Romania
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Vol. 4

INTERMODAL TRANSPORTATION FEASIBILITY STUDY IN ROMANIA

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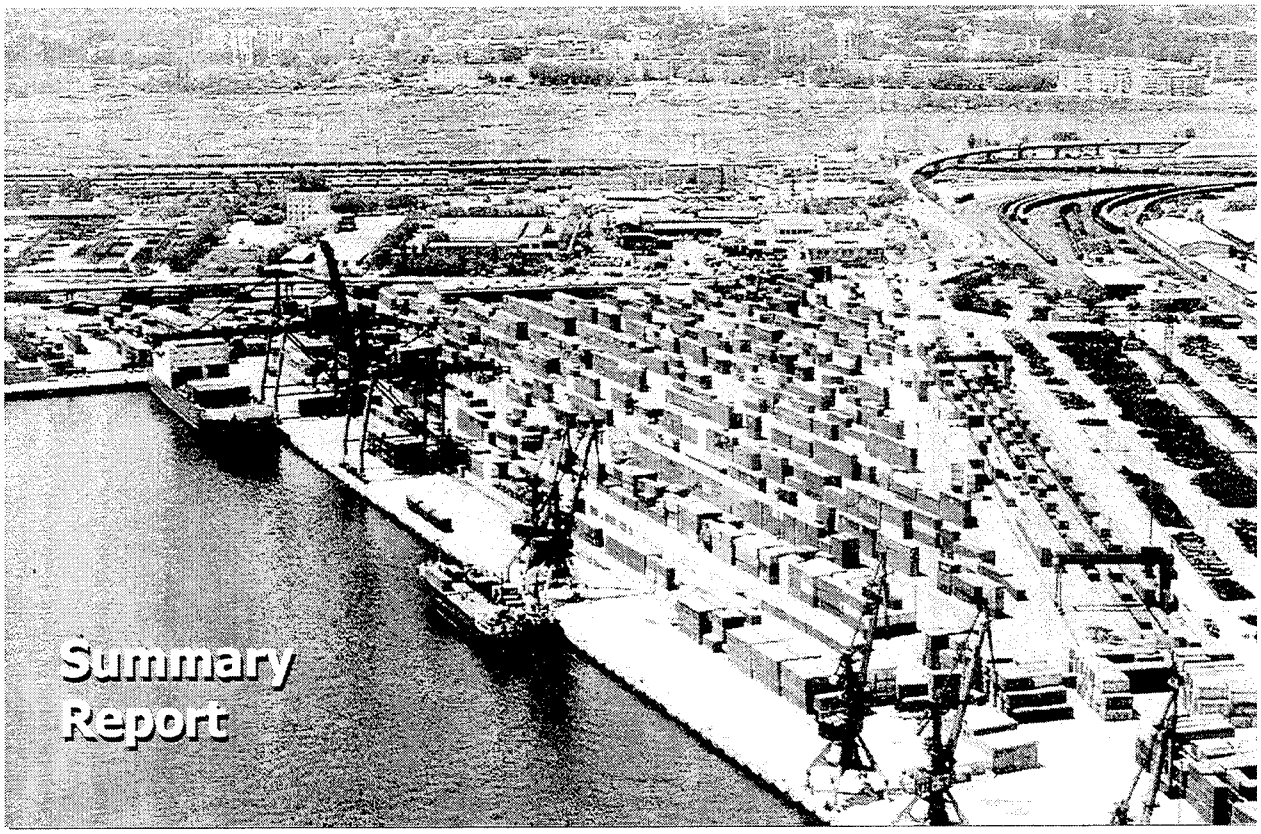

Presented to:
CFR-Freight S.A.

Prepared by:
WILBUR SMITH ASSOCIATES
in association with
RAILWAY STUDY AND DESIGN INSTITUTE
and
FREDERIC R. HARRIS

February 1999

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INTERMODAL TRANSPORTATION FEASIBILITY STUDY IN ROMANIA

Summary Report

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March 1999

CFR FREIGHT S. A.
38 Bd. Dinicu Golescu
Bucharest, Romania

SUBJECT: Summary Report

ATTN: Mr. George Buruiana
General Manager

Dear Mr. Buruiana:

Wilbur Smith Associates, and its associated firms, Frederic R. Harris and the Romanian Railway Study and Design Institute are pleased to transmit this Summary Report for the "Intermodal Transportation Feasibility Study in Romania", financed by the United States Trade and Development Agency.

Due to the volume of information in this study, the Final Report is rather lengthy. Thus, to facilitate the reading of the report by interested executives and prospective foreign investors, the Consultants have prepared a shorter version, this Summary Report, which accompanies the Final Report Document. In addition, we have prepared an Executive Summary, providing a brief overview of the Study.

We greatly appreciate the cooperation extended by CFR to the Consultants which made it possible to conduct this work.

Thank you for the opportunity to assist you; we look forward to further cooperation with your organization, and the people of Romania.

Sincerely yours,

WILBUR SMITH ASSOCIATES

Stephen W. Schar

Stephen W. Schar, AICP
Vice President - International

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INTRODUCTION & OBJECTIVE

This study has been undertaken with a grant from the United States Trade Development Agency (TDA). The objective of the study is the expansion of intermodal transportation through the Port of Constantza for Container, Truck and Trailer on Flat Car (TTOFC), Container on Flat Car (COFC), Roll on - Roll out (Ro-Ro), and general cargo in wagons and bulk via ferryboats. Establishing an intermodal facility on the Bulgarian side opposite to Giurgiu for rolling motorway (TTOFC) is also considered.

The study analyzes the entire Romanian Railway intermodal system with emphasis on the intermodal operations and facilities in the Port of Constantza. Special attention is given to ferryboat operations. Construction of intermodal facilities in the Constantza South Port and Giurgiu area is suggested.

This report presents the realized traffic and the actual situation and discusses the technical/infrastructure and the institutional improvements and the necessary investments to ensure the capacity for handling the forecasted traffic. To that extent, it addresses the railway-port interfacing, type of organization, the management and marketing functions, and the framework/institutional structure capable of providing efficient operations, attracting future business and prospective investors. A master plan for port development has been prepared.

OVERVIEW

Romania has a strategic geographical position in southeastern Europe. It represents an access gate between Europe and the Middle East including a number of former Soviet Union republics. Romania is a go-between between Europe and its 15 countries with 340 million consumers and a $250 billion demand for goods and services, and the 250 million consumers located in the former Soviet Union countries. It is a transit point for intermodal transport, via the Black Sea and the Port of Constantza. It is located along the trade route known since antiquity as the "Silk Road".

The Port of Constantza is integrated in to the European System of Priority Transport Corridors, being the Eastern Terminal for Corridors 4 and 7, both of which cross the north-south Corridor 9. Figure **I** shows the Railway corridors in Central and Eastern Europe.

Located at the crossroads of trade routes between Europe, the Middle East, CIS States, Far East and North Africa, the Port of Constantza has the potential of becoming the main port for the Black Sea region and the eastern gateway to Europe.

The development of the Port of Constantza has as main objectives, the following:

- To become the main port for transport originating in the Near and Middle East, Far East and North Africa, with destinations in Central and Eastern Europe.
- To be a transition point for transport originating in the CIS, Central Asia and Transcaucas and bound for Europe and vice-versa.
- To be the main port for shipping between Black Sea countries, the Danube-Black Sea Canal, and cabotage along the Black Sea coast.
- To become a distribution center by using the existing free zones.

The new geo-political and geo-economic structure east of the Black Sea region has provided a steady increase in the number of containers being handled through Constantza. There is great potential for expansion of the container trade in the region. New facilities to meet the contemplated container traffic will be needed. A new container terminal, to be built at Constantza South Port, capable of handling 337,000 TEUs per year, will start operations in 2001.

The Port of Constantza is well connected with the rest of the country and with Europe. A complex track system in the port area gives easy access to the national railway network, and to Europe, through a double track electrified 25 KV, 50 Hz line. Figure **II** shows Romanian railway network

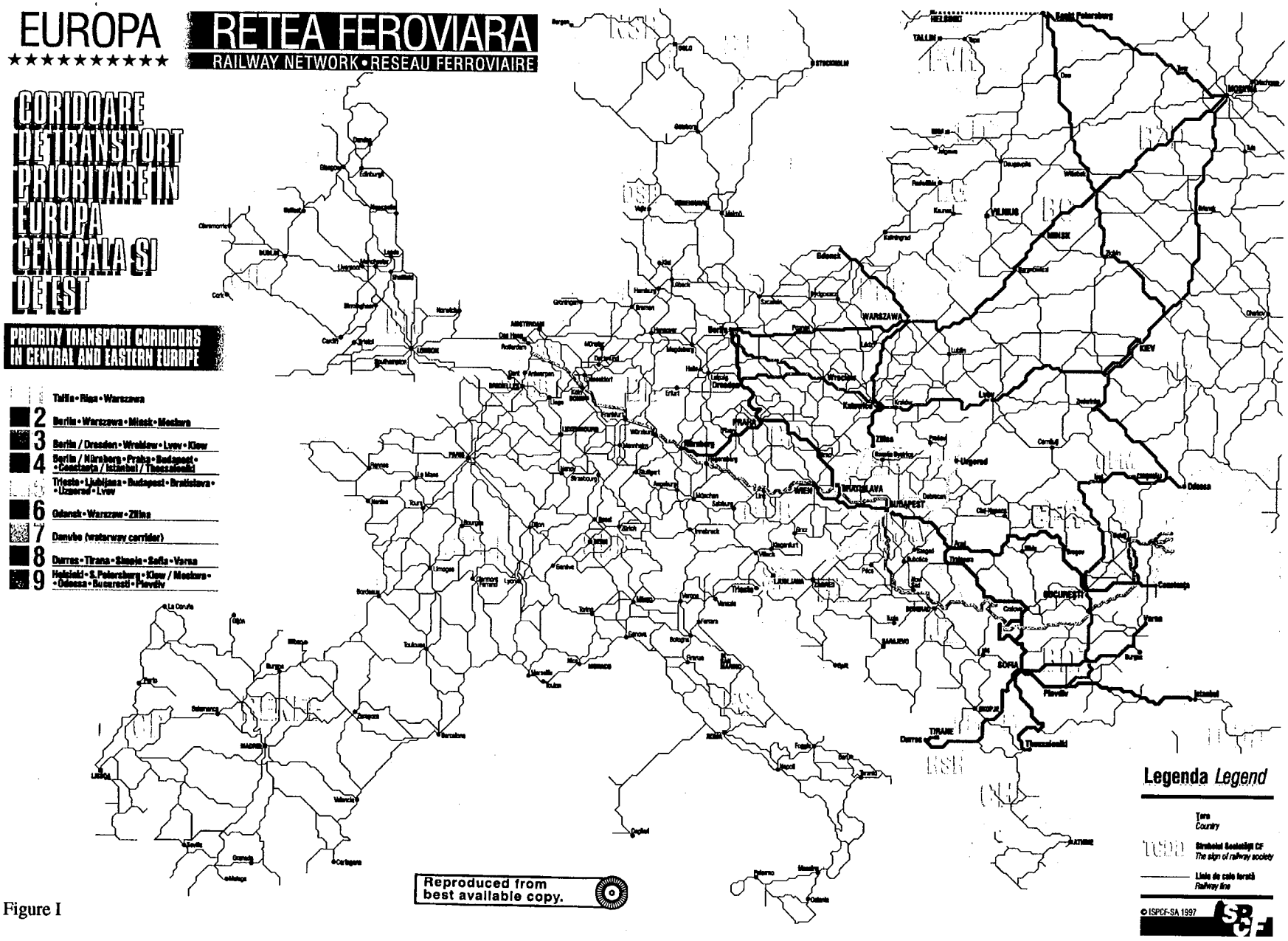
EUROPA
RETEA FEROVIARA
RAILWAY NETWORK • RESEAU FERROVIAIRE
CORIDOARE DE TRANSPORT PRIORITARE IN EUROPA CENTRALA SI DE EST
PRIORITY TRANSPORT CORRIDORS IN CENTRAL AND EASTERN EUROPE
2 Tallin • Riga • Warszawa
2 Berlin • Warszawa • Minsk • Moskva
3 Berlin / Dresden • Wroklaw • Lvov • Kiew
4 Berlin / Nürnberg • Praha • Budapest • • Constanta / Istanbul / Thessaloniki
5 Trieste • Ljubljana • Budapest • Bratislava • • Uzgorod • Lvov
6 Gdansk • Warszawa • Zilina
7 Danube (waterway corridor)
8 Durres • Tirana • Skopje • Sofia • Varna
9 Helsinki • S. Petersburg • Kiew / Moskva • • Odessa • Bucuresti • Plovdiv
Reproduced from best available copy.
Legenda Legend
Tara Country
Simbolul Asociatiei CF The sign of railway society
Linie de cale ferată Railway line
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Figure I

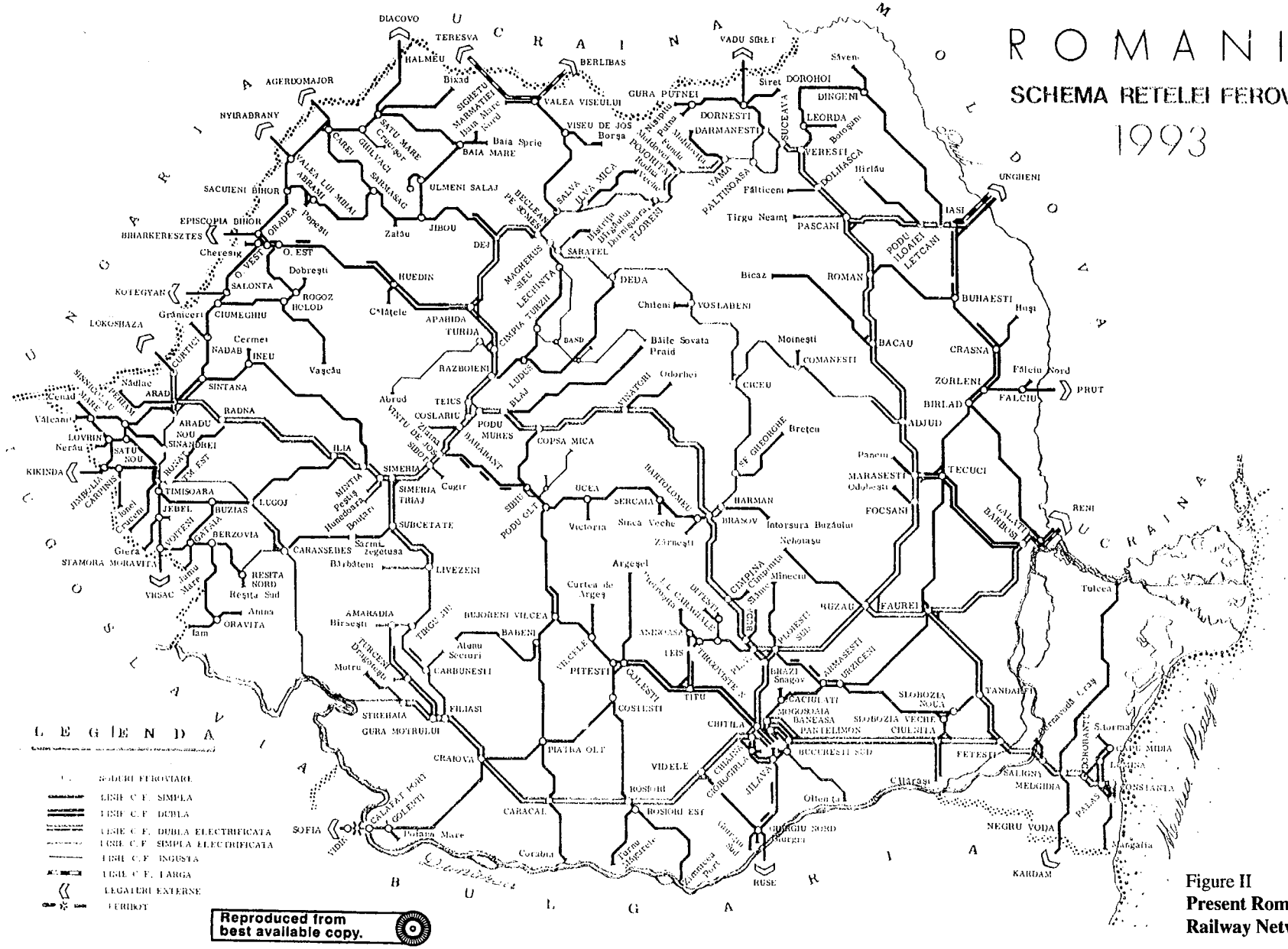


Figure II
Present Romanian Railway Network

[CFR]. The red lines represent the electrified territory, while double line represents double track. By road, Constantza is connected to National Road #32, through a double lane highway. By air, the International Airport Mihail Kogalniceanu links Constantza with the interior of the country and foreign destinations.

The Danube-Black Sea Canal and Danube-Rhein-Main Canal links Constantza with Rotterdam and, respectively, the Black Sea with the North Sea.

The Port of Constantza is the fourth largest port in Europe, after Rotterdam, Antwerp, and Marseille and is the largest and deepest port on the Black Sea. The port is a complex consisting of the North Port, South Port, and the access area to the Danube-Black Sea Canal. Located at 330 km from the Bosphorus Strait and 157 km from the Sulina Branch of the Danube, it covers 3,600 hectares. Figure III shows the plan of Constantza Port.

The port is protected by a 8,875 meter north breakwater and 5,560 meter south breakwater. There are 133 berths totaling 28.5 km.

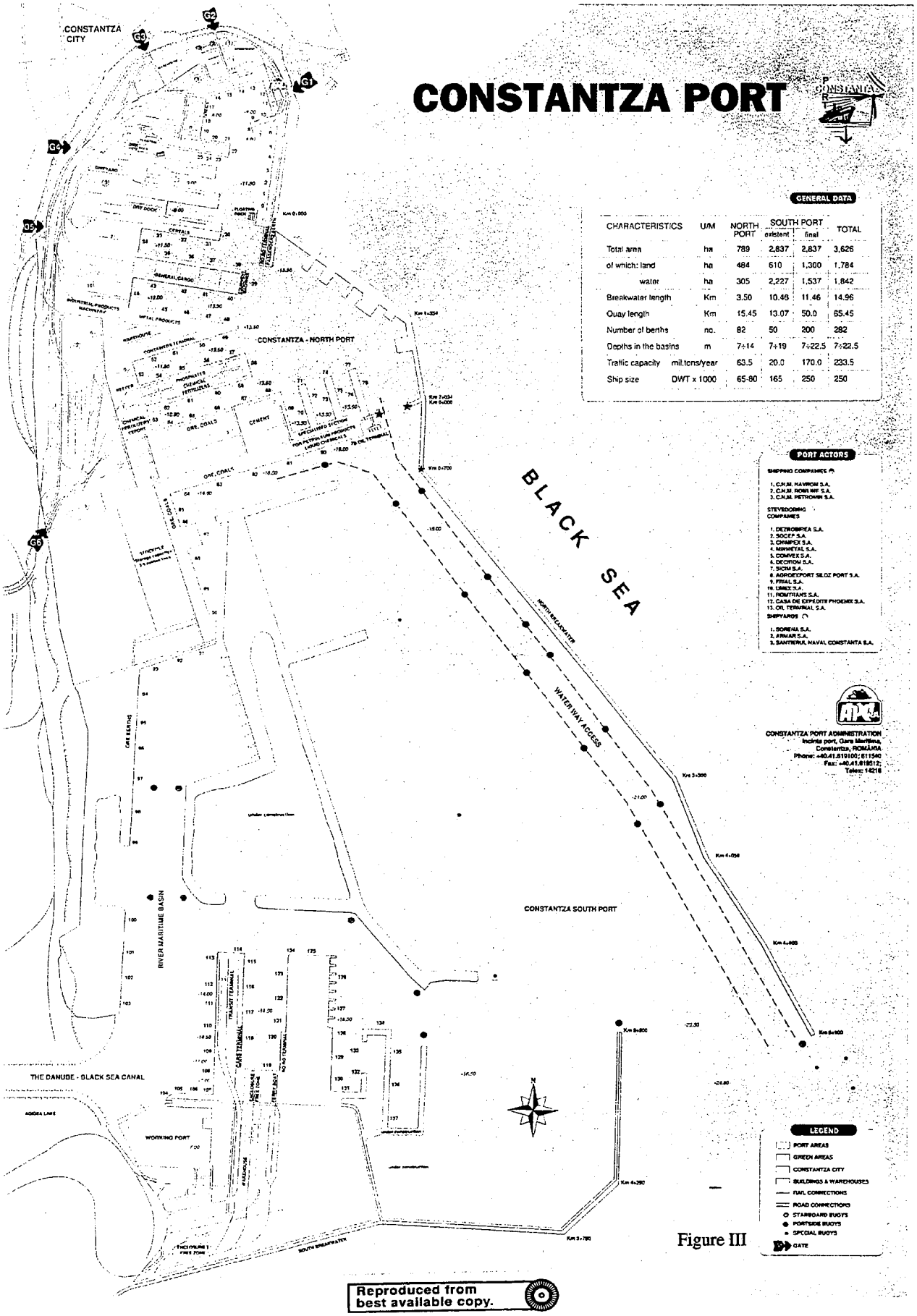
The North Port is fully operational with 12 basins, 15.5 km of quay, and 82 berths with water depths of 7 m (23 ft.) to 13.5 (44 ft.) which handles all types of commodities, including containers. The South Port is partially operational and has 13 km. (8 miles) of quay with 25 operational berths for different commodities. In the South port are located the Free Zone, the site of a planned Container Terminal, the Ferryboat Terminal for two vessels Mangalia and Eforie and the Ro - Ro Terminal.

This Executive Summary is presented in short form, to provide a general idea of the objectives of the study, the findings, and the approaches recommended by the Consultant.

The amount of international attention being recently given to the Black Sea basin in general and its ports in particular, with a special interest in Constantza Port, has also prompted this Consultant to elaborate a more concise version of the study, besides the Executive Summary, and of the study itself. The reason of this rather unusual procedure resides in the intention to offer, to specially interested parties, the opportunity to gain an overview of the facts and the figures of this project, within a fraction of the time needed to read the entire voluminous study.

This Executive Summary version of the presentation has been organized in the same manner as the original study, by tasks.

CONSTANTZA PORT



CHARACTERISTICS	U/M	NORTH PORT	SOUTH PORT existent	SOUTH PORT final	TOTAL
Total area	ha	789	2,837	2,837	3,626
of which: land	ha	484	610	1,300	1,784
water	ha	305	2,227	1,537	1,842
Breakwater length	Km	3.50	10.46	11.46	14.96
Quay length	Km	15.45	13.07	50.0	65.45
Number of berths	no.	82	50	200	282
Depths in the basins	m	7÷14	7÷19	7÷22.5	7÷22.5
Traffic capacity	mil.tons/year	63.5	20.0	170.0	233.5
Ship size	DWT x 1000	65-80	165	250	250

Figure III

Task 1. REVIEW OF PAST AND CURRENT ACTIVITIES

OBJECTIVE:

- *Obtain traffic data necessary for Task 1 and the subsequent tasks, towards the further development and the completion of the study.*

OVERVIEW:

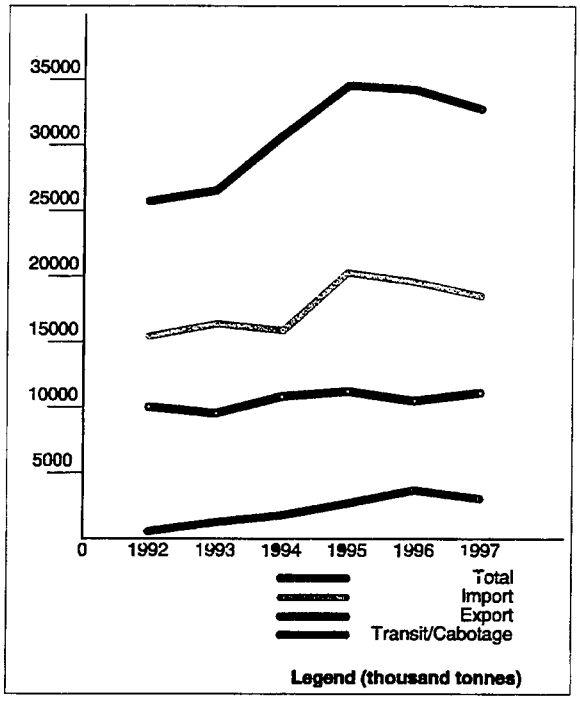
- *The complexity of the present study made it imperative for the **Wilbur Smith Associates (WSA)** team to consult various information sources, starting with pertinent studies sponsored by international organizations about Constantza Port and continuing with field data gathered from Romanian National Railways (**CFR**), the different entities operating in the port, The Railway Study and Design Institute (**RSDI**) of Bucharest from its data base and the statistics provided by the Administration of the Maritime Port of Constantza (**AMPC**). Moreover, specialized international literature containing information on foreign trade and patterns, development indicators and potential traffics of the respective originating countries, has been examined.*

FINDINGS

There is no uniform system for data collection in the Constantza Port. Port operators keep some statistical information in their particular areas of interest. The Ministry of Transportation and the Port Administration do not keep detailed information capable of providing a solid base for the monitoring of overall activity. Moreover, there is no coordination in record keeping between the commercial companies, Port Administration, CFR and the Ministry of Transportation.

Collection of data continued, for the most part, during the course of the project since it was necessary to provide a solid information base for all tasks. Traffic data from the listed sources was collected, examined and organized.

Figure 1.1
MARITIME CARGO VOLUMES, PORT OF CONSTANTZA, SINCE 1992



General Cargo Traffic

Following the dramatic downturn of the Romanian economy after 1989, the maritime cargo volume handled in the Port of Constantza showed a pronounced recovery starting with year 1992, illustrated by Figure 1.1

There is also a very significant traffic volume through the Port of Constantza being handled over on the Danube - Black Sea Canal, according to the following tabulation.

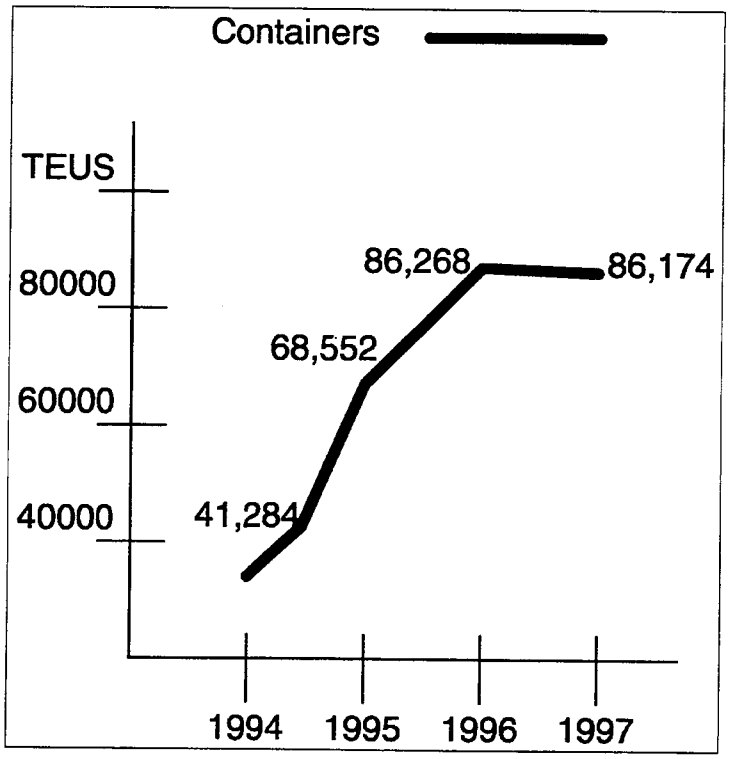
YEAR	TONS (1000)
1992	3,284
1993	4,611
1994	5,724
1995	8,217
1996	9,379
1997	10,177

Container Traffic through Constantza Port

In the context of Constantza Port global traffic, the container traffic represents a primary focus of this study. Data on container traffic was provided by SOCEP and the Railway Directorate (D.C.F.) Port Constantza. It shows a continuous upward trend from 1994 to 1996, with a slight decrease in 1997.

The evolution of container traffic between 1994 - 1997 is illustrated by Figure **1.2**

Figure 1.2
EVOLUTION OF CONTAINER TRAFFIC BETWEEN 1994 - 1997 (TEUs)



TEU = Twenty-foot Equivalent Unit

Table 1.1
THE TRANSPORT ACTIVITY OF FERRY BOAT EFORIE
(1995 - 1997)

Year	Line	Number of voyages (R/T)	Number wagons		TOTAL TONS
			Loaded	empty	
1995	Constantza - Samsun	3	-	-	6560
1996	Constantza - Samsun	7	-	-	12100
1997	Constantza - Samsun	10	-	-	5900
	Constantza - Mersin	4	157	129	7837
1998	Constantza - Mersin	8	480	508	14400

Ferry Boat Traffic

In 1995 two existing ferry boats Eforie and Mangalia were transferred from Romanian Maritime company to then SNCFR.

The ferry boat Eforie started regular voyages in the Black Sea, between Constantza and Samsun (Turkey) in 1995. Until 1997, the vessel has executed 20 R/T voyages to Samsun. Then, due to lack of freight from Samsun, the line was discontinued. In the same year, 1997, a new line was started between Constantza and Mersin, Turkey, in the Mediterranean Sea.

The following Table **1.1** shows the voyages of Eforie between 1995 to-date.

Ro - Ro Traffic

Constanza South Port accommodates Ro-Ro-traffic mainly to/from Turkey with origin/destination Romania or Europe.

Between 1992 and 1997 Ro-Ro traffic has decreased from 13006 truck + trailers per year, to 4085 per year in 1997. A primary reason for the drop has been the lifting of the embargo to Serbia. The latest restrictions on axle loads on European highways and newly introduced legislation requirements for drivers contributed to the drastic reduction of Ro-Ro traffic through the Port of Constantza. Table **1.2** shows the Ro-Ro transit through the Port of Constantza between 1992 - 1997.

Free Zone

The establishment of Free Zone Constantza South & Basarabi (FZCSB) was approved by the Romanian Government on August 16, 1993. It is an economic zone mainly for developing contractual joint ventures and foreign capital enterprises. It enjoys preferential policies, incentives and flexible measures granted to special economic zones in Romania.

FZCSB covers an area totaling 134.6 Ha. The port-linking extension of the Constanza Port that crosses FZCSB for a distance of about 4 km seaward and along 6.5 km of seafront serves as the line of demarcation and allows the operation of Panamax and Overpanamax ships. Figure **1.3** shows the Free Zone within Constanza South Port.

Table 1.2
RO-RO TRAFFIC THROUGH THE PORT OF CONSTANTZA BETWEEN 1993 - 1997

YEAR	# TRUCKS & TRAILERS	TONS
1992	13006	390027
1993	14745	433645
1994	12245	352216
1995	6143	179768
1996	5344	149916
1997	4085	114997

The aim of the FZCSB is to build itself into an export oriented economic center with foreign trade as the guiding factor, modern industries as its foundation and harmonious development of the tertiary sectors such as finance and trade.

Free Zone Activities

The following activities can be carried on within the area of the Free Zone Constantza South & Bararabi:

- Handling, storage, sorting, measuring, processing, assembling, manufacturing of goods;
- Testing, auctioning, selling and purchasing;
- Stock-exchange, financial and domestic operations;
- Leasing or renting buildings, storage areas, territory mounting economical objectives;
- Chartering, brokerage and ship chandlering;
- Rendering a wide range of services.

All these activities may be performed by Romanian or foreign, natural persons or corporate bodies, exclusively subject to a License & the Entry Permits issued by the Free Zone Administration of the Constantza South & Basarabi.

Advantages To Users

- Lease of land and hire of buildings for a period of up to 50 years;
- No customs or levied taxes on consumer merchandise;
- No tax on profit and VAT;
- Possibility to transfer capital and profit abroad;
- Guarantee of all investments and custom guarantees;
- Possibility of changing the origin of the merchandise.

Exporters investing in the Free Zone of Constantza South & Basarabi benefit as follows:

- No income tax for goods sold inside the free zone;
- Profits result from transport tax differences for goods in bulk brought in and re-exported after processing;
- The possibility to bring sub-assemblies and spare parts from different countries, and the re-export the final products after assembly in the free zone;
- The right to be part of the free zone development process;
- The possibility to have an available market on the Black Sea coast and on the Danube hinterland, accessible by roads, railroads, airways and inland navigation that crosses the European continent;
- Skilled and inexpensive labour force.

The Importers also benefit by getting closer stocks of goods from their own market, when international juncture is unfavorable.

Opportunities For Investors

In order to extend its activities, the Free Zone Administration of Constantza South & Basarabi intends to develop the following additional terminals:

- Oil products;
- Cereals; and
- General goods, automobiles, and processing products.

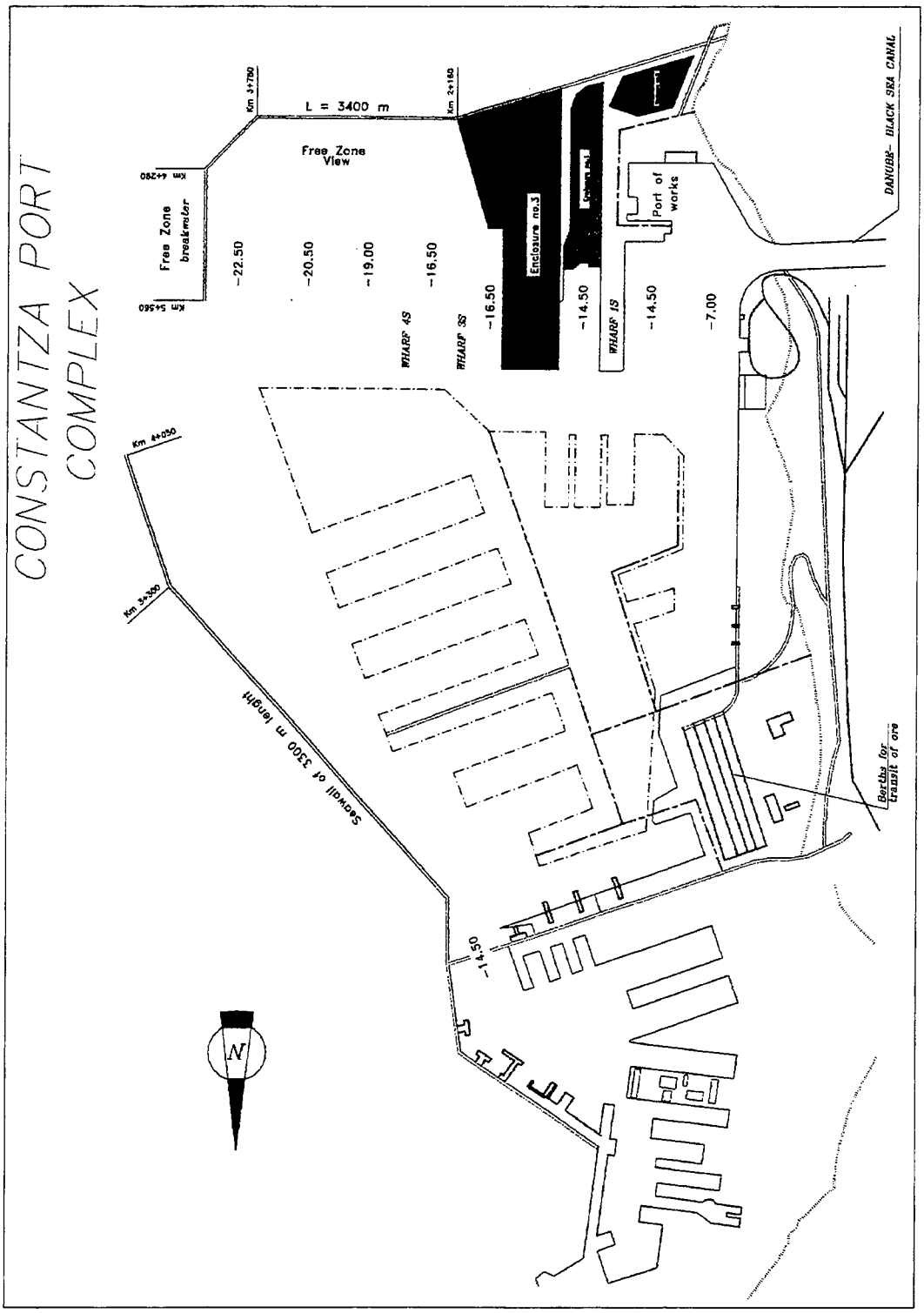


Figure 1.3
CONSTANTZA SOUTH PORT
FREE ZONE LAYOUT

Free Zone Traffic

Constantza Port Free Zone was established in 1995. After a timid start in 1995, it handled 58,700 tons in 1997.

Table **1.3** shows Free Zone Traffic between 1995 - 1997 through Constantza Port, handled by rail, truck and barge.

Figure 1.4 shows detailed layout of existing and planned facilities in the Free Zone, South Port

Inland Container Terminals

CFR-Freight presently operates 32 inland intermodal terminals. With few exceptions, most of them have low or very low activity. Data provided by the terminals shows a total traffic of 352,700 tons and respectively 35,720 Twenty-foot Equivalent Units (TEUs) handled in 1997.

Black Sea Ports

A summary examination of the traffic volumes and present layouts was done for the following Black Sea ports:

- Bulgaria .....Burgas and Varna
- Russia .....Novorossiysk
- Ukraine .....Odessa and Ilichevsk
- Georgia .....Poti and Batumi

As previously stated due to the numerous agencies and operators involved or monitoring the intermodal activity, and some times due to the difficulty to secure pertinent and/or consistent information, the process of data collection has continued throughout the entire project.

Table 1.3
FREE ZONE TRAFFIC THROUGH CONSTANTZA PORT BY RAIL/ TRUCK/ BARGE
1995 - 1997

YEAR	IN			OUT			TOTAL		
	TONS	# physical units	TEUs	TONS	# physical units	TEUs	TONS	# physical units	TEUs
RAIL									
1995	270	-	-	203	-	-	473	-	-
1996	132	11	17	44	4	8	176	15	25
1997	1989	179	298	375	20	38	2364	199	336
TRUCK									
1995	166	-	-	60	-	-	226	-	-
1996	633	-	-	839	-	-	1472	-	-
1997	3497	118	193	4849	68	131	8346	186	324
NAVAL (BARGE)									
1995	3192	-	-	-	-	-	3192	-	-
1996	365	-	-	24,558	-	-	24,923	-	-
1997	2687	83	166	56,016	-	-	58,703	83	166

TEU = Twenty-foot Equivalent Unit
SOURCE: Free Zone Administration.

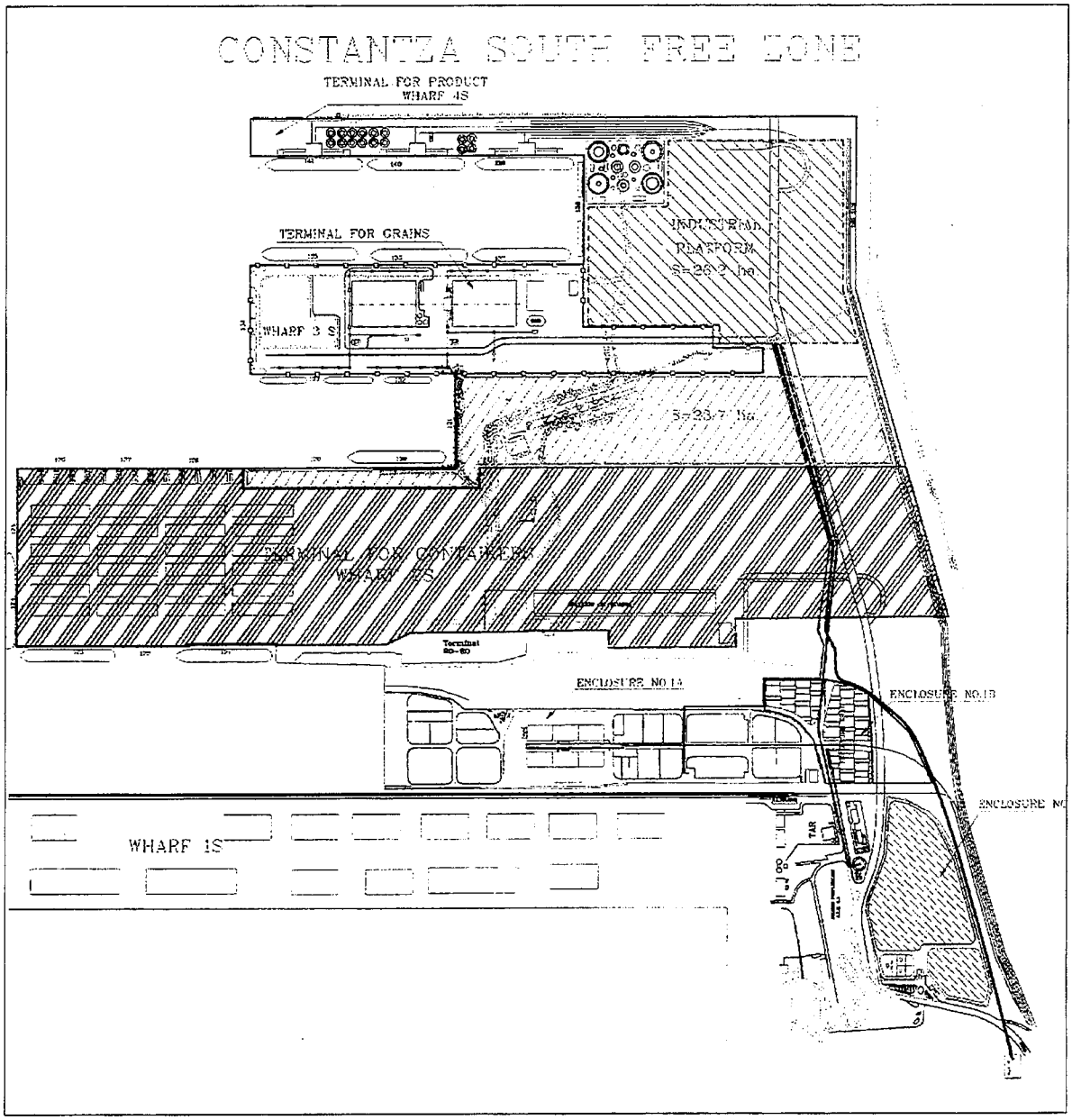


Figure 1.4
DETAILED LAYOUT OF EXISTING AND PLANNED FACILITIES, SOUTH PORT FREE ZONE

Task 2. REVIEW OF CURRENT FACILITIES & OPERATIONS

OBJECTIVE:

- *Description of the existing inland intermodal facilities and operations and of the terminals and facilities that are related to the rail intermodal and container handling activities within Constantza Port.*

OVERVIEW:

- *The Port of Constantza is the largest port on the Black Sea. It consists of more than 100 berths with ongoing expansion. The port has been divided into two major components, referred to as the North Port and the South Port. The initial berths of the Port date back to 1895 when the first portions of the North Port area were constructed. The most recent development within the port, as well as the Free Zone, are located in the South Port area.*

RAIL SYSTEM DESCRIPTION

Romanian Railways (CFR) operates a rail system of 11,187 km, including 351 km of meter gauge; and 36 km of 1524 mm gauge in the vicinity of the Moldavian and Ukrainian borders, used primarily for the interchange of wagons with former Soviet Union rail systems. Major routes are electrified double track lines (3,942 km). Rolling stock includes 1,061 electric and 2,274 diesel locomotives, 6,082 coaches and 140,961 wagons. Due to the drastic reduction of traffic after 1990, only part of the exiting rolling stock is operational.

Between 1993-1996 Romania has joined international conventions and agreements for integration of the national railway network within the European Railway System.

In Romania the branch of Pan-European Railway Corridor IV has as its main route the Curtici - Arad - Brasov - Bucharest - Constantza line. The Bucharest-Constantza line has 225 km. It is a double track, 25Kv, 50 H_z electrified line, which was designed for 140 km/h. The track consists of UIC 60 type rail (60 Kg/meter) laid on mono-block concrete ties with a crushed ballast bed. Due to a maintenance backlog as well as the need to increase the line's maximum speed to 160 Km/h for passenger trains and 120 Km/h for freight trains, the rehabilitation and modernization of the line is urgently needed. This is also a requirement for integration of the line within railway corridor IV. A short study containing technical and economic considerations for rehabilitation of the Bucharest- Constantza railway line is attached as Annex I.

CONTAINER TERMINALS IN CONSTANTZA PORT

Container handling operations are located in a number of different locations in the north port area and plans have been defined for the addition of a new container area in the south port area, near the free zone. Each of the existing areas has been reviewed and evaluated in detail within this task.

Berth 39

This facility handles a limited volume annually, due to the small size of the terminal and because only geared or self sustaining vessels can be accommodated. It is operated by Sun Shipping and Unix.

Rail intermodal service is provided by rail lines on berth 38 and berth 40, with a capacity of 20 cars.

Berth 44

This berth is used to handle combination vessels which transport general cargo as well as containerized cargo. It can accommodate vessels less than 150 meters in length. The berth is 220 meters long and offers 11.7 meters of water depth. Like berth 39, berth 44 does not have traditional equipment for the handling of containers. However, three crawler cranes on the berth can be used for the occasional handling of containers.

Berths 51 & 52

The container terminal at berths 51 and 52 offers a 440 m. berth front and 9.7 m. water depth. This terminal is currently the primary facility in the port of Constantza for the import and export of containerized cargo. The terminal operator,

SOCEP, is responsible for the maintenance and operation of the handling equipment. The overall terminal area is 125,000 sq. meters with a storing capacity of 6,000 TEUs. The rail layout consists of seven tracks, two of which permit direct loading/unloading of containers between vessels and rail. The terminal has a dedicated intermodal rail area serviced by three tracks, 400 m. long, with a parking capacity of 20 wagons for 180 TEUs. Two rail mounted gantry cranes span the working area and do the loading/unloading of the intermodal trains. The cranes are fitted with telescopic spreaders which can handle panamax vessels.

Dwell time

Forklift trucks are used to stack containers up to three high, in stacks that are essentially one deep.. The average dwell time is 30 days, although the "free time" is only 15 days. The most effective way of increasing the handling capacity of the terminal at berths 51 and 52 would be to reduce the dwell time. The size of the terminal is directly related to dwell time, hence by reducing the dwell time to 20 days, the terminal size could be reduced in size by 35%, or the through-put capacity could be increased by 35%.

Access

Access to SOCEP terminal is greatly restricted because the gate to the SOCEP terminal is located off the port road with only a limited amount of waiting space, prior to entry the terminal. This is compounded by the general condition of the road which effectively restricts the speed of truck movement. To complicate things the rail tracks to the terminal provide conflicting moves when wagons are switched in or out of the terminal.

Customs clearance

The efficient operation of the container terminal is further impeded by the current Customs procedures to release cargo between 11 am and 2 pm, only. Trucks which are not inspected by 2 PM, have to wait until the next day.

RO-RO AND FERRY BOAT TERMINALS

The Ro-Ro and the Ferryboat terminals are located in the south port, at berth 120 and 121, respectively (see Introduction and Objective, Figure III – Constantza Port layout).

While it is possible to accommodate this type of vessel activity at other berths in the port, the berths listed here are considered to be primary locations, offering the most efficient operations.

Berth 120

This berth has 14.5 meters of water depth and is equipped with an equalizing ramp and mooring dolphins to accommodate ferry loading, over the stern or the bow. There are currently two ferries in use, providing a rail link to other ports on the Black Sea and the Eastern Mediterranean. The ferries, Mangalia and Eforie are of identical design, having three decks for storage of rail wagons, with a standard gauge of 1435 mm. Loading is accomplished via a stern ramp to the middle deck. Small combination tuggers are used aboard ship to move the rail cars. An internal elevator transfers the wagons to the upper and lower decks. The maximum carrying capacity of each ship varies from 105 to 110 wagons, depending on the actual wagon length. In a fully loaded configuration (with 105 wagons), this would be equivalent to 315 TEUs. The unloading and loading process requires approximately twelve hours for either one of the ferries.

Berth 121

Berth 121 is the roll-on-roll-off (Ro-Ro) berth, used for the loading of a wide variety of cargo types, essentially anything that has wheels or can be loaded onto a wheeled platform. This, in turn, demands that vessel design be compatible with a Ro-Ro operation method. The ramp at berth 121 offers access to vessels with a stern or bow ramp and has been designed to handle a wide range of vessel sizes. The Ro-Ro facility, next to the new container terminal, offers the opportunity for containers to be transhipped in Constantza to Ro-Ro ports on the Black Sea.

Cars are a common Ro-Ro commodity requiring a dedicated support area, Close coordination between the Port, the Free Zone, the Rail operator and the Ro-Ro operator is needed to efficiently use these facilities and to effectively utilize the Port area and rail capacity, in order to ensure a productive and smooth vessel operation.

FREE ZONE

The Free Zone Constantza & Basarabi started operations in 1995. Task 1 gives a detailed description of the free zone activities.

The Free Zone covers an area totaling 134.6 Ha. The port- linking extension of the Constantza Port that crosses the Free Zone for a distance of about 4 km. seaward and along 6.5 km. of seafront serves as the line of demarcation and allows the operation of Panamax and Overpanamax ships.

The location of the ferry boat and the proposed development of the new container terminal at berths 122-130, offers a significant opportunity for growth in both import and export levels of containerized cargo.

Inspection of the road network in the south port area has identified a number of problems with the road system which restricts the smooth flow of vehicle movement. This is largely the result of ongoing construction within the area and these defects will be corrected over the short term.

OTHER PORT FACILITIES

The remaining cargo handling facilities within the port cover a full range of capabilities and have been described and listed by cargo commodity in the report. They are of secondary interest for this study, and are only listed here, as follows:

- Terminal for ore, coal, and coke.
- Terminal for Chemical Products, Fertilizers, Urea, Phosphate, Apatite.
- Terminal for Building Materials
- Terminal for Cereals
- Oil Terminal
- Edible Oil and Molasses Terminal
- Cars Terminals

The South Port has been under development and new facilities are planned in the area. A short description of its berths and specialization follows:

BERTH #	OVERALL LENGTH (m)	WATER DEPTH (m)	CARGO TYPE
80-84	1,395	12.5-18.5	Ore, coke & coal
85	356	11.5	Ore, coke & coal transfer to Danube barges
94-96	600	7.0	Ore, coke & coal transfer to Danube barges
104-114	1,747	7-14.5	General cargo
115-119	1,195	14.5	General cargo, free zone
117-118	457	14.5	Car terminal, free zone
120	220	14.5	Rail ferry berth
121	212	14.5	Ro-Ro berth
122-125	838	14.5	New Container Terminal
126-130	850	16.5	New Container Terminal
131-137		16.5	Under planing/construction

The Danube-Black Sea Canal

The Danube-Black Sea Canal was constructed to permit vessel traffic between the Black Sea and the Danube. Also known as Corridor #4, the Danube connects to the Rhein River making it possible to travel by barge between Constantza and Rotterdam. The Canal exit locks are within the south port.

TTOFC Rail Service

CFR Freight intends to extend its intermodal services by starting a TTOFC service in Constantza. To that extent two local manufacturers are building specialized tandem platform cars to transport tracks with trailers. The introduction of these wagons in the CFR fleet will allow for truck and trailer units brought to Constantza by ferries or Ro-Ro vessels to be loaded here and transported to their final destination in Romania and Europe.

RAILWAY INTERMODAL FACILITIES & SERVICES

Facilities and Operations Within the Port Area

CFR has an extensive track layout within the port area. and a major classification yard through which virtually all traffic must pass. Due to the arrangement of the port track layout, grouped trains must pass through the yard.

Inbound facilities consist of a receiving yard, a hump yard for classification by destination pier, and an inbound holding yard. Each pier has a support yard in which wagons are held until required for ship loading.

Container facilities within the North Port area are operated by the stevedoring companies. Switching is provided by CFR, twice a day. Containers are not loaded in geographical order. They are brought from the loading area to the classification yard for sorting and formation of outbound trains. Container unit trains are dispatched directly from the departure yard.

In the South Port area, continuation of the ferry ramp is a yard with a 220 wagons capacity, used to handle the wagons to/from the ferry. Arrangement of wagons for loading is a complex, balanced loading operation, designed so that balance of the ship is maintained both longitudinally and transversely.

South of the Free Zone there is a second yard which supports all South Port activities. All cargo moving to or from the South Port passes through this yard where it is classified by destination within the port. Ferry traffic is handled in the same manner.

The Free Zone has its own yard which is operated by Romtrans. Wagons are delivered /taken from the yard by CFR with a regular rail movement of containers between the North Port and the Free Zone. These are handled in the North Port by SOCEP. Within the Free Zone, containers are transferred between wagons and chassis by rubber tired cranes.

Construction of the proposed container and grain terminals in the South Port will increase the demand for rail service. The new container terminal will include a rail layot system for intermodal container transfer and for convoys movement/train formation.

CFR has organized a separate operating directorate with jurisdiction over all port track systems. Port activity is closely monitored and planned through daily work meeting between port administration, port operators and railways staff.

Inland Terminals

CFR operates 32 inland intermodal terminals. All inland terminals are built to the same design. Except for two, all use standard rail mounted gantry cranes with 32-ton lift capacity and 25.5 meters between the centerlines of the support rails.

All of the terminals provide pick-up and delivery service and have assigned tractors and chassis for this purpose. CFR does not permit the customer to pick up a container at the terminal but requires that the railway make the delivery or pick-up. Terminal to terminal service, as is used in much of the world, is not available in Romania.

Train Operations

CFR-Freight operates a number of dedicated container trains serving the major container generating points. There are also are eleven round

trips scheduled on an as-needed basis. While some are terminal transfer operations, especially in the Bucharest area, others operate over fairly long distances. CFR-Freight operates two pairs of intermodal trains daily between Constantza and Bucharest. The normal train consist is fifteen wagons, although longer trains can be operated. The RG platform wagons can carry three twenty-foot containers. Containers for destinations not served by dedicated trains are handled in regular freight trains.

There is also some delivery of containers on wagons directly into the customer's plant. No records are available as to the volume moving in this manner. It appears that empty containers are also placed in the customer's plant on wagons for loading, and moved directly from the plant, without passing through the local terminal.

CFR Container Traffic

Container traffic moves not only through Constantza but also via other gateways to Europe. Table **2.1** shows container tonnage entering and leaving Romania by area of origin/destination and borders. Sixty-one percent of this cargo originated or terminated in Western Europe or the Mediterranean Sea areas.

CFR offers only full door to door service for containers. CFR provides the pick up and/or delivery to and from the customer facilities. Each terminal has a special tariff for truck delivery and for other miscellaneous services.

The railway handled a very substantial volume of domestic container traffic before 1990. A large number of CFR owned containers are stored at various terminals. This traffic has decreased rapidly because of the decline in economic activity and the rise of a private trucking industry, which prior to 1990, was precluded from transporting freight in competition with the railway for distances over 50 Km.

Overall freight traffic has fallen by approximately 70%, but the container traffic has been growing. Total container traffic through Constantza Port has increased over four times between 1991 and 1998, indicating the need to efficiently operate intermodal traffic.

CFR ROLLING STOCK

CFR has one standard flat wagon used for containers. The standard wagons class Rgx, have a length of 18.56 meters, tare weight of 24 tons, and loading capacity of 56 tons. Control of horizontal movement is provided. The wagon fleet is more than adequate for the present volume of traffic.

CFR owns a substantial number of containers of 10, 20 and 40-foot lengths. A number of these containers have been leased to other parties for storage purposes. CFR has transferred to the Railway Assets Company part of their out-of-order and surplus containers. CFR-Freight has kept around 6,000 for intermodal service.

Constraints

Improvements in operational efficiency could be achieved by redesign of existing track layouts at some intermodal terminals. Parking and storage areas at most inland terminals areas are quite small. At others storage has reached the point where terminal operations are affected by lack of space. Operations and service levels could be improved by finding other areas for surplus container storage.

THE EXISTING MANAGEMENT INFORMATION SYSTEM

The existing management information system (MIS) is limited. For most regional applications, there is no coordination on a system wide basis. The existing wagon control system at the headquarters level maintains records of wagon and train movements. Additional control system capacity is being achieved by the addition of hardware, data transmission lines (fiber optics) and software packages.

There are numerous deficiencies within the present information system. There is no coordination between information gathering activities. Each function gathers information required for its own operation. There is little expansion to other areas or efforts to share data between functions. In case of a need for system wide reports, it is necessary to consolidate regional and local data manually at the headquarters level.

Table 2.1
COMBINED TRAFFIC ELEMENTS FOR CONTAINERS TRANSPORT BROKEN DOWN ON TERMINALS 1997

No.	Terminal denomination	Railway Regional Division	No. of Loading/ Unloading Tracks	Usable Length of Loading & Unloading Tracks	Hadling Equipment			Storage Area sq. m.	Transported Tons	Handled Tons	Dispatched Net Tons	No. of Dispatched Containers
					No. Cranes 32 tf	K55360 No. Cranes	RDK 290 No. Cranes					
0	1	2	3	4	5	6	7	8	9	10	11	12
1	Bucure[ti Sud	Bucure[ti	2	2 x 308	3			5000	15664	15664	8298	463
2	Ploie[ti Crâng	Bucure[ti	3	3 x 350	3			1560	21021	21021	10699	612
3	Bucure[ti Progresu	Bucure[ti	2	2 x 300	1			780	-	-	-	-
4	Bucure[tii Noi	Bucure[ti	4	4 x 400	4			2000	88837	88837	13409	862
5	Târgovi[te Nord	Bucure[ti	1	1 x 350		1	1	900	6129	6129	2974	194
6	Craiova	Craiova	2	2 x 400	3			4150	10672	36379	4236	690
7	Bujoreni Vâlcea	Craiova	2	2 x 300	2			2150	8858	13991	5630	737
8	Bradu de Sus	Craiova	2	2 x 300	3			2700	28253	59233	14424	1325
9	Drobeta Tr. Severin	Craiova	1	1 x 100	-	-	2	400	135	247	96	9
10	Slatina	Craiova	1	1 x 100	2			725	3386	6782	565	32
11	Glogov`]	Timi[oara	2	2 x 230	2			2250	8732	15420	2864	414
12	Semenic	Timi[oara	4	4 x 250	2			5300	33686	46120	11532	1859
13	Deva	Timi[oara	2	2 x 200	1			1380	4491	6872	1501	267
14	Baia Mare	Cluj	2	2 x 192	2			900	4674	5422	915	125
15	Bistri]a	Cluj	2	2 x 80	2			400	17858	17858	10695	546
16	Cluj Napoca Est	Cluj	2	2 x 200	2			1750	13729	14590	2724	528
17	Oradea Est	Cluj	2	2 x 200	2			1750	6751	8878	2106	298
18	Zal`u Nord	Cluj	2	2 x 110	1			500	5111	8135	2440	195
19	Turda	Cluj	2	2 x 115	1			925	6189	6191	4065	308
20	Alba Iulia	Bra[ov	2	2 x 376	1	-	-	750	4266	876	211	19

Table 2.1 (continued)
COMBINED TRAFFIC ELEMENTS FOR CONTAINERS TRANSPORT BROKEN DOWN ON TERMINALS 1997

No.	Terminal denomination	Railway Regional Division	No. of Loading/ Unloading Tracks	Usable Length of Loading & Unloading Tracks	Hadling Equipment			Storage Area sq. m.	Transported Tons	Handled Tons	Dispatched Net Tons	No. of Dispatched Containers
					No. Cranes 32 tf	K55360 No. Cranes	RDK 290 No. Cranes					
21	Târn`veni Vest	Bra[ov	1	1 x 150	-	-	1	500	2775	2784	1458	132
22	Sibiu	Bra[ov	2	2 x 180	2			1080	11535	15340	4285	390
23	Media[	Bra[ov	2	2 x 160	2	-	-	1280	5607	9816	2307	210
24	Tg. Mure[Sud	Bra[ov	3	3 x 180	2			1200	7784	12454	3369	306
25	Bra[ov Triaj	Bra[ov	2	2 x 300	3			1200	37883	68264	8549	777
26	Miercurea Ciuc	Bra[ov	2	2 x 200	1			1600	1615	2795	602	32
27	Suceava	Ia[i	2	2 x 150	2			2000	6078	9351	2193	224
28	Socola M`rfuri	Ia[i	2	2 x 300	2			3000	31072	68280	2135	864
29	Bac`u	Ia[i	2	2 x 150	2			1520	9462	12445	3709	416
30	Vaslui	Ia[i	2	2 x 240	1			1800	949	1727	53	25
31	Boto[ani	Ia[i	2	2 x 165	1			2000	13175	33246	1482	163
32	Gala]i M`rfuri	Gala]i	2	2 x 250	3			3105	12394	31303	7674	373
33	Buz`u Sud	Gala]i	2	2 x 250	2			2250	22713	30199	16049	715
34	Constan]a M`rfuri	Constan]a	2	1 x 380	3			3600	15000	16074	6270	350
35	Tulcea	Constan]a	2	1 x 490	2			3040	4333	4500	2400	244

Data recording at intermodal terminals is even more deficient. Inland terminals keep data on physical containers, not TEUs, nor tons. They quantify only outbound containers, but not the inbound ones. No information is kept concerning local pick-up and delivery activities or origins and destinations of containers, except for customer billing purposes. Much of the information required for proper terminal management is not readily available Deficiencies in the existing MIS has led CFR to design a new Integrated Railway Information System (IRIS). Priority applications have been identified in sales and marketing, operations, maintenance (infrastructure and rolling stock), and human resources. During this Study, it was anticipated that contracts would be signed for this system by December 1998. Installation is expected to take three years for system wide application. This will be coordinated with the installation of a new fibre optics cable system throughout the CFR network to improve the communications capability.

THE FERRY SERVICE

CFR initiated rail wagon ferry operations in 1995 when two existing ferries, the Eforie and Mangalia, were transferred from the Romanian Maritime Company to the CFR. The two ferries were built in Romania during the early 1980's and both have recently received capital repairs.

Initial operations were between Constantza and Samsun, Turkey. Due to lack of traffic, the service to Samsun was discontinued in 1997 and new service to Mersin, Turkey on the Mediterranean Sea was started. Service to Samsun or Mersin requires about five days transit time (round-trip). At Constantza, unloading of a full load (about 105 wagons) requires 6 hours of terminal time. A further 6 hours is required to load. The same terminal time is required at Samsun where proper terminal facilities are available. At Mersin, however, a substantially longer time is required as proper terminal facilities are not available. The handling of one wagon may require several hours due to the absence of facilities.

CFR has recently entered into agreements for starting service to Poti, Georgia. This is intended to permit the ferry service to become part of an Asia-Europe service. This cooperation could become reality by building a standard gauge (1435 mm.) track layout at Poti for freight and container transfers at Poti between the standard and wide rail gauge wagons.

CFR is also soliciting the movement of highway trailers and tractors on flat cars by ferry boat. Positive discussions have taken place between CFR and a Turkish truck organization. To anticipate the sevice, lodging facilities for drivers have been added on ferry boats along with special tie-downs for the highway equipment.

Each ferry requires a crew of 35 men. The full staff travels with the ferry and are on duty throughout the year, regardless of how many voyages are made.

THE GAUGE CHANGE AT NORTHERN AND EASTERN BORDERS

At the borders with Ukraine and Moldova rolling stock must be transposed by lifting the wagon box/platform and interchanging the bogies.The gauge interchange border points are Dornesti, Ungheni and Galatzi Transbordare. CFR operates a total of 36 km of 1,524 mm gauge, all in the vicinity of cross border junctions. When existing wagon ferry operations are extended to Georgia and Russia, as anticipated, the ferries will be affected by problems with track gauge. The ferries presently have provision for wagons of 1,435 mm gauge only and no adaptation to 1,524 mm seems feasible.

Use of containers or swab bodies which can be easily trans-loaded from one system to another may be an efficient, economic solution.

Task 3. TRAFFIC FORECAST

OBJECTIVE:

- *Investigate present demand and future potential for intermodal services currently being offered or to be provided by the Romanian State Railways (CFR) from/to the Port of Constantza to domestic and foreign destinations. The task includes examination of container traffic movements through the Romanian borders. The traffic forecasts are developed by market segments.*

OVERVIEW:

- *This task is focused upon the unitized imports and exports of Romania, currently handled in containers and also TTOFC, Ro-Ro and ferry boat services and on the potential for the use of the transport corridor from Constantza to neighboring countries for the transit of international trade. The Task 3 Report identifies the traffic potential for intermodal transportation services provided by the CFR.*
- *Romania has experienced vigorous growth in containerized trade, despite the dramatic reduction of economic activity in the period 1989-1992, following the political and economic structural changes which have occurred at the beginning of 1990. The containerized trade of Romania remains a buoyant and attractive market for rail based intermodal services. However, the transport industry is becoming increasingly competitive. This means that CFR has to adjust and adapt to the new economic environment by building a different, commercial oriented organization, a realistic marketing strategy and a firm policy for service quality and cost control.*
- *International in-transit cargo consists of a small portion of the current intermodal traffic but presents a considerable opportunity for Romania to exploit the privileged geographic position of Romania. This potential may be secured with total integration of transport services, efficiency and low cost services to the international market. This will require comprehensive and continuing marketing, based upon knowledge of the structure, functioning and exigencies of the international logistics network. These conditions do not presently exist at the CFR.*

ECONOMIC BACKGROUND

The collapse of the communist political structure and the rise of the market economy brought a dramatic reduction of the role of the State and the fomenting of a private sector as the basic engine of economic growth. Between 1989 and 1992, the Romanian economy had a drastic downtrend with the GDP declining by one third. The value of industrial production declined over the same period by more than 60%. The foreign trade component of the economy was thrown into distress, as trade was transformed and converted from inter-bloc transactions to market-based, hard currency relations. Imports and exports plummeted, declining more than 50% in value between 1989 and 1991.

Positive growth rates for international trade resumed in 1992 and for the GDP in the following year. It is expected that the value of foreign trade surpassed the level of 1989 in 1998. Maintaining the structure of government, employment and of public obligations has led to a level of emission of currency which provoked an inflationary spiral and a decline in the value of the national currency. However, in spite of former state control, central planning and public sector distribution of economic resources, the privatization of economic activities has progressed considerably, with the private sector contributing an estimated 52% of the GDP in 1998, in comparison with the 23.6% recorded in 1991.

The transportation sector declined from the level of 1989 by more than 75% by 1993. The composition of trade was transformed as the heavy industrial and extractive industries departed from their historic trading patterns.

The highly developed, high density rail system served social objectives until 1990. Cargo moving

over 50 km. distances could not be transported by truck if it was in competition with the railway. Following 1989, the Railway underwent a precipitous decline in freight volumes, falling from 306.3 million tons in 1989 to 99 million tons in 1993. By 1997, CFR recorded a total of 93.9 million tons of freight traffic. The modal share of national ton kilometers transported by the Railway has been steadily declining. Plans have been developed to alter the structure of the Railway in order to make the organization more commercial. A comprehensive reorganization plan was implemented in October 1998.

THE MARKET FOR INTER-MODAL TRANSPORTATION SERVICES FOR ROMANIAN FOREIGN TRADE

The Port of Constantza is the most important port facility in Romania, handling over 70% of the total waterborne commerce. The crisis of 1989-1992 produced a traffic reduction of 57%. Starting in 1993, the Port has had a positive traffic trend. Beyond the reduction in total volume, the economic changes not only implied a reduction in trade, and a change in trading patterns, but also important changes in the composition of trade. The increase in the level of participation of the private sector in foreign trade activities is notable, and by 1996, the private sector accounted for approximately one half of the value of Romanian import and export traffic. This evolution is presented in Table 3.1

The trade relations that emerged emphasized commerce with the principal economies of the European Union and the European Free Trade Association, replacing the former partners in COMECON. This tendency is stronger for Romanian exports than for imports, reflecting the need to generate hard currency.

The Port of Constantza handles virtually all the maritime containerized trade in Romania.The container traffic at the Port of Constantza has experienced a strong growth after 1990. Table 3.2 presents the total port traffic in thousands of tons and the numbers of container units (expressed in standardized twenty foot equivalent units - TEUs).

Table 3.1
ROMANIAN FOREIGN TRADE
(million US dollars)

Year	Total Exports	Total Imports	Private Sector Exports	Private Sector Import	% Private Sector Exports	% Private Sector Imports
1990	5,775	9,202	11	35	0.2%	0.4%
1991	4,266	5,372	679	864	15.9%	16.1%
1992	4,363	5,784	1,201	1,898	27.5%	32.8%
1993	4,892	6,020	1,364	1,636	27.9%	27.2%
1994	6,151	6,562	2,481	2,573	40.3%	39.2%
1995	7,910	9,487	3,259	4,306	41.2%	45.4%
1996	8,084	10,555	4,156	5,096	51.4%	48.3%

Source: Statistical Yearbook of Romania, National Commission for Statistics

Table 3.2
PORT OF CONSTANTZA CONTAINER TRAFFIC

Year	TEU Units	Total Cargo (000 Tons)	Index (1990=100) TEUs	Index (1990=100) Total Cargo
1989	30,200	62,231	133.7	146.6
1990	22,580	42,452	100.0	100.0
1991	26,500	28,486	117.4	67.1
1992	28,789	26,882	127.5	63.3
1993	30,370	27,800	134.5	65.5
1994	41,290	30,400	182.9	71.6
1995	68,550	34,900	303.6	82.2
1996	86,268	34,836	382.1	82.1
1997	90,473	32,219	400.7	75.9

Source: Administration of the Maritime Port of Constantza

Projections of Constantza Container Traffic from Previous Studies

The changes which have occurred after 1989 in the structure of the Romanian economy, foreign trade composition, and trading patterns, have significantly altered the nature of the import, export, and the transportation activities. For these reasons the projection of trade and transportation activity in Romania presents a real challenge.

Recent studies that have developed container traffic forecasts for the Port of Constantza include the following:

- Port of Constantza Strategy Plan, Frederic R. Harris, Inc., November 1993
- Container Terminal Development Project, SAPROF, December 1996
- European Container Market - Prospects to 2008, Ocean Shipping Consultants, Ltd., 1997

The Strategy Master Plan produced low and high variant forecasts through the year 2010.The resulting containerized cargo for the Port presented two widely diverging scenarios, providing end-year totals of 280,000 TEUs and 490,000 TEUs, respectively.

The SAPROF study evaluated the feasibility of a plan to construct a new container terminal in the South Port area. The Study carried out a low, medium and high forecast through the year 2020. Projections were based upon the relationship of the growth of GDP and the growth of cargo susceptible to containerization. GDP growth rates were taken from econometric model results from the Romanian Commission for Forecasting.

The OSC document is an assessment of the container prospects for European countries. It created projections from 1997 to 2008, based upon the relationship of GDP growth to container flows, from a regional focus.

The data demonstrate that the projections have similar results through the years 2008-2010, after which the trends start to diverge. Recent estimates of GDP growth developed by the World Bank indicate a medium term forecast of 4% to 5%, less than estimates by the Romanian National Commission of Economic Forecasting in 1995, which were somewhat above the range of 6%.

Development of Containerized Traffic Forecasts of Romanian Imports and Exports

The forecasts of containerized foreign trade traffic developed for the Intermodal Study were based upon the following steps:

- Establish the Relationship of GDP to Import-Export Activity
- Estimate Future Growth of the GDP
- Develop the Relationship of Import-Export Values to Volumes
- Estimate Volumes of Cargoes Susceptible to Containerization

- Develop Rates of Containerization of Containerizable Cargoes
- Determine the of Number of Container Units

Table 3.3 presents GDP / Foreign Trade activity evolution between 1990-1996.

Table 3.3
GDP AND FOREIGN TRADE ACTIVITY - REAL GROWTH RATES

Year	GDP	Foreign Trade
1990	-5.6%	-20.9%
1991	-12.9%	-35.7%
1992	-8.8%	5.3%
1993	1.5%	7.5%
1994	3.9%	16.5%
1995	7.1%	38.8%

Following an analysis of the Romanian GDP with the value of foreign trade activities, comparative indices were developed, as presented in Table 3.4

The forecast of GDP was based upon the prospects for the Romanian economy as estimated by the World Bank: GDP 4% per year between 2000 and 2010. For the period 2011 to 2020, GDP has been estimated at 3% for the base (medium) forecast. A high forecast will be developed using a rate of growth of 6% for the years 2000 to 2010 and 5% for the period 2011 through 2020.

Based on experience with developed economies but taking into consideration the specifics of the Romanian economy the estimate for the level of containerization is in the range of 20 to 30%, a very low figure compared to western patterns..

Table 3.4
INDEX OF GDP AND FOREIGN TRADE (1990=100)

Year	GDP	Foreign Trade
1985	90	124
1986	86	119
1987	92	126
1988	95	127
1989	97	126
1990	100	100
1991	65	64
1992	67	68
1993	70	73
1994	80	85
1995	85	116
1996	90	124

Source: National Commission for Statistics and National Bank of Romania

Table 3.5 shows the incidence of containerization of Romanian foreign trade.

For the Port of Constantza, the projected level of containerization is approximately 50% for 2010 and 90% by year 2020. This level is representative of North America, Japan and Western Europe container markets. The number of containers projected for Romania has been established at a rate of 10 tons per TEU, a reasonable weight for the Port, and close to the levels experienced in developed trade routes.

Table 3.5
THE INCIDENCE OF CONTAINERIZATION OF ROMANIAN FOREIGN TRADE

Year	Foreign Trade (000 Tons)	Container Potential (000 Tons)	Containerized Cargo (000 Tons)	% Potential Container of Total Cargo	% of Potential Containerized
1994	31,305	1,615	408	5.2%	25.3%
1995	30,411	2,015	682	6.9%	32.4%
1996	40,947	2,269	655	5.5%	28.9%
1997	29,130	2,130	673	10.7%	21.5%

Sources: National Commission for Statistics & Administration of the Maritime Port of Constantza

Projections of Romanian Container Traffic for the Intermodal Study

Based on the analysis and evaluation described in the previous section, medium and high forecasts for the development of Romanian container traffic have been developed. These are presented in Table **3.6.**

Table 3.6
FORECAST OF FOREIGN TRADE CONTAINER TRAFFIC
(000 TEUs)

YEAR	MEDIUM FORECAST	HIGH FORECAST
2000	120.2	127.8
2005	150.1	185.9
2010	246.2	341.6
2015	382.2	586.1
2020	589.8	996.5

Source: Intermodal Feasibility Study

The projections are derived from the information available at the time of the Study. Changes which may later occur in the expected behavior of the parameters involved in the analysis could alter the projected container volumes.

CFR Participation in the Transport of Romanian Container Traffic

The preponderant position of CFR in freight transportation before 1990 has drastically changed over the past decade, due to the increased competition from the truck industry. Before 1989, when both the railway and the trucking industry were state owned, the market was allocated by the criteria of the central plan.

After 1989, this orderly regulated market collapsed. Now, shippers and consignees determine the transport routings and modal choices based on market factors. Moreover, Romania has received a $400 million credit for rehabilitation and modernization of its national road network. Table **3.7** (next page) shows the modal share rail/truck between 1989-1997.

The import/export rail shipments between Romania and the neighboring countries have increased at a 6.6% steady pace in the last years. Table **3.8** illustrates this traffic.

For the more specialized segment of the sea borne import-export container traffic, CFR has relatively maintained, with some inroads by the road mode, its modal share between 1991-1996. However, a marked decline in its market of the transportation of maritime containers for the Railway and the road sector for the period 1991 through 1997 share started in 1997 and continued through 1998. Table **3.9** presents the evolution of the rail/road market share for maritime container traffic (1991-1998).

There is also an insignificant container rail traffic volume between Romania and its neighbor countries via conventional trucks. However, available data relating to truck shipments is scarce.

Table 3.8
LAND BORDER IMPORT/EXPORT TRAFFIC TRANSPORTED BY THE CFR [TONS]

COUNTRY	1994	1995	1996	1997
Bulgaria	700,729	463,721	422,360	443,391
Yugoslavia	121,601	178,649	635,704	676,734
Hungary	1,700,719	2,702042	2,834,249	3,234,766
Ukraine	5,617,587	5,097,603	4,877,562	5,462,603
Moldova	727,485	748,950	726,290	922,283
Total	8,868,121	9,190,965	9,496,165	10,739,777

Source: CFR

Table 3.7
RAIL SHARE OF LAND TRANSPORTATION MARKET (rail + road tons)

Mode	1997	1996	1995	1994	1993	1992	1991	1990	1989
	Land transport total tons								
Rail	93,882	105,040	105,131	99,179	98,961	111,419	146,279	218,828	306,302
Road	180,485	191,030	159,076	167,581	45,291	65,193	112,059	201,783	382,342
Total	274,367	296,070	264,207	266,760	144,252	176,612	258,338	420,611	688,644
	Foreign trade land transport tons								
Rail	19,612	19,770	21,321	20,740	20,733	24,178	30,325	48,811	65,191
Road	18,494	10,939	10,264	5,331	939	994	705	344	298
Total	38,106	30,709	31,585	26,071	21,672	25,172	31,030	49,155	65,489
	Internal market land transport tons								
Rail	74,270	85,610	83,810	78,439	78,228	87,241	111,590	170,017	245,617
Road	161,991	180,091	148,811	162,250	44,352	64,199	111,346	201,445	382,044
Total	236,261	265,701	232,621	240,689	122,580	151,440	222,936	371,462	627,661
	Of land transport total tons								
% Rail	34.2%	35.5%	39.8%	37.2%	68.6%	63.1%	56.6%	52.0%	44.5%
% Road	65.8%	64.5%	60.2%	62.8%	31.4%	36.9%	43.4%	48.0%	55.5%
	Of foreign trade land transport tons								
% Rail	51.5%	64.4%	67.5%	79.6%	95.7%	96.1%	97.7%	99.3%	99.5%
% Road	48.5%	35.6%	32.5%	20.4%	4.3%	3.9%	2.3%	0.7%	0.5%
	Of internal market land transport tons								
% Rail	31.4%	32.2%	36.0%	32.6%	63.8%	57.6%	50.1%	45.8%	39.1%
% Road	68.6%	67.8%	64.0%	67.4%	36.2%	42.4%	49.9%	54.2%	60.9%

Source: CFR and SOCEP

Table 3.9
RAIL AND ROAD MARKET SHARE OF MARITIME CONTAINER TRAFFIC

YEAR	TOTAL TEUs	RAIL TEUs	ROAD TEUs	% RAIL	% ROAD
1991	26,500	20,255	6,245	76.4	23.6
1992	28,780	21,129	7,651	73.4	26.6
1993	30,370	21,243	9,127	69.9	30.1
1994	41,290	28,781	12,509	69.7	30.3
1995	68,550	47,889	20,661	69.9	30.1
1996	86,268	60,110	26,158	69.7	30.3
1997	90,473	60,926	29,547	67.3	32.7
1998	110,132	58,076	52,056	52.7	47.3

Source: CFR and SOCEP

INTERMODAL IN-TRANSIT CARGO USING ROMANIAN TRANSPORT CORRIDORS

Romania and International Transportation Corridors

The geographic position of Romania, its rail and road networks, and the strategic importance of the Port of Constantza as the largest most developed port on the Black Sea, have ensured the inclusion of Romania in the Pan European Transport Corridors studies listed below:

- **Pan European Corridor IV** - Road, Rail to Central Europe and Northern Europe, from Berlin/Nuremberg-Prague-Budapest-Constantza / Thesssaloniki / Istanbul
- **Black-Sea Danube Corridor VII** - inland waterway connecting the Black Sea to Rotterdam, via the Danube, Main and Rhine River System.
- **Pan European Corridor IX** - Road, Rail to Moldova, Ukraine and Russia, from St Petersburg - Moscow / Pskov - Kiev - Liubashevska - Kishinev - Bucharest - Dimitrovgrad - Alexandropolis

Within the interfacing European railways and with the objective of promoting effective competition and to revitalize the railways, the European Community has created the **Trans-European Rail** Freight Freeways offering use of rail infrastructure to any qualified operator. The following Freight Freeways, with their respective functions, available pathways and rate structures have been established:.

- Rotterdam, Netherlands to Milan and Gioia Tauro, Italy
- Antwerp, Belgium to Barcelona and Valencia, Spain
- Hamburg, Germany to Verona and Brindsi, Italy
- London, U.K. to Sopron, Hungary

The response and the traffic attracted so far have been rather weak. As for the London to Sopron Freight Freeway, the Railway Corridor IV, Curtici to Constantza is a logical continuation of the London –Sopron Freight Freeway. While working in Bucharest, the Consultant was visited by Mme. Marie-France Lagraulet from the French Railways (SNCF) who was in charge of the London – Sopron Freeway project. The manifested scope of the visit was to examine the opportunity of extending the freight freeway from Sopron to Constantza, based on possible traffic. It appears that there is a significant potential traffic to and from Greece and Turkey for the Freeway. From the projected traffic on Corridor IV, over half of it has its origin or destination in Turkey or Greece, making Rail Corridor IV a primary candidate for the freeway.

Current In-transit Activity in Romania

In-transit cargo consists of shipments that cross Romania along its transport infrastructure. Inconsistent data made it difficult to quantify with certainty the volume in-transit cargo. The rail in-transit shipments accounted for virtually all in-transit traffic until 1991. However, in 1997 trucks have handled more in-transit cargo than CFR. Table **3.10** shows the distribution between road and rail.

Identification of Corridors for In-transit Transportation Through Romania

This section focuses upon the potential for intermodal traffic in-transit through Romania. The traffic to be analyzed will be the potential for intermodal services including the Port of Constantza and the Romanian Railways (CFR).

The geographic position of Romania provides the potential to attract in-transit traffic. To capture this traffic requires investment, organizational and regulatory reform, upgrading of the quality of service, cost control, modern monitoring systems, and the implementation of a realistic marketing strategy.

In order to assess the potential transit corridors that may route cargo through Romania, the Consultants have organized the market into service regions with specific corridors. An analysis was carried out to identify the potential demand for in-transit service on the CFR.

The selected service regions are outlined below:

- **Service Region W:** Western and Central Europe, including Hungary, Czech Republic, Slovakia and Poland.
- **Service Region A:** Turkey and the Middle East, including Iran, Iraq, and Syria.
- **Service Region B:** Balkans, including Bulgaria, Croatia, Slovenia, Albania, Bosnia, Macedonia and Yugoslavia.
- **Service Region S:** The nations of the Caspian Basin and toward the East, considered part of the Silk Route , including Georgia, Armenia, Azerbaijan, Kazakstan, Turkmenistan, Uzbekistan, Kyrgyzstan and Tajikistan.
- **Service Region E:** Russia, Ukraine, Moldova, Belarus and the Baltics.

The traffic between these service regions has been organized into corridors that are relevant for the potential use of Romania as an in-transit route. These Transport Corridors are listed as follows:

- **Corridor 1:** Traffic between Service Regions W and A, representing traffic between Central and Western Europe and the Middle East, including Turkey, Syria, Iraq, Iran, Lebanon, Israel and Jordan

Table 3.10
MODAL DISTRIBUTION OF LAND TRANSPORT IN-TRANSIT TRAFFIC

YEAR	% OF TOTAL IN-TRANSIT CARGO	TOTAL LAND TRANSPORT TONS (000)	% RAIL	% ROAD
1997	43%	1,034	47.7%	52.3%
1996	32%	719	59.7%	40.3%
1995	40%	1,420	54.2%	45.8%
1994	52%	1,002	87.0%	3.0%
1993	68%	913	97.9%	2.1%
1992	32%	277	90.6%	9.4%
1991	60%	450	94.7%	5.3%
1990	92%	1,990	99.6%	0.4%
1989	97%	2,599	100.0%	0.0%

Source: National Commission for Statistics

- **Corridor 2:** Traffic between Service Regions W and B, including traffic between Central and Western Europe and the Balkans and Greece, including Bulgaria, Albania, Yugoslavia, Bosnia Herzegovina, Slovenia and Macedonia.
- **Corridor 3:**. Traffic between Service Regions W and S, including traffic between Central and Western Europe and the Black Sea to Georgia and points East. Includes Armenia, Azerbaijan, and Iran, then across the Caspian Sea to Kazakstan, Turkmenistan, Uzbekistan, Tajikistan, Kyrgyzstan, Tajikstan.
- **Corridor 4:** Traffic between Service Regions E and B/A consisting of traffic between Russia, Ukraine, Belarus and Moldova and the Balkans as well as Turkey and the Middle East.

Transport Infrastructure of the In-transit Corridors

The potential for in-transit traffic through the intermodal facilities in Romania will be determined by the costs and quality of service offered by the entire transport corridor, in comparison with alternate routes. The service regions for each Corridor defined for the Intermodal Study possess infrastructure facilities that currently service the cargo flows.

Western Europe and the Mediterranean basin are provided with a dense shipping network having a diversity of services for containers, including deep sea, short sea and feeder services. Table **3.11** presents, for major transshipment hubs, the container volumes handled in 1997.

The majority of container cargo is moved by ships between this region and the Balkans, Turkey and the Middle East. Service Region **W** has a high density rail and road network, most being modernized for integration with the EU. Service Region A has less a developed transport infrastructure but has good access to maritime shipping services on the Mediterranean and Persian Gulf.

Service Region **E** consists of states of the former Soviet Union. Their basic infrastructure requires extensive rehabilitation and upgrading. These countries have access to the Baltic and road/rail connections to Central Europe. Russia and the Ukraine also have port facilities on the Black Sea.

Service Region S is central to the Silk Road. Geographically isolated, the region has transportation problems going west. There are programs underway to improve rail systems and connections to ports.

The advantages of the geographic location of Romania and the basic transportation infrastructure available is evident and they constitute important attractions for the development of intermodal services for in-transit cargo. Mediterranean shipping services could connect with rail transport corridors for access Central and Western Europe, competing with the all-water services from the Mediterranean to Northern Europe. Gioia Tauro in Italy has plans underway to connect the port with unit trains to France and Germany. The ports of Trieste, Koper and Rijeka have existing rail links that transfer containers to Central European destinations. In the Black Sea, Constantza has an advantage of scale and infrastructure connections, both by rail and by waterway.

Table 3.11
MAJOR MEDITERRANEAN TRANSSHIPMENT HUB PORTS

PORT	TEU VOLUME 1997
Algeciras, Spain	1,537,627
Barcelona, Spain	971,921
Damietta, Egypt*	249,108
Genoa, Italy	1,179,954
Gioia Tauro, Italy	1,448,800
Limassol, Cyprus	238,000
Marsaxlokk, Malta	662,648
Piraeus, Greece**	710,000
Total	**6,998,004**

*January to May** Estimate
Source: "Hub Ports - Leaders & Feeders," *Containerization International*, June, 1998

In-Transit Traffic Through Romania by Railway

The records of the CFR provide details on the in-transit traffic of the Railway by major border crossing. CFR handled 938,280 tons of in-transit traffic in 27,210 wagon and container units in 1997. 92% was carried in rail wagons. 45% of wagons passed through **B** Region, 33% through **W** Region and 22% for Region. Over 80% of the containers transported in-transit by the CFR was directed to the B Service Region, principally Bulgaria, which is the link to Balkans and Service Region A. Next in destination volume is Hungary which is along the most used corridor to Western and Central Europe.

In-Transit Traffic through Romania by Road

There was no data available for in-transit traffic through Romania by truck. However, a limited survey carried out for selected road border crossings, covering a one week period from September 29 through October 6, 1997 was used. This survey was carried out by the Railway Study and Design Institute, the Consultants' local associate for this Intermodal Study. The following were the border crossings included in the survey:

- Giurgiu
- Giurgiu Mocanasu
- Bechet
- Calafat
- Nadlac

The first four border crossings are on the Romania -Bulgarian frontier. Nadlac is located on the western Romanian - Hungarian border. These data record the number of trucks and the tons of cargo along with origin and destination information for the study period. Table **3.12** shows the collected data.

Trucks crossing from the South border have as their origin Service Region **A** (Turkey and the Middle East) and **B** (Balkans and Greece), representing 57% and 40% of incoming trips. The majority of the trips and cargo are destined to Service Region **W** (Western and Central Europe) 60%, Romania 20%, beyond eastern Romania 17%. Service Region **W** generated 67% of the trips through the western border. Romania and Russia were the source areas of most of the remaining traffic, with 31% of trips.

Examination of these data proves the important regional role of Romania as a vital in-transit truck corridor between Western and Central Europe and Turkey/Middle East and the Balkans.

At the southern border of Romania, Turkish traffic accounted for over 60% of total border crossings in trucks, and over 80% of total tons. Considering the survey as representative of total traffic, it appears that the in-transit road traffic that crosses Romania is mainly Turkish trade. Table **3.13** provides data on Turkish truck traffic through Romania.

Table 3.12
TRAFFIC ON SOUTHERN BORDER CROSSINGS
(29/09/97 - 06/10/97)

BORDER CROSSING	INCOMING TRIPS	OUTGOING TRIPS	INCOMING TONS	OUTGOING TONS
Bechet	351	154	1,546	1,753
Calafat	317	341	3,213	5,061
Giurgiu	1,774	1,177	31,951	23,332
Giurgiu Mocanasu	549	89	3,664	1,327
Total	**2,991**	**1,761**	**40,374**	**31,473**

Source: Railway Study and Design Institute, elaboration by Study

Table 3.13
TURKISH ORIGIN/DESTINATION OF TRAFFIC FROM SURVEY
(29/09/97 - 06/10/97)

TRAFFIC	TRIPS	TONS
Outgoing Total	1,761	31,473
Outgoing Turkish Destination	928	18,764
Incoming Total	2,991	40,375
Incoming Turkish Origin	1,609	26,443
% Turkish Destination of Outgoing Traffic	52.7%	59.6%
w/o Romanian Traffic	64.4%	81.6%
% Turkish Origin of Incoming Traffic	53.8%	65.5%
w/o Romanian Traffic	66.5%	87.4%

Source: Survey, elaboration by Study

Table 3.14
BASELINE 1997 TRAFFIC ESTIMATE BY CORRIDOR

IN-TRANSIT CORRIDORS	SERVICE REGIONS	TONS (000)
Corridor 1	W to A	8,020
	A to W	6,000
	Subtotal	*14,200*
Corridor 2	W to B	4,300
	B to W	3.100
	Subtotal	*7,400*
Corridor 3	W to S	675
	S to W	340
	Subtotal	*1,015*
Corridor 4	E to B/A	2,200
	B/A to E	3,950
	Subtotal	*6,150*
Grand Total		**28,585**

Source: Intermodal Study

Forecast of Potential In-transit Traffic for Romania

In order to establish a baseline for the forecasts, it is necessary to establish base year traffic data. A principal source for this information has been the European Union, which maintains a detailed data base of imports and exports between EU countries and the rest of the world. The data base provides country of origin and destination, and detailed commodity information covering 99 commodity groups. The Eurostat Office provided data to the Study covering the year 1997. Table **3.14** presents the estimated total traffic for the corridors.

For the development of traffic forecasts for the period 2000 to 2020, current conditions present difficulties in anticipating the development of foreign trade activities in the Service Regions. To minimize these uncertainties, a medium and high forecast were prepared.

To develop projections for the potential in-transit traffic for Romania, annual growth rates were developed representing a medium and high scenario.

Service Corridor	Medium Scenario	High Scenario
1	3%	6%
2	2%	5%
3	2%	8%
4	2%	6%

Forecasts developed for the medium and high growth scenarios are presented in Table **3.15**

The proportion of the traffic that will be attracted to Romanian intermodal transport services will depend upon a broad range of policies and actions to be taken by the Romanian Government and transportation officials, upon the investment of public and private sector capital in the improvement and upgrading of these systems and upon the continuing efforts to integrate the transport systems of the Corridors to provide efficient, safe and reasonably priced transport services to international trade.

Table 3.15
FORECASTS OF POTENTIAL IN-TRANSIT TRAFFIC THROUGH ROMANIA BY CORRIDOR
(000 Tons)

Medium Scenario							
Corridor	Service Regions	Estimated Traffic - 1997	Forecasted				
			2000	2005	2010	2015	2020
1	W to A	8,020	8,764	10,159	11,778	13,654	15,828
	A to W	6,000	6,556	7,601	8,811	10,215	11,842
	Sub Total	*14,020*	*15,320*	*17,760*	*20,589*	*23,868*	*27,670*
2	W to B	4,300	4,563	5,038	5,563	6,141	6,781
	B to W	3,100	3,290	3,632	4,010	4,428	4,888
	Sub Total	*7,400*	*7,853*	*8,670*	*9,573*	*10,569*	*11,669*
3	W to S	675	716	791	873	964	1,064
	S to W	340	361	398	440	486	536
	Sub Total	*1,015*	*1,077*	*1,189*	*1,313*	*1,450*	*1,601*
4	E to B/A	2,200	2,335	2,578	2,846	3,142	3,469
	B/A to E	3,950	4,192	4,628	5,110	5,642	6,229
	Sub Total	6,150	6,526	7,206	7,956	8,784	9,698
Grand Total		*28,585*	*30,777*	*34,825*	*39,430*	*44,671*	*50,637*
High Scenario							
Corridor	Service Regions	Traffic - 1997	2000	2005	2010	2015	2020
1	W to A	8,020	8,764	10,760	14,399	19,269	25,787
	A to W	6,000	6,556	8,050	10,772	14,416	19,292
	Sub Total	*14,020*	*15,320*	*18,810*	*25,172*	*33,685*	*45,079*
2	W to B	4,300	4,563	5,339	6,814	8,696	11,099
	B to W	3,100	3,290	3,849	4,912	6,270	8,002
	Sub Total	*7,400*	*7,853*	*9,188*	*11,726*	*14,966*	*19,101*
3	W to S	675	716	887	1,303	1,914	2,813
	S to W	340	361	447	656	964	1,417
	Sub Total	*1,015*	*1,077*	*1,333*	*1,959*	*2,878*	*4,229*
4	E to B/A	2,200	2,335	2,784	3,725	4,985	6,671
	B/A to E	3,950	4,192	4,998	6,689	8,951	11,978
	Sub Total	6,150	6,526	7,782	10,414	13,936	18,650
Grand Total		*28,585*	*30,777*	*37,113*	*49,271*	*65,466*	*87,059*

Task 4. INTERMODAL FACILITY COMPONENTS

OBJECTIVE:

- *Define capacity requirements needed to handle projected traffic volumes and to recommend additional intermodal facilities, if deemed necessary.*

OVERVIEW:

- *The capacity of existing facilities for handling of intermodal cargo through the port of Constantza is compared with that required for the projected volume of traffic. Inclusion of TTOFC (Rolling Motorway) in the Master Plan depends upon the conclusions reached by a financial analysis.*
- *Capacity assessments were made for the existing facilities. A review was done of the new container terminal planned for the South Port. Recommendations have also been included for changes, as required to meet changing cargo handling demands.*
- *The upgrading of the Bucharest-Constantza railway line as part of Corridor is discussed in Annex I*

PORT FACILITIES

The existing handling capacities were reviewed over the short term. For the long term the necessary capacities will be established as a function of the forecast traffic and intermodal future needs. In fact, defining capacity requirements for handling of projected intermodal traffic is the central focus of this study. The intermodal categories to be investigated are general container, TTOFC, Ro-Ro, and Ferry boat.

Ro-Ro Cargo Capacity

There is adequate capacity within the Port of Constantza. The new berth 121, in the South Port, has adequate capacity for the short term. Ro-Ro cargo projections indicate low growth in the future, making present facilities adequate for the increased traffic.

Ro-Ro Market Sensitivity

Ro-Ro traffic has suddenly declined due to the new sea service between Turkey, Greece to /from Italy that has diverted most traffic from the Port of Constantza. Provided that the ferry boats will cater to Ro-Ro and also to Rolling Motorway Service, a loading / unloading facility would be installed in the present ferry yard. However, by getting into the Ro-Ro business, CFR will compete with Romtrans, a major intermodal client. CFR should take a decision in this matter only after a full evaluation of the gains and of the losses involved.

Rail Ferry Capacity

Rail ferry capacity is currently adequate to meet short term needs. Minor terminal modifications would provide the needed capacity to meet the forecast demand.

Container Handling Capacity

Containers are currently being handled in the North Port, at berths 39, 44, 51 and 52. Present facilities are close to capacity. Extra capacity is needed, until the new container facility becomes operational in 2001. Over the long term, the new container terminal, at berths 121,122 and 123, will provide adequate capacity to meet the forecast demand.

Container Capacity Shortage - Short Term

Over the short term, the Port capacity to store containers is limited. Table 4.1 shows the container storage requirements.

To increase present storage capacity without investments, several approaches are possible. A listing of possible approaches follows.

Reduce Dwell Time

The average container dwell time in the Port of Constantza is 30 days, or two to three times the dwell time used in many ports in the world. By reducing the dwell time, the need for container storage capacity is also reduced. Table **4.2** shows container storage requirements as a function of dwell time.

Table 4.1
CONTAINER STORAGE REQUIREMENTS

YEAR	THROUGHPUT (TEUs)	INCREASE IN STORAGE (TEUs)	TOTAL INCREASE (TEUs)
1997	90,473		
1998	110,000		
1999	115,500	460	460
2000	121,300	480	940
2001	127,300	500	1,440

Table 4.2
CONTAINER DWELL TIME

YEAR	THROUGHPUT (TEUs)	STORAGE CAPACITY (TEUs)		
		30 Days Dwell Time	25 Days Dwell Time	20 Days Dwell Time
1998	110,000	9,170	7,640	6,110
1999	115,500	9,630	8,020	6,420
2000	121,300	10,110	8,420	6,740
2001	127,300	10,610	8,840	7,070

To implement dwell time reduction, AMPC could mandate an increase in storage fees after the "free time" is over, or could shorten the "free time"

- Removing rail lines L 3 & L 4 and increase stacking in SOCEP terminal.
- Decrease the number/length of the rail lines in the back of SOCEP terminal.
- Increase the container stack height
- Increase the depth of each stack
- Convert to an equipment type that offers a greater container storage density.
- Expand the terminal area or provide an additional storage area.
- Expand the container storage area near berth 39 or 44.

As an initial step to ensure the necessary container storage and handling capacities in the North Port, it is strongly recommended the area at berths 50-51 which was previously under SOCEP control and then reassigned to DECIROM be returned to SOCEP control. This expansion will help to secure container traffic until 2001, when the new South Port Container Terminal becomes operational.

The New Container Terminal

The development of a new container terminal in the South Port is underway. The AMPC has confirmed that a loan agreement has been signed with Japan to cover 75% of the construction and equipment cost of the development. Construction is expected to begin 1999, with operation beginning in 2001. The construction of the terminal will consist of three phases.

The close location of the new container facility to the rail ferry operation provides an excellent opportunity to form a "partnership." The integration of these two operations can be structured to benefit both parties.

The container terminal will have an intermodal loading and unloading facility, which is currently

designed to include an overhead gantry crane as well as a storage area under the crane. This layout has been proven effective in numerous intermodal terminals. It is recommended that a form of "partnership" be formed, between the railway and the container terminal operator. Another approach would be for CFR to operate the new intermodal loading yard. By doing this CFR would make sure that the containers are loaded in proper order, therefore permitting the formation of closed container trains directly from the terminal yard. Other resulting benefits for CFR would be:

- The rail ferry could use this facility to handle all of its intermodal loading.
- The ferry could utilize a high volume intermodal loading facility without the need to invest.
- CFR could review current designs before construction and provide input for track layout design, to ensure efficient convoys/train movements within the terminal and to provide efficient handling of all types of cargoes, including TOFC, COFC and TTOFC within the new terminal.

RAIL FACILITIES

The required facilities for special services offered by CFR, including both rail and ferry boat services are discussed here.

Rail Ferry

The existing ferry boat track layout has working capacity beyond the year 2020. Expansion of the Free Zone and the possible construction of a new grain terminal at Pier 3 will result in some increase in demand for rail service. This should not adversely affect ferry boat wagon load operations.

CFR intends to build a standard 1,435 mm gauge track layout and transloading facilities at Poti, in Georgia, to allow for cargo transfer from the 1,524 mm wide gauge wagons to CFR wagons which will be loaded on the ferry boat. To that extent, contacts at the government level have been made.

At Mersin (Turkey) lack of proper terminal facilities leads to great delays for loading/unloading of the wagons transported by ferry boat. In order to provide efficient handling operations, construction of proper facilities is imperative.

Rolling Motorway / TTOFC

The Rolling Motorway (TTOFC) is a potential intermodal service for South Port, for which no facilities are currently available in the Port. It includes the transportation of trailer, tractor and driver in unit trains. According to CFR, a Turkish trucking organization has manifested its interest in using the ferry boat for TTOFC services from Constantza to Romania and Europe. To meet these requirements, a loading /unloading facility (ramp) is recommended to be built at one track of the existing ferry layout.

An even stronger market for Rolling Motorway services is provided by trucks moving between Turkey and Western Europe through Bulgaria, via Giurgiu (Romania), as evidenced by a three-week survey in 1997 at the southern and western Romanian borders. To capture this traffic, construction of a TTOFC terminal facility at Ruse (Bulgaria) is analyzed and documented as Task 10 (Financial Analysis) of this report.

The Consultants' analysis indicates sufficient potential to justify a full evaluation of the TTOFC and TOFC services. New terminals and rolling stock will be required for this type of operation. There will also be some modifications required to the ferry boats, all of which requires capital investment. Potential terminal locations include Constantza, Bucharest and Giurgiu.

Port Rail Issues

At the present time, containers are loaded by stevedoring contractors UMEX at Berths 39 and 44, and by SOCEP at Berths 51 and 52 from piers. Both contractors load containers without regard for destination. This results in unnecessary switching and sorting of wagons by CFR, great delays and higher operating costs. CFR, together with the authority of AMPC, should induce terminal operators to change their loading practices by main destination, and avoid additional handling.

The present track layout within the Port does not provide a bypass track. Such track is necessary to allow container trains to achieve organization by this classification.

Inland Terminals

The present CFR system includes 32 intermodal terminal facilities. In addition, there are container transfer facilities at the border crossings with Moldova and Ukraine.

Most terminal have a stub-in track layout configuration and many handle a very small volume of traffic, resulting in high terminal costs. Moreover, the present number of terminals is not warranted because of the low container traffic volume. Consequently, a consolidation program has been proposed in the Master Plan, Task 11. CFR should conduct detailed market studies in order to establish an efficient, proper consolidation program.

THE GAUGE CHANGE AT ROMANIA'S EASTERN BORDERS

Romania constitutes one of the border states between the 1,435 mm European standard rail track gauge and the 1,524 mm wide gauge. At the borders with Ukraine (Dornesti and Galatzi Transbordare) and with Moldova at Cristesti Jijia, there are wagon transposing and cargo transloading facilities. An efficient approach is the use of containers or swap-bodies for handling traffic moving between railways of different gauges.

At the present time, the ferry boats are used as a transloading shed. The increased frequency of sailings will preclude this use. At the present cargo volume, investment in a shed is not justified. However, as volume increases, it will become more efficient to provide such a facility.

Installation of dual-gauge track on the ferries was considered. However, the actual construction of the ferries does not make this feasible.

CONCLUSIONS AND RECOMMENDATIONS

For the short-term there are capacity problems at the present container terminals in Constantza Port. Action must be taken to ensure that adequate capacity is provided until the new container terminal is open. For the long term, construction of the new terminal will provide all needed capacity beyond 2020.

CFR should participate in some manner in the operation of the rail facilities included within the new container terminal. CFR needs to insure that import containers are grouped by destination when loaded. The most effective method of achieving this objective is to participate in the operation of the terminal. There are several methods by which this participation can be achieved, each of which has different economic implications.

There should be construction of a bypass track around the classification yard in the Port, permitting direct operation of container trains to and from the Port container facilities, at berths 39, 44, 51, and 52.

The inland terminal network must be rationalized. Existing terminals should be replaced with a small network of regional terminals with improved highway access and modified track layouts to improve operational efficiency.

The intermodal train service should be revised to provide a network of dedicated trains. All intermodal traffic should be handled on these trains.

Introduction of Rolling Motorway and/or TOFC services will require new facilities. Potential terminal sites include Constantza, Bucharest and Ruse. At Constantza, the rolling motorway terminal should consist of a loading/unloading ramp to be installed on a stub-in track within the existing ferry track layout. A similar facility could be installed at Ruse.

Transloading for cargo moving between the different gauge networks may involve combinations of transloading, bogie change and use of containers, or swap-bodies. A full economic evaluation of each approach needs to be completed in order to establish which is most effective for the markets served by CFR.

In addition, the consultants recommend:

- Intra-Port Road System. Improve the intra-port road system and reduce the number of slow moving vehicles such as "farm" tractors.
- Customs Clearance Process. Allocate at least eight hours per day for customs inspection.

This should be expanded to 24 hours in the future.

- Roadway Maintenance. Resurface the dock area for berths 51 and 52. Currently the two rail tracks are raised above the surrounding surface.

Task 5. COMMUNICATION AND NAVIGATION AIDS

OBJECTIVE:

- *Describe and evaluate the existing CFR communications network, the ferry boat communications and navigation equipment, and port navigational aids, as well as vessel and port technical parameters.*

OVERVIEW:

- *The present communication system is inadequate to meet current and projected demand. A project to upgrade the system with EBRD funding is underway. USTDA has funded a further study of requirements, which is currently being prepared by Transportation and Economics Research Associates (TERA) of Washington, DC.*

COMMUNICATIONS

The existing communications system is based on open wire communications and buried cable installations. Its capacity has been saturated.

There is a separate telex network providing low speed (50 baud) data transmission circuits, with terminals worn out. There is also a data transmission network using X-25 protocols connecting the CFR units in the entire country. The X-25 network is also used for data transmission to/from connecting railways which also have X-25 systems.

There is a radio system for dispatcher to station and train communication. There are a total of 9,353 hand held radio units used by train crews, station personnel and other staff involved in train operations. Continuous radio communication is available over the entire system.

New System

The new fiber optics project financed by EBRD consists of 3,335 km of cable to be installed along the catenary and railway lines. A 60-km pilot line was installed in 1994 between Bucharest and Ploiesti. The USTDA study, currently in progress, recommends installation of an additional 1,018 km of fiber optics. The pilot system uses SDH (Synchronous Digital Hierarchy) and is operating according to specifications. The new system will substantially increase the number of circuits available and permit expanded applications, including the Integrated Railway Information System (IRIS) The new system will meet all CFR requirements and will have extra capacity to be operated commercially. The existing radio system is adequate for the present and projected intermodal demand.

Ferry Boats

The ferry boats are equipped with modern radio communication equipment permitting communication with port facilities and other agencies, including CFR headquarters. No improvements are necessary to meet expected demand.

NAVIGATION AIDS

In Constantza Port, recognized international standards have been implemented to ensure safe operation of vessels within the harbor. These standards deal with the navigation aids, communication, water depth, channel width, hazardous cargo, and the like.

The Port operates on a 24 hour a day basis, throughout the entire year. Under extreme weather conditions, generally above number six on the Beaufort Wind Scale, movements are restricted. Vessel activity averages 15 arrivals and 15 departures daily.

Vessel movement in the Port is controlled by the Harbor Master. A modern VTS system is used to pinpoint and display the position of vessels in real time.

Rail Ferry Navigation Equipment

The two rail ferries (Eforie and Mangalia) have recently upgraded their ship-board navigation and communication equipment, to comply with current international standards and regulations. The equipment consists of:

- Radar for navigation;
- Auto pilot with compass and radar input;
- Global Positioning System (GPS);
- Fire protection; and
- Data recorder.

CHANNEL REQUIREMENTS

Task 4 details the vessel and port design parameters to evaluate them against international standards. Table **5.1** shows main vessel design parameters for the categories considered in the study.

According to Table **5.1,** the design vessel container ship has a length of 250 m, which can be easily accomodated in the outer harbor. However, at the entrance to berths 121 - 123, a 90 degree turn will be required and the effective turning basin diameter will be marginal, once the "island" area is developed. Use of extra tugs or restriction of vessels berthing along berths 114 and 124 would be required. Shorter vessels will not have this problem. However, for the new container terminal this problem does not exist since berths 128 to 130 can accommodate a 450 meter turning basin.

The approach channel, due to harsher conditions, demands a greater depth than required within the shelter of the inner harbor.

The Port of Constantza is designed to handle vessels significantly larger than the vessels considered in this study. Scrutiny of existing conditions in the Port of leads the Consultants to conclude that the navigational aids and the current configuration of the channels are adequate for the safe operation of vessels in the present as well as in the next 20 years.

Table 5.1
DESIGN VESSEL

VESSEL TYPE	LOA (m)	BEAM (m)	RATIO L/B [1]	DRAFT (m)	RATIO h/T [2]
Ro-Ro, gen purpose	170	28	6.1	7.5	1.9
Ro-Ro, car	200	32	6.3	9.5	1.5
Rail Ferry	180	26	6.9	8	1.8
Container	250	33	7.8	12	1.2

Notes:
1. Directional Stability ratio, a lower value reflects the ability to maneuver around tight bends.
2. Shallow Water ratio, with a value less than 1.5, all ships will turn less readily.

Task 6. CONDUCT AN ENVIRONMENTAL IMPACT ASSESSMENT

OBJECTIVE:

- *Provide a primary assessment of the environmental impact the implementation of the project might have on the area.*

OVERVIEW:

- *A review of physical-chemical, biological, legislative and socio-economic factors was conducted. It was concluded that the proposed intermodal facility in Constantza South Port will have no adverse environmental impact. Consequently, preparation of an environmental impact statement will not be required.*

METHODOLOGY

Pertinent legislation (e.g. MARPOL) establishing environmental limits and standards was reviewed before commencing the baseline study. Technical observations of the existing situation within the Port were made in the following sectors:

- air pollution
- water quality
  - potable water
  - wastewater
  - groundwater
- sea water
- soil contamination
  - hazardous wastes
  - solid waste disposal
  - dredged material
- noise pollution
- visual pollution
  - socio-economic factors
  - economic impact
  - health impact

Environmental Assets of the Constantza Area

The primary environmental assets of the Constantza region include the Danube (Black Sea - Rhine - Main Canal), the Black Sea, rich soil, lakes, air quality, groundwater, and historical importance.

Danube

The Danube - Main - Rhine waterway, which traverses Europe and outlets into the South Port of Constantza, is not only of great importance as a source of potable and irrigation water, but has nationwide environmental significance. The whole area around the Danube is termed the "Danube Delta Biosphere". Of a total of 3500 plant species in Romania, the Biosphere contains 1,150. The Biosphere also houses 300 different species of birds, of a total of 8600 species in the entire world.[1]

Black Sea

This water body, which provides Romania access to the high seas via the Bosporus and the Dardanelles, is, on a regional basis, the site of oil and gas wealth and profitable fishing grounds. The generally N-S oriented coastline in the vicinity of Constantza is well known for its beaches and summer resorts.

The civil works required to construct the Danube Canal have resulted in a relocation of the alluvium carried by the river to the canal itself.

Lakes

Lakes Siutghiol and Tasaul furnish fishing and recreational areas north of Constantza.

South of the city is Lake Techirghiol, renowned for its therapeutic properties which are alleged to cure rheumatism due to its high concentrations of iodine and other minerals. The lakes in the

[1] Ministry of Waters, Forests and Environment Protection: Environment Protection Strategy, Bucharest 1996

Constantza area have a neutral PH indicating that they have not been subject to acid rain.

Air Quality

The Constantza area does not suffer from serious air pollution. Representative values in Constantza of air pollution indicators, as yearly averages for 1993 and 1994, are presented below in Table **6.1**.

Groundwater

Groundwater adjacent to the Port has been contaminated by saline intrusion. Other groundwater assets within the Constantza region exhibit high concentrations of nitrate.

History of the Port of Constantza

The Port of Constantza is located on the western coast of the Black Sea, 182 nautical miles from the Bosphorous. Known habitation in the Constantza area dates back to the sixth century B.C. when a community known as Tomis was founded by Greek colonists from Milletus. Several popular museums within the city of Constantza display valuable artifacts from the Greek, Roman, and Ottoman eras. Tomis has been a focal point of commerce for two millenia.

Pollution Control Agencies

Among the agencies involved in the control of pollution in the Constantza area, the most prominent are AMPC; the Constantza Harbor Master, the Regional Semi-Autonomous Romanian Water Agency; Constantza Office (Regia Autonoma Apele Romane, Filiala Constanta); the Romanian Water and Wastewater Companies; the Romanian Marine Research Institute (IRCM); and the Ministry of Waters, Forests and Environment Protection (EPA).

For a study focused on the Constantza Port, the most applicable of all these regulatory environmental documents is the International Convention for the Prevention of Pollution by Ships (MARPOL 73/78 including the 1984, 1987, 1990, 1991 and 1992 amendments). Romania has ratified MARPOL Annexes I, II, and V.

Table **6.2** shows present applicable Romanian legislation for environmental protection.

Potable Water

Potable water is provided by multiple sources, including both surface and ground water, in a linear system parallel to the coast. The surface water undergoes multiple barrier treatment comprised of the standard rapid sand filter regime, namely, coagulation, flocculation, sedimentation, filtration, and disinfection. For disinfection, chlorine is used. The total water supply is more than adequate for the proposed port expansions. It was also noted that the port is precluded from sinking separate wells because of saline intrusion in the aquifers adjacent to the Port.

Table 6.1
TYPICAL AIR POLLUTION DATA FOR CONSTANTZA

Locality	Pollutant Exhausted In The Air	Annual Average Of The Concentration (mg/cu.m)	Maximum Concentration In 24 Hrs (mg/cu.m)	The Frequency Of MPC Exceeding In 24 Hrs
0	1	2	3	4
Constantza	SO_2	0.030	0.245	-
	NO_2	0.073	0.114	1.0
	NH_3	0.061	0.100	1.1
	Powders in suspension	0.125	0.436	4.5

Source: EPA, Environment Protection Strategy, Bucharest, 1996

Table 6.2.
LIST OF RELEVANT LEGISLATION CONCERNING ENVIRONMENTAL PROTECTION

1.	Law 137/1995 - Environmental Protection Law
2.	Law 107/1996 - Water Law
3.	Law 17/1990 - Concerning juridical regime for internal seawater
4.	Law 98/1992 - Convention regarding Black Sea protection against pollution
5.	Law 6/1993 - For the participation of Romania at the International Convention for the prevention of pollution caused by ships MARPOL 73/78
6.	Governmental Decision 730/1997 for the approval of the Regulation regarding the limits for pollutants of the discharged waste water in the water resources
7.	MAPPM Ordinance 645/1997 for the approval of the Regulation regarding the discharging of waste water in the sewerage networks of the localities
8.	8. MAPPM ordinance 756/1997 for the approval of the Regulation environmental pollution assessment. -
9.	MAPPM Ordinance 184/1997 for the approval of the procedure for the environmental balance.
10.	Governmental Decision 340/1992 regarding the regime for waste and residues import.
11.	Governmental decision 347/1992 regarding the modification and completion of GH.340/1992
12.	Governmental Decision 511/1994 regarding the adoption of measures for environmental pollution prevention by commercial companies with activities resulting in pollutant waste.
13.	Health Ministry Ordinance 536/1997 for the approval of hygienic standards and of the recommendations concerning the environment of human life.
14.	Health ministry ordinance 43/1990 regarding the approval of the lists of toxic substances and of those plants which contain toxic substances.
15.	Law 98/1994 regarding the legal hygienic norms and public health.
16.	Governmental Decision 33/1995 regarding the measures for collection, recycling and reintroduction in the productive circuit of all types of reusable waste.

Source: IWACO, Ongoing Harbor Waste Management Study

Wastewater

Sewage, as initially reported by Harris (1993), remains a serious problem. The sewage pumping station near Gate 6 handles both domestic and industrial wastewaters from adjoining sections of the city as well as from both the North and South Ports. When this pumping station is overloaded, raw sewage is pumped on an emergency basis, directly into the harbor via outfalls located near Berths 84 and 34. There is little flushing of the harbor so that contaminants introduced into the sea water essentially remain in place and are only slowly biodegraded. An indication of the poor water quality within the harbor is presented in Table 6.3, which reflects conditions in 1991.

Pollution Control Boats

Floating oil slicks and assorted debris litter the surface of the harbor. Combatting these are four pollution control boats, each with a tank capacity of 40 m^3 (approximately 40 tons) plus a separate basket for the floatables.

The Regia Autonoma Apele Romane conducts regular marine sampling and testing on locations, from sampling on the 5m, 10m, and 20m isobaths, which are located 400m, 800m, and 4.2 km from shore, respectively.

Hazardous Wastes

All solid wastes, including hazardous wastes, as well as domestic and industrial wastes plus oil sludges, are trucked to an outmoded dump located near Gate 6. An effort is being made to isolate the hazardous wastes.

Solid Waste Disposal

The dump near Gate 6 does not meet current environmental standards.

Wastewater

The MUPD (Municipal Utilities Development Project) being managed by the EBRD is conducting a study of the existing wastewater collection and treatment systems, both in the Port and in the city of Constantza.

Table 6.3
WATER QUALITY DATA, HARBOR, PORT OF CONSTANTZA

No	Analysed	M/U	SAMPLE POINTS				
			Berth 0	Berth 10	Berth 34	Berth 64	Berth 78
1.	Temperature	O_G	12.0	12.0	12.0	12.0	12.0
2.	Salinity	$g^{s\%O}$	16.0	16.91	13.32	13.63	16.87
3.	Solved Oxygen	$mgo_2/1$	5.78	4.74	4.99	7.02	5.91
4.	CBO_5	$mgo_2/1$	3.71	27.36	7.68	6.59	6.11
5.	Solved organic substance	$mgo_2/1$	2.46	7.92	7.7	6.16	3.85
6.	Total hydrocarbons contents	mg/1	0.254	0.182	0.795	0.659	0.863
7.	Sulfates	$ugH_2S/1$	0.025	0.04	0.11	0.08	0.055
8.	PO-P_4	µg/1	45.27	69.16	230.12	173.53	60.36
9.	N-NO_2	µg/1	19.09	25.17	72.08	112.62	36.30
10.	N-NO_3	µg/1	128.30	183.90	133.70	110.20	143.0
11.	N-NH_4	µg/1	69.29	125.06	95.48	473.20	105.60
12.	Si-SiO_3	µg/1	582.0	1095.0	2340.0	2130.0	720.0
13.	Anionic detergents	mg/1	0.137	0.131	0.289	0.194	0.121
14.	Total suspensions	mg/1	35.3	55.45	46.2	54.1	76.4

Source: Institutul Roman de Cercetari Marine (IRCM), Constantza, November 1991

Sea Water

The AMPC is currently combatting pollution on the surface of the harbor by operating pollution control boats and by minimizing the spread of oil spills. MARPOL stipulates that a port must have adequate facilities to accept all oily wastes from visiting ships.

Solid Wastes

As noted earlier, the inadequate area set aside for hazardous waste, and the haphazard operational procedures at the dump do not meet contemporary environmental standards. The IWACO study for waste management within the port will address such topics as the need for additional dumps and, possibly, an incinerator to break down the hazardous wastes.

Noise Pollution

Constantza Port is a large, busy industrial complex. Given these circumstances, the existing audible background is loud but not deafening. It is not considered detrimental to the efficiency of the workers nor injurious to their health.

Visual Pollution

Constantza Port has a skyline of ship masts, huge cranes, and roofs of maintenance end storage sheds. In the background, one sees the breakwaters, possibly a ship traversing the entrance channel, and in the distance the vista of the Black Sea leading to Odessa, Sevastopol, and the Bosporus. All in all, a stimulating view to confront the visitor to the Port of Constantza.

Socio-Economic Factors

It is reported that some 18,000 individuals are employed at the Port by either government agencies or the 200 companies involved in Port activities. In addition, there is undoubtedly a multiplier effect to the extent that a great many other families (e.g. in service industries) in the adjacent city of Constantza are likewise dependent for their livelihood on the business generated within the Port.

PREDICTION OF IMPACT

Within the South Port, effects will be minimal as the only required construction will be asphalt pavement in the vicinity of the ferry boat landing, a Ro-La Rail Loading Ramp (see Task 4), and some utility upgrade to rehabilitate the washing/disinfection facilities for both the rail wagon ferry and the RO-RO.

Task 7. CONTROL, MONITORING AND MIS REQUIREMENTS

OBJECTIVE:

- *Define the information requirements for the interfacing of the Administration of the Maritime Port of Constantza (APMC) and the Romanian Railways (CFR) intermodal services, addressing the ability of existing and planned systems to meet these requirements and the necessary improvements. The information system must provide all the necessary elements to CFR and Port management in a prompt and timely manner.*

OVERVIEW:

- *The present CFR accounting system is unable to prepare detailed costs required for responsibility accounting, or for allocating expenses to specific functions which are necessary to establish the cost of cargo movements.*

EXISTING SITUATION

The Administration of the Maritime Port of Constantza Information System

The AMPC keeps incomplete information concerning the port activity. While data on vessel status and operations is monitored on a daily and hourly basis, the situation of container operations is provided to AMPC only periodically by the respective operators. Port administrations world-wide require extensive and timely information from terminal operators, on a contractual basis. Presently, AMPC has no capability to monitor overall port performance due to lack of pertinent information.

A new law (September, 1998) stipulates the function and the authority of APMC to collect and centralise traffic and operations data and the obligation of all operating agents involved to provide such data. This allows AMPC to exercise proper monitoring and management control. The present information system should be expended to meet the new requirements.

The CFR Information System

The existing CFR information system has two separate systems for accounting and management information, which operate independently with limited interfacing. The existing information system consists of a number of specific applications which are not coordinated. Some management applications use data from the accounting system.

The CFR Accounting System

The present accounting system does not produce detailed operating or management costs. While it reports total system costs and has the capability to report detailed costs by region, it does not permit calculation of unit costs for specific operations which could allow AMPC to establish full, long-run variable and incremental costs. Presently, the Company for Railway Management Services (SMF-SA) is working with the Consultant firm Oracle to implement a comprehensive management and accounting system for operating costs and revenues. It is anticipated that this system will become operational in the first semester of 1999.

CFR Communications

The present system, consisting of open wire lines for telephone and an X-25 data transmission network, is not expandable for modern data processing needs, and is fully utilized. There is no capacity available for additional applications. The proposed fibre optics system is discussed in Task 5.

THE INTEGRATED RAILWAY INFORMATION SYSTEM (IRIS)

CFR is in the process of contracting an Integrated Railway Information System (IRIS) which includes applications in sales and marketing (passenger ticketing and reservations, freight tariff management), operations (train performance, traffic and wagon control), rolling stock and infrastructure maintenance, and management of human resources.

The Marketing Department's need for detailed cost and revenue information makes it imperative that highest priority is given to installation of the cost and revenue reporting parts of the system.

The Proposed Communications System

CFR has received funding for design and installation of a new system based on fibre optics cable and the latest switching and transmission technology. This system is essential to IRIS and to the improved management information system.

INTERMODAL SYSTEM INFORMATION NEEDS

The Port of Constantza

AMPC has presently no means to measure, in real time, overall actual port performance and the realized quality and quantity indicators. In the new competitive environment, AMPC must know port performance and how it compares with that of other competitive ports. Much of the MIS design for the AMPC must reflect the need to monitor performance.

Electronic Data Interchange

An effective EDI (or MIS) system in the Port of Constantza would link all of the parties and agencies involved in the movement of containerized cargo. Restricted access is required to protect proprietary and sensitive information. Users of the EDI system typically include terminal operators, customs, rail operators, and the Harbor Master Pilot. Since port activity is performed by contractors, AMPC needs a rather small MIS with the primary functions of maintaining statistics, measuring contractor performance and its own accounting functions.

Remote terminals should be in the offices of the General Manager, Operations Manager, Marketing Manager and Manager of Finance and Accounting to permit their ready access to information. There must be a link to the CFR system for the reporting of advance vessel manifests, number of containers on hand awaiting rail movement and other information required for forecasting demand for rail service.

CFR Freight

Intermodal Services operate in an extremely competitive service market. Consequently, intermodal managers should have up-to-date, real-time information on container trains and single container movements. An automated billing system is another basic requirement. EDI capability must be included in the system.

CFR is going to implement the IRIS which does not meet all specific intermodal needs. A new MIS is needed for intermodal, to be integrated within IRIS. The CFR system has to be linked with AMPC system.

Within the intermodal division each terminal and the headquarters should have its own cost centers.

Ferry Boats

The present billing system, bill of lading for sea travel, and the transport document for the railway, should be consolidated into a single transport bill. The Ferry Boats can also use the automated billing system. This system must also have EDI capability. Ferry boat accounting must be on a cost center basis. The ferry boat communications system has to be interfaced with the CFR system. Each port served by the ferry vessels should have its separated calculated cost.

Port Operators

Container Terminal Operators will also report entire container activity and handling modes. Periodic reports will be sent to the APMC administration and to the Ministry of Transport. These will include performance, traffic volume and financial results. All operating data should be inputed on a real-time basis.

CONCLUSIONS

There is a critical need for improved management information within the AMPC and CFR. These needs require expansion of the existing system. Within CFR, intermodal needs will not be met by IRIS as presently planned and a separate MIS must be provided for intermodal transport.

AMPC management needs can be met through the expansion of the existing system. The APMC has

the legal authority to request contractors to provide the necessary information for efficient port management. APMC should take immediate action to revise its reporting requirements and to expand the MIS to a level that allows for real time measurement of port performance.

Within CFR, separate systems are needed for rail intermodal and ferry boat operations. Both systems should be integrated with each other and with IRIS so the information developed by one system can be passed among and used by the others.

Prompt cost and revenue data is a critical need for intermodal management. This requires development, on a priority basis, of a new accounting system using cost centres and structured for responsibility accounting. The accounting system requires integration with the intermodal MIS, as many management reports will require both accounting and operating information.

Task 8. DETERMINE INSTITUTIONAL REQUIREMENTS

OBJECTIVE:

- *Analyze existing institutional structure and recommend necessary organizational changes and new organization charts.*

OVERVIEW:

- *The Romanian Government has recently reorganized the SNCFR and the Administration of Constantza Port. Pursuant the act of the Legislature, APC is now the Administration of the Maritime Port of Constantza (AMPC) a stock company instead of a "Regie Autonoma."*
- *With the new reorganization, the administrative and monitoring authority of APMC has been increased significantly. This will provide APMC with the opportunity and the means to correct existing port operating and information gathering deficiencies.*
- *The railway has now been reorganized as six separate companies, as follows:*
  - *SNCFR, the former Romanian National Railways becomes CFR S.A. a holding Company for five railway companies, each one having specific business objectives and operating responsabilities;*
  - *CFR Freight S.A., which operates all freight services including the intermodal and the ferry - boats;*
  - *CFR Passenger S.A., which operates all passenger services;*
  - *CFR Infrastructure maintains and controls access to the infrastructure;*
  - *The Company for Railway Management Services (S.M.F. - S.A.); and*
  - *S.A.A.F. - S.A., the railway assets company.*
- *S.A.A.F has acquired most surplus assets of former SNCFR, including out-of-sevice rolling stock and containers. Recently, S.A.A.F. - S.A. has concluded a joint-venture agreement with Greenbrier Companies of the United States, allowing Greenbrier to rehabilitate 9000 out of order wagons owned by S.A.A.F. - S.A. Company.*
- *The Intermodal Services including the Ferry-boat are now part of C.F.R. Freight - S.A. In line with the objectives of the present study, the Consultant's analysis addresses only the organizational and institutional issues pertaining to rail intermodal services and the ferry - boats.*

CENTRAL GOVERNMENT RELATIONS

The policy of the Romanian Government to privatize state owned industries has not been extended to the rail sector. The present drawback for government owned railway is the lack of delegated authority. This is seen as a main obstacle in achieving commercial efficiency by the railways. The new C.F.R.-Freight organization must take into account this essential management tool and implement delegated authority at all levels.

Presently, Romanian domestic truck industry has the freedom to establish its tariffs, as a function of market conditions. At the same time, railway tariffs have been strictly regulated, their approval depending on the Ministry of Transportation, Ministry of Finances and the National Office for Competition. Within the new organization, railway tariffs will be elaborated by C.F.R. Freight S. A. and approved by the Administration Council, that includes members of the Ministry of Transportation.

In order to be competitive in intermodal business, C.F.R Freight must have tariff and service freedom. Thus, the elaboration of full tariffs for containers and service standards should be accomplished by the Intermodal Department.

The Intermodal Department must be established us a profit center to provide the incentive for profit maximization. The failure to give C.F.R. Freight the same tariff flexibility which their competition enjoys will result in a further diminishing of their railway market share.

CFR FREIGHT INTERMODAL SERVICES

Inland Intermodal

Rail intermodal service is a highly specialized operation with operational and marketing aspects which are different from those of wagonload services. Intermodal services should be set up as a division of the CFR-Freight, as a separate profit center and with full responsibility for all aspects of marketing, pricing, operations and profit. It should elaborate the intermodal train schedules and monitor the realization of intermodal train operations.

Figure **8.1** shows as suggested organization for the Intermodal division. The Intermodal Division should have its own marketing staff, with specialists for each type of intermodal service (container, TOFC, TTOFC (Ro - La) and Rolling Motorway (TTOFC + driver)).

Each C.F.R. Regional office should have a Sales Manager and several staff sales people. Use of sales agents in foreign countries, on a commission basis, should be considered, responsible also for wagonload and ferry boat services.

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CFR Freight should use its Freight Station Masters as C.F.R. Freight Representatives for selling both wagon load and intermodal services, on a commission basis, in addition to their salaries and social charges.

Ferry Boats

The present ferry-boat service operates at a significant loss. Potential new markets, such as containers, Ro - Ro, Ro -La, outsized cargoes and break bulk, can make the ferry-boat operation a profitable one. However, no detailed feasibility studies have been conducted to determine those markets, the rates, the type of service and the market strategy required to penetrate them. The consultant has suggested an organization that reflects the need for extensive market research and increased sales effort (see Figure **8.2**)

For the present time, the ferry-boats should be organized as a division sharing administrative costs with C.F.R. Freight, resulting in reduced administrative costs. The ferry - boat management must have the autonomy to establish rates, services and routes. Consequently, the management has to have profit responsibility and the ferry-boat division should become a profit center.

Due to its unique type of operation and the need for close monitoring, it is recommended that the Ferry Boat Division be integrated within the CFR Freight Constantza Region.

Rail Operations in Constantza Port

Container operations at SOCEP terminal are not efficient. Besides the great delays due to Customs three-hour daily inspection program and the operators non-orderly loading of containers, there is also poor monitoring by DCF Constantza Port. For difficult to understand reasons, DCF Constantza Port is a small CFR unit reporting directly to the CFR General Manager in Bucharest while, at the same time CFR has there its own CFR Freight Constantza region. For close monitoring of DCF Constantza Port activity and greater efficiency, it is recommended that DCF Constantza Port be included as a division within CFR-Freight Constantza region.

CONCLUSIONS

- CFR Freight must have the same level of freedom in establishing its rates and services as their road carrier competitors. Without this business freedom any investment in the intermodal facilities and equipment can not be recommended.

- Intermodal Services must be organized as a division within C.F.R.-Freight-SA, with full responsibility and autonomy.

CFR Freight - Intermodal Division
PROPOSED ORGANIZATION CHART

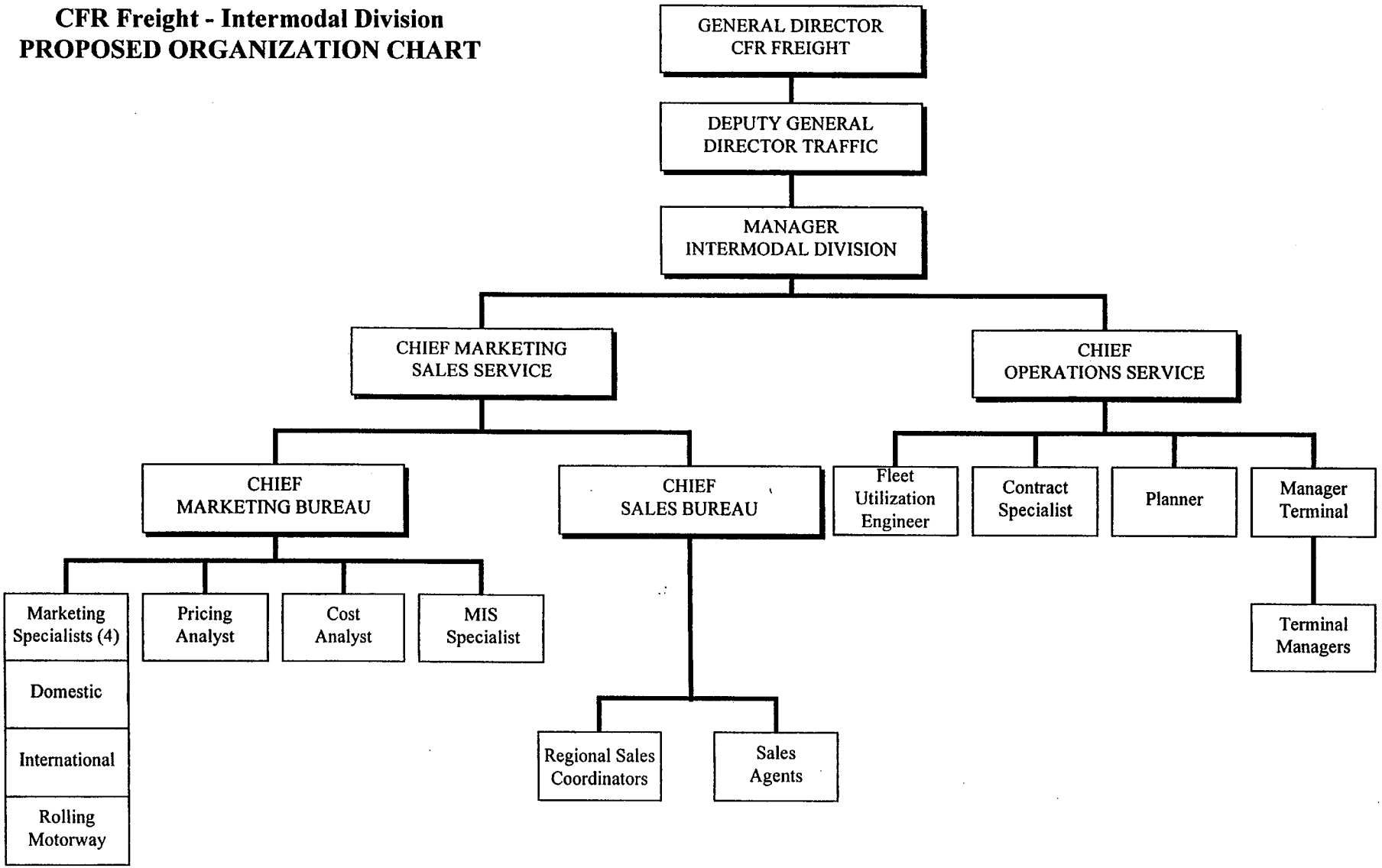

Figure 8.1

Proposed Ferry Boat Division
ORGANIZATION CHART

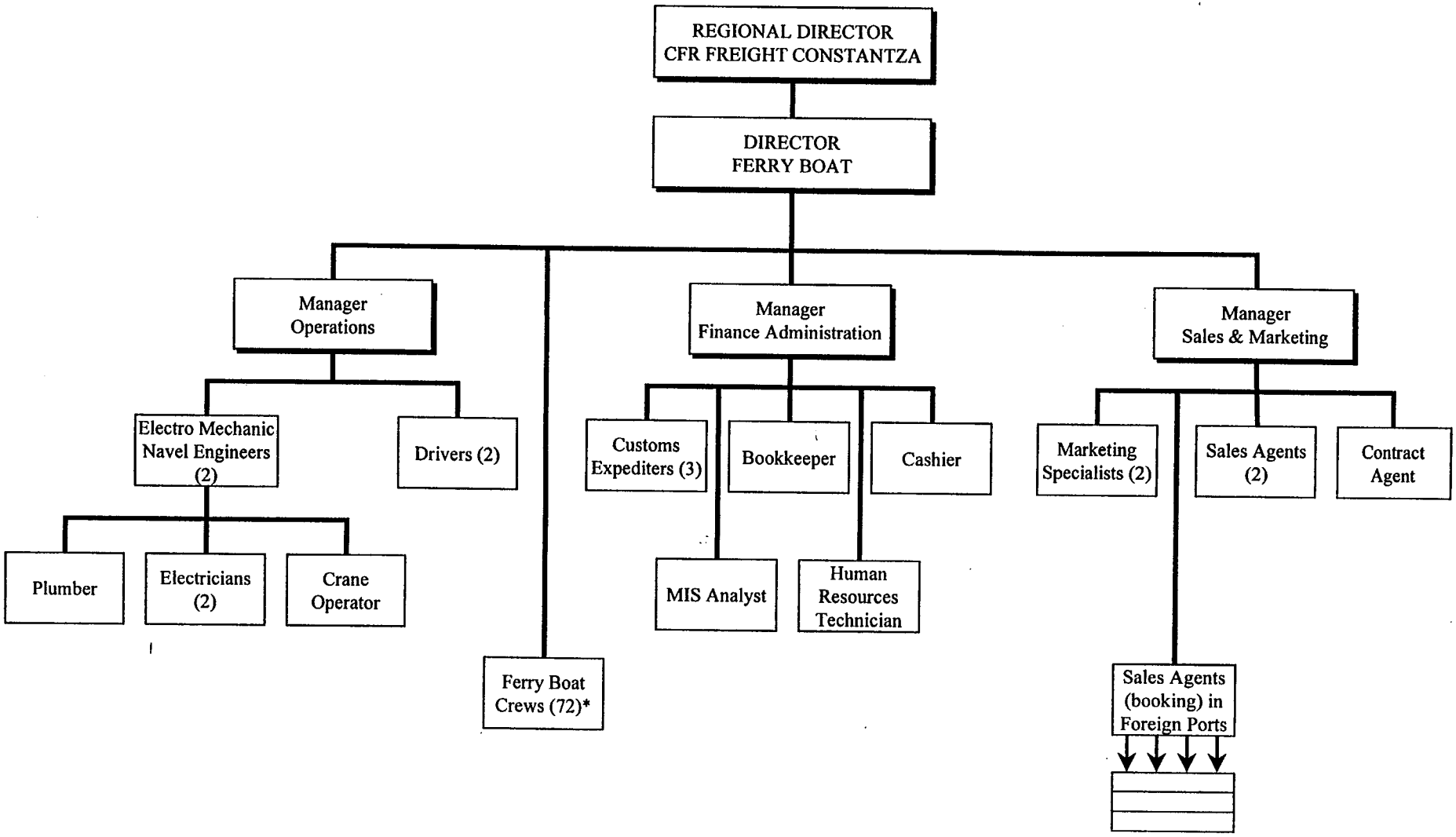

Figure 8.2

- DCF Port Constantza should be integrated as a division within the CFR-Freight Constantza Region. This will provide local supervision of CFR port operations and will also enhance CFR leverage in dealing with AMPC, port operators and foreign partners in case of joint-venture for operations of the new terminal.

- Ferry-Boat Services should be organized as a division, with full autonomy to conduct business and with the goal of becoming a profitable operation. For an effective monitoring of its daily activity, the Ferry-Boat Division should be integrated within the CFR-Freight Constantza Region.

Task 9. DETERMINE PERSONNEL REQUIREMENTS

OBJECTIVE:

- *Based on the institutional structure recommended in Task 8, Task 9 is to determine and quantify personnel requirements for intermodal division, ferry boat services and support activities.*

OVERVIEW:

- *Following the new organization of October 1998, CFR-Freight has increased its management staff by 84%. In spite of this manpower increase, intermodal service has not been properly organized and some of staff have been given mixed responsibilities. For the new intermodal organization the Consultant recommends a staff of 16 persons, plus administrative personnel.*
- *Inland terminal staff ranges from eight to twenty persons per terminal. Office and administrative staff are almost constant, regardless of the traffic volume*
- *At the headquarters level, virtually all the positions are currently held by engineers without sales or marketing experience. While excellent professionals and technically efficient, they have no experience in operating intermodal services profitably. An extensive training program will be required for staff involved in intermodal operations, marketing and sales.*

THE RECOMMENDED TRAINING PROGRAM

Within the intermodal and ferry boat operations, the training needs are in basic economics, finance, general management, marketing, sales and the design and operation of intermodal services.

It is vital that the candidates be trained in English. Besides the headquarters, CFR-Freight should prospect its regional offices to find suitable candidates. The inception training will consist of a two-week seminar to be offered in Bucharest to a selected group of senior and middle management staff. Then, a few senior managers will travel to the United States for one month of on-the-job intensive training in the intermodal department of a US railroad.. The training will comprise operations/management marketing and sales and wagon /container fleet utilization.

Next, the middle management group will be trained for three months in a US railroad - intermodal department, each individual according to his future job requirements. Upon return to Romania the trainees will share their newly acquired knowledge by training others, applying and implementing what they have learned at the US railroad.

Training Costs

For the courses offered in Romania, the cost per trainee is assumed to be $500.The training for CFR senior and middle management will result in the following costs:

TRAINING IN ROMANIA

- Total number of participants 60 x $500 = $30,000

TRAINING ABROAD (USA)

For senior management

- It is estimated that a total of twenty senior managers from all CFR Companies will travel to USA for one-month training at a cost of $500,000

For middle management staff

- It is estimated that a total of 40 middle management staff will participate in the training at a cost of $2,180,000

THE TOTAL TRAINING COURSE WOULD BE:

- Formal training in Romania: $30,000
- Senior Management training in the United States: $500,000
- Middle Management training in the United States: $2,180,000

TOTAL **$2,710,000**

Staff Restructuring

The proposed consolidation of intermodal terminals will result in a significant staff reduction. Present social legislation provides voluntary resignations ensuring a payment of twelve to twenty average salaries.

For specific marketing skills, CFR may wish to hire outside professionals if present staff does not meet requirements.

FERRY BOATS

In line with delegated authority and effective management control, it has been recommended that the ferry boat operation be established as a division within CFR-Freight Constantza. Based on this recommendation, the Ferry Boat Division should have a staff of 24 people.

From an operating standpoint, the present ferry boat staff is well qualified and trained. Ferry Boat officers, including captains and mates, hold the requisite papers as required by the international shipping community.

The recommended new organization includes the addition of two marketing representatives. The ferry boat service should have port representatives in the areas it serves, paid on a commission basis.

Training Program

All ferry boat management staff needs training in free market operations and the marketing of transportation services. They also should be fluent in English. The training with three-month duration, should take place on a shipping line which provides container and break-bulk services.

NEW CONTAINER FACILITIES

The new container facility at Constantza will require the hiring of adequate manpower. The facility will be operated by a concessionaire. CFR-Freight should participate directly in the operation of the new terminal. CFR should operate the rail loading facilities to insure that loading is done to the extent of reducing wagon movements and increasing the speed of container handling in the transportation process.

MIS Requirements

Intermodal, including the ferry boats, has pressing needs for improved management information. The design and installation of MIS needs specialized input for the intermodal functions. To that extent two specialists should be hired to provide the necessary expertise for the intermodal and ferry - boat functions.

CONCLUSIONS

CFR-Freight Intermodal

The major deficiency in present staff skill levels within the CFR-Freight organization is the absence of marketing and sales skills and experience. Establishing a profitable operation with an adequate market share requires that these skills be incorporated into the organization as quickly as possible.

In order to provide some trained individuals as quickly as possible, the initial training program must be condensed into two weeks, followed by three months of training with U.S. intermodal transport companies. Fluency in English is a prerequisite. Following completion of the formal course, intermodal staff should be sent for training with the Intermodal Department of a major U. S. railroad and an Intermodal Marketing Company.

A training section should be established within CFR in order to provide long term training programs in management, economics, and marketing.

Ferry Boats

All ferry boat staff require extensive training in commercial operations and marketing as well as training with shipping lines. The most immediate training need is for the marketing staff.

Task 10. FINANCIAL ANALYSIS

OBJECTIVE:

- *Evaluate the proposed investments in order to identify which should be included in the Master Plan for the Development of Intermodal and Ferry Boat Services (Task 11).*

OVERVIEW:

- *The capacity of existing CFR-Freight facilities will accommodate forecast traffic. However, a few existing terminals will require future expansion to meet demand*
- *When an investment is justified based on staff reduction, this should be implemented in order to reduce operating costs and realize the anticipated economic benefits. The financial analysis has been adversely affected by a lack of reliable cost data. The implementation of the new accounting system will solve this problem.*
- *The proposed investment projects have been analyzed as relating to their financial viability. The new accounting system should be able to generate balance sheets for individual operations. Projects which have a positive evaluation are included in the Master Plan.*
- *Evaluations are presented in U.S. dollars. The discount rate used is eight percent. Costs and revenues are expressed in constant US Dollars.*

CFR-FREIGHT RAIL INTERMODAL PROJECTS

New Intermodal Container Terminal, Port of Constantza

The construction of a new intermodal container terminal in the South Port (supported by Japanese funding at 75%, and 25% by the Romanian Government), will have a major impact on CFR-Freight intermodal operations and consequently can have a significant impact on rail costs.

CFR-Freight should participate in the operation of the new terminal, by entering into a joint-venture agreement with the terminal operator and participating in the operation of the rail loading/ unloading operations. CFR-Freight should also provide 25% as its pro-rata share of the recommended construction investment, estimated at $1,767,000. Total rail facility cost is estimated as $7,067,000. This budget includes the acquisition of handling equipment.

The relevant cash flows used in calculating net present value (NPV) and the financial internal rate of return (FIRR) are shown in Table **10.1**. It has been assumed that the new terminal will handle one-third of the port volume in the first year of operation, two-thirds in the second year and the full estimated volume in the third and subsequent years.

It has been assumed that CFR-Freight will secure one-third of the projected saving during the first year of new terminal operation, two-thirds during the second year, and the full benefit in the third year.

Assuming that CFR-Freight provides the full $7,067,000 investment required for the rail facility, the NPV is $2,850,000 and the FIRR is 12%. The returns are moderately attractive.

- Internal Rate of Return: 12%
- Net Present Value: $2,850,000
- Benefit/Cost Ratio: 1.29

Additional operating savings of $626,000 a year will result from trains being dispatched directly from the loading tracks without switching.

The viability of the proposed investment depends upon the realization of the switching savings. This appears to be a good investment. CFR presence in the new Container Terminal in Constantza South Port is vital for efficiency of operations and control of its own operating costs.

Table 10.1
FINANCIAL EVALUATION: PROPOSED INTERMODAL TERMINAL IN THE NEW SOUTH PORT CONTAINER TERMINAL
(in thousands of constant 1998 US Dollars)

Year	Containers Handled Teu 000	Project Costs			Project Revenues			Net Cash Flow
		Terminal Investment	Terminal Operations	Total Costs	Terminal Revenues	Shunting Savings	Total Revenues	
2000		7,067		7,067			0	(7,067)
2001	46.1		132	132	231	416	647	515
2002	78.3		197	197	392	625	1,017	820
2003	87.3		215	215	437	625	1,062	847
2004	96.4		233	233	482	625	1,107	874
2005	105.5		255	255	528	625	1,153	898
2006	118.9		278	278	595	625	1,220	942
2007	132.3		305	305	662	625	1,287	982
2008	145.6		331	331	728	625	1,353	1,022
2009	159		358	358	795	625	1,420	1,062
2010	172.3		385	385	862	625	1,487	1,102
2011	191.3		423	423	957	625	1,582	1,159
2012	210.4		461	461	1,052	625	1,677	1,216
2013	229.4		499	499	1,147	625	1,772	1,273
2014	248.5		537	537	1,243	625	1,868	1,331
2015	267.5		575	575	1,338	625	1,963	1,388
2016	296.6		633	633	1,483	625	2,108	1,475
2017	325.7		691	691	1,629	625	2,254	1,563
2018	354.7		749	749	1,774	625	2,399	1,650
2019	283.8		808	808	1,419	625	2,044	1,236
2020	412.9		866	866	2,065	625	2,690	1,824

Feasibility Indicators	
Financial Internal Rate of Return	12%
Net Present Value	$2,850
Present Value Benefits	$12,672
Present Value Costs	$9,821
Benefit/Cost Ratio	1.29

Bypass Track for the Existing Port Classification Yard

It has been suggested that a bypass track be constructed from the existing container loading facility at Berths 51 and 52 to the main-line, permitting container trains to operate directly to and from the terminal without passing through the classification yard. Since the new terminal is expected to handle full container ships much more efficiently than the existing facilities, construction of this track can not currently be justified.

Consolidation of Intermodal Terminals

CFR-Freight has too many intermodal terminals for the present volume of container traffic. Economics and service can be improved by consolidating the present terminals into a limited number of main terminals. The consolidation has been proposed taking into account the European railway corridors number IV (Constantza-Bucharest-Brasov-Copsa Mica-Simeria-Curtici) and number IX, (Bucharest-Ploesti Sud-Buzau-Pascani-Ungheni Prut) Regional terminals are recommended at Bucharest, Brasov, Medias, Cluj Napoca, Glogovat, Semenic, Bradu de Sus, Buzau, Bacau, Cristesti Jijia, and Suceava.

Cash flows for terminal consolidation have been estimated at $356,000 which represent the reduction of 180 positions. Estimated severance payments are $445,000 which will occur in the first year.

The financial evaluation of the terminal reduction program is presented in Table **10.2.** The results of the analysis show that this program is highly attractive in financial terms, yielding a very high return on the initial investment. The relevant financial indicators are presented below:

- Internal Rate of Return:..... 110%
- Net Present Value:..... $2,554,000
- Benefit/Cost Ratio:..... 1.09

Rolling Motorway

The Rolling Motorway service transports tractors, trailers and drivers, representing a type of long-haul rail ferry service for highway truck companies. CFR-Freight intends to offer this service between Western Europe and Turkey via Constantza in connection with ferry boats and to/from Bucharest. There is a potential market for this type of service, for trucks moving between Turkey and Western Europe, transiting Romania between Giurgiu and Bors or Nadlac. Trucks transiting Romania via highway are required to purchase permits that cost $600. If trucks cross both borders by rail, there is no permit required. Consequently, for trucks with trailers using the railway, an intermodal Rolling Motorway facility built at Ruse, across the Danube from Giurgiu, would be attractive..

The highway distance between Giurgiu and Curtici is 700 km. Truck company costs for transiting through Romania (Giurgiu-Curtici) via highway, are estimated at $1,100.These transiting costs do not include the costs of delays on the Romanian highway due to congestion or accidents. The train will consist of 30 platform wagons carrying 15 trucks with trailers, and one coach for the drivers. The train will operate between Ruse/Giurgiu and exit through Curtici, a distance of approximately 620 kilometers and taking 12 hours. The terminal will be located at Ruse. BDZ employees would ensure full operations of the terminal.

The total CFR operating costs for one-way trip for a truck and trailer would be $1,024 compared to $1,100 for the operating costs of a truck with trailer transiting Romania via highway and crossing the Carpathian Mountains, with increased incidence of equipment wear and equipment requirements. Compared to the cost of transiting Romania by road ($1,100) CFR could charge the trucking company $1,060 and be competitive.

Initial needed investments would be $942,494. Due to the excess of CFR locomotives and cars, only used units will be considered for this service, using their residual value Subsequent investments will be required as follows:

- 2001: $1,424,000
- 2002: $1,442,000
- 2009: $1,216,000
- 2014.....$48,000

It is estimated that the service can capture one third of the potential market in the first year, two-thirds in the second year and the full potential thereafter. On this basis, the following financial indicators result:

- Internal rate of return: .....---
- Net present value: ..... -$875.000
- Benefit/cost ratio:.....0.99

These preliminary calculations show that the rolling motorway service may achieve "break even" only over the long range. This warrants further investigation by CFR, using more accurate cost figures available to the. Table **10.3** presents the cash flows for this project.

Management Information System (MIS)

The intermodal needs a specific MIS. The present IRIS does not meet the requirements of the intermodal service. The proposed intermodal MIS will be installed on a PC at the Headquarters office; each of the eleven intermodal terminals, plus the Port of Constantza office, would have data entry access to the system, which will interface with the IRIS. Estimated cost of the hardware is $50,000 and of the software is $30,000. Adding $20,000 for installation assistance will bring the total system cost to $100,000.

The system includes installation of centralized billing for all intermodal traffic; resultant payroll reduction is estimated at $14,700 per year. The major benefit will be improved management performance which should result in increased profit from operations. Due to the intangible nature of the benefits, no cash flow table, or estimates of NPV or FIRR have been prepared.

Table 10.2
FINANCIAL EVALUATION: INTERMODAL TERMINAL REDUCTION PROGRAM
(in thousands of constant 1998 US Dollars)

Year	Project Costs			Project Revenues			Net Cash Flow
	Separation Payments	Revenue Reduction	Total Costs	Operations Reduction	Salary Savings	Total Revenues	
1999	445	1,436	1,881	1,416	178	1,594	(287)
2000		2,872	2,872	2,832	356	3,188	316
2001		2,872	2,872	2,832	356	3,188	316
2002		2,872	2,872	2,832	356	3,188	316
2003		2,872	2,872	2,832	356	3,188	316
2004		2,872	2,872	2,832	356	3,188	316
2005		2,872	2,872	2,832	356	3,188	316
2006		2,872	2,872	2,832	356	3,188	316
2007		2,872	2,872	2,832	356	3,188	316
2008		2,872	2,872	2,832	356	3,188	316
2009		2,872	2,872	2,832	356	3,188	316
2010		2,872	2,872	2,832	356	3,188	316
2011		2,872	2,872	2,832	356	3,188	316
2012		2,872	2,872	2,832	356	3,188	316
2013		2,872	2,872	2,832	356	3,188	316
2014		2,872	2,872	2,832	356	3,188	316
2015		2,872	2,872	2,832	356	3,188	316
2016		2,872	2,872	2,832	356	3,188	316
2017		2,872	2,872	2,832	356	3,188	316
2018		2,872	2,872	2,832	356	3,188	316

Feasibility Indicators

Financial Internal Rate of Return	110%
Net Present Value	$2,544
Present Value Benefits	$29,824
Present Value Costs	$27,280
Benefit/Cost Ratio	1.09

Table 10.3
FINANCIAL EVALUATION: PROPOSED ROLLING MOTORWAY SERVICE (TTOFC)
(in thousands of constant 1998 US Dollars)

Year	Project Costs			Project Revenues		Cash Flow	Cumulative Cash Flow
	Equipment Investment	Opertations & Maintenance	Total Costs	Revenues	Total Revenues		
1999	943		943		-	(943)	(943)
2000		3,134	3,134	3,244	3,244	110	(833)
2001	1,424	6,268	7,692	6,488	6,488	(1,204)	(2,037)
2002	1,442	9,402	10,844	9,732	9,732	(1,112)	(3,149)
2003		9,402	9,402	9,732	9,732	330	(2,819)
2004		9,402	9,402	9,732	9,732	330	(2,489)
2005		9,402	9,402	9,732	9,732	330	(2,159)
2006		9,402	9,402	9,732	9,732	330	(1,829)
2007		9,402	9,402	9,732	9,732	330	(1,499)
2008		9,402	9,402	9,732	9,732	330	(1,169)
2009	1,216	9,402	10,618	9,732	9,732	(886)	(2,055)
2010		9,402	9,402	9,732	9,732	330	(1,725)
2011		9,402	9,402	9,732	9,732	330	(1,395)
2012		9,402	9,402	9,732	9,732	330	(1,065)
2013		9,402	9,402	9,732	9,732	330	(735)
2014	48	9,402	9,450	9,732	9,732	282	(453)
2015		9,402	9,402	9,732	9,732	330	(123)
2016		9,402	9,402	9,732	9,732	330	207
2017		9,402	9,402	9,732	9,732	330	537
2018		9,402	9,402	9,732	9,732	330	867
2019		9,402	9,402	9,732	9,732	330	1,197

Feasibility Indicators

Financial Internal Rate of Return	-
Net Present Value	($875)
Present Value Benefits	$80,335
Present Value Costs	$81,210
Benefit/Cost Ratio	0.99

FERRY BOAT PROJECTS

Initiation of Rail Ferry Service to the Port of Poti

The Ferry Bureau has proposed the start of a new ferry service from the Port of Constantza across the Black Sea to the Port of Poti in Georgia. CFR is considering construction of a track layout, at standard gauge, for transloading of freight from wide gauge wagons to standard gauge wagons and vice-versa. This will link the Romanian railway system to the Caucasus region and the vast land locked areas of Central Asia, including Georgia, Armenia, Azerbaijan, and across the Caspian Sea to Turkmenistan, Uzbekistan, Kazakhstan, and Tajikistan. The region holds extensive natural resources, particularly of petroleum and natural gas.

The European Union's TRACECA program, has as its objective the improvement of the efficiency of the region's transport system including rail, port, infrastructure and intermodal facilities. For the CFR system and the ferry boat system in particular, this presents a great opportunity to link EU with the Silk Road countries, by integration of the various national rail systems.

The estimated costs for the rail ferry voyage to Poti have been developed by the CFR-Freight Ferry Bureau. The costs are presented in Table **10.4** for a voyage calculated for 7 days at a cost of $87,602. The Client's estimation of the initial investment requirements at Poti for a transloading track, a ramp for the ferry boat, a forklift for the ferry and transloading equipment for both liquid and dry bulk amounts to $1,000,000

The rail ferry charges for transport service are based upon the cost in linear meters of the rail wagons carried. Assuming a ferry boat load ratio of 60%, taking into account the estimated ferry operating costs and adding a margin of 10% for additional costs (administration, marketing, facilities, etc,) and 15% profit, it results in a tariff rate of approximately $60 per linear meter of loaded rail wagon.

Table 10.4
ESTIMATED VOYAGE COSTS - CONSTANTZA TO POTI
(in US Dollars)

Vessel Speed:12 nautical miles per hour
Distance: 1200 nautical miles
Time at Sea: 100 hours
Time in Port: 72 hours

COST ITEM	UNITS	COST/UNIT	COST/VOYAGE
Fuel			
IFO	1.59 ton/hour	110	17,490
MDO	0.125 ton/hour	180	3,870
LUBOIL			
- in Port	0.002 ton/hour	1,800	259
- at Sea	0.02 ton/hour	1,800	3,600
Port Dues			
Constantza	per voyage	2,500	2,500
Poti - Ship Charges	per voyage	23,885	23,885
Poti - Stevedoring	per wagon	94	14,664
Operating Costs			
Amortization	per day	710	4,970
Insurance	per day	418	2,926
Crew	per day	307	2,152
Cash to Master	per night	977	5,862
Subsistence	per day	204	1,425
Repairs	per day	500	3,500
Misc Items	per voyage	500	500
		TOTAL	**87,602**

Source: CFR-Freight

The cost of implementing and maintaining the service between Constantza and Poti is compared to the contemplated revenues, in order to assess the viability of the proposed rail ferry service. This comparison is done for a 20-year period. The considered costs were for investments at Poti, the handling equipment for ferry boats, port maintenance costs, ferry operating and maintenance costs and marketing costs. The revenues and costs are presented in Table **10.5**.

The results of the financial viability calculations are as follows:

- Internal Rate of Return:..... 44%
- Net Present Value:..... $2,133,407
- Benefit/Cost Ratio:..... 1.08

These indicators are attractive, but consideration should be given to further refinement before any decision is made.

For the proposed service, it is estimated that ferry transport capacity will be in the 100,000 to 150,000 tons per year, range. The potential partners and customers in Georgia and beyond should be contacted to establish cargo potential and the commitment for using ferry service.

The new service to Poti must earn a reputation for dependability and customer satisfaction. Negotiations for integration of rail service between the CFR, Georgian and other regional railways via the ferry boat system should be conducted. Schedules, investment participation in the port of Poti, port charges and competitive service rates should be established well in advance of starting operations

While it is vital that Romania becomes a participant in the development of the Constantza-Poti route, in order to take full advantage of its transportation infrastructure, the ferries and its strategic location, CFR should eventually employ only moderate investments for a standard gauge track at Poti.

SENSITIVITY ANALYSIS

The investment projects developed during the Intermodal Study have been analyzed using available data. However, where data was inconsistent the Consultant applied the experience of other comparable systems and professional judgement to estimate the costs and benefits of the projects. A sensitivity analysis of the financial feasibility calculations has been carried out to test the impact of changes in the basic variables on the attractiveness of the various projects. Costs and revenues were modified, as follows:

- Intermodal Terminal in South Port Container Development - an increase of 10% in the costs of construction and equipment and a reduction of 10% in the revenues generated by the New Terminal.
- Terminal Reduction Program - an increase in 25% in severance payments and a reduction o 50% in estimated labor cost savings.
- Extension of Rail Ferry Service to the Port of Poti - a decrease of 10% in the generation of revenues for the transport of cargo.

No sensitivity analysis was performed on the Proposed Rolling Motorway Service, since the Consultant does not believe the operating cost data provided by CFR to be reliable. However, preliminary analysis indicatesthat the project deserves further investigation. The results of the sensitivity analysis are summarized Table **10.6**

The results of the sensitivity analysis show that, even with the reductions in benefit categories and in project costs, the projects continue to be feasible, exceeding the discount rate, and producing positive net present values. The terminal reduction program is the least sensitive to change in the fundamental variables used in the analysis, while both the rail ferry project and the intermodal terminal must be managed carefully and corrective action taken should the evolution of the business cause margins to deteriorate.

Table 10.5
FINANCIAL EVALUATION: PROPOSED RAIL FERRY SERVICE TO POTI
(in constant 1998 US Dollars)

Year	Project Costs						Project Revenues			Net Cash Flow
	Terminal Investment	Terminal Maintenance	Ferry Operations	Ferry Maintenance	Marketing Expenses	Total Costs	Cargo Revenues	Residual Value	Total Revenues	
2000	1,000,000		657,015		43,875	1,700,890	877,500		877,500	(823,390)
2001		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2002		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2003		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2004		50,000	2,277,652	300,000	152,685	2,780,337	3,053,700		3,053,700	273,363
2005		50,000	2,277,652	300,000	152,685	2,780,337	3,053,700		3,053,700	273,363
2006		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2007		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2008		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2009		50,000	2,277,652	300,000	152,685	2,780,337	3,053,700		3,053,700	273,363
2010		50,000	2,277,652	300,000	152,685	2,780,337	3,053,700		3,053,700	273,363
2011		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2012		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2013		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2014		50,000	2,277,652	300,000	152,685	2,780,337	3,053,700		3,053,700	273,363
2015		50,000	2,277,652	300,000	152,685	2,780,337	3,053,700		3,053,700	273,363
2016		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2017		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2018		50,000	2,628,060		175,500	2,853,560	3,510,000		3,510,000	656,440
2019		50,000	2,277,652	300,000	152,685	2,780,337	3,053,700		3,053,700	273,363
2020		50,000	2,277,652	300,000	152,685	2,780,337	3,053,700	600,000	3,653,700	873,363

Feasibility Indicators

Financial Internal Rate of Return	73%
Net Present Value	$ 4,089,690
Present Value Benefits	$ 31,369,942
Present Value Costs	$ 27,280,252
Benefit/Cost Ratio	1.15

Table 10.6
RESULTS OF SENSITIVITY ANALYSIS

FINANCIAL INDICATOR	INTERMODAL TERMINAL SOUTH PORT CONTAINER PORT	TERMINAL REDUCTION PROGRAM	RAIL FERRY SERVICE TO THE PORT OF POTI
Financial Internal Rate of Return	9%	28%	25%
Net Present Value ($ 000)	$929	$766	$1,120
Benefit/Cost Ratio	1.09	1.03	1.04

CONCLUSIONS AND RECOMMENDATIONS

The need for improved management information is most critical for CFR management. A specific MIS linked with IRIS is required for the intermodal system, on a high priority basis.

Operation of the rail portion of the new Constantza Container Terminal by CFR-Freight is a moderately attractive investment. CFR-Freight should enter into a joint-venture with the marine terminal operator, to participate in operations.

Consolidation of the intermodal terminals into eleven main units will improve CFR-Freight operations and reduce operating costs. Besides personnel reductions, no investments are necessary; so implementation can take place within a few months.

The market for cargo movement between Constantza and Poti, Georgia, offers an attractive opportunity for expanded ferry boat service. An adequate development of track and loading facilities at Poti is required. At the present time CFR should consider only moderate investments at Poti, due to probable international participation. However, CFR could start strong marketing efforts and conclude business agreements on an urgent basis.

The Rolling Motorway services are marginal. Accurate cost data and further investigation are needed to establish the course of action to be taken by CFR.

Task 11. MASTER PLAN

OBJECTIVE:

- *Overall examination of the main issues of the study, findings and recommendations.*
- *The intermodal traffic through the port of Constantza shows a sharp decline from January 1997 to September 1998. To avoid further decrease of its modal share, CFR-Freight should take prompt corrective action.*

OVERVIEW:

- *Intermodal services present a number of attractive market opportunities for CFR-Freight with the possibility of increased revenues and profit for the railway. To achieve this CFR should organize the intermodal staff based on modern free market principles. This is a major challenge for CFR management due to its lack of experience and know how in a free market economy.*
- *The Master Plan emphasizes the imperious need for the training abroad of CFR upper and middle management, as a practical, necessary and the only way of enabling the railway to implement this Consultant's recommendations.*
- *A major drawback in the CFR intermodal activity is the lack of proper cost accounting information and also the absence of a MIS tailored to intermodal needs.*

CFR-FREIGHT RAIL INTERMODAL SERVICES

Forecast of Intermodal Traffic for CFR-Freight

The intermodal traffic for the Romanian rail system has two distinct markets:

- Romanian foreign trade - import and export cargo - with intermodal potential that is handled in the Port of Constantza.
- International in-transit traffic with potential for transport through Romania using CFR-Freight.

Task 3 has detailed the respective traffic forecast. The evaluation of the rail intermodal traffic has been done by using the medium forecast.

Modal Distribution of Intermodal Traffic

For the transport of containers to and from the Port of Constantza and locations in Romania, there are two available alternatives; rail or highway. A survey conducted by Prognos Consultants with Romanian companies [60 responded] illustrated the main factors which influence the modal choice:

- 47% Price
- 24% Speed
- 24% Quality (timeliness, duration of trip, risk of accident)
- 7% No Alternative

In relating their use of international transport services, the survey respondents provided indications of main problems and potential solutions for transport difficulties experienced by users.

Recently, CFR is facing a very strong competition for container traffic to/from the Port of Constantza. While in 1995 the railway modal share was 70%, in September of 1998 this has declined to 31%.

Between 1995 and 1998, CFR had fourteen freight tariff rates to keep up with inflation. Until May 1997 those adjustments were in line with the inflation. However, starting in May 1997, tariff adjustments have been greater than the inflation rates. This has coincided with a decrease of the railway market share. This trend has continued to the present.

CFR-Freight personnel indicate that no competitive analysis was performed when adjusting container handling tariffs and no evaluation is made of the potential loss of traffic due to the tariff adjustments. The adjustments are based upon the revenue requirements of the railway. The greatest impact on the CFR market share has been in the container intermodal traffic through the Port of Constantza, reaching an all time low of 31% in September of 1998.

Rates for Transport Services for Intermodal Traffic

An investigation of current container transport rates charged by CFR-Freight and by private trucking companies has been carried out in order to compare the current levels. Trucking costs are based upon information from the National Union of Road Transporters of Romania (UNTRR), with a membership of 3,000 firms, most being small scale operators. Table **11.1** presents the estimated average costs for the main domestic destinations.

It should be mentioned that the trucking industry does not have a published official tariff. The rates are established following negotiations with each client. CFR has a published official tariff. As a rule there are no incentives and discounts. The tariffs for containers contain a multitude of supplemental charges, some of them unwarranted, making them customer unfriendly. Further investigation of container tariff rates has reveled that they vary considerably by terminal, and are dependent upon the weight of the container. The comparison of the estimated rail and truck transport tariffs for a loaded container is presented in Table **11.2**

Table 11.1
ESTIMATED ROAD TRANSPORT RATES FOR CONTAINERS
(Costs in lei as of 10/98)

ROUTE	DISTANCE (km)	RATE - ONE WAY	RATE EMPTY RETURN	RATE WITH BACKHAUL CARGO
Constantza - Bucharest	225	1696.92	1465.21	1548.69
Constantza - Craiova	503	3281.38	2896.34	3061.6
Constantza - Brasov	360	3076.94	2644.19	2771.97
Constantza - Cluj Napoca	692	3940.73	3453.46	3680.06
Constantza - Iasi	325	3528.42	2915.08	3076.94
Constantza - Timisoara	834	4407.55	3801.02	4070.21
Constantza - Arad	794	4427.99	3761.84	4027.62

Source: Base cost data from UNTRR. Overheads calculated by consultant.
9,000 lei = 1$

Table 11. 2
COMPARATIVE CONTAINER TRANSPORT CHARGES
(in Lei as of 10/98)

TRIP CONSTANTZA -	ESTIMATED RAIL TARIFF	ESTIMATED TRUCK RATE ONE WAY	ESTIMATED TRUCK RATE WITH EMPTY RETURN
Bucharest	1,892,645	1,696,920	3,162,120
Craiova	2,352,086	3,281,380	6,177,720
Brasov	219,3974	3,076,940	5,721,130
Cluj Napoca	3,433,006	3,940,730	7,394,190
Iasi	2,352,086	3,528,420	6,443,510
Timisoara	2,352,086	4,407,550	8,208,570
Arad	3,609,540	4,427,990	8,189,830

Source: Intermodal Study, Calculations by Consultant
$1 = 9000 lei

The results of this comparison show that truck transport rates are lower than CFR rates for Bucharest-Constantza segment, only. For the rest of the segments, CFR rates are very competitive. On the other hand, delivery time by truck is much faster than by rail. Table **11.3** shows estimated trip times by road from Constantza to main domestic destinations.

Table 11.3
ESTIMATED TRIP TIMES FOR ROAD TRANSPORT

TRIPS CONSTANTZA TO/FROM	TIME (HOURS)
Bucharest	**7**
Craiova	**13**
Brasov	**12**
Cluj	**18**
Iasi	**14**
Timisoara	**22**
Arad	**24**

Source: UNTRR

By rail these times are much greater due to the train extra activity involved, especially when the container are being shipped with regular freight trains. Along this study it has been consistently recommended to organize to the possible extent closed container trains and when this is not possible, to load the containers on rail wagons, grouped by destination, in order to avoid unnecessary switching activity and the resulting delays.

Railway intermodal service from the Port of Constantza in scheduled intermodal trains is shown in Table **11.4**

Review of the container total transit time by rail, shows that CFR is at great disadvantage in service time, even for cities served directly from the Port of Constantza. For perishable or high value freight, the time factor is critical and would determine the modal choice. Table **11.5** shows estimated rail transit time from Constantza to domestic destinations for import containers.

Table 11.4
SCHEDULED INTERMODAL TRAINS

TRAIN NUMBER	80062	80032	90034	90076
Frequency	Daily	Daily	2 x per Week	As Needed
Route (Same Stops & Frequency on Return)	Constantza Port Palas Buzau Ploiesti Brasov	Constantza Port Palas Bucuresti Noi	Constantza Port Bucuresti Noi Craiova Semenic	Constantza Port Craiova (Daewoo Plant)
Return Train Number	80061	80031	90033	

Source: CFR-Freight

Table 11.5
ESTIMATED RAILWAY TRANSIT TIME FOR IMPORT CONTAINERS

CONSTANTZA TO:	BUCURESTI NOI	BRASOV	CRAIOVA	SEMENIC
Port Rail Terminal	12	12	12	12
Line Haul	8	15.5	15	28
Destination Terminal	2	2	2	2
Total Hours	22	29.5	29	42

Source: CFR- Freight

It is instrumental for CFR to improve container loading and train operations as well as container terminal operations, in order to reduce the overall container transport time and increase efficiency and its competitive potential.

CFR has no tariff or operational flexibility as compared with the trucking industry. Besides, its activity has not been commercially oriented. The study recommends practical approaches to enhance CFR-Freight chances of competing with auto mode and of securing its market share.

A great railway advantage over the trucking industry is the fact that CFR -Freight is empowered to transport cargo in bond, for customs clearance at destination. This is a big plus since it permits clearance at the point at which the goods are needed by the consignee, conserving capital, saving in communications and travel costs. Trucking firms and customs brokers must provide a bonded guarantee for the customs duties prior to being able to transport goods in bond. The financial requirements of this guarantee is a burden for most trucking companies.

Railway Modal Share of Containerized Imports and Exports

The Consultants have developed three scenarios for the development of the container market. The scenarios depend upon future policies set by the Railway, which will effect its market share of containerized traffic.

Scenario 1 - Represents a continuation of current market trends, in that the Railway continues to lose market share following the trend established in the period 1991 to 1998. It is assumed that a 45% market share is maintained until 2000, at which time the declining trend continues through the year 2020.

Year	Market Share
2000	45.0%
2005	38.9%
2010	25.0%
2015	11.0%
2020	0

Under this Scenario, current operations and productivity levels are maintained, with no fundamental changes in modus operandi or service quality. This rather represents CFR-Freight current activity and policy.

Scenario 2 - Assumes a continuation of the current market situation, with CFR being able to stop present trend, without further deterioration of its competitive position, which will result in maintaining the railway market share at 50%.

Scenario 3 - Assumes an aggressive program by reversing the trend and capturing the lost market This implies a radical transformation of CFR-Freight Intermodal, following the training and the professional indoctrination of its upper and middle management in the United States, on a railroad intermodal environment. The implementation of Scenario 3 requires the transformation of the Railway into a market driven, client focussed organization, with services offered based upon profitable service operations. This scenario will take some time to implement, and its goal is to attain a market share of 70% by 2005 of the import and export container traffic through the Port of Constantza. An urgent crash program consisting of training, service improvements and vigorous marketing strategy is needed in order to achieve this objective.

Table **11.6** presents a summary of the forecasted traffic for CFR-Freight by Scenario.

Table 11.6
FORECAST OF RAILWAY CONTAINER TRAFFIC
('000 TEUs)

YEAR	SCENARIO 1	SCENARIO 2	SCENARIO 3
2000	54.2	54.2	54.2
2005	58.4	75.1	105.5
2010	61.6	123.1	172.3
2015	42	191.1	267.5
2020	-	294.9	412.9

Source: Calculations by Consultant

Concerning Scenario 1, continuation of the status quo will result in a long-term decline of both market and the traffic absolute volume and possibly the loss of the intermodal service. For Scenario 2, requires improvement of service in order to maintain the modal share. Scenario 3 depends upon actions which are beyond the control of CFR-Freight. They are the opportunity for training abroad, the freedom to establish competitive tariff rates and the ability to implement modern operations and an aggressive marketing program.

ESTIMATE OF RAILWAY SHARE POTENTIAL IN-TRANSIT MARKET

The international in - transit traffic has many alternatives available. For CFR this is a minor traffic; it amounted to only 2,000 containers in 1997. In order to examine its potential, three scenarios were devised. Table 11.7 presents them:

Table 11. 7
ESTIMATE OF RAILWAY INTERNATIONAL IN-TRANSIT TRAFFIC ('000 Tons)

YEAR	SCENARIO 1	SCENARIO 2	SCENARIO 3
2000	0	87	616
2005	0	98.5	697
2010	0	111.5	789
2015	0	126.3	893
2020	0	143.2	1013

Source: Calculations by Consultant

Scenarios 2 requires efficiency improvement and securing of present trend. Scenario 3 requires fundamental changes and investments.

The Long-Term Development Strategy

To achieve the profitability of its intermodal services, CFR should establish long-term strategy consisting of components to be achieved.

Marketing Strategy

The study (Task 11) fully elaborates on the development strategy required which could be condensed in the previous statements for scenarios 2 and 3. It should be pointed out that besides all the recommended changes at CFR-Freight Intermodal, it is imperative that improved operations and management, formalities and procedures take place in Constantza Port. This includes CFR port division, the port operators, contractors, Customs and the port administration.

As a rule CFR-Freight does rail pickup and delivery for all containers. In some occasions CFR allowed customers to provide their own pickup and delivery service. This practice is rather usual in other countries and should be expended as a major marketing advantage for CFR.

This study has focussed on international traffic moving through the Port of Constantza, which represents over ninety percent of CFR-Freight intermodal traffic. However, before 1990 domestic intermodal transports represented more than fifty percent of the entire intermodal traffic. The potential of the domestic should be seriously explored by the marketing staff, since CFR has a solid infrastructure of intermodal terminals.

Intermodal Tariffs

Present tariff rates and fees for container transport and related services shows an intricate system. This could be defined as "customer unfriendly," due to the extreme itemization of services as well as for some unpopular and unwarranted charges. CFR must abolish present tariff for containers and replace it with a consolidated, simple floating rates tariff, which should incorporate all basic services in a single rate scale. For loaded containers, there should be a minimum weight charge plus ad valorem rates based on commodity values.

For transport of empty containers separate rates should be applied based on distance and container size. The tariff should allow for negotiated discounts as part of the marketing strategy and as a function of road competition in a particular market, or as it affects a specific terminal.

Operating Plan

The Operating Plan assumes that the recommended terminal rationalization will be implemented and the eleven terminals will be served by dedicated intermodal trains. These trains will run to/from Constantza Port and operate in two primary corridors, Constantza-Bucharest-Brasov-Simeria-Curtici; and Constantza-Iasi. Dedicated trains will serve the terminals which are not located on the primary corridors.

Management Information System and Communications

Development and installation of the Management Information System, as discussed in Task 7 is also a critical requirement. This should be implemented at the same time as the training program. The CFR should have a specific MIS devised for its intermodal division. The accounting system being designed by Oracle USA should include provisions to calculate the specific intermodal costs, which are essential for a modern, commercially viable system.

Terminal Rationalization

CFR-Freight has an excessive number of intermodal terminals for the present traffic volume. Reduction of their number will result in important savings and increased efficiency. Geographic location was of primary concern in recommending the inland terminals to be kept. Direct access to a main highway was also part of criteria. The existing 32 terminals should be consolidated into eleven main terminals. As a general rule these terminals are located along the EU corridors IV and IX. Consolidation will combine long haul rail service with the short haul flexibility of the truck. Also, it will permit increase in the number of direct closed intermodal trains, which will yield substantial savings by the derived higher operational efficiency.

An obvious example of the need for consolidation is offered by the existence of three intermodal terminals in the Bucharest area. The main one, Bucuresti Noi, handled 75% of the container traffic for Bucharest area in 1997. The terminal is located at 12 km of the capital beltway. A special case is the terminal at Craiova for Daewo plant, serviced by unit trains from Constantza.

South Port New Container Terminal

The terminal is planned to become operational in 2001. CFR-Freight should participate in the rail operations and possibly in the financing of the new terminal. To that extent he should join with local port operators or foreign partners to enhance its chances of being a participant in the operations of the new terminal CFR-Freight should continue to follow the progress of this project closely. Of particular interest will be the date when APMC intends to solicit terminal operating proposals, and the identification of potential bidders. As potential bidders are identified, CFR-Freight should make immediate contact with the firms identified and advise them of the Railway's interest in participating in the operation. The objective of this effort is to insure that CFR-Freight is offered the opportunity to participate with as many prospective bidders as possible.

Gauge Change at the Borders

Rail traffic moving between Romania and FSU countries has to change boogies or transload the freight from 1,524 mm wide gauge to standard 1,435 mm gauge. wagons and vice-versa. Mechanized equipment is available for both wagons and bogies. This is a costly, time consuming operation. As Romanian wagons are not allowed into Ukraine or Moldova, the bogie change is used primarily for Russian wagons destined to Romanian points. In several instances, Russian wagons have been carried by the ferry boats to Turkish points for loading. The extension of the ferry boat service to Poti, Georgia, will create another point at which tracks of two different gauges connect.

Rolling Motorway /TTOFC Service

In task 10 (Financial Analysis) the viability of Rolling Motorway service from Ruse to Curtici and continuing to Western Europe was analyzed. Preliminary calculations showed that this potential traffic could break even and it should be explored further.

The Consultant recommends that CFR Freight conduct a very detailed economic study using reliable operating costs figures, to determine beyond any doubt the profitability (or lack of it) for the Rolling Motorway (TTOFC) service. There also is a potential market for intermodal service between Romania and Western Europe using equipment such as trailers, swap bodies, or containers.

The Freight Freeways is a new intermodal concept developed by EU, allowing private intermodal operators to use the infrastructure of the national railways. This appears to be a potentially profitable market and CFR-Freight should explore this opportunity. The new established freight freeway service from London to Sopron, Hungary will have a natural continuation to Curtici and Constantza, on the rail corridor IV.

FERRY BOAT SERVICE

CFR-Freight operates a rail ferry service in the Black Sea and Eastern Mediterranean using two ferry boats which are owned by the railway. Each ferry boat has a capacity of 108 four-axle wagons. Ferry boat operations were started in 1995, with wagonload cargo to/from Turkey. Palletized cargo and containers have also been transported. The ferry has a specialized yard in the South Port, for loading/unloading wagons. Table **11.8** presents Ferry boats voyages to Turkish ports

CFR intends to start ferry service to Poti, with the anticipation of capturing cargo from Georgia, Azerbaijan, Armenia and countries east of the Caspian Sea, as a natural outlet to world markets through Constantza Port and Romania. However, Poti has no suitable infrastructure such as standard gauge tracks

Table 11.8
FERRY BOAT VOYAGES

YEAR	ROUTE	NUMBER OF VOYAGES
1995	Constantza - Samsun	3
1996	Constantza - Samsun	7
1997	Constantza - Samsun	8
	Constantza - Mersin	4
1998*	Constantza - Mersin	6
	Constantza-Mersin-Izmir	7

** Through 01/10/98*

Source: CFR-Freight

Table 11.9
SUMMARY OF FERRY BOAT VOYAGES IN 1998
(01/98 - 10/98)

VOYAGE UNITS/CARGO	CONSTANTZA - MERSIN - CONSTANTZA	MERSIN - IZMIR - CONSTANTZA	IZMIR - CONSTANTZA
Wagons - Full	*205*	*293*	*92*
Wagons - Empty	*501*	*205*	-
Wagons - Total	706	498	92
Containers	60	42	69
Total Units	**766**	**540**	**161**
Wagon Cargo	10,327	7,245	3,161
Container Cargo	-	662	1474
Palletized Cargo	-	527	-
Total Cargo	**10,327**	**8,434**	**4,635**

Source: Intermodal Study

and equipment for accommodating CFR wagons and permit cargo trans-loading. To accomplish this, some modest investments, by western standards, are required.

Table **11.9** shows ferry boat activity in 1998

Ferry boat service does not have detailed cost records concerning the entire activity. Except for approximate direct costs, it was difficult to discern repairs, maintenance and overhead costs. Also, CFR-Freight could not provide a detailed breakdown for ferry revenues. The ferry operations have been onerous in general. In 1998 costs had exceeded revenues by more than 50%.

Competitive Position of the RailFerry – Tarriff Rates

The rail rates for conventional wagon load cargo and containers are generally competitive with conventional containerized ocean shipping rates. The main reasons for ferry boat losses are the lack of proper marketing of its services. A secondary reason is the perception by prospective clients of the ferry service irregular schedules and the problems and delays with the intermodal transfer.

The unprofitable ferry boat operation is also illustrated by utilization ratio of its cargo capacity, that averaged 47% during 1998, out of which 24% represents the transport of empty wagons.

The current ferry boat operations are in a losing trend, in spite of the great potential the rail ferry service has in the Black Sea basin and the connections to Europe by rail. The most obvious solution to the present unprofitable activity is effective marketing and securing of dependable markets. From a practical view point, the ferries should stress the conventional way of operations by increasing the number of loaded wagons transported. CFR should insist in an equitable wagon use via ferry boat, between CFR and Turkish Railways, in order to reduce the transport of CFR empty wagons and increase efficiency of ferry operations.

Marketing of Ferry Boat Services

CFR intends to enter the Ro-Ro market. However, by design ferry vessels are not well suited to compete with specialized Ro-Ro vessels, which could better use their cargo carrying space.

CFR has conducted discussions with a Turkish truck organization to transport their trucks to Constantza by ferries (Ro-Ro) and from here to continue as a Rolling Motorway service to western Europe. This possibility should be further investigated. By enering in the Ro-Ro business, CFR should compete with Romtrans who is also a major client. On the other hand CFR could also organize the Rolling Motorway service from Constantza with trucks brought in by Romtrans.

Future Organization

The Consultant has developed an organizational structure and estimates for personnel requirements (tasks 8 and 9), which emphasizes the need for implementation of a valid marketing strategy that will enhance the ferry boat division efforts to conduct profitable operations. Annex II describes approaches to market ferry boat sevices.

International In-Transit Rail Traffic

CFR rail ferry service has to concentrate its efforts to provide continuous railway connections to European destinations, by wagon exchanges with other railway administrations. As a matter of fact, European Union is allocating resources to link with the Black Sea countries and beyond, along the "Silk Road" Realization of rail links are part of these efforts. CFR has the opportunity to complete one of the possible links by starting ferry service to Poti.

The great trade potential with east of Black Sea countries could be illustrated by the fact that in 1997 the import/export between Romania and the region has amounted to 450,000 tons and $100 million. CFR has been intending to make some infrastructure investments at Poti, in order to start ferry boat operations to that port. At the present time CFR should investigate the potentiality of the market, before committing any resources. On the other hand the feasibility studies being conducted for Georgia ports would point out their geo-economic importance and recommend significant infra-structure investments.