Organization of multimodal transport

Mehmet Celalettin Ekinalan

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ORGANISATION
OF
MULTIMODAL TRANSPORT
Case study of Turkey

Mehmet Celalettin
EKINALAN
WORLD MARITIME UNIVERSITY

MALMOE, SWEDEN

ORGANIZATION OF MULTIMODAL TRANSPORT

Case Study of Turkey

by

Mehmet Celalettin EKINALAN, Turkey

A paper submitted to the World Maritime University in partial fulfilment of the requirements for the award of a

MASTER OF SCIENCE DEGREE

in

GENERAL MARITIME ADMINISTRATION

The contents of this paper reflect my own personal views and are not necessarily endorsed by the World Maritime University.

Signature: ________________________________
Date : 16 October 1989

Supervised and assessed by:
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World Maritime University

Co-assessed by:
Gosta Thulin
Regional Manager, ASG, Sweden
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Mehmet C. Ekinalan
To my father.
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ABSTRACT

Containerisation and its application in all transport modes, multimodal or intermodal, become more economic if it is well organised. There is no doubt that the transport sector functions as a locomotive of a country’s economy. The organisation of multimodal transport therefore has some benefits for a country. But the important question in this respect will be "Is multimodal transport beneficial to all countries?" It has been developed in the Far East, the USA and Europe where economic development has already taken place. Therefore at least basic infrastructure is necessary to organise multimodal transport.

In the case of Turkey, the country’s economy has been developing rapidly since the beginning of this decade, as a result of which transport demand is increased. A better development of the transport system is a must if more benefits are to be reaped. Beyond the national development in the export and import trade, there is another important issue which is the growing transit transport through Turkey. It is obvious that development of the transport sector will provide Turkey with valuable foreign exchange earnings accruing to Turkish shippers, road transport companies and port agencies. The country should use this reserve in an efficient way.

Moreover, the country’s location support transit traffic by the sea-land combination or pure land
transport. On the other hand, the infrastructure which is necessary for multimodal transport, are under construction and special efforts are being made for the development of the transport sector as a whole. In addition to this, experts are available in transport and its related sectors.

In the light of the above mentioned situation, what are the problems which act as bottleneck to the organisation of the multimodal transport?

Before discussing the solution to the problems, it is necessary to emphasis that it has already been decided to install infrastructure for containerisation in Turkey. Requirements of containerisation have to be met, otherwise it will destroy the idea of better organisation of transport instead of supporting the idea.

The aim of this paper is to contribute to the solution of the container transport problems especially in multimodal transport case:
I. GENERAL OVERVIEW OF TURKEY

1.1 INTRODUCTION

Turkey is surrounded by sea on three sides and offering a natural landbridge between Europe, the Middle East and Asia. This function as a natural landbridge, has been used for centuries as a part of the Silk Route. If the Silk Route is traced from Europe to the Far East, it always passes through Turkey either by road or by sea. This geographical location has helped to maintain the world importance of Turkey.

The country has an area of 779,452 sq km and with about 6,000 km of coastline from the Black Sea in the North, and the Mediterranean Sea in the south. Anatolia peninsula is bordered to the east by the USSR and Iran, and to the south by Iraq and Syria. The European part of Turkey is bordered to the west by Greece and Bulgaria. Turkey is subject to transit transport due this location which should be a big portion of Turkey’s transport potential far beyond the transport demand of the Turkish population which is about 55 millions.

1.2 THE ECONOMY OF TURKEY

Turkey’s economy is expanding at a rapid rate. The value of merchandise exports has leapt by 156 per cent from US$ 2.9 bill in 1980 to US$ 7.5 bill in 1986. European share in Turkish export is up 10 per cent in 1986 to 61 per cent with textiles and foodstuffs being the major export products. Exports to Islamic countries currently account for approximately 30 per cent. The expansion of the export market to Europe has also played a significant role in reducing foreign trade deficit.
FIGURE 1. Turkey and its location in Europe - the Middle East connection
<table>
<thead>
<tr>
<th>Item</th>
<th>1986</th>
<th>1987</th>
<th>Change in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPORTS (total)</td>
<td>5,451,638</td>
<td>5,882,982</td>
<td>7.9</td>
</tr>
<tr>
<td>Investment goods</td>
<td>1,587,747</td>
<td>1,555,580</td>
<td>-2.0</td>
</tr>
<tr>
<td>Consumer goods</td>
<td>464,563</td>
<td>499,957</td>
<td>7.6</td>
</tr>
<tr>
<td>Row material</td>
<td>3,399,328</td>
<td>3,827,445</td>
<td>12.6</td>
</tr>
<tr>
<td>EXPORTS (total)</td>
<td>3,566,730</td>
<td>4,236,310</td>
<td>18.8</td>
</tr>
<tr>
<td>Agricultural product</td>
<td>727,394</td>
<td>827,321</td>
<td>13.7</td>
</tr>
<tr>
<td>Mining</td>
<td>111,095</td>
<td>106,655</td>
<td>-4.0</td>
</tr>
<tr>
<td>Industrial goods</td>
<td>2,728,241</td>
<td>3,302,334</td>
<td>21.0</td>
</tr>
<tr>
<td>FOREIGN TRADE DEFICIT</td>
<td>1,884,908</td>
<td>1,646,672</td>
<td>12.6</td>
</tr>
</tbody>
</table>

FIGURE 2. Imports and Exports for the first half of 1987 (US $ 000s)

Source: Made in Turkey, August 1987

One of the most important projects which is estimated to boost the country's economy and cause a significant effect on Turkish ports, as known the future plan is to develop agriculture and energy production in the South East Interior (GAP). The project which will generate 7500 MW of electricity, represents more than the country's present power production and double the nation's agricultural produce through irrigation. It is estimated that the project will be completed in the year 2000, but some parts of it are already in operation. Besides that, a free trade zone, consisting of 776 000 sq m, was opened in Mersin, the major port of the region equipped with full port facilities. In addition to the Mersin Free Zone, Free
Trade Zones in Antalya and Izmir and Free Industrial Zone in Yumurtalik are in operation. All of the facilities are built with Built-Operate-Transfer (BOT-build, operate to recover cost and handover) model. In addition to these projects, pipelines from Iraq to Yumurtalik for oil are resulting in new trade. All these activities will increase transport demand and related sector of transport network are being renovated to upgrade their facilities and services to accommodate new and progressively increasing demand.

1.3 SHIPPING POLICY IN TURKEY

Transport by sea is always considered as one of the important elements of the Turkish economy, because Turkey has a long coast line which covers around 2/3 of Turkish border. Since 1980 a liberal economic policy has been applied in shipping by which remarkable changes have been observed. During the period 1980 - 1986, the Turkish merchant marine fleet has increased from 1,354,455 dwt of 261 ships to 5,547,616 dwt of 601 ships. The capacity of the Turkish merchant marine fleet represent 0.9 per cent of the world merchant marine fleet. This expansion was supported by government encouragements and credit facilities.

1,463,627 dwt of the fleet tonnage is operated by the state owned company called DB Turkish Cargo Lines. There is no container vessel in the Turkish fleet. Containers are carried on deck, but DB Turkish Cargo Lines however has ordered some semi container vessels to respond to the increasing demand of container transport.

The average age of the Turkish Merchant fleet was
16.4 by the end of 1985. This problem is discussed in many national fora. The Turkish Government is trying to take some measures to reduce the age of the fleet and to support competitiveness of the fleet on the international market.

55 per cent of the Turkish seaborne trade are carried under Turkish flag.

<table>
<thead>
<tr>
<th></th>
<th>1984</th>
<th>1985</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXPORT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own Flag Vessel</td>
<td>2,472,870</td>
<td>2,459,325</td>
</tr>
<tr>
<td>Foreign Flag Vessel</td>
<td>7,124,733</td>
<td>6,953,230</td>
</tr>
<tr>
<td><strong>IMPORT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own Flag Vessel</td>
<td>17,815,910</td>
<td>19,417,200</td>
</tr>
<tr>
<td>Foreign Flag Vessel</td>
<td>9,373,056</td>
<td>10,864,431</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own Flag Vessel</td>
<td>20,288,780</td>
<td>21,876,525</td>
</tr>
<tr>
<td>Foreign Flag Vessel</td>
<td>16,497,789</td>
<td>17,817,661</td>
</tr>
</tbody>
</table>

**FIGURE 3. Share of National Flag Vessel in National Seaborne Trade**

Source: II. Deniz Sektoru Sorunları Sempozyumu

The difference between export and import tonnage which were carried under Turkish flag, is caused by selling goods in FOB term for competition in free market. High percentage of export goods are carried under Greece, Panama, Italy, Liberia and Cyprus flags. It means that a high percentage of seaborne trade is carried under the flag of convenience. Heavy taxes in maritime transport
resulted, goods are carried by road in many cases. Turkish share of transit trade passing through the country is around 12 per cent.

DB Turkish Cargo Lines, which have around 70 vessels, runs liner services to the USA, Northern Europe, England, Mediterranean, Adriatic, Arab Gulf until Bangladesh and the Far East. This state owned company also runs ships on the tramp market.

Some Ro/Ro traffic is operated by the same company between Italy - Turkey and Romania - Turkey. These operations are concentrated to help road transport between Turkey and North Europe. There are some quotes on the way for transit vehicles. As a result Ro/Ro operations became necessary and so supported financially by the state without looking for any profit.

The Turkish Maritime is also another big state owned shipping company mainly concentrating on passenger operation. All ferries bustling around Istanbul, and big vessels which are operated on regular services around the Black Sea and Mediterranean, as well as in the cruise market belong to the same company.

The shipbuilding Industry is developing in the country. On the one hand, the sector is negatively affected by the shipbuilding industry crises. On the other hand, the industry has an advantage compared to shipbuilding industry located in developed countries, with decreasing capacity. As it is known, the shipbuilding industry is labour intensive and comparative advantage of cheaper labour in the developing countries is a big advantage if the industry could be well organised. In
addition, the shiprepairing industry is suitable for the developing world. The priority is given to this sector in Turkey.

In connection with the shipping industry, road and railway networks play an important role. Communication facilities are available in the country especially since 1980 when big steps were taken as far as telecommunication is concerned. 8439 km of main railway track exist and all kinds of rail cars and wagons are manufactured in the country. Percentage of usage of the road transport is high within the total transportation system. Highways are built under the World Bank Projects. Beyond that, Turkey has a remarkable road transport capacity which was more than 200,000 tons in 1988.

1.4 MARITIME ADMINISTRATION

The biggest part of the Maritime Administration's work is carried out by the Maritime Transport General Directorate under the authority of the Ministry of Transport. However, the Ministry of Foreign Affairs, the Ministry of Agriculture Forestry and Rural, the Ministry of Finance and Customs and the State Planning Organization deal also with maritime activities.

The Ministry of Transport, which is responsible for sea, rail, road and air transport, telecommunication and related matters, is headed by a minister. Under the Minister, a deputy under secretary and three or four assistant deputy secretaries take responsibilities on their level. The Turkish Maritime Cooperation General Directorate, the Turkish Shipbuilding Industry Inc. General Directorate, the DB Turkish Cargo Lines General
Directorate and the Railways, Harbours and Airports Constructions General Directorate which deals with studies and establishment of railways, ports, airports, infrastructure investment and development programs, are the responsibilities of the assistant deputy secretaries.

The Maritime Transport General Directorate has four main divisions which are:

a) International Maritime Affairs
b) Shipbuilding
c) Ports and Harbours
d) Maritime Transport

Rules and Regulations are made by the Maritime Transport General Directorate. It establishes the national policy for maritime transport and maritime navigation. It covers legal, economic and political decisions related to international matters, development of the Turkish fleet, maritime safety measures, etc.

1.5 PORTS

Ports play a dominant role in Turkish transport system. In this line, possibilities to develop the transport in a country depend mainly on ports. Availability of adequate port facilities have led to the expansion of trade which is reflected in all related business.

Turkey has 69 ports, 21 of which are main ports. The main ports are owned by the state and operated by two organisations namely the Turkish Maritime Cooperation General Directorate (TDI) and the Turkish State Railways
General Directorate (TCDD). Private companies run 6 ports and the remainder are operated by the municipal or local authorities.

Seaborne trade represents a great part of the Turkish total trade. The country had 48.9 mil tons international trade in 1986; 42.4 mil tons of this figure, representing 86.6 per cent, was carried by ships. Some steps have been taken to improve the efficiency of Turkish ports, following the line of an agreement signed between Turkey and the World Bank. The project, called "Third Ports Rehabilitation Project", focussed specially on container handling facilities. The project covers Trabzon, Mersin, Haydarpasa (Istanbul) and Izmir ports. In addition to these ports, Iskenderun, Samsun, Hopa, Antalya, Bandirma, Giresun and Rize ports are under the long term container development program. The project will be completed in 1989. To increase port efficiency is difficult if they are owned by a state company. Under the open economy it may be thought that ports would be operated by the private sector.

Some ports and their output figures are as follows:

ISTANBUL (Haydarpasa): the port of Haydarpasa is situated on the Sea of Marmara. The port is serving the Istanbul region which is the most active trade center of Turkey.

Cargo throughput is increased with expansion of trade in Turkey. Total cargo throughput was tripled within 6 years and the increase in container movement is also remarkable.
<table>
<thead>
<tr>
<th>Year</th>
<th>Ships Number</th>
<th>Total cargo (tonnes)</th>
<th>TEU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>457</td>
<td>1,015,609</td>
<td>7709</td>
</tr>
<tr>
<td>1881</td>
<td>580</td>
<td>1,239,137</td>
<td>11364</td>
</tr>
<tr>
<td>1982</td>
<td>685</td>
<td>1,477,639</td>
<td>11456</td>
</tr>
<tr>
<td>1983</td>
<td>708</td>
<td>1,863,035</td>
<td>11896</td>
</tr>
<tr>
<td>1984</td>
<td>949</td>
<td>2,060,418</td>
<td>19150</td>
</tr>
<tr>
<td>1985</td>
<td>1214</td>
<td>2,526,984</td>
<td>22782</td>
</tr>
<tr>
<td>1986</td>
<td>1563</td>
<td>2,953,407</td>
<td>41105</td>
</tr>
</tbody>
</table>

**FIGURE 4.** Cargo throughput in port of Haydarpasa (Istanbul)

Source: Port of Haydarpasa

Necessary equipment is purchased to increase output of the Port of Haydarpasa. Equipment can be described as follows: 2 gantry cranes, 6 transtenas, 2 reach stackers, 18 trailers, 15 terminal tractors, 2 forklifts (12 tons capacity) and 12 forklifts (2 tons capacity). Two container quays, one of which has a berth of 250m with 12m depth and another of 300m length with 2 m depth are operated with the above mentioned equipment.

Container movement is estimated at 88 000 TEU in 1989 in Haydarpasa port, where the main problem is space for further developments. The operator of the port of Haydarpasa, TCDD, is planning to develop the Port of Derince and the Port of Bandirma both of which serve the Istanbul region. When it is needed to divert cargo from one place to another, all existing facilities have to be examined carefully especially in the case of container transport, availability of road, railway and airport connection to the port. Due to the shortage of finance, TCDD is looking for foreign investment with the idea of
IZMIR: The port is situated on the Agean Sea coast of Turkey. Izmir is the leading export port of Turkey where 25 per cent of the total export cargo is handled. With rehabilitation project of Turkish ports, 2 gantry cranes, 6 transtenas, 2 reach stackers, 18 trailers, 15 terminal tractors, 2 forklifts with 12 tons capacity and 12 forklifts with 2 tons capacity are purchased, and being constructed on 1400 m berth with around 10m depth. Pioneer port training programme was carried out in Izmir by Hamburg Port Training Institute GmbH. A roro ramp is also being completed in connection with container movement. Statistics and projections compiled by the port authority, show that good management with adequate facilities will increase container movement in the port of Izmir. In 1986 container movement was 50,000 TEU and the estimation made by TCDD, is shown below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Export</th>
<th>Import</th>
<th>Number of containers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Empty</td>
<td>Full Empty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>666</td>
<td>207</td>
<td>42,0 2,1 8,2 35,9</td>
<td>88,2</td>
</tr>
<tr>
<td>1990</td>
<td>703</td>
<td>224</td>
<td>47,2 2,4 10,8 38,8</td>
<td>99,2</td>
</tr>
<tr>
<td>1991</td>
<td>750</td>
<td>242</td>
<td>53,4 2,7 13,6 42,3</td>
<td>112,2</td>
</tr>
<tr>
<td>1992</td>
<td>796</td>
<td>261</td>
<td>59,9 1,0 17,2 45,7</td>
<td>125,6</td>
</tr>
</tbody>
</table>

**FIGURE 5.** Forecast for container transport in Izmir Port

Source: Turkish State Railway (TCDD)

All necessary steps, related to increasing container movement through the port, are taken into account by TCDD such as 292,000 sq m container terminal
with stacking capacity of 6000 TEU, 4221 sq m five level workshop and stores, 1000 sq m container washing facility, expansion of existing container quay and new container quay with a deeper depth.

**MERSIN:** The city has the region's major port, and is situated on the south cost of Turkey. Big development expectation for the Turkish trade has to be taken into account because the port serves South East Turkey where the complex project called GAP is under development. The project will lead to a considerable expansion in trade volume. The location of the port of Mersin is also suitable for transit cargo to the eastern neighbours of Turkey (Iraq, Iran). In addition, Mersin is the first free zone of the country which will encourage expansion of the trade in the region.

Another port in the region is Iskenderun, which can not be separated from the project of Mersin port. The port of Iskenderun is close to Mersin but its function is mainly to serve the steel and some other industries in the region. Yumurtalik Free Industrial Zone also provides some cargo for the port and increases the importance of it.

<table>
<thead>
<tr>
<th>Year</th>
<th>Mersin (tons)</th>
<th>Iskenderun (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>9,309,267</td>
<td>4,085,767</td>
</tr>
<tr>
<td>1986</td>
<td>9,241,624</td>
<td>3,372,006</td>
</tr>
<tr>
<td>1987</td>
<td>8,685,481</td>
<td>3,175,847</td>
</tr>
<tr>
<td>1988*</td>
<td>9,090,491</td>
<td>2,867,598</td>
</tr>
</tbody>
</table>

* For first 11 months of 1988

**FIGURE 6.** Cargo throughput in the port of Mersin and Iskenderun

Source: Turkish State Railways (TCDD)
These figures show that considerable cargo is handled in Mersin compared to other ports. For example, in 1986, 21.8 per cent of the total cargo of Turkey was handled in the port of Mersin. The location of Mersin on the Mediterranean Sea is suitable for container transport, in particular, for transit traffic. Figure 7 shows that a big portion of the total cargo moved was in transit.

<table>
<thead>
<tr>
<th>Year</th>
<th>Export (tons)</th>
<th>Import (tons)</th>
<th>Transit (tons)</th>
<th>Total (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>257,666</td>
<td>49,800</td>
<td>361,276</td>
<td>668,736</td>
</tr>
<tr>
<td>1987</td>
<td>346,699</td>
<td>64,673</td>
<td>226,586</td>
<td>637,558</td>
</tr>
<tr>
<td>1988*</td>
<td>374,721</td>
<td>42,420</td>
<td>309,070</td>
<td>726,031</td>
</tr>
</tbody>
</table>

* For first 11 months of 1988

FIGURE 7. Cargo handled in containers in the port of Mersin

Source: Turkish State Railway

<table>
<thead>
<tr>
<th>Year</th>
<th>Export (000 tons)</th>
<th>Import (000 tons)</th>
<th>Transit Traffic (000 tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>963</td>
<td>341</td>
<td>Inbound 1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Outbound 120</td>
</tr>
<tr>
<td>1990</td>
<td>1024</td>
<td>368</td>
<td>Inbound 1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Outbound 120</td>
</tr>
<tr>
<td>1991</td>
<td>1090</td>
<td>398</td>
<td>Inbound 1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Outbound 120</td>
</tr>
<tr>
<td>1992</td>
<td>1159</td>
<td>430</td>
<td>Inbound 1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Outbound 120</td>
</tr>
</tbody>
</table>

FIGURE 8. Forecast for container transport in Mersin Port

Source: Turkish State Railway
For the above forecast, the development project in the southern part of Turkey, Free Zones and other developments were considered.

For expectation of expansion of container traffic in Mersin, necessary steps have been taken. 13 transtenas, 2 reach stackers, 21 terminal tractors, 23 trailers, 3 forklifts with 12 tons capacity and 6 forklifts with 2 tons capacity were purchased. In addition to these 5 gantry cranes will be purchased.

Besides these three main ports of Turkey, Samsun and Trabzon ports have their important roles to play in the transit traffic to Iran and Iraq. Some developments in Ro/Ro traffic are also in progress in these ports. They are competing with the USSR ports in the Black Sea.

In addition to the above mentioned ports, there are some other important ports which are serving to the special industries (steel industry in port of Kdz.Eregli) and some others which are developed for special purpose under the control of private companies.
II. MULTIMODAL TRANSPORT

II.1 CONCEPT OF MULTIMODAL TRANSPORT

In multimodal transport, some terminology needs to be clarified such as single modal, intermodal, online, interline, multimodal transport operator and the definition of types of goods.

Intermodality is described by John H. Mahoney as "the science that deals with the movements of goods between and among various modes of transport". The main idea of intermodality is to keep the goods moving while they are being transferred from one mode to another. Warehousing is described very well as transportation at zero mile an hour. In other words, if goods stay for any length of time at the interchange point, that is warehousing and not intermodality.

Single modal transfer is one type of transfer which is made between the vehicles of a single mode. The operation of transfer in singlemodal is easier than transfer in multimodal because vehicles are alike. For example, transfer of trailer can be made by changing trailer from one tractor to another one. It is also easy in the case of rail transport.

On one hand, on-line transfer is movement of freight between vehicles of the same company. On the other hand, interline transfer occurs between two different companies' vehicles. Nowadays big shipping companies generally provide all facilities under one roof so it becomes on-line transfer.
There are two categories of cargo: general and bulk. General cargo consist of products like machinery, packed goods, vehicles and equipment. Bulk cargo is coal, petroleum, various gases, iron ore, etc. Transfer of bulk cargo from one mode to another is easier than general cargo. Bulk commodities are moved in large quantities by pipelines, barges, unit trains, etc.

Multimodal Transport Operator (MTO) as described in the United Nations Convention on International Multimodal Transport, is any person who on his own behalf, or through another person acting on his behalf, concludes a multimodal transport contract and who acts as a principal, not as an agent or on behalf of consignor or of the carriers participating in the multimodal transport operations, and who assumes responsibility for the performance of the contract.

During the last decades considerable changes have been observed. These include possibilities of transporting cargo in a container, changes in type of ships, very good integration of different transport modes, data communication and electronic data interchange among others. All major changes have occurred in containerisation. It does not mean that multimodal transfer is occurring only with container. It takes place both with and without the help of intermodal container but it is important to know that containerisation plays a vital role in facilitating and promoting multimodal transport.

Containers provide many advantages, first of all containerised shiploading is a great advantage because it reduces time in port and gives ships more productive time
at sea. Besides these, it provides advantages such as unitizing freight, protecting it from weather and pilferage and making it easier to load and unload on and off vehicles. At the same time there are some disadvantages such as cost of rental and repair, empty backhaul and incompatibility with the vehicle.

Since containerisation has been accepted by the market, operators are looking for better transport service through logistics, integrated distribution system and better organizational structure. Shippers have various choices of transport which is a combination of different modes. Important elements for the choice are price, transport time and quality of transport.

The multimodal transport system is pushing all relevant industries forward such as railtrucks, roadtrucks, airplanes and ships. These developments cause better and cheaper service, on the other hand new changes may render existing infrastructure useless. Since expectations from statistics shows that much valuable goods will be transported in the future, more steps should be taken as far as multimodal transport development is concerned.

In that line, there is a debate between developed and developing countries to share cargo. Under the UNCTAD liner code of conduct, it is proposed that liner trade between any two nations should be allocated equally to the flag carriers of those two nations, with 20 per cent of trade being set aside for vessels of third countries or "cross traders". This formula was intended to help developing countries to establish their own liner services which is mostly containership operation.
Therefore in many cases it is obvious that developing countries should establish container facilities to reap the benefit of containerization and later to organize multimodal transport. Because the infrastructure involved in multimodal transport which covers containerization is big investment, the cost should be borne by public. So the decision for the modes to complement one another, to develop infrastructure of different modes and organisation for maximum utilisation of existing facilities is important especially for developing countries where there is lack of capital.

II.2 LEGAL BACKGROUND OF MULTIMODAL TRANSPORT

The concept of uniform international liability rules for multimodal transport was raised in the 1960's with the expansion of the container revolution. The Hamburg Rules provide uniform common carrier liability for ocean carriers starting from acceptance of goods by the carrier, to delivery at the destination port. The burden of proof is on the carrier. However, the Hamburg Rules have not gone into effect because there are not enough ratifications.

In 1973, the Trade and Development Board of UNCTAD established an Intergovernmental Property Group on International Multimodal Transport to prepare a preliminary draft convention on the request of the Economic and Social Council (ECOSOC) of the United Nations. As a result, the United Nations Convention on International Multimodal Transport was adopted in May 1980, but it has not entered into force yet. It requires at least 30 ratifications for entering into force. After coming into force, the Convention will not apply to and
The Convention states that the Multimodal Transport Operator (MTO) is liable for the goods from the time of acceptance until delivery. The burden of proof of lack of fault is on the MTO.

There is limitation of liability which differs when the international multimodal transport does include carriage of goods by sea or by inland waterways.

II.3 COMPARISON OF DIFFERENT TRANSPORT MODES

There are mainly five transportation modes by which cargo is carried from one place to another. They are road, rail, water, air and pipelines. All these different transport modes have their own bases on which economic structure of the modes are built. But there are always some advantages or disadvantages to consider when the choice of transportation is necessary among the modes. Besides that, every mode has a different service and set of equipment which need to be considered.

Sometimes more than one mode may team up to compete with other modes, which was existing in Europe and the United States in the nineteenth century. This corporation has resulted generally in a rail-steamship corporation, although each mode had a single-mode approach in the transportation industry. Since the multimodal transport concept is rising in the transport market, the single-mode approach is giving way to the multimodal transport approach. It means, that even though there is one mode, other modes cannot be ignored because of the close relationship among them. Therefore coordination among the
different planning authorities is necessary to optimize the use of existing and new investment.

 Particularly in developing countries, the creation of new infrastructure and maintenance of the existing one require considerable finance, generally foreign currency which is difficult to come by. Consequently investment policy for transport needs great co-operation. In some cases there are more or less adequate transport infrastructure such as road and railway but there is a lack of good organization. Transport is still organised in a traditional way which does not need coordination or any further arrangement for the other legs of transport. This system is rather costly as compared to the multimodal transport arrangement. However, multimodal transport arrangement does not require only infrastructure investment but also, it needs changes on custom procedures, legal aspects and documentation.

 For the choice of mode, an important element is the inland transport which is road, railway and inland waterway network. Because the sea leg of transportation is taken as a base, the discussion will be built on connecting the others to the sea leg. On the other hand air transport will be discussed as a separate part because of gap of cost with other modes. Air mode also does not need very special investment than normal airport facilities.

 The comparison will be based on two main criteria. One is the quality of service, and the other is the cost calculation. The cost calculation is however as difficult as the description of the quality of service. First of all it is very difficult to establish the cost for each level
which will differ from country to country and in different regions of the same country. But identification of some cost elements will give a general idea as far as the cost calculation is concerned.

High percentage of road transport cost is the variable cost which gives comparative advantage for short distance. As a contrast the variable cost does not cover high percentage of rail and inland waterway transport cost.

Secondly, difficulties are experienced when determining the cost for the different modes. While railway is used generally by single operator, the road and the inland waterway infrastructure are used by the heterogenous group. Therefore it is difficult to calculate the costs for each user group.

The main item is energy, which with a high portion in variable cost has a tendency to raise the cost. Energy consumption of different modes are compared as fallows:

(Rail transport being set at 100)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road transport</td>
<td>200 - 400</td>
</tr>
<tr>
<td>Rail transport</td>
<td>100</td>
</tr>
<tr>
<td>Inland waterway transport</td>
<td>80 - 140</td>
</tr>
</tbody>
</table>

**FIGURE 10. Comparison of energy consumption of different modes**

Source: Multimodal transport and containerisation report by the UNCTAD secretariat.

Electric propulsion can be the alternative choice for traction power of the rail transport. This requires big investment if it does not exist.
The quality of transport service is difficult to evaluate in monetary term as said earlier. But elements of the quality of services are described as follows: speed, door-to-door capability, reliability, security, safety, flexibility and availability.

All the above mentioned elements of quality were provided in a better manner by road transport than rail and inland waterway transport. Since containerisation was introduced, rail and inland waterway transport has also become suitable as far as quality of transport service is concerned. But it has to be mentioned that the latter is not the case in every country because the organizational aspect of rail and inland waterway transport is rather difficult. The reason is that rail and inland waterway transport arrangement requires regular cargo flow and minimum number of containers which is around 100,000 tons of cargo per annum for daily service of train of 20 two-axle wagons.

All the same, road transport arrangement still have some advantages over rail and inland waterway arrangements such as speed and flexibility. And other important things which has to be underlined is that all other modes depends on road transport service to reach the final destination point.

Laying of pipelines is a difficult decision because it depends on first, the cargo volume and second, political situation, if the pipelines cross borders which is the case between Turkey and Iraq. Therefore, it requires sound agreements between parties, otherwise, difficulties might surface during the operation of the pipelines (in cases of
conflict). Beyond these considerations, pipelines provide most of the requirements of quality in transport service. Its variable cost is rather low in comparison with the other modes. This mode needs careful management with sophisticated equipment at the receiving end of oil or gas pipeline for transfer to the next transport mode.

The transport of air cargo has always involved more than one mode of transportation. Second leg is generally truck from/to the airport. The consignments consisted in most cases of small parcels and individual shipments. In the past decade, a combined sea-air transport service has been offered by both airlines and shipping companies. So the shipper gets the benefit of less transportation time as compared to pure sea transportation time with less freight rate than pure air freight rate.

The characteristics of sea-air multimodal service are flexibility and a wide range of options related to available routes. A shipper can select among different options, the optimal service, ranging from air to sea through a combination of air and sea or air and surface modes, according to shippers specific needs and fluctuating demand for the products.

The construction of standard air-surface multimodal transport container, especially 20x8x8 feet, produced a common denominator for air-sea and air-surface multimodal movements. There are still some studies for utilisation of air container, for instance, Boeing’s Air Freight system developments division has tried to bridge the gap between the multimodal 20 foot air container and small shipment characteristics of air freight. It has developed the multimodal module concept which is standardised shipping
II.4 CRITERIA FOR CHOICE OF TRANSPORT MODES

Choice of transport modes at the organisational level requires very careful planning which is described at three levels in the multimodal transport and containerisation papers by UNCTAD.

a. Detailed sector programme planning
b. Transport sector programme planning
c. Transport planning in the context of national economic and social development.

These three levels are interrelated and all levels require study with consideration of other levels.

The transport sector plays an important role in the economic development of a country, sometimes it is difficult to see the direct impact of transport on the economy, but there is no doubt that the transport influence patterns of industrialisation and extent of a country's integration.

The transport sector programme planning is the bridge between detailed project analysis and national transport planning to determine every project's priority and to ensure that every project's plan and its implementation have close interrelation of other projects.

The general decision of door-to-door transport has to be taken at the national transport planning level as the decision affects other levels. But special emphasis has to
be put on sectoral transport planning level because success of multimodal transport operations depend on well organised transport and transfer operation which should have to be done in every mode by sectoral programme planning. For instance, volume of multimodal transport has been increased in this decade in the United States. This growth of traffic could not have been achieved without promotion and investment by the ocean carriers, without a major change in attitude by the railroad, and without the cooperation and coordination of other vital links in the multimodal transport chain. Availability of existing infrastructure help to plan the modal split for transportation of containers.

Planning of modal split also depends on geographical factors of the countries such as the nature of country, size of country, distribution of population, geographical setting, and so on. For example, distance between consumption centers in Europe as well as production centers and between coastline and consumption centers are much shorter than in the USA consequently the implementation and practice of multimodal transport is different in Europe compared to that of USA. In Europe railroads have to try harder to gain competitive advantage over road transport in short distance like in west Europe. Europe consists of several countries and therefore, continuous flow of goods encounters some difficulties due to differences in national rules and regulations. These disadvantages segment multimodal transport in Europe. The system is better developed among EEC countries because of co-operation to avoid any hindrance and congestion at the boundaries of the EEC countries. Even some European countries which are not members of EEC, apply same rules as it is among EEC countries to get maximum benefit from
multimodal transport. As a result, the geopolitical structure of countries have impact on development and implementation of multimodal transport.

Investment decision shows country’s choice for transport mode at national and international level. Infrastructure investment, e.g. in new roads and railways, is costly. So, generally it is advisable to extend existing infrastructure which has been used for years. Even expansion of existing infrastructure of railway or road involves relatively big investment especially for the developing countries. Sound statistical data is therefore a pre-requisite in determining weather there is enough volume of cargo or not.

Also expansion in a country’s economy, economical and technological developments in the world and regions, political decisions between countries or a group of countries, future trend of transport type and expectation of growth rate on commodity types have to be considered at the decision level. But all the above mentioned considerations depend on statistical data for forecasting which does not always yield the right answer resulting in over investment for infrastructure.

Besides geographical and other considerations, there are some basic calculations which give an idea about transport cost.
Figure 11 shows that rail transport can compete with road transport in long journey because of high fixed costs on rail transport. The limit of distance changes from country to country. However variable costs increase less in railway transport than it increase in road transport. Therefore D1 is a break-even point beyond which rail transport will have a comparative advantage. The point D1 will move to D2 if transfer cost of rail transport are taken into consideration.

In the light of these calculations, load factor become an important point for using rail transport. Second important factor is the transfer cost. Pick up, delivery and transfer costs make up remarkable percentage of the total cost. In the contrast, direct delivery by truck does not require any extra cost. The percentage of cost after terminal depends on voyage distance. It is obvious
that importance of these extra cost will be decreased in the case of long distance voyage.

II.5 INVESTMENT REQUIREMENTS OF MULTIMODAL TRANSPORT

After recognition of door-to-door transport concept at national level, investments should take priority numbers related to their importance. But planning for investment has to be in line with international, regional and national transport policy. Generally long term investment plan is drawn up by the government, who does not deal with, most of the time, details of investment.

RAILWAY: Nowadays all railway companies have some difficulties, they generally get subsidies from the governments to cover their cost and to keep trains run. In Europe most of the railway companies are owned by the state or they have similar organisation structure. Political objectives of running trains for passenger traffic is generally dominant in profit-oriented company objective. Therefore condition of railway companies is getting worse to compete with other modes which are almost operated by purely private companies.

Before any decision for railway investment, careful investigation have to be carried out to determine potential capacity of existing railway services. It can be done by getting statistical data of the use of facilities like efficiency of locomotives, optimisation of use of locomotives, turnaround time of waggons, number of empty runs, to make alternative plan for itineraries, to find out interruption points and to determine knowledge level of personnel.
From the above mentioned data, the railway system has to have at least a minimum required physical and organisational standards. If the system does not fulfil these minimum requirements, investment may be required, such as, track investment for which soil condition, curves and gradients, number of tunnels, number of bridges and distribution of population.

Determination of line capacity is rather important for new investment. Unit trains play an important role in multimodal transport, if there is sufficient cargo for unit trains, railways can compete with other modes. But if facilities already exist and a number of trains are operated on the line, addition of unit trains to the existing traffic may create problem. The capacity of a line depends on the number of tracks laid, signalling facilities, quality of permanent ways, traffic control measures, speed, etc. One solution to this problem is to double the track line which will increase the capacity to about four times that of a single track line.

Advantages of double track lines can be described as increase of average operating speed, less interruption of services during maintenance work, possibility of employing less sophisticated signalling system and less wear of track. On the other hand single track line which exist in most of the developing countries, may enjoy a sufficient volume of cargo. The capacity of single track line depends on the following factors:

a. Distance between crossing points
b. Quality of signalling and traffic control system
c. Length of by-pass rails
Increase of speed which is important for multimodal concept, depends on energy cost and quality of line.

Another problem is the different rail gauges which are used in different countries. A standard gauge is 1435 mm which is used in 62 percent of the total world railway network, other 8 types of gauge are used in the rest of the world. The gauge problem does not cause only transfer problem at the boundaries but also create container loading and stability problem.

Rolling stock calls for a considerable investment for the rail mode of transport. Important things have to be considered for rolling stock investment to meet shippers requirements. Waggon types have to be suitable to track and other equipment such as special equipment to carry container or double stack container or to apply piggy-back system has to be applicable to the system.

Another investment for rail transport mode is inland rail terminals. It is strongly recommended, if the unit train operation is planned. Location of terminals depends on production and consumption centers, structure of various transport network and location of existing rail freight facilities. Location of the inland rail terminals should be exercised at regional and local level. Size of terminals should be based on handling rate. The International Union of Railways has established the size, which depends on handling rate, is as follows:

- Large inland terminals: more than 100 containers/day
- Average inland terminals: 20 to 100 containers/day
- Small inland terminals: up to 20 containers/day
All sizes of terminals should have transfer area of at least one rail track, one road line and one parking line with transfer crane which is the main equipment of the inland rail terminal. The capacity of the crane should be about 30 tons to permit transshipment of loaded 40 ft containers.

ROAD: The road transport investment planning should be carried out in the line of long-term transport plan which is designed generally by the government to establish priorities in the transport sector. Required data for the road investment planning includes inventory of existing roads and vehicles with qualitative and quantitative aspects.

Qualitative aspect is as important as quantitative aspect, because the plans of a container movement network is related to the quality required of the road for container carriage. Deficiency in quality may be identified by the experts in the country because of difficulties in criteria establishment on a general basis. Quantitative data should be combined with forecast of the future transport needs for which geographic location of production and consumption centers, availability and long term plans of other modes and suitable transport mode for production are to be studied.

The container transport or general transport infrastructure investment policy issue should be taken into consideration to ensure optimum use of infrastructure, which covers reasonable charges for users and regulatory policy which should organise smooth traffic flows, and not to be a barrier to road usage for container transport. The charges for user should be adequate to cover infrastructure cost and cost of maintenance and repairs. If special charge is applied to foreign
vehicles, country may face a problem with transit countries or the country of destination/source of the container.

The required standard of road for container transport, related to dimension and weight of the containers, must be met by the road. For determination of level of road standard requires government decision about maximum weight and dimension of containers which will be allowed to be carried on trucks. Number of lanes of road is decided by using forecast and also distribution of weight to the wide road will help to extend the life of the road. It is also advisable to extent climbing lanes to reduce adverse consequences on the total road capacity. Vehicle height is not standardised but at least regional standard can be taken as a referance.

Bridges are very often bottlenecks for the transport of containers. Consequently, several solutions can be offered like re-routing of heavy traffic or installing light signal to have only one container on the bridge at any given time.

For the vehicles requirement, container carrying vehicles should be the purpose built type and equipped with special devices. Sometimes the transport demands of a country may be met by creating special size of container which can be carried by special vehicles. For example in Sweden, special container which is smaller then 20 ft container is used. For this purpose, vehicles have special devices by which it is possible to load and unload container to/from vehicle itself or to/from railway waggons. The reason is insufficient cargo for 20 ft containers in Sweden but in contrast, in the USA, there is
sufficient cargo even for 40 ft containers.

If the containers have to be stripped or stuffed in the port because of weight limit of a country, it destroys the multimodal transport concept. Because it causes first, extra cost, second, waste of time and probably theft of the content of the container in the port.

**CONTAINER DEPOT**: Establishment of container depots plays an important role as far as distribution of containers are concerned. Logistic for inland container depot points need careful study because the depots can be used for other purposes like pure road transport. The idea behind the establishment of inland container depots is to keep containers in these places, one of which is close to the consignee another close to the shipper. There are many advantages which can be enumerated to complement the above mentioned idea.

- Custom clearance of containers can be made before container goes to port or before container is released from port without clearance and then the clearance is done at the container depots.
- Container depots can be established at the place which has a good connection to all modes, and transfer from one mode to another will be made easy.
- Inland container depots can be used as a storage place especially if the port has space limitation.
- Stuffing and stripping of containers can be done at the container depots, so that small consignments can reach its destination point more safely.
- Inland container depot is a more convenient place compared to the ports for the repair and maintenance of containers.
Therefore the fulfilment of these requirements depends also on some criteria related to location of inland container depots.

First of all, inland container depots have to be in a place where connection will be easy to existing and planned road network for distribution or collection of cargo and to the existing and planned industrial areas. The second is that container depots should have enough land for further extension and have adequate soil quality. Alternative uses of ICD have to be considered to reach maximum optimisation of collection and delivery of cargo.

After establishment of ICD, the most important step is to organise service which will not break the transportation chain. There are several types of distribution service from/to inland container depots.

a. Pick-up and delivery of LCL consignments

For this service, limiting the weight of each consignment may be necessary, if it is above the limit, direct delivery or pick-up may be more convenient as far as the cost is concerned. It means a long distance transport vehicle may deliver or pick it up from/to consignee's place without intermediate handling in ICD.

b. Short distance road transport

This is another service which is different from long distance transport, pick-up and delivery service. For a and b, special truck can be used to handle consignments from/to vehicles, it depends on the cost of manpower and
frequency and quality of services.

c. Pick-up and delivery of containers, bodies and trailers

This service is provided to the factories or big production centers where sufficient cargo for filling a container is available.

d. Long distance transport

It is provided by means of railway waggons, unit trains, container truck, piggy-back system, swap-body system and different types of vehicles of road transport.

For the organisation side of inland container depots, data storage and data transfer are important. Computer controlled system helps in keeping tabs inside depots when there is a lot of consignments.

Other functions of distribution centers are storage, packing and un-packing of goods. The center may function also like production finish point.

PORT: When the use of containers became a reality, it brought a new port concept which is different from the conventional port concept.

The main reason for the introduction of container transport is to introduce a more efficient transport system which will increase productivity and at the same time decrease the manpower requirements in the container ports. Efficiency is increased by speeding up the handling operation, reducing packing requirements, etc.
Since increasing the speed of vessel is restricted by economic considerations, ports play an important role in speeding up cargo movement. Therefore ports have to provide adequate facilities and quick turnaround of container vessels to reach its target. If the port does not provide adequate facility, that will increase the cost of the shipowner, who will then pass this cost on to exporter/importer, and in the end, will be borne by the consumers. Discussion start from the point; the adequate port capacity which is unknown in advance and influenced by commercial, political decisions or technological changes. Besides these elements, performance of the port is the key and can be measured in several ways:

a. cargo throughout per berth in tons
b. ship turnaround time in hours
c. berth occupancy in per cent of time
d. productivity in number of ships per time unit
e. labour cost per ton

Other requirements of a container port are extra land for parking and moving containers and for access by trucks and rail. This requirements can not be met if the container terminal is located in a conventional port.

Port planning should be a part of the integrated transport plan for which the close relationship between adequate port facilities and prospects for economic development should be taken into account. To achieve this, all related parties concerned have to be harmonised in the port planning. For instance some ports have very good facilities which are provided for interested parties but lack of good living standards around the port can affect port productivity by not attracting people who are...
supposed to work in the port. Therefore, the interest of all parties have to be studied carefully. In some cases, existing facilities around the port makes it difficult to expand the new port, because of this a new port is built away from the existing one without any facility.

Before any new investment is made, all possible alternatives should be evaluated. Some of these are a more intensive use of existing facilities which can be done by increasing working hours in a day, efficient management and decreasing some of the paper work. Even sometimes better organisation of inland transport may increase productivity in port.

At the planning stage of the container terminal, container handling requirement have to be assumed and it will be the base for all decisions. Size of container terminal area depends on container storage area which is determined mainly by some factors, namely;

a. number of TEU's to be handled
b. type of container handling equipment used
c. average staying time of containers in the storage area.

After deciding to build a new container terminal the first decision to be made is the type of handling system the operation should be performed with. For this decision the available area, the number of different shipping lines, information on container flow and of course, trade capacity has to be taken into consideration. The decision maker should be aware of how sophisticated system is required and can be managed by the operator.

Different operational systems requires different
types of special equipment.

a. Chassis system

This system have guarantee for random access to each containers. Containers are handled by gantry crane on a trailer or chassis and then is pulled by a tractor to the marshalling area. The chassis with the container remains in the marshalling area until picked up to the inland or to the container freight station. The container has a high flexibility and speed in the horizontal transport on the container terminal. The system is suitable if there is enough space in the marshalling area and inland transport depend on mostly road transport.

b. Straddle carrier system

In this system, movement in the marshalling area is done by straddle carrier. Containers are stacked either two or three high in the marshalling area. With this system, one third of space which is required for the chassis system, is necessary. One must be aware that container transport by straddle carrier in the terminal has to be short distance.

c. Back-up gantry crane system

Transfer from shipside to storage area is normally carried out by tractor or by trailer units and back-up gantry crane stacks containers four or five high in the storage area. The main advantage of the system is the economical use of land area. On the other hand there are some disadvantages such as inflexibility, the high initial
investment and the possibility of lower productivity than straddle carrier system. Supervisory and planning is important since the system is more complicated than the straddle carrier system.

d. Combined straddle carrier/service trailer system

Containers are discharged on service trailers and pulled by tractors to the marshalling area and then discharged and stacked by straddle carriers. The difference between this system and the straddle carrier system is that transport on the yard is made by service trailer with a tractor which is cheaper than straddle carriers.

e. Forklift system

In this system, forklifts are used instead of straddle carriers. The advantage of the system is that forklifts could be used for roll-on/roll-off and conventional cargo handling. The disadvantage of the system is that forklifts are not well suited for horizontal transport.

f. The computerized overhead container handling system

This system is rather more complicated than the other systems. The system is fully computerised, it means qualified office staff and reduction in outdoor labour.

Containers are taken from ship and transported to the marshalling area by gantry crane. The containers do not touch the ground during this transport. The system is very
capital intensive.

Besides this infrastructure, container berths have to have enough depth to allow containerships of the anticipated size to enter the port. Depth requirement is an important element, because it forms a high portion of terminal cost if dredging is required. To avoid extensive dredging, often the berth location is chosen close to the open sea.

The decision of the number of berths determines the total cost of terminal, because all berths need equipment. But traffic forecast is an important item when deciding the number of berths. Berth occupancy rates will be lower than for break-bulk berths since the container vessels are very capital-intensive so she requires quick turnaround.
III. EDI AND ITS MULTIMODAL TRANSPORT APPLICATION

III.1 INTRODUCTION

The substantial rationalisation measures in all international trade related activities are introduced by EDI (Electronic Data Interchange) on cost saving and improvement of competitiveness. Companies and organisations involved in trading nationally and internationally send to and receive from their business partners transactions which involves a lot of paper. Most of these companies have therefore moved to computer technology. Most of the information is printed onto paper, sent or faxed and the form changed into the receiver's computer. All this process increases risk of error and waste a lot of valuable time and resources, all of which are paid for with money. EDI provide direct exchange of the information between two computer systems by eliminating the above mentioned elements.

The advantages of the system may be described as follows:

a. EDI saves costs by avoiding re-entry of data and allows timely and error free transaction information to be passed from one computer to another.

b. The system introduce the possibility of introducing new business strategies such as "Just in time" manufacturing in a factory inventory management technique based on "zero stock" principal by providing error free information to the right place at the right time, allows quick response to orders and shortening of delivery cycle therefore lower stock levels can be kept and working capital increased.
c. Speedy payment results by quicker and safer processing of invoices, thus improve the cash flow.

d. EDI facilitates and speeds up border controls and other official interventions such as custom clearance of goods thus improve the efficiency of the controlling authorities.

e. EDI connecting related parties, creates new way of doing business and improving customer services. As a result, EDI becomes an indispensable feature in production and trade both domestically and internationally.

In November 1985, United Nations Rules for Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT) was established and prepared recommendations on data elements and their structure and on standard message format. As a result, the International Invoice has been officially approved by the UN/ECE. The second message, the Purchase Order has been approved for trial use and it is expected to receive full approval very shortly. The third message, the International Forwarding and Transport Message will be submitted for approval of its trial use. These improvements will not only affect multinational companies and international transportation firms but also ports. For example more or less all European ports have set up computerised systems or are in the process of doing so. Their base for the system is EDI on UN/EDIFACT.

Since the system will link all interested parties, no one of them can afford to be left out in this business.
III.2 EDI SYSTEM IN PORTS

The port industry is not an exception to the revolution which has taken place by the introduction of computers. In the seventies, computer was introduced to the ports by its off line application for payroll and some other calculations. From the beginning of this decade, on line application has been introduced and it is applied by port authorities of developed countries to container control, cargo clearance, trade forecasting, information retrieval systems, etc. On the other hand, it is observed that port functions have changed from their conventional way. The demand of bulk, break bulk and container trade could no longer correspond with the role which the ports intend to play in their range of influence. Consequently in most of the developed world, the ports have already started to develop a new industrial service function which are mainly industrial consolidation, warehousing and distribution. Before, transnational forwarding and trucking groups were providing storage, consolidation and distribution facilities but nowadays ports, are moving to this area and the intention is to extent these services in the line of shippers demand. There is proof that it is more efficient and less costly to manufacture final or semi-final products in different places, even countries, and consolidate them at one specialized site. After which distribution will take place from this location for semi-final or finished products. Therefore increasing use of semiproducts, which are produced in other place, create an increasing demand for consolidation, warehousing and distribution. As a result decreasing storage cost which in turn diminish the fixed cost and avoid keeping inflexible storage capacities.
In addition to this, if these services are equipped with modern EDI systems and provide experienced logistical systems and methods, it will be attractive to the big companies.

Computerised container control system provide instant access to all departments to the updated information. The users are generally Terminal Manager, Terminal Information Office, Shipworking Foreman, Custom Office, ingate and outgate. Each user has a set of functions which is suitable to his needs. Also the system gives an on-line facility for retrieval of information on vessel, export, import and vehicle monitoring. Boxes are stacked by computer system which is designed for clients needs and at the same time optimises space utilisation on the container yard. The system is flexible and its aim is to minimise container movement and speed up unloading and loading operation.

The computer oriented service which serves all related parties of the port, have to make economic sense. It must be technically feasible and it must also be capable of implementation from the organisational viewpoint. On the other hand, it is difficult for a single company to produce such a system. As a result, joint effort is organised by the port authorities to produce and provide the system.

With this system, customs, forwarding agents, shipping agents, port authority, port operators, stevedoring company and other related groups connected to each other and to database with limited access are drawn from their work. From the small companies' point of view, no special skills should be required to operate the
system. Their concentration is not on a computer system, but rather it gives them a possibility to improve their conventional system on the base of a computer oriented system.

For example one of the interested parties can get information about the sailing list which may consist of the ship's name, the ship's call sign, name of the shipping company and its agent, receiving port, the estimated time of arrival and departure, the loading shed, the cargo receiving deadline, the number of the bill of lading form and the number of copies of the bill of lading required by the shipping agent. This example can be extended to a very wide area if required, and also important to know that the service will be cheap if it is extended to more clients. This is because the same data will be used for several purposes. Documents can be filled out from this data with a very low error margin.

The users of the system in many cases compete with each other so the system has to be secure, which is called access authorisation. There are different ways to secure the system and computer technology took several important steps as far as security of the data is concerned.

The user charge can be calculated on the base of time which the user occupies the system but user have to be aware that expenses for writing documents and communication for getting information are decreased. In addition to that, users have connection by computer network to each other. As a result EDI brings advantages for everybody and cuts down costs.

The new trend is to connect ports via satellite.
FIGURE 12. Application of EDI in port of Bremen/Bremerhaven
Therefore information will be available in advance and the same information will be used by related groups at the two ends.

Ports without these facilities may not be attractive even when having efficient cargo handling facilities. Facilitated ports can not satisfy their users without corresponding information. Consequently shipping lines and shippers will divert to the place where the facilities exist.

III.3 CONTROL OF TRANSPORT CHAIN BY EDI

Since Multimodal Transport became a more useful way of transportation, especially in the developed world, the decision of the multimodal transport operator for the route affect modes and ports. When MTO uses several modes of transport in one package, he has to be sure that the route is less costly and he has control over every step of the transport. On the other hand, the existence of a qualified industrial consolidation, warehousing and distribution centre will definitly influence the decision of MTOs to select a well-equipped special port oriented facility to be utilised for such a purpose.

The data base which is commonly used, is established at the port, because generally all modes have a connection to the port. Every single container may be monitored and have an access from departure to arrival. Information should possibly consist of location status and condition of container.

If the system is elaborated on a country base, every container depot should have connection to the central data
base and container status are transmitted to the central, small depots or truckers who may not have a computer connection to the system but rather pass their information in a standard form by telex or other means of communication. Railway System which may be a dominant mode of transportation especially in the case of the developed world, should have their own computer network, so that related information can be transmitted from railway computer system to the central data base in the port.

For example in West Germany, the Port of Bremen/Bremerhaven, besides general computer information network, have several sub-systems such as "Store" which is the logistic system for the storage and distribution of import and export goods at the sea port. Another sub-system is called "Car" which concentrate optimisation of distribution and continuous monitoring of vehicles in the logistic chain of transport from the production right through the consignees in the destination country.

The crucial point is the customs which may break multimodal operation very easily. In EDI Supported Multimodal Transport System, the custom should have information in advance, giving them enough time to examine the cargo by using the information which may consist of shipper's name, departure place, content of cargo, route of cargo, transshipment port, carrier's name, final destination, etc. With these information, the custom may decide either to open the container or not. After which the information passes on to the port operator who can plan for further steps of movement of the container. The main reason to introduce the EDI system is to reduce the paper work and speed up the cargo movement. If the custom doesn't work in the line of this idea, all efforts will be
wasted. In the USA, Cargo Release System which is called RACER, is being developed to facilitate cargo clearance in advance. Containers therefore could move without any stopover in the ports.

EDI system seems expensive and complicated especially to the developing countries, but after a certain level of development, it is necessary to begin at least with a small network. After getting some benefits of the system, the network may be expanded. The important thing in the beginning is to follow EDI standards and not to cause any problem for further developments.
IV. CONTAINERISATION AND MULTIMODAL TRANSPORT IN TURKEY

IV.1 DEMAND FOR CONTAINER TRANSPORT

Since the containerisation has came in to the effect, Turkey can not stay outside of this new transport concept. This is because of Turkey’s connection to Europe where the containerisation took initial stage.

Transport of freight is concluded by road transport most of the time, in other words, rail, sea, and air transport depend on road transport to conclude the transportation of goods. By means of container, transfer from one mode to another become easier with different transfer techniques, so for one destination, more than one route may be available. It can be only road transport or road-sea transport or another combination of modes. Shippers choose cheap and good service of transport therefore transport companies are seeking the cheapest route with the best quality. The other element for choice of transport is transport time which can be included in the quality of transport. It is the case in many countries, that individual modes have good quality with cheap service, but the organisation of transport by using more than one mode is more difficult. The reason for this problem is that loading, unloading and transfer time forms a remarkable high percentage of the total time of the transport. Therefore if there are more than one mode of transport in the total transport chain, transfer time becomes a critical part of the transport time. As a result, organisation of multimodal transport need good quality experts who are supported by additional elements.
such as satellite communication, computer network and necessary infrastructure.

The level of containerisation depends on several factors such as trade partner of a country, development level of a country, type of production and consumption which is containerisable and the available infrastructure for transport of containers.

Trade partners of Turkey are generally the developed world where containerisation has passed its initial stage. This factor encourages Turkey to favour containerisation.

| III. East European Countries | 1102,2 | 7.7 | 609,4 | 5.2 |
| IV. Others | 1065,1 | 7.4 | 816,2 | 7.0 |

FIGURE 13. Imports and Exports by Group of countries in 1988 (Millions of Dollars)

Source: SPO

The country's application to join the EEC is another positive step which may lead to the trade volume with Europe becoming more than the present volume. If the country is accepted as a member of EEC, multimodal
transport operation will be obligatory for Turkey because it is necessary for integration of Turkey to Europe where multimodal transport is widely operated.

Apart from this, Turkey is on the transit route to the Middle East, where there is a remarkable traffic flow from Europe. Turkey may have the opportunity to handle these cargo which are coming to both south and north ports, and to organise transport to the destinations.

<table>
<thead>
<tr>
<th></th>
<th>1986 (tons)</th>
<th>1987 (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road transport from</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkish ports to Iran</td>
<td>304 924</td>
<td>274 279</td>
</tr>
<tr>
<td>Road transport from</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe to Iran</td>
<td>85 327</td>
<td>33 861</td>
</tr>
<tr>
<td>Road transport from</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkish ports to Iraq</td>
<td>1 479 843</td>
<td>1 126 159</td>
</tr>
<tr>
<td>Road transport from</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe to Iraq</td>
<td>129 537</td>
<td>97 821</td>
</tr>
</tbody>
</table>

**FIGURE 14. Freight transport by Turkish Trucking Companies to Iran and Iraq**

*Source: International Transportation Magazine February 1988*

The above figures represent around 16 per cent of total traffic volume to the countries mentioned, so improvement of transport quality will expand the trade
Another important factor that affects demand is the type of production and consumption of the country. However, this subject will be discussed in section IV.2 below.

The efficiency of the railway system has an effect on multimodal transport, especially if the country like Turkey, has a remarkable population and long distances between consumption and production centers. Consequently availability of railway infrastructure is an important factor when introducing the new transport concept. TCDD is a state owned railway company which is subsidised by the government as in many other countries. But for numerous reasons, the operation of the railway is always having negative results. Organisation of multimodal transport will create additional volume of cargo for the railway company if the company provides adequate facility. As a result, the company's objective should be to concentrate on carrying cargo on long distance in sufficient volume.

IV.2 IDENTIFICATION OF CARGOES

In general, all kinds of cargo can be carried in containers but the choice should be limited by technical and economical characteristic of containers. Therefore commodity should be valuable, and in small volumes such as electronic equipment, spirit, textile and some fruits. Besides this definition, some types of cargo could be carried if there is enough volume to make carriage profit in the long run. Figure 15 shows the kinds of cargo that could be containerised.
### FIGURE 15. Possibility of cargoes to be containerised

Source: Container Transport Feasibility Study by ITU

In the light of the above identification, we can elaborate on the export and import commodities of Turkey.

From figures 16 and 17, a considerable percentage of the export and import commodities can be containerised. In addition to export and import commodities, domestic production and consumption can not be ignored because of the around 60 million population of Turkey.
<table>
<thead>
<tr>
<th>Category</th>
<th>Value (in millions of dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and livestock</td>
<td>499.3</td>
</tr>
<tr>
<td>Wheat</td>
<td>2.9</td>
</tr>
<tr>
<td>Rice</td>
<td>27.3</td>
</tr>
<tr>
<td>Merino Wool</td>
<td>87.6</td>
</tr>
<tr>
<td>Others</td>
<td>381.5</td>
</tr>
<tr>
<td>Mining and Quarrying</td>
<td>2861.3</td>
</tr>
<tr>
<td>Crude Oil</td>
<td>2434.3</td>
</tr>
<tr>
<td>Coal</td>
<td>251.7</td>
</tr>
<tr>
<td>Others</td>
<td>175.3</td>
</tr>
<tr>
<td>Industrial Products</td>
<td>10979.1</td>
</tr>
<tr>
<td>Processed Agriculture Products</td>
<td>736.4</td>
</tr>
<tr>
<td>Soya Bean Oil</td>
<td>71.8</td>
</tr>
<tr>
<td>Other Vegetable Oils</td>
<td>121.5</td>
</tr>
<tr>
<td>Cigarettes</td>
<td>168.9</td>
</tr>
<tr>
<td>Others</td>
<td>376.2</td>
</tr>
<tr>
<td>Petroleum Products</td>
<td>343.3</td>
</tr>
<tr>
<td>Other Industrial Products</td>
<td>9897.4</td>
</tr>
<tr>
<td>Cement</td>
<td>49.6</td>
</tr>
<tr>
<td>Chemicals</td>
<td>1984.4</td>
</tr>
<tr>
<td>Rubber and Plastic</td>
<td>525.1</td>
</tr>
<tr>
<td>Hides and Leather Products</td>
<td>51.3</td>
</tr>
<tr>
<td>Forestry Products</td>
<td>8.9</td>
</tr>
<tr>
<td>Textiles</td>
<td>259.6</td>
</tr>
<tr>
<td>Glass and Ceramics</td>
<td>141.1</td>
</tr>
<tr>
<td>Iron and Steel</td>
<td>1655.1</td>
</tr>
<tr>
<td>Non-Ferrous Metal</td>
<td>411.7</td>
</tr>
<tr>
<td>Metal Products</td>
<td>61.8</td>
</tr>
<tr>
<td>Machinery</td>
<td>2400.3</td>
</tr>
<tr>
<td>Electrical Appliances</td>
<td>1075.2</td>
</tr>
<tr>
<td>Motor Vehicles</td>
<td>690.1</td>
</tr>
<tr>
<td>Others</td>
<td>583.0</td>
</tr>
</tbody>
</table>

**FIGURE 16. Commodity Composition of imports of Turkey for 1988 (in millions of dollars)**

Source: SIS, SPO
<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture and Livestock</td>
<td>2341.4</td>
</tr>
<tr>
<td>Crops</td>
<td>1988.9</td>
</tr>
<tr>
<td>Cotton</td>
<td>141.2</td>
</tr>
<tr>
<td>Tobacco</td>
<td>266.0</td>
</tr>
<tr>
<td>Hazelnuts</td>
<td>359.4</td>
</tr>
<tr>
<td>Raisin</td>
<td>139.6</td>
</tr>
<tr>
<td>Others</td>
<td>1082.7</td>
</tr>
<tr>
<td>Livestock Products</td>
<td>286.0</td>
</tr>
<tr>
<td>Fishery Products</td>
<td>51.3</td>
</tr>
<tr>
<td>Forestry</td>
<td>15.2</td>
</tr>
<tr>
<td>Mining and Quarry Products</td>
<td>377.2</td>
</tr>
<tr>
<td>Industrial Products</td>
<td>8943.5</td>
</tr>
<tr>
<td>Processed Agricultural Product</td>
<td>884.7</td>
</tr>
<tr>
<td>Petroleum Products</td>
<td>331.3</td>
</tr>
<tr>
<td>Other Industrial Products</td>
<td>7727.5</td>
</tr>
<tr>
<td>Cement</td>
<td>6.5</td>
</tr>
<tr>
<td>Chemicals</td>
<td>734.3</td>
</tr>
<tr>
<td>Rubber and Plastic</td>
<td>351.7</td>
</tr>
<tr>
<td>Hides and Leather Products</td>
<td>514.1</td>
</tr>
<tr>
<td>Forestry Products</td>
<td>21.6</td>
</tr>
<tr>
<td>Textiles</td>
<td>3201.4</td>
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<tr>
<td>Glass and Ceramics</td>
<td>233.3</td>
</tr>
<tr>
<td>Iron and Steel</td>
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<tr>
<td>Non-Ferrous Metal</td>
<td>226.1</td>
</tr>
<tr>
<td>Metal Products</td>
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</tr>
<tr>
<td>Machinery</td>
<td>333.0</td>
</tr>
<tr>
<td>Electrical Appliances</td>
<td>294.0</td>
</tr>
<tr>
<td>Motor Vehicles</td>
<td>118.0</td>
</tr>
<tr>
<td>Others</td>
<td>184.5</td>
</tr>
</tbody>
</table>

**FIGURE 17.** Commodity composition of exports in Turkey for 1988 (in millions of dollars)

*Source: SIS, SPO*
IV.3 POSSIBILITIES TO EXPAND CARGO VOLUME

Container traffic can be grouped under three different headings.

a. Domestic traffic
b. International traffic for export and import
c. International transit traffic

For export and import of goods, the Turkish trade depends mainly on the sea. That is, about 70-80 percent of goods are carried by vessels. Therefore the capacity of ports have to be adequate to handle around 48 million tons of cargo in every year. The necessary measures were taken into consideration and with financial help from the World Bank, the main ports which are Istanbul, Mersin and Izmir have been developed for container transport, in other words these ports now have the necessary infrastructure. However, operation of ports with new port operation concept will take time because the port operating company is the state owned company, TCDD, which as at now have financial and operational difficulties. Otherwise Turkish foreign trade witnessed a remarkable expansion in volume in this decade. This expansion create transport demand in favour of containerisation because Turkish export and import commodities composition is shifting to semi-manufactured or finished manufactured goods from raw materials.

By the end of the war between Iraq and Iran, a new transport demand will be available so Turkey may get the same portion from these countries transport market. The Port of Mersin is the main Turkish port in the Mediterranean Region with adequate infrastructure and
suitable road and railway connection.

Other developments which are free trade zones at Mersin and Iskenderun and GAP (Agriculture and energy development plan in south east interior), will encourage expansion of trade and therefore transport demand. In the Mediterranean Region there are some other ports such as the Aqaba port of Jordan which serves Iraq, but Turkey holds on advantage in the region in that there is stability in the country. This advantage may attract some transit cargo via the Turkish Ports. The author is aware that stability in a country alone is not enough to attract transit cargo, efficient operation of ports which will provide quick turnaround for ships and organisation of inland transport are also necessary requirements for choice of a port.

In the Black Sea region, there is competition between Turkish ports and the USSR ports for transit cargo to Iran. The main Turkish ports which are Trabzon and Samsun have development priority among Black Sea ports because of the considerable transit cargo demand of Iran. But Trabzon which is closer to Iran, does not have any railway connection which is a big disadvantage when it comes to competition. An important point which caused debate over infrastructure investment in Trabzon Port is that, the port will depend on only one country’s transit cargo. Consequently, if Iran prefered another port for its transit cargo, then the Trabzon port will lie idle. As a result, Samsun is more suitable for development because of railway connection which can be a key element in competition for the long distance inland transport leg of the transport chain. The efficiency of railway operation will be another dominant factor for expansion of cargo
volume in the port of Samsun.

Commodities to meet domestic demand are carried mainly by trucks because of the availability of roads. If the unit train concept is accepted as a dominant to passenger train concept, then unit trains can be provided at least between the main consumption centers. This step will be the beginning of multimodal transport operation which will create extra demand for domestic traffic.

IV.4 AVAILABILITY OF MULTIMODAL TRANSPORT RELATED INFRASTRUCTURE

As a result of being a land bridge linking Europe and the Middle East, Turkey has a remarkable truck fleet which is operated mainly for transit cargo and export and import of commodities. The Turkish truck fleet was 225,872 registered trucks in 1987. On the other hand, the country has around 31,062 km State highways and around 27,853 km provincial roads. Highway construction is going on for international routes. The objective of the government, with respect to highways is based on the build-operate-transfer (BOT) principle. The projects for highways, one of which connects the country to Iran, the other to Iraq, are financed by the World Bank. Both of them will pass close to transit ports (Mersin in south and Samsun in North). The government collect tolls from users of the highways. This right is sold to the public and new highways are financed by the money realised. For the beginning period of multimodal transport, road transport will be used more than any other mode of transport. Therefore road infrastructure should have priority for the short term solution.
FIGURE 18. Railway network in Turkey
## 2.1. YOL DURÜMU

### Lines

#### 2.1.1. HATLARIN VE YOLLARIN UZUNLUKLARI

Lengths of Lines and tracks

<table>
<thead>
<tr>
<th>(Km.)</th>
<th>1983</th>
<th>1984</th>
<th>1985</th>
<th>1986</th>
<th>1987</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANA HATLAR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elektrikli - Non Electrified</td>
<td>7.965</td>
<td>7.878</td>
<td>7.878</td>
<td>7.879</td>
<td>7.878</td>
</tr>
<tr>
<td>Elektrikli - Electrified</td>
<td>204</td>
<td>291</td>
<td>291</td>
<td>291</td>
<td>291</td>
</tr>
<tr>
<td><strong>TOPLAM - Total</strong></td>
<td>8.169</td>
<td>8.169</td>
<td>8.169</td>
<td>8.170</td>
<td>8.169</td>
</tr>
<tr>
<td><strong>İKİNCİ ANA HAT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elektrikli - Non Electrified</td>
<td>16</td>
<td>43</td>
<td>43</td>
<td>43</td>
<td>82</td>
</tr>
<tr>
<td>Elektrikli - Electrified</td>
<td>188</td>
<td>188</td>
<td>188</td>
<td>188</td>
<td>188</td>
</tr>
<tr>
<td><strong>TOPLAM - Total</strong></td>
<td>204</td>
<td>231</td>
<td>231</td>
<td>231</td>
<td>270</td>
</tr>
<tr>
<td><strong>ANA HAT TOPLAMI</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elektrikli - Electrified</td>
<td>392</td>
<td>479</td>
<td>479</td>
<td>479</td>
<td>479</td>
</tr>
<tr>
<td><strong>TOPLAM - Total</strong></td>
<td>8.373</td>
<td>8.400</td>
<td>8.400</td>
<td>8.401</td>
<td>8.439</td>
</tr>
<tr>
<td><strong>DİĞER YOLLAR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Elektrikli - Non Electrified</td>
<td>1.738</td>
<td>1.778</td>
<td>1.807</td>
<td>1.839</td>
<td>1.842</td>
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<tr>
<td>Elektrikli - Electrified</td>
<td>77</td>
<td>85</td>
<td>85</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td><strong>TOPLAM - Total</strong></td>
<td>1.815</td>
<td>1.863</td>
<td>1.892</td>
<td>1.927</td>
<td>1.930</td>
</tr>
<tr>
<td><strong>TOPLAM YOLLAR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elektrikli - Electrified</td>
<td>469</td>
<td>564</td>
<td>564</td>
<td>567</td>
<td>567</td>
</tr>
<tr>
<td><strong>TOPLAM - Total</strong></td>
<td>10.188</td>
<td>10.263</td>
<td>10.292</td>
<td>10.328</td>
<td>10.369</td>
</tr>
</tbody>
</table>

**FIGURE 19.** Lengths of lines and tracks
The availability of railway networks is a big advantage to Turkey. Unfortunately most of the rails are one line tracks making railway operation very difficult. For one track railway operation, an elaborate signalling system is very necessary as far as efficiency is concerned. With the World Bank’s assistance, TCDD has a project for modernisation of main lines, signalling systems and other issues like a comprehensive program for improving the management of the locomotive fleet. Computerisation, which is important for interfacing with other modes, has also been started in the railway company.

It seems that there is still a long way to go for the railway company to join multimodal transport operation efficiently. For the time being, efficiency of the company is being improved by a better management system but changes from traditional methods to modern ones will take time. For example, for several reasons, TCDD increased its passenger train km by 25% between 1980 and 1985 while freight train km decreased by 9% and there is no increase in revenue to compensate the extra cost incurred.

Ports are more efficient in comparison with the railways. It is compared with railways because most of the ports are operated by the railway company. In many cases the inefficiency in railway operation has a negative impact on port operation. Even though both ports and railways are operated by the same company, dependence of a high percentage of transport on sea, makes port operation a more sensitive subject, making users reactions receive quick response.

There was a debate between shipping companies and
trucking companies over 5% ad-valorem wharf tax (rihtim resmi) which was applied to import sea traffic. However, when the government applied 3% similar tax to import road traffic the 5% of import sea traffic tax had to be reduced to 4%. This new decision will cause a foreign earnings every year around US$ 200 million estimated by the World Bank. Commodities were unloaded in neighboring ports and transported to Turkey by means of road transport to escape from the tax before the decision was rescinded.

Ports of Izmir, Istanbul (Haydarpaşa) and Mersin have received container handling equipment. Other necessary improvement steps are under consideration like application of computer to port operation and training of staff for modern port operation. So far, it seems that inefficiency in operation will remain at the top of the priority list as far as port problems are concerned.

The positive trend is that private companies build and operate ports mainly for their need but if it is required, the ports facilities are provided to other users. This situation creates some competition between private companies and state owned companies. The state owned company may be forced to improve its operation because of this competition.

IV.5 CUSTOM FACILITIES

The major issue effecting the port operation is outside of the ports operation itself, custom regulation which may be the main obstruction to the multimodal transport operation. Inspection of 100% of goods in container is applied in ports because of custom regulations.
Transportation of a container itself is a problem in Turkey. With existing custom regulation, containers are stripped or stuffed at custom offices in ports, it means that work is doubled. For transit containers, custom requires the deposit of a sum of money which is a considerable amount.

Therefore the custom regulation needs to be changed urgently in line with the multimodal transport concept. For instance, port operation sometimes continue without any break, consequently the custom has to work 24 hours a day in order not to break the continuous flow of goods in the ports. In Sweden, custom's work is delegated to companies and one person in a company is responsible for custom work. Therefore, this solution brought flexibility to the companies as far as dependency on custom is concerned.

The creation of inland container depots will be one solution to the problem. Containers can be sent to inland container depots and treated as a transit container. At the depots, all necessary measures can be taken by the custom. If this is done, containers will not stay long in ports to cause congestion, secondly, containers will be moved to the closest place of destination without any break.

The custom authority is aware of the problem, doing its best to solve it. The application of computer at all entrances to Turkey is the first important step which should be taken by the custom. This step will also help the multimodal transport organisation in the country. The second step is to plan to purchase container control equipment.
IV.6 INITIAL CONTAINER TRANSPORT AND RO/RO TRAFFIC
BY TURKISH COMPANIES

So far, Turkish shipping companies operate some semi-container vessels to meet the container transport demand of shippers. The reason to start with semi-container vessels is not only one. First and foremost, Turkish ports recently started to provide container facilities. Developments are still under way to improve efficiency. The availability of infrastructure creates new demand. DB Turkish Cargo Line followed the development trend of container transport and started to provide container service by its semi-container vessels, each of which have a capacity of 154 containers. In addition to this, the company operates Ro/Ro vessels which may carry containers as well. When the company saw that container transport demand was increasing for more than the company could cope with, it developed a project to increase its container capacity by converting some break bulk vessels to semi-container vessels and purchasing new multipurpose vessels. DB Turkish Cargo Line, which is a government owned company, is taking the initial steps as it has done in many cases to help the development of container transport. In the private sector, some companies are also operating semi-container vessels in the international market.

The developments in ports and the initial steps which have been taken by the Turkish Shipping Companies will result in some further developments. These developments will force some regulations which are barrier to container transport to change. Examples are the custom regulations.

The Ro/Ro operation which can be seen as a kind of
container transport as well as an element of multimodal transport, is also organised by the same state owned company. This Ro/Ro operation is between Istanbul-Constanta (Romania), Derince-Trieste (Italy) and Mersin/Izmir-Trieste/Venice (Italy). The idea behind this operation is to create an alternative route between Turkey and Europe and to add the cheaper sea leg to the total transport. At this initial stage, the company is subsidised by the government to keep Ro/Ro service in operation. Hopefully, in the future, the operation will become profitable and the subsidy then withdrawn.

Derince-Trieste 3532
Mersin/Izmir-Trieste/Venice 385
Istanbul-Constanta
  by Turkish vessels 7747
  by Romanian vessels 10374

FIGURE 20. Number of trailers which are transported by Ro/Ro vessel in 1987
Source: D.B. Turkish Cargo Line

In addition to these lines, there are projects that should add some more Ro/Ro service between Europe and Turkey. One of them is Samsun-Costanta Ferry Line on which vessels will carry rail waggons as well. The position of the Port of Samsun, by this service will be strengthened in the competition which exist between the Turkish Black Sea Transit Route and the Trans-Siberia route of the USSR.

Shippers' demand show that Ro/Ro operation will be more attractive with better service. Turkey depends on other countries' quota for road transport and the demand
is always more than the quota given by the countries on the way to Europe. The second reason for the increasing trend is that, Ro/Ro operation result in extra saving for the trucking companies.

With Ro/Ro operation, after establishment of routes, the private sectors have to be encouraged to get involved in this transport mode.

After the war between Iran and Iraq, The Middle East traffic expectation encourage the development of the North Ports. However, the hinterland connections of the North Ports have to meet the transport demand. One high way, which is at the project level, is passing close by Samsun where facilities have been built to accommodate Ro/Ro vessels in transit between Europe and the Middle East. In addition to this, connecting south and north ports by high ways will create alternative route for transit and domestic traffic. GAP will cause an expansion in production and consumption, therefore, the domestic traffic will experience some impact as far as transport volume is concerned.

IV.7 USE OF COMPUTER IN SHIPPING

Computers are used by several sectors in Turkey. There is also available experienced personnel in this subject. As a result of this, shipping companies and other related parties such as the export-import companies and the Maritime Administration, use computer and create database for their works. Lack of connection of related parties via computer makes information flow difficult and this slows down the transport.

TCDD use computer for several purposes internally.
Due to the World Bank project, the first application of computer in the port for container operation will take place in the port of Izmir.

Another related party, the customs, also use computer at the border entrance to control traffic flow. The computer network will be connected to the Turkish Truck Association's to enable the association provide the information to its members.

The Maritime Transport General Directorate, maritime related state organisation, uses computer for ship registry, certificates and other matters. The information is stored in the data base of the Ministry of Transport's Computer system. The connection of data of other transport modes even inside the same ministry will take time because creation of a common data base will cause changes in forms and will require trained personnel. Training personnel for computer is not a difficult matter because the software part of the system is what requires specialist. This part of the work will be done by the private sector. On the other hand, the operational aspects of the system does not require expertise, a short training programme for officials may solve the problem. The software part of the system has been done successfully by the university for the Maritime Transport General Directorate.

As underlined in previous paragraph, almost all related parties use computer for their in-house work. However no connection for information flow exists. How can all parties be connected via computers? The first and most important step is the coordination of related groups. The second step is one party having to provide this system to all others, else all have to came together to create
something like an association for one system from which everybody can draw benefits. The port operating company is generally the best to provide the system because the port is the center for all groups and has already got a lot of clients due to the availability of computer information system.

Infrastructure for data transfer such as modern telecommunication system is available and this makes it easy to create a database and to connect interested groups.

From the very beginning, at least the computer departments of maritime related sectors have to be aware of EDI standards for maritime use and trade facilities. As far as EDI is concerned, a lot of activities are taking place in Europe where the country's trade partners are located. Therefore creation of a similar association for the use of the EDI system will be suitably rewarded especially to the interested parties who join.
V. CONCLUSION AND SUGGESTIONS

Turkey occupies a special place in Europe and The Middle East connection by its location. By its ports, the country provides sea connections to all over the world and via bridges in Istanbul, provide land connection between Europe and the Middle East.

The introduction of containerisation had some effects on the country. As a result of this, containerisation has received special emphasis in the development of the transport sector. Container handling infrastructure is installed in chosen ports to increase efficiency of transport. The tendency in the world transport sector shows that containerisation will continue to be developed and it will bring some developments to related sectors. Therefore Turkey should follow this trend.

Turkey has a population of around 60 million and a remarkable market in the region. The transport need will grow with the development of the country itself. For transit traffic, Iran and Iraq have a population of around 60 million and the previous years transit traffic to Iran via Turkey and the USSR was roughly 6 million tons and to Iraq through Turkey and Jordan was around 7 million tons.

Therefore, under the above mentioned transport potential of Turkey and neighboring countries for transit traffic, the transport sector has to be elaborated upon with all its individual and related sectors to meet present needs and to develop its potential for the future.
Developments in ports are accomplished by purchasing new equipment, but developments in port operation are as important as the purchasing of new cargo handling equipment. When plans are developed, as far as containerisation is concerned, they have to be in line with the new port concept which may provide very wide area of service if it is required. These objectives will be supported by the governments which are run on the line of open economy. With the new economic concept, the country's export and import trade are expanded, the ports then have to apply the necessary measures to encourage expansion of the economy.

It has been decided to develop containerisation in four ports and some other ports under the long term container development program. As is known, container handling facilities alone at the port does not mean much. The container port have to be connected to railway, highway, the airport, distribution centers and other necessary facilities. Therefore, decision to expand number of ports should be restricted, depends on the above mentioned facilities. Therefore the concentration should be on quality of container transport service as a whole (from port to destination or vice-versa) instead of expanding number of container ports.

The operation of ports are mainly under the control of TCDD. This idea is supported by the fact that operation of some main ports have changed hands from TDI to TCDD. All the same, negative effects from inefficient railway operation should not be allowed to destroy the development of an efficient port operation system for which introduction of computer oriented documentation and modern management systems are necessary.
The main bottleneck at ports is the custom which should work in the line of the new container concept i.e. to modernise custom procedures. The solution to the custom problem is to establish distribution centers which will be close to the consumption and production centers. The custom have to be flexible to provide special service to big companies to improve the quality of service.

In many countries, railway companies have a problem with financing. Therefore, they are making big efforts in marketing and offering special services to retain traffic. In Turkey, there are special efforts to run passenger trains for which there is not enough revenue as to match its cost. In addition to that passenger trains have a priority on main lines which disrupt freight train operation.

The train operation should be focussed on freight train operation by operating unit trains. The operation may be bettered by improving the management system as well as some improvements in the infrastructure. Determination of the cost for every specific leg of the service is an important item to identify loss or profit for development plan purposes.

Container operation by railway will be difficult in Turkey in the short term. However, efficiency in unit train operation and development of container transport by other modes will have some positive impact on railway operation to start container service.

In the case of container depots, even TCDD hasn't involved itself in container transport as yet, railway
network have to be considered when siting depots in the future.

Highways are critical for multimodal transport operation and it will keep its high priority in the transport sector in the short term. Availability of truck fleet for transit transport makes it necessary to have cooperation between trucking and shipping companies. Cooperation can be organised between big companies such as D.B. Turkish Cargo Line and Trucking Association to provide door to door service. Door to door service requires financially strong and reliable freight forwarders and transport companies.

Increasing number of container vessel operation will be determined by an increasing demand. But special emphasis have to be laid to make the Ro/Ro traffic profitable. If the private sector can be attracted into Ro/Ro operation, developments can take place quickly. For Black Sea container operation, the Danube river system has to be examined, particularly for transit traffic.

After all these, if it is decided to provide door to door service, application of the EDI system to the transport sector and other related sectors will be necessary. The system may be organised under one company which may be created by interested parties as has been done in Europe and other developed countries.
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Introduction

Single mode transport
When goods are carried by a single mode of transport, the transport contract is usually evidenced by a document particular to that mode: an ocean bill of lading, an airway bill, rail or road consignment notes, etc. Such a document is issued by a carrier at the point of departure and establishes his responsibilities and liability for loss or damage to the goods while they are in his charge. The conditions or contract terms are usually found on the reverse side of the document and make reference to an international Convention or national law regulating that mode of transport. Each of these "single mode" transport documents serves to pass the information necessary for the movement of the goods (information found on the face of the document). They also meet commercial and financial needs by acting as a receipt for identified goods, as a contract of carriage, and also, when issued in negotiable form, as a document of title to the goods.

Combined transport
In recent years, there has been a greatly increased through movement of goods by container or other unit-load device. Through movement means that the goods go from point of departure to point of destination by the successive use of more than one mode of transport.

Combined transport, which is also referred to as intermodal or multimodal transport, implies either the issue of a series of separate single mode transport documents or their replacement by a through "start-to-finish" transport document. A combined transport document — "CT Document" — is issued by someone who actually provides the transport, or at least part of it, or by someone who has merely arranged for the provision of the transport. But whether a provider or arranger, the person issuing the CT Document (the CTO - Combined Transport Operator) acts as a principal vis-à-vis the merchant.

Uniform Rules for CT Documents
The ICC Uniform Rules were first issued in 1973 as publication no 273. They were slightly revised concerning CTO's liability for delay in October 1975 and have remained unchanged since that date. At that time there was no international Convention specially applicable to multimodal transport in the way that existing Conventions apply to the different single modes of transport. The ICC Rules were conceived as an essential measure to avoid the commercially retrograde step of the development of a multiplicity of documents for combined transport operations.

International Convention
In May 1980, the United Nations adopted a convention on international Multimodal Transport of Goods which will enter into force one year after the Governments of 30 countries have ratified, acceded to or approved it. Given the rate at which multilateral instruments enter into force, it could be many years before the Convention actually becomes applicable to multimodal transport operations. In the meantime the ICC Uniform Rules will continue to be used extensively by commerce. Moreover, many of the articles of the Convention are modelled on the ICC Rules.

Application of the ICC Rules
There are basically three ways in which the Rules are applied in practice. The first concerns standard com-
combined transport documents elaborated by international organizations and bearing on their face the heading "Negotiable (or non-negotiable) combined transport document issued subject to Uniform Rules for a Combined Transport Document (ICC Publication n° 298)". This is the case, for instance, with the COMBIDOC which is issued jointly by the Baltic and International Maritime Conference (BIMCO) and the International Shipowners' Association (INSA), and with the FIATA Combined Transport Bill of Lading (FBL). By this method, individual CTO's, in using either COMBIDOC or the FIATA CT Document, are effectively applying the ICC Rules.

The second method of application is by individual CTO's who do not use a standard set of provisions but who nevertheless draft their conditions on the basis of ICC Rules. Several operators have done this and have printed on the face of their "Bill of Lading for Combined Transport or Port to Port Shipment" the following: "Subject to the conditions on back of Carrier's applicable tariff". As far as this Bill of Lading covers Combined Transport, it is based on the Uniform Rules for a Combined Transport Document.

The third way in which the Rules are applied is by individual CTO's who draft their conditions on the basis of ICC Rules but also who make no mention of this fact on their document.

In this respect, it is necessary to point out that the ICC Uniform Rules are minimum standard rules and not standard conditions. Some of the rules can be used as such in a CT Document but many of them have to be adapted to put them in the form of contract conditions. It is for this reason that the ICC encourages CTO's to submit their documents to the ICC for approval as the first method of application is preferable to the second and third.

Non-negotiable documents

The Rules are also forward looking, in that they take note of the tendency to replace negotiable documents, of title, which must be surrendered at destination before the goods may be delivered, by non-negotiable documents, whereby delivery is made to a consignee named in the document without the need to surrender any document, and provide for the issue of the CT document in either negotiable form, or in non-negotiable form.

Standing of the CTO

The Rules do not, however — and indeed they cannot — legislate for the commercial and financial standing of the CTO. This will be resolved by commercial willingness — or by commercial unwillingness — to regard a CT Document issued by any particular CTO as worth-while document.
General provisions

Rule 1

a. These Rules apply to every contract concluded for the performance and/or procurement of performance of combined transport of goods which is evidenced by a combined transport document as defined herein.

These Rules shall nevertheless apply even if the goods are carried by a single mode of transport contrary to the original intentions of the contracting parties that there should be a combined transport of the goods as defined hereafter.

b. The issuance of such combined transport document confers and imposes on all parties having or thereafter acquiring an interest in it the rights, obligations and defences set out in these Rules.

c. Except to the extent that it increases the responsibility or obligation of the combined transport operator, any stipulation or any part of any stipulation contained in a contract of combined transport or in a combined transport document evidencing such contract, which would directly or indirectly derogate from these Rules shall be null and void to the extent of the conflict between such stipulation, or part thereof, and these Rules. The nullity of such stipulation or part thereof shall not affect the validity of the other provisions of the contract of combined transport or combined transport document of which it forms a part.
Definitions

For the purpose of these Rules:

a. Combined transport means the carriage of goods by at least two different modes of transport, from a place at which the goods are taken in charge situated in one country to a place designated for delivery situated in a different country.

b. Combined transport operator (CTO) means a person (including any corporation, company or legal entity) issuing a combined transport document.

Where a national law requires a person to be authorised or licenced before being entitled to issue a combined transport document, then combined transport operator can only refer to a person so authorised or licenced.

c. Combined transport document (CT Document) means a document evidencing a contract for the performance and/or procurement of combined transport of goods and bearing on its face either the heading « Negotiable combined transport document issued subject to Uniform Rules for a Combined Transport Document (ICC Publication N° 298) » or the heading « Non-negotiable combined transport document issued subject to Uniform Rules for a Combined Transport Document (ICC Publication N° 298) ».

d. Different modes of transport means the transport of goods by two or more modes of transport, such as transport by sea, inland waterway, air, rail or road.

e. Delivery means delivering the goods to or placing the goods at the disposal of the party entitled to receive them.

f. Franc means a unit consisting of 65.5 milligrammes of gold of millesimal fineness 900.

Negotiable document

Rule 3

Where a CT document is issued in negotiable form:

a. it shall be made out to order or to bearer;
b. if made out to order it shall be transferable by endorsement;
c. if made out to bearer it shall be transferable without endorsement;
d. if issued in a set of more than one original it shall indicate the number of originals in the set;
e. if any copies are issued each copy shall be marked « non-negotiable copy »;
f. delivery of the goods may be demanded only from the CTO or his representative, and against surrender of the CT document duly endorsed where necessary:
g. the CTO shall be discharged of his obligation to deliver the goods if, where a CT document has been issued in a set of more than one original, he, or his representative, has in good faith delivered the goods against surrender of one of such originals.

Non-negotiable document

Rule 4

Where a CT document is issued in non-negotiable form:

a. it shall indicate a named consignee;
b. the CTO shall be discharged of his obligation to deliver the goods if he makes delivery thereof to the consignee named in such non-negotiable document, or to the party advised to the CTO by such consignee as authorised by him to accept delivery.
Responsibilities and liabilities of the CTO

Rule 5

By the issuance of a CT document the CTO:

a. undertakes to perform and/or in his own name to procure performance of the combined transport — including all services which are necessary to such transport — from the time of taking the goods in charge to the time of delivery, and accepts responsibility for such transport and such services to the extent set out in these Rules;

b. accepts responsibility for the acts and omissions of his agents or servants, when such agents or servants are acting within the scope of their employment, as if such acts and omissions were his own;

c. accepts responsibility for the acts and omissions of any other person whose services he uses for the performance of the contract evidenced by the CT document;

d. undertakes to perform or to procure performance of all acts necessary to ensure delivery;

e. assumes liability to the extent set out in these Rules for loss of or damage to the goods occurring between the time of taking them into his charge and the time of delivery, and undertakes to pay compensation as set out in these Rules in respect of such loss or damage;

f. assumes liability to the extent set out in Rule 14 for delay in delivery of the goods and undertakes to pay compensation as set out in that Rule.

Rights and duties of the parties

Rule 6

In addition to the information specifically required by these Rules, the parties shall insert in a CT document such particulars as they may agree to be commercially desirable.

Rule 7

The consignor shall be deemed to have guaranteed to the CTO the accuracy, at the time the goods were taken in charge by the CTO, of the description, marks, number, quantity, weight and/or volume of the goods as furnished him, and the consignor shall indemnify the CTO against all loss, damage and expense arising or resulting from inaccuracies in or inadequacy of such particulars.

The right of the CTO to such indemnity shall in no way limit his responsibility and liability under the CT Document to any person other than the consignor.

Rule 8

The consignor shall comply with rules which are mandatory according to the national law or by reason of international Convention, relating to the carriage of goods of a dangerous nature, and shall in any case inform the CTO in writing of the exact nature of the danger before goods of a dangerous nature are taken in charge by the CTO and indicate to him, if need be, the precautions to be taken.

If the consignor fails to provide such information and the CTO is unaware of the dangerous nature of the goods and the necessary precautions to be taken and if, at any time, they are deemed to be a hazard to life or property, they may at any place be unloaded, destroyed or
rendered harmless, as circumstances may require, without compensation, and the consignor shall be liable for all loss, damage, delay or expenses arising out of their being taken in charge, or their carriage, or of any service incidental thereto. The burden of proving the CTO knew the exact nature of the danger constituted by the carriage of the said goods shall rest upon the person entitled to the goods.

Rule 9

The CTO shall clearly indicate in the CT document, at least by quantity and/or weight and/or volume and/or marks, the goods he has taken in charge and for which he accepts responsibility.

Subject to paragraph 1 of this Rule, if the CTO has reasonable grounds for suspecting that the CT document contains particulars concerning the description, marks, number, quantity, weight and/or volume of the goods which do not represent accurately the goods actually taken in charge, or if he has no reasonable means of checking such particulars, the CTO shall be entitled to enter his reservations in the CT document, provided he indicates the particular information to which such reservations apply.

The CT document shall be prima facie evidence of the taking in charge by the CTO of the goods as therein described. Proof to the contrary shall not be admissible when the CT document is issued in negotiable form and has been transferred to a third party acting in good faith.

A. Rules applicable when the stage of transport where the loss or damage occurred is not known

Rule 11

When in accordance with Rule 5 (e) hereof the CTO is liable to pay compensation in respect of loss of, or damage to, the goods and the stage of transport where the loss or damage occurred is not known:

a. such compensation shall be calculated by reference to the value of such goods at the place and time they are delivered to the consignee or at the place and time when, in accordance with the contract of combined transport, they should have been so delivered;

b. the value of the goods shall be determined according to the current commodity exchange price or, if there is no such price, according to the current market price, or, if there is no commodity exchange price or current market price, by reference to the normal value of goods of the same kind and quality.

c. compensation shall not exceed 30 francs per kilo of gross weight of the goods lost or damaged, unless, with the consent of the CTO, the consignor has declared a higher value for the goods and such the general nature of such loss or damage, shall have been given in writing to the CTO or to his representative at the place of delivery before or at the time of removal of the goods into the custody of the person entitled to delivery thereof under the CT document, or, if the loss or damage is not apparent, within seven consecutive days thereafter.
higher value has been stated in the CT document, in which case such higher value shall be the limit.

However, the CTO shall not, in any case, be liable for an amount greater than the actual loss to the person entitled to make the claim.

Rule 12

When the stage of transport where the loss or damage occurred is not known the CTO shall not be liable to pay compensation in accordance with Rule 5 (e) hereof if the loss or damage was caused by:

a. an act or omission of the consignor or consignee, or person other than the CTO acting on behalf of the consignor or consignee, or from whom the CTO took the goods in charge;

b. insufficiency or defective condition of the packing or marks;

c. handling, loading, stowage or unloading of the goods by the consignor or the consignee or any person acting on behalf of the consignor or the consignee;

d. inherent vice of the goods;

e. strike, lockout, stoppage or restraint of labour, the consequences of which the CTO could not avoid by the exercise of reasonable diligence;

f. any cause or event which the CTO could not avoid and the consequences of which he could not prevent by the exercise of reasonable diligence;

g. a nuclear incident if the operator of a nuclear installation or a person acting for him is liable for this damage under an applicable international Convention or national law governing liability in respect of nuclear energy.

The burden of proving that the loss or damage was due to one or more of the above causes or events shall rest upon the CTO.

When the CTO establishes that, in the circumstances of the case, the loss or damage could be attributed to one or more of the causes or events specified in (b) to (d) above, it shall be presumed that it was so caused. The claimant shall, however, be entitled to prove that the loss or damage was not, in fact, caused wholly or partly by one or more of these causes or events.

Rule 13

When in accordance with Rule 5 (e) hereof the CTO is liable to pay compensation in respect of loss or damage to the goods and the stage of transport where the loss or damage occurred is known, the liability of the CTO in respect of such loss or damage shall be determined:

a. by the provisions contained in any international Convention or national law, which provisions:

i. cannot be departed from by private contract, to the detriment of the claimant, and

ii. would have applied if the claimant had made a separate and direct contract with the CTO in respect of the particular stage of transport where the loss or damage occurred and received as evidence thereof any particular document which must be issued in order to make such international Convention or national law applicable; or

b. by the provisions contained in any international Convention relating to the carriage of goods by the mode of transport used to carry the goods at the time when
the loss or damage occurred, provided that:

I. No other international Convention or national law would apply by virtue of the provisions contained in sub-paragraph (a) of this Rule, and that

II. It is expressly stated in the CT Document that all the provisions contained in such Convention shall govern the carriage of goods by such mode of transport; where such mode of transport is by sea, such provisions shall apply to all goods whether carried on deck or under deck;

or

c. by the provisions contained in any contract of carriage by inland waterways entered into between the CTO and any sub-contractor, provided that:

I. No international Convention or national law is applicable under sub-paragraph (a) of this Rule, or is applicable, or could have been made applicable, by express provision in accordance with sub-paragraph (b) of this Rule and that

II. It is expressly stated in the CT Document that such contract provisions shall apply;

or

d. by the provisions of Rules 11 and 12 in cases where the provisions of sub-paragraphs (a), (b) and (c) above do not apply.

Without prejudice to the provisions of Rule 5 (b) and (c), when, under the provisions of the preceding paragraph, the liability of the CTO shall be determined by the provisions of any international Convention or national law, this liability shall be determined as though the CTO were the carrier referred to in any such Convention or national law. However, the CTO shall not be exonerated from liability where the loss or damage is caused or contributed to by the acts or omissions of the CTO in his capacity as such, or his servants or agents when acting in such capacity and not in the performance of the carriage.

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**Liability for Delay**

**Rule 14**

The CTO is liable to pay compensation for delay only when the stage of transport where a delay occurred is known, and to the extent that there is liability under any International Convention or national law, the provisions of which:

I. Cannot be departed from by private contract to the detriment of the claimant;

II. Would have applied if the claimant had made a separate and direct contract with the CTO as operator of that stage of transport and received as evidence thereof any particular document which must be issued in order to make such International Convention or national law applicable.

However, the amount of such compensation shall not exceed the amount of the freight for that stage of transport, provided that this limitation is not contrary to any applicable International Convention or national law.

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**Miscellaneous Provisions**

**Rule 15**

Failure to effect delivery within 90 days after the expiry of a time limit agreed and expressed in a CT Document or, where no time limit is agreed and so expressed, failure to effect delivery within 90 days after the time it would be reasonable to allow for diligent completion of the combined transport operation shall, in the absence of evidence to the contrary, give to the party entitled to receive delivery the right to treat the goods as lost.
Rule 16
The defences and limits of liability provided for in these Rules shall apply in any action against the CTO for loss of, damage, or delay to the goods whether the action be founded in contract or in tort.

Rule 17
The CTO shall not be entitled to the benefit of the limitation of liability provided for in Rule 11 hereof if it is proved that the loss or damage resulted from an act or omission of the CTO done with intent to cause damage or recklessly and with knowledge that damage would probably result.

Rule 18
Nothing in these Rules shall prevent the CTO from including in the CT document provisions for protection of his agents or servants or any other person whose services he uses for the performance of the contract evidenced by the CT document, provided such protection does not extend beyond that granted to the CTO himself.

Time-bar

Rule 19
The CTO shall be discharged of all liability under these Rules unless suit is brought within nine months after:
1. the delivery of the goods, or,
2. the date when the goods should have been delivered, or
3. the date, when in accordance with Rule 15, failure to deliver the goods would, in the absence of evidence to the contrary, give to the party entitled to receive delivery the right to treat the goods as lost.
APPENDIX II

Combined Transport Document

The combined transport document lists the place of receipt (1) and place of delivery (2) and the feeder vessel (3) and ocean vessel (4). The contract of carriage is for a combined transport from the place of receipt to the place of delivery. For this reason the combined transport document evidences receipt of the goods (5) and not shipment on board. The liability of the Combined Transport Operator starts at the place of receipt and ends at the place of delivery (6). The combined transport document is duly signed (7), shows the number of originals (8) in the full set and evidences payment of transport charges (9). It is made out to the order of the consignee (10), whose endorsement will be necessary. Acceptance of such a document is governed by Article 23, UCP.

Article 23

a. If the credit calls for a combined transport document, i.e. one which provides for a combined transport by at least two different modes of transport, from a place at which the goods are taken in charge to a place designated for delivery, or if the credit provides for a combined transport, but in either case does not specify the form of document required and/or the issuer of such document, banks will accept such documents as tendered.

b. If the combined transport includes transport by sea the document will be accepted although it does not indicate that the goods are on board a named vessel, and although it contains a provision that the goods, if packed in a Container, may be carried on deck, provided it does not specifically state that they are loaded on deck.