

PART I

Final report

The Feasibility Study on the Development Project of the Port of Constantza in Romania

February 2002



Exchange Rate

US\$1.00 = Ro.Lei 26,000

US\$1.00 = JP¥110.0

(As of December 2000)

Japan International Cooperation Agency (JICA)

Ministry of Public Works, Transports and Housing, The Government of Romania

PART I

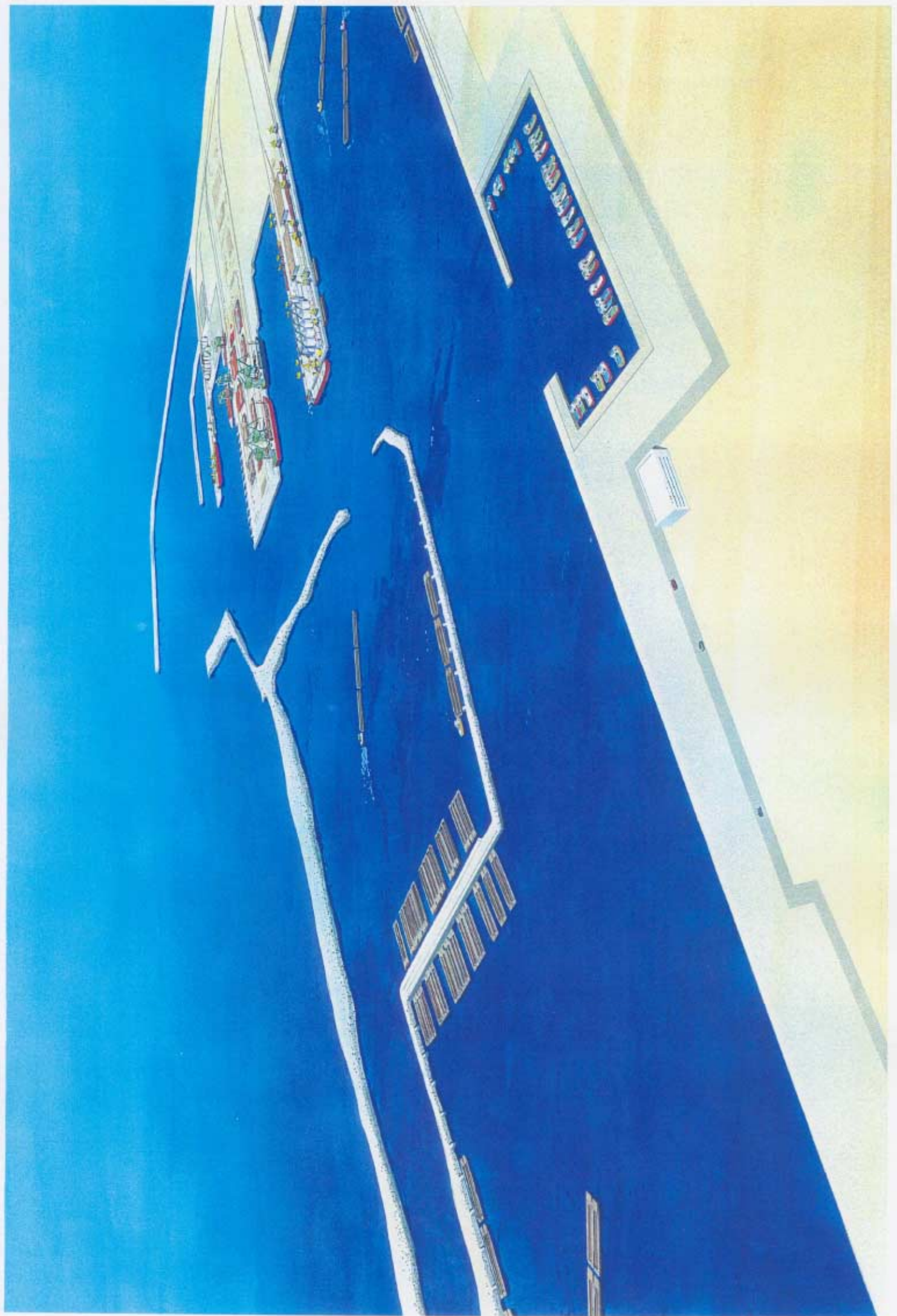
Final report

**The
Feasibility Study
on the
Development Project
of the
Port of Constantza
in Romania**

February 2002

The Overseas Coastal Area Development Institute of Japan (OCDI)

Pacific Consultants International (PCI)





PREFACE

In response to a request from the Government of the Republic of Romania, the Government of Japan decided to conduct "The Feasibility Study on the Development Project of the Port of Constantza in Romania" and entrusted the study to the Japan International Cooperation Agency (JICA).

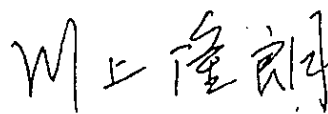
JICA selected and dispatched a study team headed by Mr. Fumio Kaneko of the Overseas Coastal Area Development Institute of Japan (OCDI) and consisting of OCDI and Pacific Consultants International Co., Ltd. (PCI) to Romania, three times between September 2000 and November 2001.

The team held discussions with the officials concerned of the Government of Romania and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Ministry of Public Works, Transports and Housing of the Romanian Government and other authorities concerned for their close cooperation extended to the study team.

February 2002



Takao Kawakami

President

Japan International Cooperation Agency

LETTER OF TRANSMITTAL

February 2002

Mr. Takao Kawakami
President
Japan International Cooperation Agency

Dear Mr. Kawakami:

It is my great pleasure to submit herewith the Final Report of the Feasibility Study on the Development Project of the Port of Constantza in Romania.

The study team of the Overseas Coastal Area Development Institute of Japan (OCDI) and Pacific Consultants International (PCI) conducted surveys in the Republic of Romania over the period between September 2000 and November 2001 as per the contract with the Japan International Cooperation Agency.

The study team compiled this report, which includes the Master Plan, the Short-term Development Plan and the Feasibility Study of the Port of Constantza, through close consultations with officials of the Ministry of Public Works, Transports and Housing of the Romanian Government and other authorities concerned.

On behalf of the study team, I would like to express my heartfelt appreciation to the Ministry of Public Works, Transports and Housing and other authorities concerned for their cooperation, assistance and hospitality extended to the study team.

I am also greatly grateful to the Japan International Cooperation Agency, the Ministry of Foreign Affairs, the Ministry of Land, Infrastructure and Transport and the Embassy of Japan in Romania for valuable suggestions and assistance through this study.

Yours faithfully,



Fumio Kaneko

Team Leader for the Feasibility Study on the Development
Project of the Port of Constantza in Romania

ABBREVIATIONS

ADB	Asian Development Bank
APDF	National Company Administration of the River Ports on the Danube
APDM	National Company Administration of River Sea Ports on the Danube
CEEC	Central and Eastern European Countries
CEFTA	Central European Free Trade Agreement
CFR	The National Company for Railway Transport
CIF	Cost, Insurance and Freight
CIS	Commonwealth of Independent States
CMPA	National Company Constantza Maritime Ports Administration
CMRC	Central Meteorologic Regional Constantsa
DFI	Direct Foreign Investment
DWT	Dead Weight Ton
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EU	European Union
FIRR	Financial Internal Rate of Return
FOB	Free On Board
GDP	Gross Domestic Product
ICN	Inspectrate of Civil Navigation
IEE	Initial Environmental Examination
IPTANA	Design Institute for Roads Water and Air Transport
ISPA	Instrument for Structural Policies for Pre-Accessions
IWT	Inland Water Transport
IWW	Inland Waterways
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
MPWTH	Ministry of Public Works, Transport and Housing
NPV	Net Present Value
PHARE	Poland and Hungary Aid for Restructuring of Economies
TEN	Trans European Transport Network
TEU	Twenty feet Equivalent Unit
TINA	Transport Infrastructure Needs Assessment
TRACECA	Transport Corridor Europe Caucasus Asia
WB	The World Bank

CONTENTS

PART I PRESENT SITUATION

Chapter 1 SOCIOECONOMIC CONDITIONS

- 1.1 Socioeconomic Conditions of Romania 1-1
- 1.2 Socioeconomic Conditions of the Surrounding Countries 1-38

Chapter 2 PRESENT CONDITIONS OF THE PORT OF CONSTANTZA

- 2.1 Site Condition 2-1
- 2.2 Port Facilities 2-4
- 2.3 Cargo Handling Equipment 2-12
- 2.4 Inland Transport Facilities in the Port 2-24
- 2.5 Port Activities 2-33
- 2.6 Port Operations 2-36
- 2.7 Free Trade Zone 2-47

Chapter 3 CARGO MOVEMENT RELATED TO THE PORT

- 3.1 Cargo Movement 3-1
- 3.2 Cargo Movement/Origin and Destination by Mode 3-12
- 3.3 Traffic Potential of the Port of Constantza with Surrounding Countries 3-22

Chapter 4 PORT ADMINISTRATION, MANAGEMENT AND OPERATION

- 4.1 Port Administration 4-1
- 4.2 Port Management and Operation 4-3
- 4.3 Compliance of Applicable International Conventions 4-16
- 4.4 Present Financial Condition of CMPA 4-23

Chapter 5 TRANSPORTATION NETWORK RELATED TO THE PORT OF CONSTANTZA

- 5.1 Transport Infrastructure in Romania 5-1
- 5.2 Future Development Plans in Romania 5-17
- 5.3 Transport Network in the Region 5-24
- 5.4 Major Competitive Ports 5-42

Chapter 6 NATURAL CONDITIONS IN AND AROUND THE PORT

- 6.1 General 6-1
- 6.2 Topography and Bathymetry 6-1
- 6.3 Climate and Meteorology 6-8
- 6.4 Oceanography 6-11
- 6.5 Geotechnical Conditions 6-14

Chapter 7	ENVIRONMENTAL CONDITIONS IN AND AROUND THE PORT	
7.1	Introduction	7-1
7.2	Environmental Issues of the Port	7-3
7.3	Field Survey on Environmental Condition	7-8
7.4	Environmental Laws and Regulations	7-22

Chapter 8 ISSUES FACING THE PORT OF CONSTANTZA

8.1	Issues on Port Facilities and Layout	8-1
8.2	Issues on Port Management and Operation	8-2
8.3	Issues on Inland Transportation related to the Port	8-5

Appendix I	CARGO MOVEMENT	A-1
Appendix IA	EXISTING PIERS AND DREDGING PLAN	A-7
Appendix IB	EXISTING CARGO HANDLING CAPACITY ESTIMATED BY IPTANA	A-21
Appendix IC	PORT WATER ENVIROMENTAL QUALITY RESULTS	A-39

List of Table

Part I

Table 1.1.1	GDP Change and its Composition	1-7
Table 1.1.2	Employment by Activities and Unemployment Rate	1-9
Table 1.1.3	Number of Assembled Cars and Land Rovers	1-24
Table 1.1.4	Production and Export Volume of Cement	1-24
Table 1.1.5	Produced Volume of Crude Steels	1-25
Table 1.1.6	Recent Product Volume of Crude Iron and Company's Future Plan	1-25
Table 1.1.7	Raw Material Procurement Plan for 2001	1-26
Table 1.1.8	Production Volume of Aluminum and Raw Bauxite	1-26
Table 1.1.9	Production Volume of Petrochemical and Crude Oil Processing	1-27
Table 1.1.10	Export Volume through Constantza Port Forecasted by MIC	1-28
Table 1.1.11	Import Volume through Constantza Port Forecasted by MIC	1-28
Table 1.1.12	Primary Energy Supply Projection by MIC	1-32
Table 1.1.13	Companies by Activities in Constantza Free Zone	1-36
Table 1.2.1	Size of Economy (Central and Eastern European Countries)	1-43
Table 1.2.2	Size of Economy (Black Sea and Former CIS Countries)	1-44
Table 1.2.3	Trade Volume	1-47
Table 1.2.4	Foreign Trade CEE Countries 1993 versus 1999	1-50
Table 1.2.5	Export and Import by Commodity of CEE Countries	1-51
Table 2.1.1	Outline of the port of Constantza	2-1
Table 2.2.2	Berths and main usage	2-7
Table 2.2.3	Major storage facilities	2-11
Table 2.3.1-1	Present Conditions of Cargo Handlig Equipment – 1/3	2-13
Table 2.3.1-1	Present Conditions of Cargo Handlig Equipment –2/3	2-14
Table 2.3.1-1	Present Conditions of Cargo Handlig Equipment – 3/3	2-15
Table 2.3.1-2	Existing Cargo Handling Capacity Estimated by IPTANA (Summary)	2-16
Table 2.4.1	Railways access points to port area	2-24
Table 2.4.2	Yearly number of trains and its average number of wagons to and from Constantza port	2-24
Table 2.4.3	Road access points to the port area	2-26
Table 2.4.4	Main Characteristics of the canals	2-28
Table 2.4.5	Ro-Ro traffic of the port of Constantza	2-31
Table 2.4.6	Transport history of Ferry Boat Eforie	2-32

Table 2.6.1	Major Terminal Operations in the Port of Constantza	2-37
Table 2.6.2	Berth Dimensions by Operator	2-38
Table 2.6.3	Cargo Handling Volume by Operator	2-39
Table 2.6.4	Cargo Handling Volume by Commodity	2-39
Table 2.7.1	Existing Development Plans	2-47
Table 3.1.1	Traffic History of the Port of Constantza 1989-1999	3-1
Table 3.1.2	Containers Handled at the port of Constantza During 1999	3-5
Table 3.1.3	Empty Containers at Constantza Port	3-5
Table 3.1.4	Average Containerized Cargo Weight	3-6
Table 3.2.1	Evolution of Cargo Throughput of Constantza Port (1994-99)	3-12
Table 3.2.2	Maritime Cargo Throughput of the Port of Constantza (1994-1999)	3-13
Table 3.2.3	Cargo from other countries in the world to Constantza area (1000 tons), 1996	3-19
Table 3.2.4	Cargo to other countries in the world from Constantza area (1000 tons), 1996	3-19
Table 3.2.5	Cargo from other Regions in Romania to Constantza area (1000 tons), 1996	3-19
Table 3.2.6	Cargo to other Regions in Romania from Constantza area (1000 tons), 1996	3-19
Table 3.2.7	Unloading Cargo at the Constantza Port (1996)	3-16
Table 3.2.8	Cargo to other Regions in Romania from Constantza area (1000 tons), 1996	3-19
Table 3.2.9	Cargo from other Countries to Constantza area (1000 tons), 1996	3-20
Table 3.2.9(a)	Cargo from other Countries to Constantza area (%), 1996	3-20
Table 3.2.10	Cargo from other Countries to Romania by mode (1000 tons), 1996	3-21
Table 3.2.10(a)	Cargo from other Countries to Romania by mode (%), 1996	3-21
Table 3.2.11	Cargo from Constantza Area to other Countries (1000 tons), 1996	3-20
Table 3.2.11(a)	Cargo from Constantza Area to other Countries (%), 1996	3-20
Table 3.2.12	Cargo from Romania to other Countries (1000 tons), 1996	3-21
Table 3.2.12(a)	Cargo from Romania to other Countries (%), 1996	3-21
Table 3.3.1	Main Trading Partners and Commodities (Kazakhstan and Uzbekistan)	3-25
Table 3.3.2(1)	Evolution of Seaborn Cargo Traffic at the Port of poti / Geogia	3-23
Table 3.3.2(2)	Evolution of Container Traffic at the Port of poti / Geogia	3-23
Table 3.3.3	Hinterland Country-wise Cargo Movement at the Port of Poti (1999)	3-24
Table 3.3.4	Origine and Destination Countries of the Cargo handled at the Port of Poti (1999)	3-26
Table 3.3.6	Hungary: Imports from the top thirty partners	3-30
Table 3.3.7	Slovak Republic: Exports to the top thirty partners	3-31
Table 3.3.8	Slovak Republik: Imports from the top thirty partners	3-32
Table 4-4-1	Income Statement CMPA	4-24
Table 4-4-2	Balance Sheet of CMPA	3-24

Table 4-4-3	Operating & Working Ratio of CMPA	3-25
Table 5.2.1	Road Infrastructure Development Project	5-21
Table 5.2.2	Rail Infrastructure Development project	5-22
Table 5.3.1	Proportion of Container Service Volume in Constantza Port by line	5-24
Table 5.3.2	Standard Schedule (Day)	5-25
Table 5.3.3	Main Characteristics of the Vessels	5-25
Table 5.3.4	Service Frequency each Service String	5-26
Table 5.3.5	Standard Schedule (Day)	5-26
Table 5.3.6	Main Characteristics of the Vessels dedicated to Romania Service	5-26
Table 5.3.7	Standard Schedule (Day)	5-27
Table 5.3.8	Main Characteristics of the Vessels	5-27
Table 5.3.9	Standard Schedule (Day)	5-27
Table 5.3.10	Main Characteristics of the Vessels dedicated to Black Sea Service	5-28
Table 5.3.11	Black Sea Container Transportation Network	5-29
Table 5.4.1	Distances Between Ports and Central European Capitals	5-51
Table 5.4.2	Mode Specific User Costs, Freight Transport	5-51
Table 5.4.3	Transport Costs Between Ports and Central European Capitals	5-52
Table 6.3.1	Temperature	6-8
Table 6.3.2	Monthly Rainfall (Precipitation)	6-9
Table 6.3.3	Winds at Constantza	6-10
Table 6.3.4	Predominant Wind Directions	6-10
Table 6.3.5	Visibility	6-11
Table 6.4.1	Record of Daily Average Water Level in 1981	6-12
Table 6.4.2	Offshore Wave Height	6-13
Table 6.4.3	Estimates of the statistical waves	6-13
Table 6.4.4	Visual Observation of Wave Conditions	6-14
Table 6.5.1	Particulars of Boreholes	6-23
Table 6.5.2	Summary of Undisturbed Samples	6-23
Table 6.5.3	Summary of Laboratory Test	6-23
Table 6.5.4	Results of Consolidation Test	6-24
Table 6.5.5	Results of Unconfined Compression and Direct Shear Test	6-25
Table 6.5.6	Characteristics of Major Earthquakes	6-27
Table 7.3.1	Results of Port Seawater Quality (November 2000)	7-13
Table 7.3.2	Results of Port Seabed Material Quality (November 2000)	7-14
Table 7.3.3(1)	Measured Range of Ambient Air Pollutants (Gate 5)	7-14
Table 7.3.3(2)	Measured Range of Ambient Air Pollutants (Gate 6)	7-15

Table 7.3.3(3)	Measured Range of Ambient Air Pollutants (Gate 9) ·····	7-15
Table 7.3.4	Results of Port Seawater Quality (June 2001) ·····	7-20
Table 7.3.5	Results of Port Seabed Material Quality (June 2001) ·····	7-21
Table 8.3.1	Ratio of Vehicles at each Gate to Total Vehicles in the North Port ·····	8-5

List of Figure

Part I

Fig.1.1.1	GDP in 1999 Market Price (1980-1999)	1-7
Fig.1.1.2	Population (1980-1999)	1-8
Fig.1.1.3	Population by Age and Gender on July 1st 1998	1-8
Fig.1.1.4	Foreign Trade Value (Million US\$)	1-11
Fig.1.1.5	Export Value (Million US\$)	1-11
Fig.1.1.6	Import Value (Million US\$)	1-11
Fig.1.1.7	Trade Partners of Romania in 1998 (Export)	1-12
Fig.1.1.8	Trade Partners of Romania in 1998 (Import)	1-12
Fig.1.1.9	Export of Romania by made in 1998	1-13
Fig.1.1.10	Import of Romania by made in 1998	1-13
Fig.1.1.11	Export to European Countries in 1998	1-14
Fig.1.1.12	Import from European Countries in 1998	1-14
Fig.1.1.13	Export (FOB) by SITC REV.3 Sections	1-15
Fig.1.1.14	Import by SITC REV.3 Sections	1-15
Fig.1.1.15	Status of State Patrimony at 30th September 2000	1-16
Fig.1.1.16	Direct Foreign Investment in Romania	1-17
Fig.1.1.17	Production Volume of Major Crops	1-21
Fig.1.1.18	Projected Volume of Food Crop Products by MAA	1-22
Fig.1.1.19	Structure Share of Industries by Major Activities	1-23
Fig.1.1.20	Domestic Production of Coal, Crude Oil and Natural Gas	1-29
Fig.1.1.21	Primary Energy Production	1-30
Fig.1.1.22	Energy Independence Degree	1-30
Fig.1.1.23	Domestic Energy Consumption	1-31
Fig.1.1.24	Final Energy Consumption	1-31
Fig.1.1.25	Conceptual Development Plan of Constantza Free Zone	1-37
Fig.1.2.1	Evolution of Gross Domestic Product (Central and Eastern European Countries)	1-43
Fig.1.2.2	Growth of GDP in the Caucasian and Central Asian Countries	1-46
Fig.1.2.3	Growth of GDP of Ukraine, Russia and Turkey	1-46
Fig.2.1.2	Map of the port of Constantza	2-3
Fig.2.2.1	Map of Approach channel and anchorage	2-5
Fig.2.2.2	Berth Numbers	2-9

Fig.2.4.1	Railway system in the Port of Constantza	2-25
Fig.2.4.2	Road network in the Port of Constantza	2-25
Fig.2.4.3	The Danble-Black Sea Canal	2-29
Fig.2.4.4	Typical cross sections of the canals	2-30
Fig.3.1.1	Total Traffic History of the Port of Constantza	3-1
Fig.3.1.2a	Commodity-wise Total Traffic	3-2
Fig.3.1.2b	Commodity-wise Export Traffic	3-2
Fig.3.1.2c	Commodity-wise Import Traffic	3-3
Fig.3.1.2d	Commodity-wise Outbound Transit Traffic	3-3
Fig.3.1.2e	Commodity-wise Inbound Transit Traffic	3-4
Fig.3.1.3	Container Throughput at the Port of Constantza	3-5
Fig.3.1.4	Full and Empty Container at Constantza Port	3-6
Fig.3.1.5a	Export Traffic by Major Commodity Classification	3-7
Fig.3.1.5b	Import Traffic by Major Commodity Classification	3-8
Fig.3.1.5c	Outbound Transit Traffic by Major Commodity Classification	3-8
Fig.3.1.5d	Inbound Transit Traffic by Major Commodity Classification	3-9
Fig.3.2.1	Evolution of Cargo Throughput of Constantza Port (1990-99)	3-12
Fig.3.2.2	Evolution of Maritime Cargo Throughput	3-13
Fig.3.2.3	Evolution of Transit Cargo Throughput (1994-99)	3-13
Fig.3.2.4	Maritime Cargo throughput of the Port of Constantza (1994-1999)	3-14
Fig.5.1.1	Location of the Major Ports in Romania	5-6
Fig.5.1.2	Layout Plan of Danube River	5-7
Fig.5.1.3	Layout Plan of Danube-Black Sea Canal	5-8
Fig.5.1.4	Main Railway Network and Inland Freight Terminals in Romania	5-9
Fig.5.1.5	Major Road Network in Romania	5-10
Fig.5.1.6	Crude Oil and Natural Gas Pipeline in Romania	5-11
Fig.5.1.7	Trans-European Energy Networks of Natural Gas	5-12
Fig.5.1.8	Location of Airports in Romania	5-13
Fig.5.1.9	Preliminary Route Plan between Cernavoda and Constantza	5-14
Fig.5.1.10	Preliminary Road Network Plan Prepared by Constantza Ciry	5-15
Fig.5.1.11	Rehabilitation Plan of Corridor No.IV Railway (South Part)	5-16
Fig.5.1.12	Trans European Network	5-35
Fig.6.2.1	General Layout of the Port	6-4
Fig.6.2.2	Original Seabed Elevation	6-5
Fig.6.2.3a	Bathymetric Map (1)	6-6
Fig.6.2.3b	Bathymetric Map (2)	6-7
Fig.6.3.1	Wind Roses at Constantza	6-10

Fig.6.5.1	Exposed Geological Features around Constantza	6-16
Fig.6.5.2 (1)	Stratification	6-17
Fig.6.5.2 (2)	Stratification	6-18
Fig.6.5.3a	Lime Stone Elevations	6-19
Fig.6.5.3b	Lime Stone Elevations (South Port)	6-20
Fig.6.5.4	Location of Borings	6-22
Fig.6.5.5	Geological Map Romania	6-26
Fig.6.5.6	Location Plan of Previous Borings	6-30
Fig.6.5.7	Location Plan of Previous Borings(1)	6-31
Fig.6.5.8	Location Plan of Previous Borings(2)	6-32
Fig.6.5.9	Location Plan of Previous Borings(3)	6-33
Fig.6.5.10	Soil Profile N-S(1) and (2)	6-34
Fig.6.5.11	Soil Profile N-S(3) and (4)	6-35
Fig.6.5.12	Soil Profile N-S(5) and (6)	6-36
Fig.6.5.13	Soil Profile E-W (1)	6-37
Fig.6.5.14	Soil Profile E-W (2)	6-38
Fig.6.5.15	Soil Profile E-W (3)	6-39
Fig.6.5.16	Soil Profile E-W (4)	6-40
Fig.6.5.17	Soil Profile E-W (5)	6-41
Fig.6.5.18	Soil Profile E-W (6)	6-42
Fig.6.5.19	Soil Profile E-W (7)	6-43
Fig.6.5.20	Soil Profile E-W (8)	6-44
Fig.6.5.21	Soil Profile E-W (9)	6-45
Fig.6.5.22	Boring Logs L1-L3	6-46
Fig.6.5.23	Boring Logs L4-L6	6-47
Fig.6.5.24	Boring Logs L7-L9	6-48
Fig.6.5.25	Boring Logs S1-S3	6-49
Fig.6.5.26	Boring Logs S4-S6	6-50
Fig.6.5.27	Boring Logs S7-S9	6-51
Fig.7.3.1	Locations of Environmental Quality Survey (November 2000)	7-12
Fig.7.3.2	Locations of Water Environmental Quality Survey (June 2001)	7-19