPENHAGEN ON 26 AND 27 MAY 1998

The report on the current state of combined transport in Europe presented in document CEMT/CM(98)14 was initially drafted by Dr. Seidelmann, Director of the Studiengesselschaft für den Kombinierten Verkehr (Frankfurt-Germany), and subsequently finalised in accordance with the comments of the ECMT Working Group on Combined Transport and the Committee of Deputies. The scope of this report has been extended beyond road and rail to include inland waterways and coastal shipping. It describes not only the situation of combined transport in ECMT Member countries, within the major international corridors identified in the report, but also draws attention to the current weaknesses of the sector and suggests possible improvements.

Main conclusions

The main conclusions are based in general on the contents of the report, and more particularly on the summary of findings presented in the final Chapter, which compares the situation to that described in the 1992 report. They may be summarised as follows:

Infrastructure

Infrastructure facilities are in some instances either inadequate or incompatible, particularly with regard to loading gauges, and are unable to meet fully the needs of an efficient combined transport network.

Terminals

There have been frequent reports of bottlenecks arising from the lack of sufficient terminal capacity and the poor standard of services provided in terminals.

Border crossings

All the actors involved in combined transport operations (railway companies, combined transport operators and national authorities) are expected to co-operate more effectively with a view to facilitating border crossings. Despite the fact that actors are aware of the straightforward technical and organisational improvements which they could make, these are not always applied.

Monitoring of combined transport movements

In too many cases there is little or no real-time monitoring of combined transport movements, although this is routine practice in the road haulage sector.

Short sea shipping and inland waterways

Coastal shipping already plays a major role in several intra-European trade flows. Combined transport with a coastal shipping component is expanding in a number of corridors, even though as yet there would seem to be little use made of combined transport involving both coastal shipping and inland waterways within Europe as a whole.

Little information would seem to be available as yet on the potential scope for development or the constraints in this area. There is therefore still a need for additional research into combined transport operations with coastal shipping and inland waterway components.

These findings show that combined transport is particularly sensitive to cost and price variations due to the individual characteristics of the various modes implicated which are also themselves competitors. Combined transport is also affected by the numerous interventions in the delivery chain which reduce the quality of service. Most of the recommendations drawn up in previous ECMT reports and Resolutions on the promotion of combined transport, in particular those contained in the Resolution adopted in Annecy in May 1994 [CEMT/CM(94)13] and also in the Resolution adopted in Berlin in April 1997 [CEMT/CM(97)22/Final], are still relevant and must be applied with greater rigour. In view of this situation, there would seem to be a genuine need to remind the parties concerned in the public and private sectors, at both national and international level, of certain elements which are needed, to achieve a significant improvement in combined transport and to ensure the sustainable development of the latter.

Accordingly, the Ministers meeting in Copenhagen on 26 and 27 May 1998

NOTE the report on the development of combined transport in Europe [CEMT/CM(98)14];

RECOMMEND to this effect that:

National and International Institutions should:

- ***with regard to costs and prices***

  – take into account the conclusions of the work carried out on fair competition conditions between modes (i.a. internalising external costs). Competition and co-operation conditions should also be more transparent within each mode (e.g. road and rail transport);

- ***with regard to networks***

  – comply with and implement the standards adopted at international level (e.g. the AGTC) on the routes agreed;
  – ensure that regional plans integrate combined transport terminal facilities into the planning of commercial freight traffic activities and logistics centres, including cases where neighbouring countries are involved; specific routes should be selected and introduced in a phased way; this can be used as a means to concentrate efforts and achieve an improvement in the quality and the quantity of the service offered;
  – make possible investment grants for terminals on certain conditions and only for viable terminals;
  – concentrate financial facilities in order to eliminate bottlenecks;

- ***with regard to interoperability***

  - ensure that maximum road vehicle dimensions remain stable with the legal framework drawn up by the European Union (Directive 96/53/EC), in order to put in place a commonly agreed basis for standards on combined transport units;
  - improve the compatibility of railway signalling systems in order to smoothen traffic flows, through both technical and commercial means;
  - encourage operational research into all components of the transport chain, whether it be in connection with Intermodal Transport Units (ITUs), interfaces or information systems;
  - take into special consideration stockable ITUs for the development of short sea and inland waterway transport ;

- ***with regard to operations***

  - take steps to ensure that the railways are put on an equal footing in the market by favouring in the first place a better co-operation between networks and by developing at the same time further market discipline, including i.a. some competition between operators. Member States should take account of the provisions of EU Directives regarding the development of the Community's railways (91/440/EC), the licensing of railway undertakings (95/18/EC) and the allocation of railway infrastructure capacity and charging of infrastructure fees (95/19/EC), as already mentioned in ECMT Resolutions 93/6 and 95/3;

- ***with regard to regulatory measures and controls***

  - give part or total exemption, wherever possible, from taxes, tolls and charges relating to the use of road infrastructure by vehicles engaged in combined transport operations, especially for initial and terminal hauls;
  - also grant exemptions from certain restrictions and traffic bans usually applied in the international road haulage sector;
  - allow higher weight limits for the road vehicles used for the transport of ITUs (Intermodal Transport Units) during initial and terminal hauls;
  - make provisions for carrying out, as far as possible, customs and border control operations (including veterinary and phytosanitory controls) at the points of loading and unloading, in order to speed up combined transport operations, achieve shorter delivery times and make reliable combined transport schedules possible;

Operators involved in the combined transport chain should:

- within a proper competitive environment, co-operate more closely to provide a reliable, efficient and flexible service, and should work together to identify and open up new markets;
- all make efforts to achieve a level of prices for combined transport operations that is as competitive as possible with road haulage services;
- consider the possibility of increasing terminal capacities by offering longer opening hours and more efficient services, particularly with regard to transhipment operations;
- encourage the use of the most efficient technologies (transfer equipment, wagons, ITUs);
- make use of efficient and compatible EDI systems to provide real-time monitoring of combined transport movements;

– should view the development of combined transport operations along specific routes such as those introduced on a trial basis in the European Union as an opportunity to achieve the above-mentioned objectives;

INSTRUCTS the Committee of Deputies, in the light of these recommendations, to continue to monitor developments in this transport sector and to report back to Ministers on the progress achieved.

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