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No. 2

VOLUME 1 SUMMARY

THE COMPREHENSIVE STUDY ON THE DEVELOPMENT OF CALCUTTA AND HALDIA DOCK SYSTEMS OF CALCUTTA PORT TRUST IN INDIA

OCTOBER 1989

FINAL REPORT

JAPAN INTERNATIONAL COOPERATION AGENCY

VOLUME 1 SUMMARY

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OCTOBER 1989

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PREFACE

In response to a request from the Government of India, the Japanese Government decided to conduct a Comprehensive Study on the Development of Calcutta and Haldia Dock Systems of Calcutta Port Trust and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent to India a survey team headed by Mr. Terumi Iijima, and composed of members from the Overseas Coastal Area Development Institute of Japan and Ocean Consultant, Japan Co., LTD, four times from June 1988 to August 1989.

The team held discussions with concerned officials of the Government of India, and conducted field surveys. After the team returned to Japan, further studies were made and the present report was prepared.

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

I wish to express my sincere appreciation to the officials concerned of the Government of India for their close cooperation extended to the team.

October, 1989

Kensuke Yanagiya

Kensuke Yanagiya
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

October, 1989

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency

Dear Mr. Yanagiya :

It is my great pleasure to submit herewith the Report for the Comprehensive Study on the Development of Calcutta and Haldia Dock Systems of Calcutta Port Trust in India.

The Study Team, which consists of the Overseas Coastal Area Development Institute of Japan and the Ocean Consultant, Japan Co., Ltd., headed by myself, conducted a survey in India from June 1988 to August 1989 at the request of the Japan International Cooperation Agency.

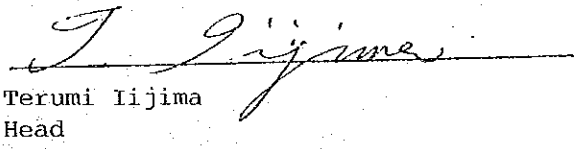
The findings of this survey were fully discussed with the Indian counter parts to formulate the Master Plan for the period up to the year 2005 and to formulate and examine the feasibility of the Short Term Development Plan for the period up to the year 1995 and were then compiled into this report. As a result of the Study, the implementation of the projects herein proposed is regarded as crucial not only to the further development of Calcutta and Haldia Dock Systems but also to the socio-economic development of the eastern region of India centered by the State of the West Bengal and also regarded as viable from economic and financial viewpoints.

I earnestly wish that the Plan herein proposed will be implemented at the possible earliest by the Government of India.

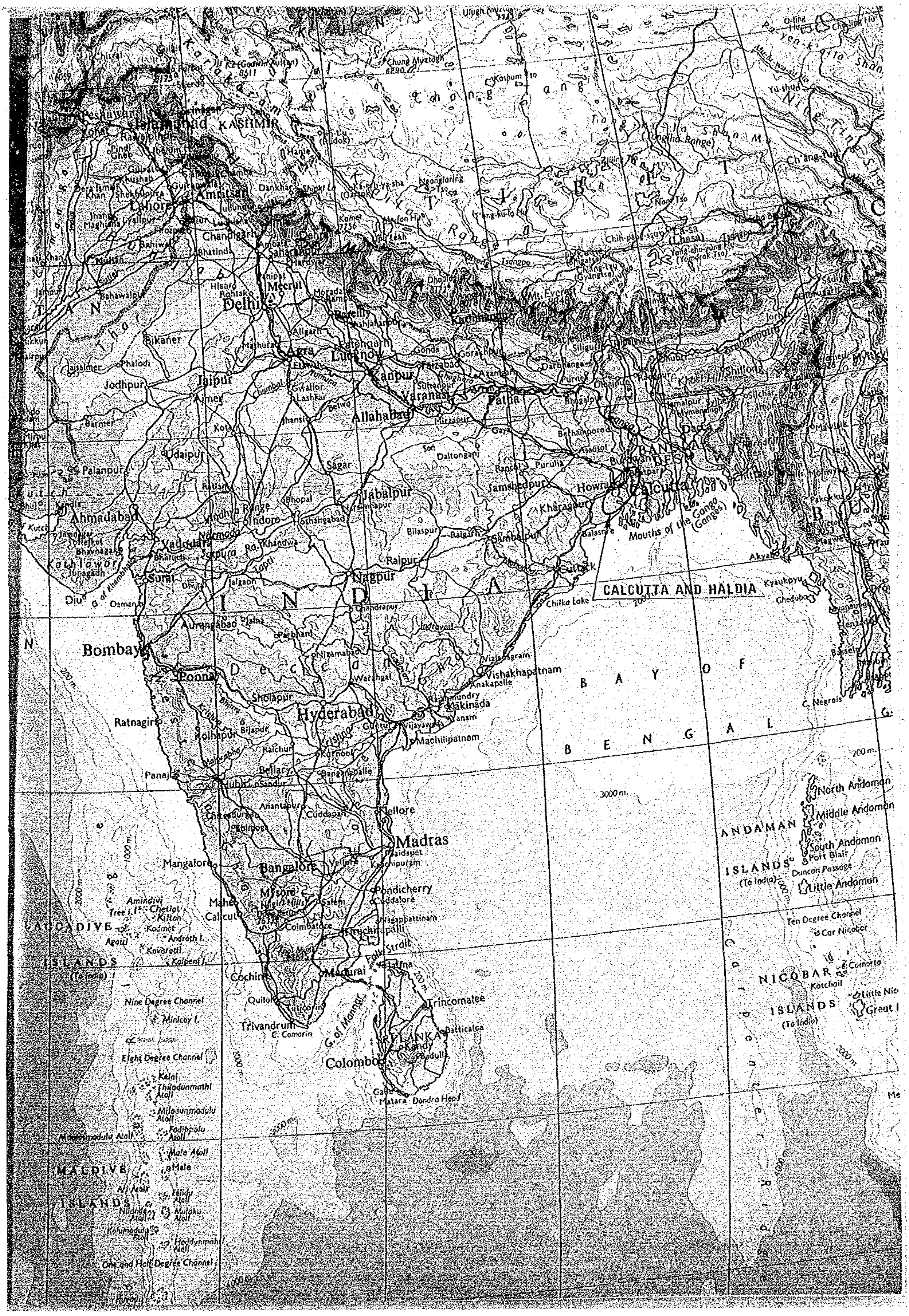
On behalf of the Study Team, I would like to express my deepest appreciation to the Government of India, the Calcutta Port Trust and the various organizations concerned with the Study for their brilliant cooperation and assistance, and for the heartfelt hospitality which they extended to the Team during their stay in India.

I am also greatly indebted to the Japan International Cooperation Agency, the Ministry of Transport, the Ministry of Foreign Affairs, the Japanese Embassy, the Japanese Consulate and the JICA Office in India for giving us valuable suggestions and assistance during the field surveys and the preparation of this report.

Respectfully,



Terumi Iijima
Head
Japanese Team for the Comprehensive Study on the Development of Calcutta and Haldia Dock Systems of Calcutta Port Trust in India
(Executive Director, the Overseas Coastal Area Development Institute of Japan)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Raipur
Calcutta
Howrah
CALCUTTA AND HALDIA
Mouths of the Ganga (Ganges)
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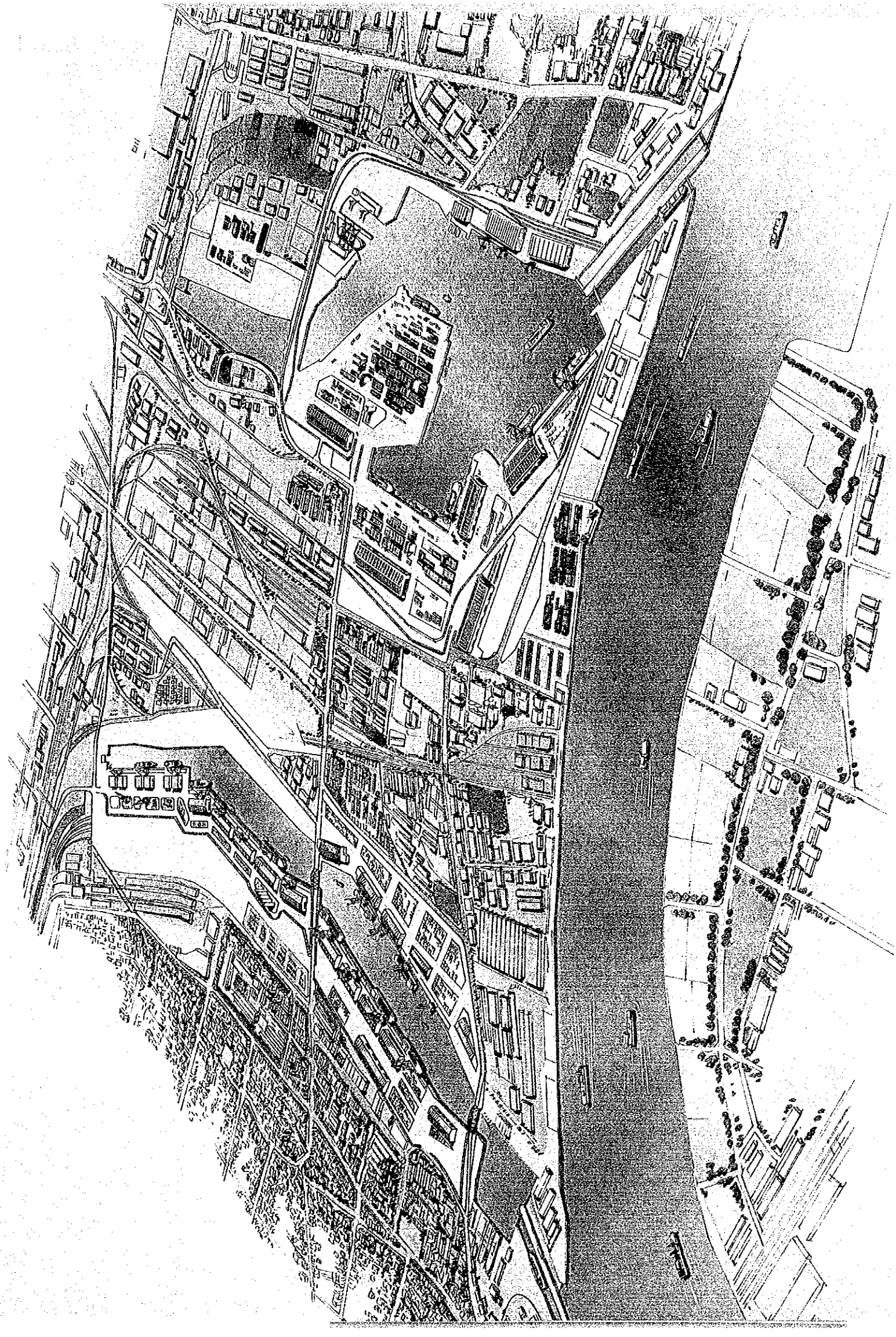
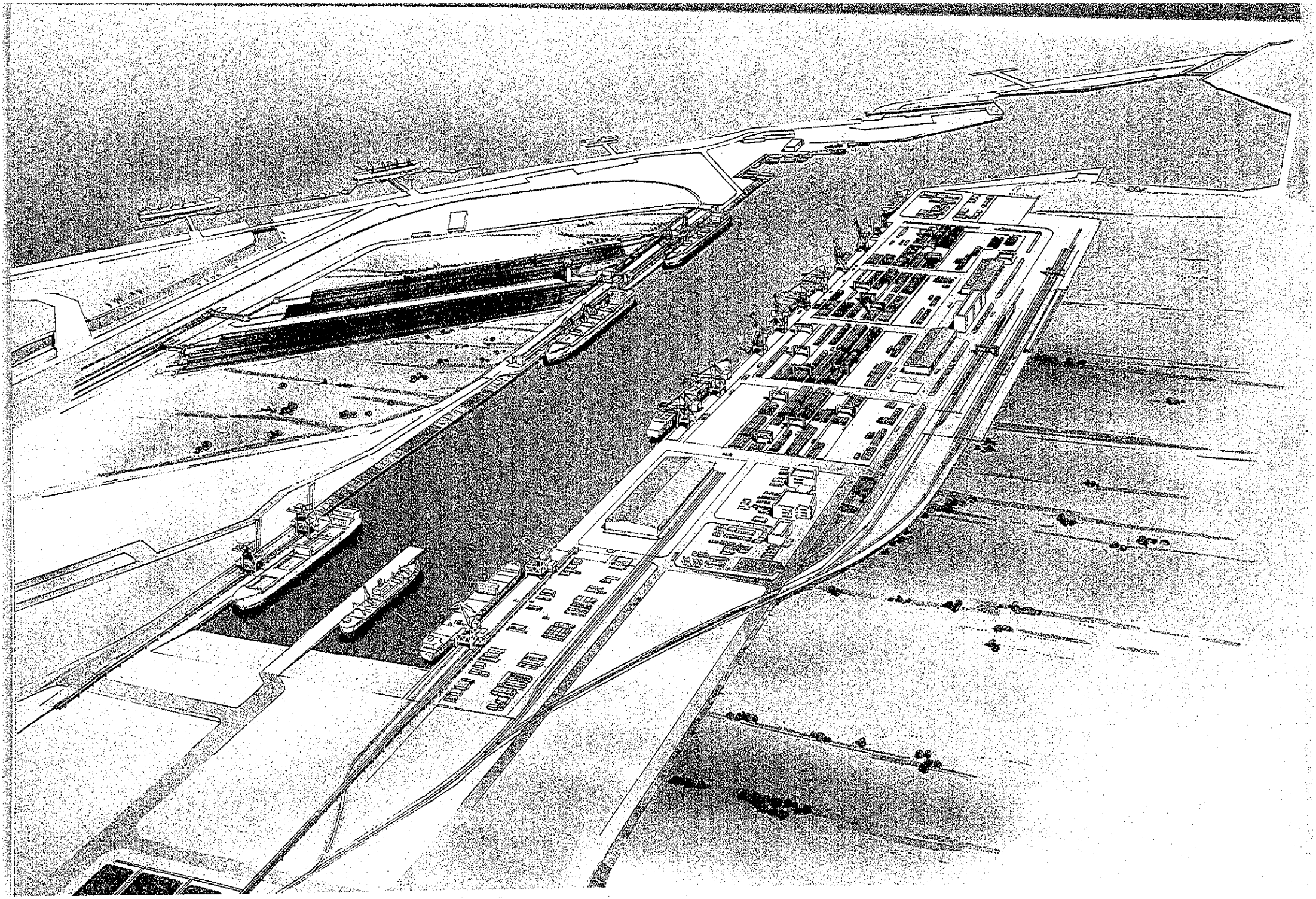




EXCHANGE RATE

$ 1 = Rs 13.50

$ 1 = ¥135

ABBREVIATIONS

ADB	Asian Development Bank
ARPA	Automatic Radar Plotting Aid
BB	Budge Budge
CDLB	Calcutta Dock Labour Board
CISF	Central Industrial Security Force
CIWTC	Central Inland Water Transport Corporation Limited
CPT	Calcutta Port Trust
DMD	Director Marine Department, CPT
DWT	Dead Weight Tonnage
EIL	Engineers India Limited
EJC	East Dock Junction
ETA	Estimate Time of Arrival
FAK	Freight All Kind
FCI	Food Corporation of India
GPS	Global Positioning System
GRT	Gross Registered Tonnage
HFC	Hindusthan Fertilizer Corporation
IALA	International Association of Light House Authorities
IBRD	International Bank for Reconstruction and Development
ICD	Inland Container Depot
IISCO	The Indian Iron and Steel corporation Limited
IOC	Indian Oil Corporation
IPA	Indian Ports Association
IWT	Inland Waterway Transport
JICA	Japan International Cooperation Agency
KODS	Kidderpore Old Dock Sill
KPD	Kidderpore Dock
LOA	Length Over All
MOST	Ministry of Surface Transport, Government of India
MP	Madhya Pradesh
MY	Million Yen
NRT	Net Registered Tonnage
NSD	Netaji Subash Dock
OCC	Oil Coordination Committee
OCDI	Overseas Coastal Area Development Institute of Japan

OECF	Overseas Economic Cooperation Fund
PHRI	Port and Harbour research Institute, Ministry of Transport, Japan
Rs	Rupee(s)
SAIL	Steel Authority of India Limited
SAR	Search and Rescue
SCI	Shipping Corporation of India Limited
SE	South Eastern Railway
TEU	Twenty-foot Equivalent Unit
UHF	Ultra High Frequency
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
UNLK	United Nations Layout Key
UP	Utter Pradesh
USA	United States of America
VHF	Very High Frequency
VTS	Vessel Traffic Management Service
W/T	Wireless Telephone

CONTENTS (VOLUME 1)

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. Necessity of the Development of the Calcutta and Haldia Dock System

1) The Calcutta Dock System is located along the east side of the river Hooghly some 200 km away from the Sandheads river estuary. Because of the long approach channel, winding river morphology, and the shallow depth of the river, it had gradually not been suitable for very large vessels.
2) The Calcutta Dock System consists of three wet docks, viz NSD, KPD1 and KPD2, which were constructed more than 40 years ago. Due to the superannuated facilities, many managerial and operational problems, such as high operational cost and low cargo handling productivity, has become conspicuous recently.
3) The Calcutta Dock System has the hinterland of the last metropolitan area, Calcutta City, which has the big population over 9 million people and is confronted with the congested traffic problems.
4) In order to solve the above problems which the Calcutta Dock System has been suffering from and to develop a new central zone of city functions, the new port, the Haldia Dock System, had been planned some 100 km downstream of the River Hooghly about 20 years before as a complemental port to the Calcutta Dock System.
5) Although the bulk cargoes, such as coal, fertilizer and rew materials for fertilizer and petroleum, which have to be carried by the very large vessels have been promptly shifted to the Haldia Dock System, some cargoes like iron ore were not able to be handled even in the Haldia Dock System because the required draft of such cargo carriers has already beyond the available draft of the Haldia Dock System.
6) Moreover, considering the recent tendency of the prompt increase of container traffic, it becomes necessary to take into consideration again the functional allocation between Calcutta and Haldia Dock Systems based on the comprehensive demand forecast of port traffic.
7) In order to cater to the traffic congestion around the Calcutta Dock System, the second Hooghly Bridge between the east and west banks of the River Hooghly started to construct intending to be commission in 1990.

8) At this situation, it has become necessary to review the last Master Plan of the Haldia Dock System, which had planned about 20 years before, and also to formulate the Master Plan of the Calcutta Dock System.

9) The Haldia Dock System is also located along the River Hooghly some 100 km away from the river estuary and it has also the draft restrictions.

10) Based upon the future trend of shipping technology, the likely predominant vessel draft of bulk carriers seems to be less than 12 m with the exception of ore carriers and crude oil tankers. Accordingly, if the on-going river training scheme succeeds in the improvement of available draft up to 12.0 m, it may not be necessary to explore the possibility of a new deep seaport.

2. Proper Allocation of the Functions between Calcutta and Haldia Dock System

(1) Since the commissioning of Haldia Dock System, the bulk cargoes have shifted from Calcutta to Haldia almost entirely, with the result of the present functional allocation, i.e. general cargo are handled mainly at Calcutta whereas Haldia is the focal point of the bulk cargo handling. In addition, efforts have been made to shift container throughput from Calcutta to Haldia mainly through discriminative tariff policy, however its effect was not so significant.

(2) Judging from the future development of the hinterland regions and the inland transport links as well as the secular trend of the vessel size increase on the one land, and the excessive traffic congestion prevailing in the inner city of Calcutta and the needs to ensure the balanced development of the Calcutta and Haldia regions, the basic lines of the presently adopted functional allocation seems appropriate and it should be pursued also in the future.

(3) It is likely proper to develop the Calcutta and Haldia Dock Systems in the future, taking into account the followings.

1) Calcutta and Haldia should serve their hinterlands in an integrated manner, complementing each other's role to play.

2) In principle, Calcutta shall continue to be the general cargo port while Haldia functions as the focal point of bulk cargo handling. However, Calcutta should also cater to the requirement of POL and POL products for Calcutta Metropolis and nailouring areas as well as part of emergency import of food grains.

3) Calcutta and Haldia shall progressively become an integrated port for handling containers in the future.

From the long term perspective, Haldia shall become the main focus of container transport with multiple inland transport links connecting the hinterland regions including rail to/from distant regions, road to/from Hawra/Hooghly area and its naibouning areas as well as Inland Waterway Transport while Calcutta primarily cater to the container traffic to/from Calcutta Metropolis.

In the meantime, Calcutta and Haldia shall jointly cater to the projected container traffic with the main emphasis gradually shifting to Haldia and pave the way to the above long term functional allocation through the introduction of IWT and modernization of the infrastructure for container traffic as a whole.

3. Master Plan

(1) Demand Forecast and Target Year

1) The Master Plan is formulated with a target year of 2005.

2) Demand forecast of ship cargoes at Calcutta/Haldia Dock Systems are estimated as follows:

(Unit: ,000 tonnes)

	Total Demand Forecast 2004/05
Calcutta	8,710
Haldia	20,245
Total	28,955

(2) Calcutta Dock System

1) The available draft will be expected to increase from 6.7 m to 7.9 m, but it may not be expected to see the drastical change in vessel size.

2) In the Master Plan, it is required to improve the cargo handling productivity by the rehabilitation works, such as repavement of in-

dock roads, and by the application of mechanical handling equipment such as mobile cranes and forklifts.

3) It is not still necessary to construct a new berth by utilizing the existing facilities fully and improving the cargo handling productivity to a reasonable extent to cater to the projected traffic.
4) In order to highten the cargo handling productivity, the exclusive container berths and the exclusive break bulk berths are expected to be introduced.
5) In order to cater for the increase of road traffic, major roads in the port area shall be improved including the reinforcement of bridges, the development of parking spaces around the docks and the improvement of gates and roads in the dock areas.
6) In order to promote the efficiency of the railway handling system, the railway facilities shall be improved including the development of Block Rake loading Terminal for concentrating the bulky cargo handling and eliminating the disused tracks.
7) It is necessary to improve equipment and facilities for container cargo handling such as forklifts, mobile cranes, tractor/trailers & chassis, rubber mounted transfer cranes, CFS and yards etc.
8) Unit load system (such as pallet/container)shall be introduced for the general cargo handling.
9) It is necessary to improve grand surface condition (pavement) in port area for the activity of the introduced equipment.
10) The equipment un-used and/or hardly used such as quay-cranes, yard cranes, warehouses etc. shall be removed and/or demolished as possible for the increment of the space in the port area.

(3) Haldia Dock System

1) It is assumed according to CPT's projection that the available draft at Haldia will be increased to 10.67 m from the present 8.6 m up to the year of 2005. In the Master Plan, it is required to develop the port facilities together with the relevant equipment to handle the projected traffic such as the augmentation of POL jetties, the expansion of coal handling plants, mechanization of the coking coal berth, multi-purpose/general cargo/container berths together with a dedicated IWT terminal even if the utilization of the existing assets are maximized. The construction of the 2nd lock entrance will also be required.

2) In order to cater for the increase of containers, coking coal and P.O.L traffic, the railway handling system shall be improved, including the expansion of container loading/unloading facilities, the development of the mechanical handling system for coaking coal and the improvement of the General Marshalling Yard and the Bulk Handling Yard.

3) The development of modern container terminals at Haldia should be particularly stressed. It is necessary to develop sufficient equipment and facilities for the container cargo handling based on the transfer crane system including quay cranes, transfer cranes, tractor/trailers and chassis etc.

(4) Crafts, Vessels and Maintenance Work Shops

1) It is necessary to modernize and minimize the floating equipment for the improvement of the productivity and the cost-saving of the port.

2) The floating equipment shall be located near their working sites to minimize time loss and the expences.

3) The Multi-purpose ship shall be introduced.

4) The maintenance work system shall be modernized properly to increase the commissioning hours. The scheduled maintenance system shall be established.

(5) Required Total Cost (exclude custum duties)
for Master Plan Rs. 7,418,800,000

4. Short-term Development Plan

(1) Development Forecast and Target Year

1) The Short-term Development Plan is formulated with a target year of 1995 as the first phases development plan to achieve the Master Plan.

2) Demand forecast of ship cargoes at Calcutta/Haldia Dock System are estimated as follows:

(Unit: ,000 tonnes)

	Total Demand Forecast 1994/95
Calcutta	5,140
Haldia	15,520
Total	20,660

(2) Calcutta Dock System

1) The Short-term Development Plan covers the urgent rehabilitation works of dilapidated facilities and operation improvement.
2) It is required to improve the cargo handling productivity to the extent of Indian average to cater to the projected traffic.
3) The Short-term Development Plan proposes the development of the new roads linking NSD - Sonapore Road - Remount, the improvement of Swing Bridge and Hasting Bridge on Garden Reach Road and the development of the Block Rake Loading Terminal at EJC.
4) It is necessary to improve equipment and facilities for container cargo handling such as forklifts, mobile cranes, tractor/trailers & chassis, rubber mounted transfer cranes, CFS and yards etc.
5) Unit load system (such as pallet/container) shall be introduced for the general cargo handling.
6) It is necessary to improve grand surface condition 8pavement) in port area for the activity of the introduced equipment.
7) The equipment un-used and/or hardly used such as quay-cranes, yard cranes, warehouses etc. shall be removed and/or demolished as possible for the increment of the space in the port area.

(3) Haldia Dock System

1) It is assumed according to the CPT's projection that the available draft at Haldia will be increased to 9.3 m from the present 8.6 m up to the year of 1995. In the Short-term Development Plan, it is required to develop the port facilities together with the relevant equipment to handle the projected traffic such as the augmentation of POL jetties, the expansion of coal handling plants, mechanization of the coking coal berth, one multi-purpose and one container berth even if the utilization of the existing assets are maximized. Due to the increase of calling vessels, the handling productivity at lock entrance should be improved through upgrading tug and crew arrangement as well as night navigation.
2) The Short-term Development Plan proposes the railway handling system including the expansion of the container loading/unloading terminal, the improvement of the coking coal loading terminal and the General Marshalling Yard and the Bulk Handling Yard.
3) It is necessary to develop equipment and facilities for the container

cargo handling based on the transfer crane system including quay cranes, transfer cranes, tractor/trailers and chassis etc.

(4) Crafts, Vessels and Maintenance Work Shops

1) It is necessary to modernize and minimize the floating equipment for the improvement of the productivity and the cost-saving of the port.
2) The floating equipment shall be allocated near their working sites to minimize time loss and the expences.
3) The Multi-purpose ship shall be introduced.
4) The maintenance work system shall be modernized properly to increase the commissioning hours. The scheduled maintenance system shall be established.

(5) Required Total Cost (exclude custum duties)
for Short-term Development Plan Rs. 3,146,200,000

5. Port Management and Operations

A full-fledged container terminal should be established at Haldia in order to make Haldia more attractive for future container traffic.

The following points would be advisable from the viewpoint of the port management and operations so as to realize this;

1) to establish an autonomous operating unit which has entire responsibility for container handling operations throughout the Haldia Container Terminal (hereinafter refereed as HCT),
2) to secure a reliable telecommunication system within the Haldia Dock System and between Haldia and Calcutta, and
3) to install a computer-based container handling system at HCT.

Establishment of an automous unit for the container handling operation would be advisable in order to realise the following points;

1) to maximize the utilization of the container terminal, and
2) to meet the point users' requirements which are particularly requested at Haldia.

Establishment of a reliable telecommunication system should be taken into consideration as follows;

1) VHF system inside the terminal
2) Strengthening of internal telecommunication system in the Haldia Dock System, and
3) Exclusive telecommunication and data communication linkage between Haldia and Calcutta.

6. Improvement of Navigation Aid System

(1) For the further Development of the port in the near future the Plan-2 is the most advisable system and will greatly improve the safety, efficiency, and working environment of the pilotage.

But this system requires a large initial investment for establishment of the traffic lanes in the upper part of the approach channel and so on.

(2) The Station Vessel System has been being replaced by the new system in the same type of river ports in the world in recent year for the safety and economic reason.

(3) According to the result of our first field survey, most of the channel users indicated the possibility of safe transit of the channel under the condition of proper layout of the channel and navigation aids.

(4) However, there are many things which should be taken into account before a complete shift from the Station Vessel System. So, at this stage of the study it would be premature to give up new pilotage systems into practice.

(5) Therefore, JICA team propose the following Phased Plan as mentioned in 10-3.

This plan consist of 3 steps.

Step-1 : Plan-4 (combined system with the current system and Plan-3) is still in an experimental stage, so in this stage various studies and investigations should be carried out and examined and clarified the problems.

Step-2 : According to the result of the Plan-4, Plan-3 (lower Middleton Channel System) should be adopted as an intermediate system to replace Plan-2 (Sagar Road System)

Step-3 : If the circumstances require stepping up to Plan-2, necessary procedures should be carried out complying with the Plan-2.

7. Economic and Financial Analysis of the Short-term Plan

(1) Economic Analysis

The Short-term Plan is evaluated using the Internal Rate of Return (IRR) which is calculated based on cost-benefit analysis from the viewpoint of the national economy. Benefits considered are the savings in ships' staying costs and time cost, while costs are the construction cost, repair/maintenance cost and operation/administration cost. The internal rate of return, using 30 years as the period of economic calculation,is 18.88 %.

This shows that the Short-term Plan is feasible from the viewpoint of the national economy.

(2) Financial Analysis

The viability of the Short-term Plan is analyzed based on the Financial Rate of Return using the Discount Cash Flow Method. In the Base Case, the FIRR is calculated to be 12.14 %. And financial soundness of CPT will be maintained during the project life provided that reduction of manpower and induction of sofl loans are to be conducted.

(3) Evaluation

Judging from the above, we conclude that the Short-term Plan with the target year of 1995 is feasible both economically and financially.

RECOMMENDATIONS

The cargo traffic at the Calcutta and Haldia Dock System will be expected to increase in the future, but the many problems caused by superannuated facilities at the Calcutta Dock System has already become conspicuous, and the facility shortage at the Haldia Dock System will be seen shortly. Then the proposed plans should be implemented as soon as possible to cater to the projected cargoes.

Planning, fund raising, detailed design and construction for this project shall be conducted in accordance with the plans presented in this report. Also the planning and implementation of the project should be harmonized with the on-going project and with plans concerned.

The recommendations below concern various matters we notices while conducting this survey and drafting the plans.

(1) Functional Allocation

The container traffic allocation between Calcutta and Haldia herein proposed in the Master Plan presumes the realization of various factors which do not necessarily fall within the responsibility of the port sector, of which major prerequisites are as follow:

1) Development of the efficient inland transport links between Haldia Dock System and Calcutta such as the road transport link and IWT link enabling FCL transport.
2) Development of efficient communication links between the Calcutta and Haldia Dock System including IWT terminals to enable the functioning of these terminals in an integrated manner.
3) Development of the Haldia to enable the sufficient accumalation of the commercial infrastructure such as banking and clearing agencies.
4) Tariff system to be formulated appropriately reflecting the cost incurred throughout the whole chain of container transport.
5) Promotion of door-to-door service which is the ultimate goal of containerization.

It is recommended that the policy initiatives of the relevant agencies be taken to realize these conditions to the benefit of the whole economy.

(2) Land Use

CPT has huge areas of their own real estates, which is required from both port and city sides at present. The waterfront area, basically, have to be preserved for the future development of port functions, but some of them may sometimes render to city functions in the case that ports are located in the congested city areas. We proposed the required areas from the port side such as roads and cargo storage spaces in dock areas and parking spaces, open storage spaces and traffic facility spaces around dock areas. However we also proposed the areas which will not be required from the port side in the Master Plan and may be usable for city functions, we would like to recommend for CPT to take into consideration the future utilization of this area more in detail through the discussion with CMDA and other related organizations.

(3) Navigation Aid

1) Further discussion by the expert group (of India who are familiar with local conditions) as well as trials are necessary to ensure the possibility of replacing pilotage system.
2) The optimum conclusions must be established by detailed consultation with the member of utilizing port.
   So, it is advisable to discuss in the Council for Maritime Safety which is including members of the expert such as :
   Navy, DMD, Maritime Technology, Research Institute, Maritime Meteorological, Shipping Company etc.
3) If the circumstances require stepping up to Plan-2, detailed study should be carried out to minimize dredging cost and possible counter measures.

(4) Transportation Facilities

1) In connection with the improvement of Swing Bridge and Hasting Bridge, the improvement cost shall be borne by CPT and the state government, who will profit. It should be borne in proportion to the share of traffic volume of the port-related traffic and the non port-related traffic.
2) In order to prevent congestion at the Kidderpore Intersection, Kidderpore bridge shall be improved by the state government. Therefore, further study shall be conducted.

3) In order to improve the handling productivity of bulky railway cargo a Block Rake Loading Terminal shall be developed at the earliest possible time. For this purpose, management and operation systems shall be further investigated. It is proposed to start the tentative operation at the existing tracks to identify the matters to be further studied.

4) The possibility of the direct dealing of the commercial and industrial sidings viz. FCI and CESC at Calcutta, IOC and HFC at Haldia with the Indian Railways shall be investigated so as to specialize and rationalize the port railway's function for the port related cargos.

5) In order to reduce and rationalize the examination period at Haldia Railway System, further coordination between CPT and Indian Railway shall be necessary.

(5) Others

1) The sieving plant for the coal shall be installed at the mining sites instead of the shipping site to increase the efficiency of the productivity.

2) The cargo marketing division shall be introduced for the promotion of the activity of CPT.

3) It is preferable for the port to review the tariff structure for containers form the viewpoint of simplification of port procedures.

SUMMARY

Chapter 1 Introduction

1-1 Background

In response to the agreement reached between the Government of Japan and the Government of India, Japan International Cooperation Agency (hereinafter referred to as JICA), the official agency responsible for the implementa-tion of the technical cooperation programms of the Government of Japan, conducted the Comprehensive Study on the Development of Calcutta and Haldia Dock Systems of Calcutta Port Trust (hereinafter referred to as "the Study").

Accordingly, JICA organized the Japanese Study Team (hereinafter referred to as "the Team"), which consists of 13 experts directed by Mr. T. Iijima, the leader of the Team and Managing Director of the Overseas Coastal Area Development Institute of Japan (hereinafter referred to as OCDI).

1-2 Objectives of the Study

The objectives of the Study are as follows.

1. To prepare a Master Plan for Calcutta and Haldia Dock Systems for the period up to the year 2005.
2. To prepare a Short-term Development Plan for the development of Calcutta and Haldia Dock Systems up to the year 1995, within the framework of the Master Plan, and to determine the technical, economic and financial feasibility of the Short-term Development Plan.

1-3 Scope of the Study

The Study covers the following items:

(1) Review and Field Surveys
 1) review of available information relevant to the Study
 2) field surveys to the extent necessary for the Study

(2) Formulation of Master Plan
 1) establishment of main goals and policy of the port development

2) forecast of the traffic for the period up to the year 2005

3) determination of national allocation of functions between the two Dock System

4) layout of major port facilities and relevant infrastructure

5) preparation of preliminary cost estimates

6) preparation of implementation program

(3) Feasibility Study on Short-term Development Plan

1) detailed forecast of port traffic

2) preparation of detailed facilities development plan

3) preparation of preliminary design

4) preparation of cost estimates

5) preparation of implementation schedule

6) economic analysis

7) financial analysis

8) recommendation on management, operation and maintenance systems

Chapter 2 Socio-Economic Background

2-1 Population

2-1-1 Population at Present

According to the 1981 census, the total population of India was 685,184,692. India has nearly 16 per cent of the world's population. It is, after China (983 million in 1981), the second most populous country in the world.

India's biggest problem is its ever increasing population. The population growth can be explained by the sharp decline in the death rate, while the birth rate has decreased only slightly (i.e. the natural growth rate).

Population growth in India also depends on net migration (i.e. the difference between the rates of in-migration and out-migration).

In Maharashtra and West Bengal, the migration has been high from the rural to the urban areas. West Bengal has also received a large number of rural refugees from Bangladesh.

2-1-2 Future Population

According to the Indian population projections, the Indian population will increase to 836 million people in 1991, 915 million people in 1996, and 991 million people in 2001 (middle estimate), and the annual growth rate will decrease from 2.25 per cent in the decade 1971-1981 to 1.7 per cent in the decade 1991-2001 (middle estimate) assuming that a well-organized family planning programme will be effective.

2-2 National Economy

Overall Development

In India, reconstruction and development of the economy were the obvious imperatives in the post-independence period. The principal strategy was industrialization with the development of heavy and basic industries. A five-year plan was prepared to promote rapid development.

In the 1950's and 1960's the growth rate of the economy (GDP) was 3.7 per cent and 3.3 per cent per annum respectively and this growth rate increased to 4.8 per cent by 1986. The growth rate of the agriculture sector was 2.4 per cent in the 1960's, 1.7 per cent in the 1970's and 1.3 per cent during 1980 to 1986, while that of the industrial sector was 5.6 per cent in the 1960's, 3.7 per cent in the 1970's and 9.2 per cent during 1980 to 1986.

In spite of the GDP growth, the growth rate of GDP per capita was lower than that of the GDP itself because of the high population growth. As noted above, the population of India is expected to continue to increase in the future. Therefore the GDP growth rate must be higher than the growth rate of population in order to increase the GDP per capita.

2-3 Transportation

2-3-1 Railways

The Indian railways are the nation's lifeline and the principal mode of transport in the country.

Indian railways carry nearly 50 per cent of the country's passenger traffic and two-thirds of its freight, thus constituting the most important means of transport in the country.

Indian's railway route length is 61,850 kms (as of 31 March 1985) which is the largest in Asia and the fourth largest in the world, but the electrified route length is 6,325 kms. During 1984/85, they carried approximately 33.3 million passengers and 2,648 thousand tonnes of freight traffic. The operational fleet consisted of 10,128 locomotives, 38,583 coaching vehicles and 365,390 wagons in that year.

2-3-2 Roads

Indian roads have a total length of about 1.7 million kilometers (1983-84). Roads are generally classified into the following categories:

National highways, State highways, District roads, Rural roads

The surfaced length of road as of March 1983 was 731 thousand kilometers comprising 47 per cent of the total length of roads in India and the unsurfaced road totaled 823 thousand kilometers, comprising 53 per cent.

2-3-3 Sea transport (Ports and Shipping)

There are 11 major ports except Nhava Sheva and 137 intermediate/minor ports. The management and administration of the major port is governed by the Major Port Trusts Act of 1963 and carried out by the respective Port Trusts under the overall responsibility of MOST and that of intermediate/minor ports by the respective State Governments. The administration and development of shipping services is also the responsibility of MOST. The overall planning is, however, the responsibility of the Planning Commission.

India's coastline is about 6,000 kms. During 1987-88 a total of 139

million tonnes of cargo was handled by all the ports: the share of major ports was about 96 percent. The main commodities handled at the major ports were POL (47%), Iron ore (22%) and coal (10%).

India has one of the largest merchant fleets among the developing countries. The country's operative tonnage was 5.58 million GRT (Gross Registered Tonnage) as of 30 June 1986.

2-3-4 Air Transport

Inland has two independent airline corporations, Air India for international routes, and Indian Airlines for all major internal and a few external flights to neighboring countries.

International Airports Authority of India (IAAI) was set up in 1972 for operation, management, planning and development of international air ports at Bombay, Calcutta, Delhi and Madras.

The fleet of Air-India as of 31 December 1986 was 9 Boeing 747s, 5 Boeing 707s, and 3 Airbuses, and one more Boeing 747 and an additional 707 were delivered in 1987. Indian Airlines has in its fleet 26 Boeing 737s, 10 Airbuses and other smaller air craft.

Chapter 3 Present Situation of the Port

3-1 Location Conditions

3-1-1 Calcutta Dock System

Calcutta Dock System is located on the left bank of river Hooghly at Latitude 22°33'N and Longitude 88°18'E. It is situated within the City of Calcutta which has a population of about 9,000,000 people.

The navigational waterway to Calcutta Dock System is river Hooghly which has many curves, shoals and sandbanks formed by sedimentation. Accordingly, the navigation of vessels is difficult and compelled pilotage for all merchant vessels over 200 GRT. The pilot distance from the sea to Calcutta Dock is over 200 km. The navigational channels have varied in configuration and position due to sediment movement over the years and are constantly being dredged and maintained. However, it is impossible to secure the sufficient depth. Accordingly, larger vessels must wait for high tide.

The hinterland area of Calcutta Dock System is Calcutta city, West Bengal State, Assam State and Nepal.

3-1-2 Haldia Dock System

Haldia Dock System is located on the right bank of river Hooghly at Latitude 22° 02' N and Longitude 88° 06' E. It is about 104 km downstream of Calcutta and the navigable distance from the sea is about 100 km.

Haldia Dock System is planned as a complementary port to Calcutta Dock System, mainly to receive deep draughted vessels which cannot visit Calcutta because of the draft restriction in the river upstream of Haldia.

Haldia Dock System is linked by railways and roads with the hinterland of Calcutta Port.

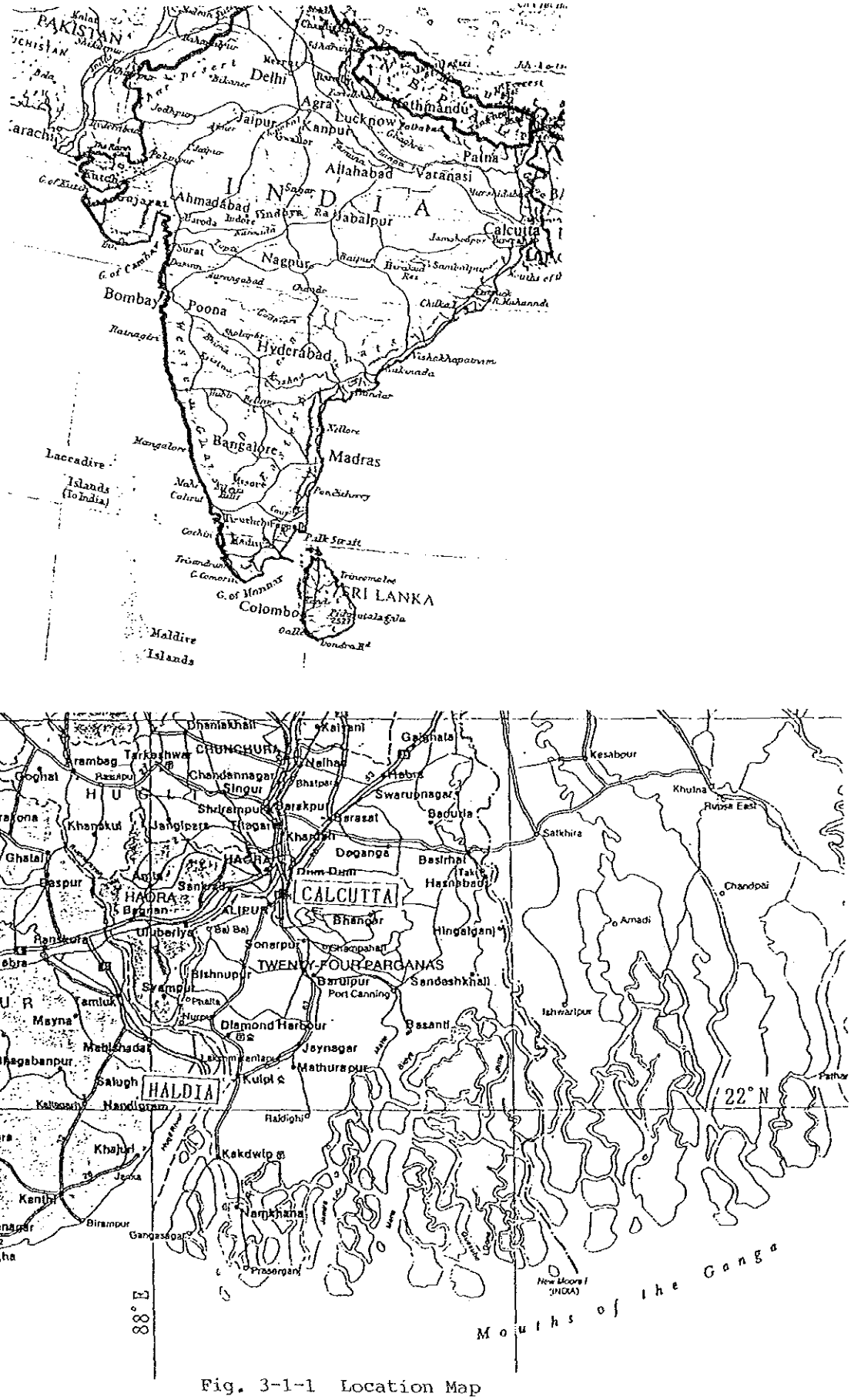


Fig. 3-1-1 Location Map

3-2 Natural Conditions

3-2-1 Geology

Calcutta region is comprised mainly of ancient to recent deltaic sediments of vast thicknesses. These alluvial deposits are overlying marine formations probably of Mid-Pliocene age and older precambrian shales, schists and phyllites.

The topmost sediments, belonging to the recent alluvium, consists of clay, kankar and at some places laterite gravel. Underlying these sediments are older alluvial deposits which consists of coarse sand and laterite. This area as part of the Ganga-Brahmaputra delta has undergone subsidence in the geologic past. Soft clayey soil covers the entire port area which thickness is approx. 15 m at Calcutta and 18 ~ 23 m at Haldia.

The epicenter of only one earthquake with an approximate magnitude of 5.0 to 6.0 was located near Haldia in the past 100 years. However, no epicenter of earthquakes have been located around Calcutta for the past 190 years.

3-2-2 Meteorological Conditions

Calcutta region is located near the tropic of cancer. Therefore, there is a seasonal variation in the temperature. April and May are hotter months which mean annual daily average temperature is approximately 30 °C, whereas December and January are colder months which mean annual daily average temperature is approximately 20°C.

This region is mainly exposed to the south-west monsoon from June to September and the average monthly rainfall is approximately 350 mm. July and August are the wettest months having a monthly rainfall of over 400 mm. During the north-west monsoon period from November to February, the monthly average rainfall is less than 35 mm.

The relative humidity is highest in August and lowest in March, but the annual variation in the morning (AM. 8:00) is small as the range of 75% to 90%.

Extreme wind occur during cyclonic period. Wind speed of 57 m/sec has been recorded during one of the severmost cyclonic storm. From October to January, winds are calm and their speed does not exceed 5 m/sec.

3-2-3 River Hooghly and the Estuary

The tidal range at Calcutta is 4.21 m in springs and 2.10 m in neaps and at Haldia it is 4.90 m in springs and 2.16 m in neaps. There are seasonal variations in the tide levels because of freshets in the river Hooghly. The range between freshets and dry season in high water spring is about 0.9 m at Calcutta and 0.4 m at Haldia.

The tidal currents during north east monsoon have an intensity of 3 to 3.5 knots at springs and 1.5 to 2 knots at neaps. From July to October freshets cause the outgoing stream to predominate, it attains a maximum rate of 7 knots at springs.

Since Calcutta and Haldia are located on the upstream of estuary, the waves are generally less than 0.5 m high. However, waves upto 1 m can occur during monsoons at Haldia.

The navigable channel is subject to annual variations caused by the difference in direction of the scour of the freshets and flood stream during the rainy and dry seasons. The channel through the estuary is subject to changes across the whole of its width, from time to time, such as occur in all wide, sandy and tidal estuaries in their normal state.

In some parts of the river the changes in depth and in the direction of the channels are very rapid, so frequent soundings are carried out by the Marine Department of C.P.T. After the analysis of the soundings, suitable tracks in the channel are quickly decided and the river pilots are informed.

3-3 Existing Facilities and Equipment

3-3-1 Calcutta Dock System

Since the river Hooghly is tidal with large fluctuation in draught, the dock system has been designed as an impound basin with a lock entrance. THere are two impound basines which were separately excavated, K.P.Dock (constructed in 1983) and N.S.Dock (constructed in 1928). The depth of impound basin is 7 ~ 9 m and number of berths are 19 at KPD and 9 at NSD.

The cargo handling volume at Calcutta Dock System is 4.4 million tons in 1987/88. Major import/inward items are petroleum products, fertilizer, iron and steel products, and machines and major export/outward items are jute, jute products, and tea.

Almost all the facilities and equipment are old and time-worn. Therefore, the improvement and/or rehabilitation of existing facilities and equipment on land and in floating shall be taken into consideration. However, almost all of the quay structures are in sufficient condition for use even at present because they are gravity type structure made by concrete.

Concerning cargo handling equipment for various cargos, there are many quay-cranes, yard-cranes, warehouses & rail-lanes. Almost all of these facilities & equipment are unused regretfully except most of warehouses. In practice, handling operations are made by ship's gears, mobile-cranes, tractors/traillers, some of yard-cranes, forklifts and manpower. It shall be necessary to improve, modernize, rehabilitate, replace and demolish them in proper way by each.

Among facilities related to the Dock System, some bridges at the intersections between roads and docks are deteriorated structually and there are problems of traffic congestion. Furthermore, reconstruction and development of fundamental facilities such as railways/roads/communication system, etc. is surely needed.

3-3-2 Haldia Dock System

Development of Dock System began in 1964 and the oil jetty, located on the river itself, was commissioned in 1968. The main Dock System with lock entrance and 13.7 m deep impound basin was commissioned in 1977. Five

berths have been provided inside the basin as the first stage of development.

Ore berth	332 m long
Coal berth	280 m long
Fertilizer berth	239 m long
Finger jetty	231 m long
General cargo & Container berth	432 m long
Oil Jetty	234 m long

The cargo handling volume at Haldia Dock System is 8.7 Million tons in 1987/88. Major import/inward items are crude oil, petroleum products and coke, and major export/outward items are coal and petroleum products.

Haldia Dock System is more rational in comparison to Calcutta Dock System in terms of facilities arrangement and land use because the port is much newer. However, it has become necessary to review the original master plan because 20 years have already passed since the port was opened. Especially, the increase of bulk cargo volume and container cargo volume are urgent themes. Since 1885 the iron ore handling plant had been shifted to coal due to stopage of ore export. And the plant for coking coal is not mechanized sufficiently yet. Then, it is observed to equip short facility for the container cargo. It is necessary to rehabilitate, improve and expand properly these facilities for increasing cargo volume. And it is observed that there are some difficulty for maneuvering of the ship in the dock at night time during the south-west monsoon season.

Also it is important to develop access traffic networks.

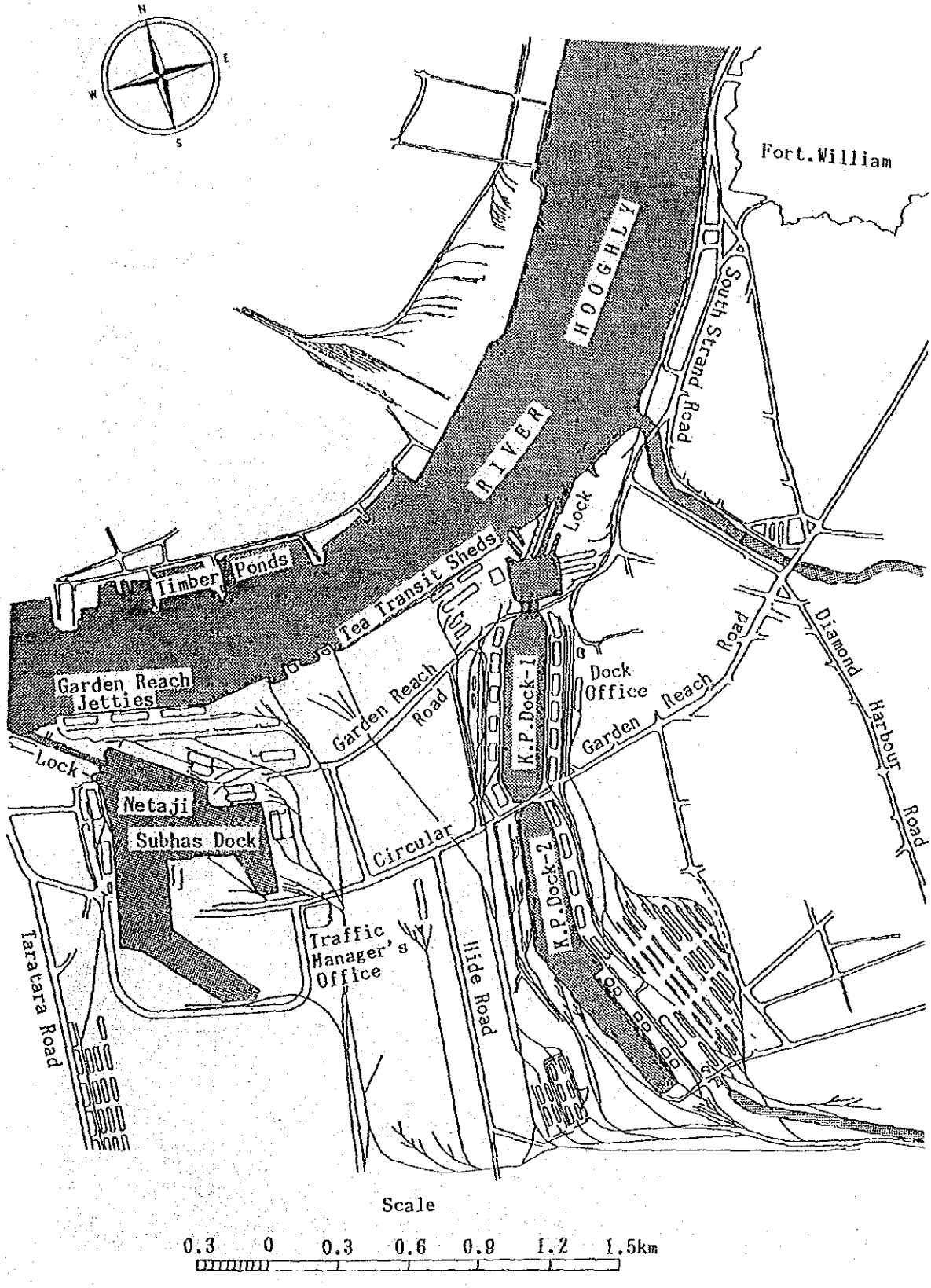
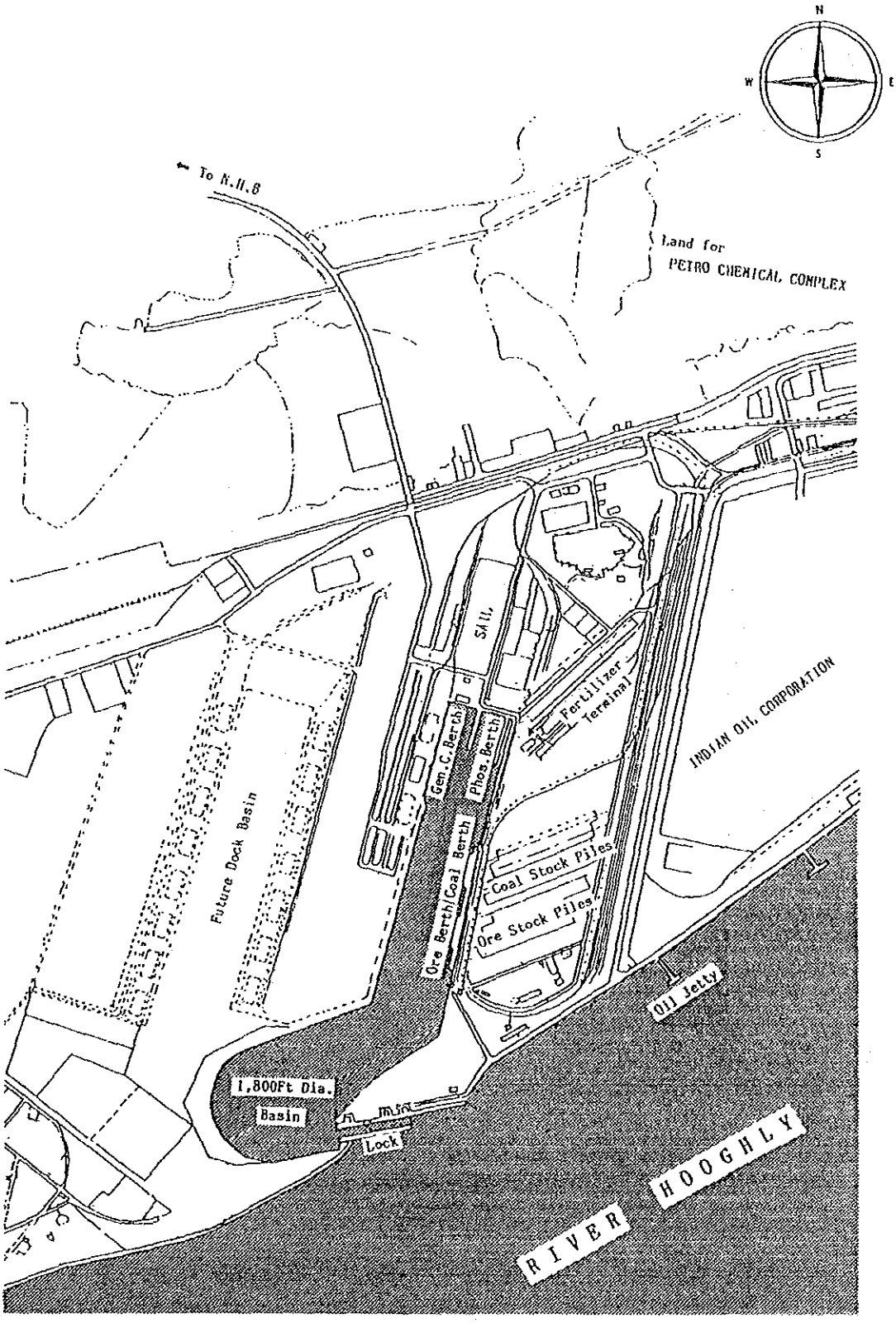


Fig. 3-1-2 Plan of Calcutta Dock System



Scale

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 Ft

Fig. 3-1-3 Plan of Haldia Dock System

Chapter 4 Present Port Traffic Facilities

4-1 Railway System in Calcutta Dock System

(1) Present Condition

The present CPT Railway network was developed around 1920, and certain modifications were carried out in 1963/64 (Fig. 4-1-1).

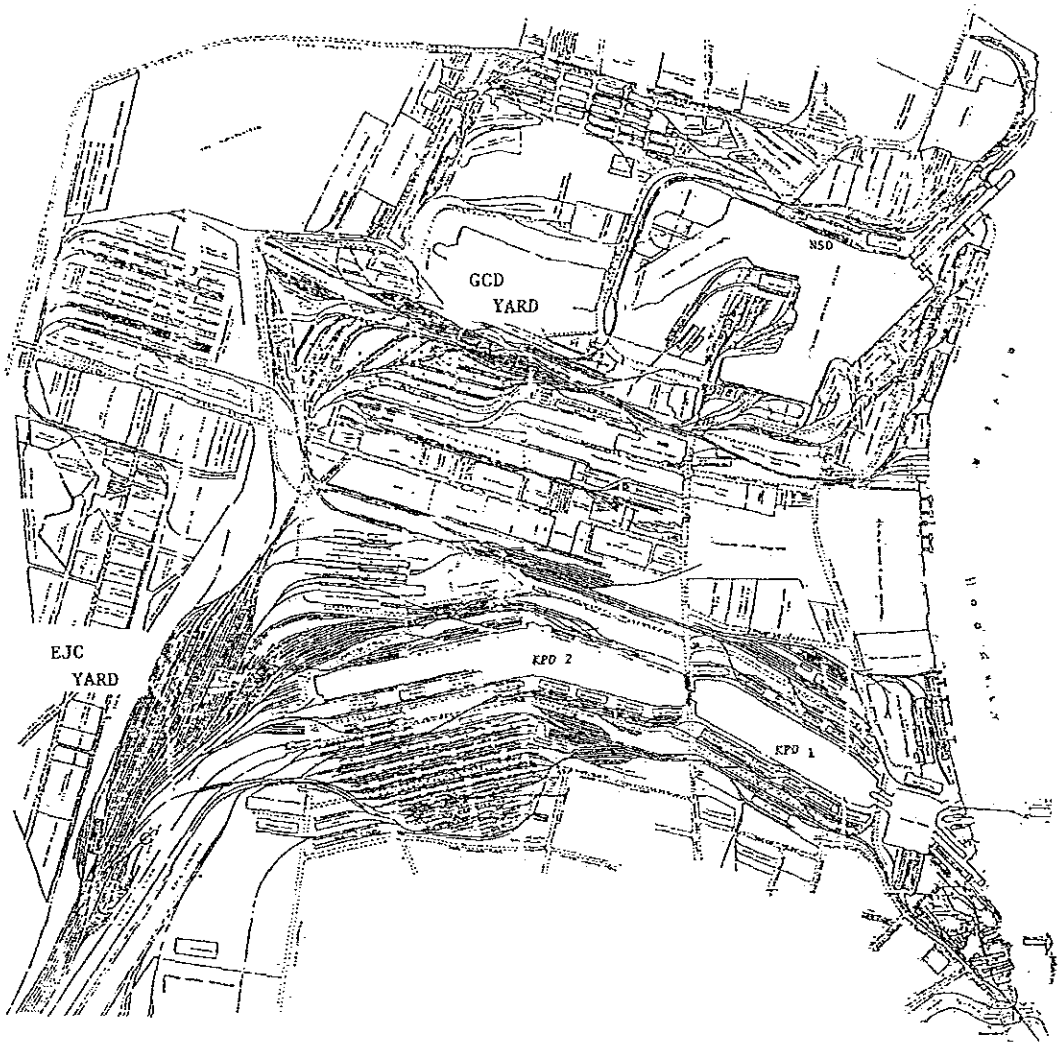


Fig. 4-1-1 Railway System in Calcutta Port

The CPT Railway network at Calcutta has fallen into disuse in many areas with the increase of road transportation, and some railway tracks have been removed. CPT Railway has two major yards now, viz East Dock Junction interchange yard (EJC) and the subsidiary yard (GCD) with a holding capacity of 1900 and 500 wagons respectively. The handling capacity is estimated at 3.5 million tonnes per year. However, CPT Railway traffic in 1987/88 is estimated at about 1.1 million tonnes. At present, most CPT railway cargoes are to/from industrial and commercial sidings located around the dock system. Port related cargo volume is very small.

The cargo volume to/from the industrial/commercial sidings by rail includes 0.874 million tonnes of inward cargoes comprising food grain from the northern part of India (Punjab, Haryana) and steel from Bhalai, Bokaro, etc., which are consumed in and around Calcutta. Imported cargo transfered by railway is mostly bulk cargo, viz, cement, fertilizer, sugar, etc. The major destination is Nepal.

(2) Bottlenecks

At present, a minimum of six placements and withdrawals have to be made for loading a rake at the transit sheds. This situation has forced the importers to switch over to road or carry their cargoes to the rail terminal around Calcutta for onward dispatch by rail.

(3) Traffic Volume

The number of trains and wagons received and dispatched at Calcutta is shown in Table 4-1-1.

Table 4-1-1 Number of Trains/Wagons at Calcutta

	1985/86	1986/87	1987/88
Total No. of trains received	490	427	538
Total No. of trains despatched	461	407	519
Total No. of wagons received	35,110	32,026	39,117
Total No. of wagons despatched	35,138	32,093	39,336
Total food loaded	258	29	100
Total fertilizer loaded	1,061	59	648
Average turn around of wagons (days)	5.4	4.2	4.11
Total traffic *1000 tonnes	993	990	1,103
inward	808	808	876
outward	185	182	227

4-2 Railway System in Haldia Dock System

(1) Present Condition

Haldia port serves as a terminal of the South Eastern Railway and as an exchange area where trains are taken over/made over to the trunk railway.

Haldia railway has two major yards, the general marshaling yard (GM) and the bulk handling yard (BH). The general marshaling yard has five reception tracks and five departure tracks for general cargo and oil traffic. The bulk handling yard is directly connected with the South Eastern Railway main line and has five reception tracks and five departure tracks for coal and three stabling tracks for loaded and empty oil tank wagons for Indian Oil Corporation.

The average yard holding capacity with operational mobility is 1500 wagons.

(2) Bottlenecks

The total railborne traffic handled in 1987/88 was 4.03 million tonnes which included 2.54 million tonnes of coal, 0.69 million tonnes of P.O.L., 0.51 million tonnes of coking coal and 3000 TEUs of containers. But there has been no corresponding development of infrastructure and workforce. Therefore, Haldia port is presently under heavy pressure. The existing facilities, especially locomotives and tracks, are not sufficient to handle the expected increase in the handling volume of coal, P.O.L. and containers.

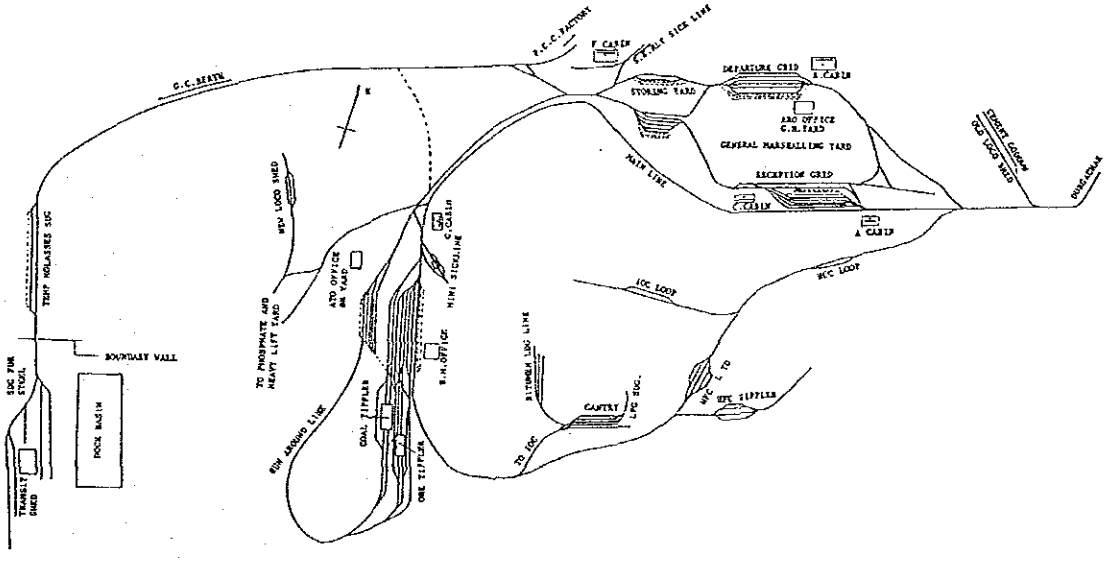


Fig. 4-2-1 Railway System in Haldia

(3) Traffic Volume

The number of trains and wagons received and despatched at Haldia is shown in Table 4-2-1.

Table 4-2-1 Number of Trains/Wagons at Haldia

	1985/86	1986/87	1987/88
Total No. of trains received	1,782	1,799	1,921
Total No. of trains despatched	1,683	1,721	1,835
Tonnage (Outward) millions	1,274	1,240	1,336
Tonnage (Inward) millions	2,258	2,345	2,694
Total No. of wagons received	132,632	140,440	152,142
Total No. of wagons despatched	134,189	138,362	156,520
Total No. of Coal wagons received	81,017	86,225	109,683
Total No. of wagons loaded with P.O.L.	33,652	32,984	31,923
Total No. of wagons loaded with coking coal	19,652	18,200	22,045

Source: CPT

4-3 Road Transportation System in Calcutta Dock System

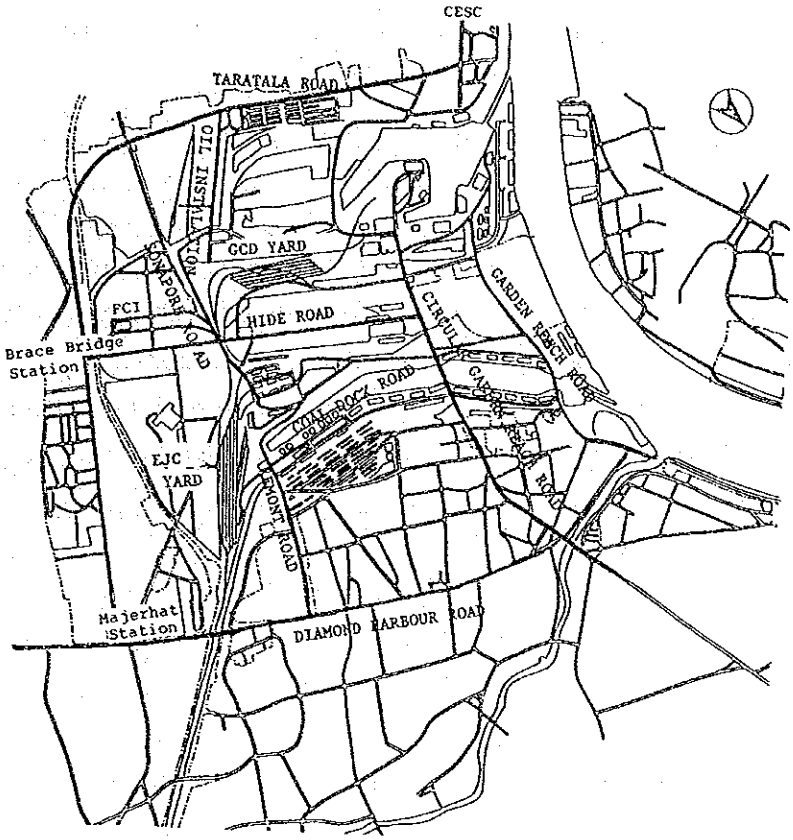


Fig. 4-3-1 Road Network in Calcutta Port

(1) Present Condition

In Calcutta port, there are four major longitudinal corridors and three major transverse corridors, as follows.

Longitudinal corridors

① Circular Garden Reach Road

② Garden Reach Road

③ Remount Road - Sonapore Road - Oil installation Road

④ Taratala Road

Transverse corridors

① Taratala Road

② Hide Road - Nimak Mahal Road

③ Diamond Harbour Road

These main corridors constitute the road network together with secondary roads viz. Coal Dock Road, Dumayun Avenue, Satya Doctor Road, Eastern Boundary Road, Kantapurker Road, and Sonai Road.

At present, four gates are used for Kidderpore Dock No.1 (KPD-I).

Gate 1 and Gate 2 are for entry and Gates 3 and 4 are for exit. For KPD-II, three gates are used. Gate 5, Gate 11 and Gate 13 are used for both entry and exit. For NSD, 6 gates are used viz. 3 GRJ, 3 NSD, 4 NSD, 5 NSD, 7 NSD, and 9 NSD gates.

(2) Bottlenecks

1) On the Circular Garden Reach Road, at Kidderpore intersection and at Kidderpore bridge, the traffic condition is very bad. Many trucks, buses, and private cars pass through this intersection and bridge together, not only from Circular Garden Reach Road but also from Diamond Harbour Road, and many trucks come through this intersection and pass over the bridge.

2) On Garden Reach Road, heavy vehicles are prohibited from using Swing Bridge. Therefore, all these vehicles have to move to Circular Garden Reach Road, and this worsens the congestion on that road.

3) Inside and outside the gates, parking of incoming and outgoing trucks on the road creates bottlenecks due to the absence of proper parking facilities.

4) Street parking activity on Garden Reach Road, Circular Garden Reach Road and Hide Road badly affect road movement.

(3) Traffic Volume

Inbound and outbound traffic movement at the port are presented in Table 4-3-1.

Table 4-3-1 Statistics on Inbound/Outbound Trucks

		88/85	85/86	86/87	87/88
Inbound					
Export	1) Trucks (Including Trailers)	68,100	76,639	56,136	51,693
	2) Carts	374	461	460	605
Outbound					
Import	1) Trucks (Including Trailers)	160,401	180,883	182,489	177,312
	2) Carts	1,435	1,663	1,469	882

Chapter 5 Present Shipping and Cargo Traffic

5-1 General

Due to the draft restriction and the shortage of the cargo handling facilities, the size, type and cargo carrying capacity of the vessels calling at the ports of Calcutta and Haldia are limited to a great extent. In spite of this severe situation, there are many shipping lines actively carring trade to and from Calcutta and Haldia.

1) Calcutta

The majority of the shipping lines are still operating Break Bulk vessels for general cargo. As to the container service, Calcutta is not surved by main line container vessels due to the access restictions and the present small quantity of container cargo. Instead, a number of shipping lines maintain feeder services to Calcutta from Singapore, Madras and Colombo and vice-versa, mainly on a slot charter basis. The major lines are APL, CSC, COBRA and SCI (SCI and CSC operate their own feeder vessels in addition to slot charters.)

2) Haldia

Haldia is served mainly by bulk carreis, although some container vessels and Combi also call at the port. BLASCO (USSR) and SCI are the main users of the port.

5-2 Present shipping

5-2-1 No. of Vessels Calling at the Ports

1) Calcutta

During the year 1987-88, 933 vessels called at Calcutta (including Budge Budge) as against 894 vessels in the previous year. The total number of calling vessels has been increasing at an average annual rate of 5.9% over the last three years. Out of 933 vessels, 155 vessels (16.6%) are domestic trade vessels and 778 vessels (83.4%) are foreign trade vessels.

The number of domestic and foreign trade vessels is as follows.

	Domestic		Foreign	Total
1985-86	149	17.9%	683	832
1986-87	137	15.3	757	894
1987-88	155	16.6	778	933
		16.6		

2) Haldia

During the year 1987-88, 555 vessels called at Haldia as against 571 vessels in the previous year. The total number of calling vessels has decreased slightly for the last three years. About 30% are domestic trade vessels and 70% are foreign trade vessels.

5-2-2 Vessel Types and Sizes

Many types of vessels call at Calcutta/Haldia, but the size and cargo carrying capacity of the vessels are naturally limited due to the draft restrictions in the riverine ports.

1) Calcutta

Out of the total number of calling vessels, about 58% are Break Bulk vessels, 17% are Liquid Bulk vessels, 17% are Container feeder vessels and the rest are Dry Bulk vessels. Since there are no Gantry cranes available at the port, normally self-sustained container feeder vessels call at Calcutta. The number of vessels by vessel type is as follows.

Vessel type	1985-86	1986-87	1987-88
Liquid Bulk	130	151	157
Dry Bulk	81	61	69
Break Bulk	483	509	545
Container	138	173	162
Total	832	894	933

2) Haldia

Out of the total number of calling vessels, about 55% are Liquid Bulk vessels, 26% are Dry Bulk vessels, 14% are Container vessels and the rest are Break Bulk vessels. The number of vessels by vessel type is as follows.

Vessel type	1985-86	1986-87	1987-88
Liquid Bulk	349	323	307
Dry Bulk	144	133	146
Break Bulk	28	30	25
Container	50	85	77
Total	571	571	555

It is remarkable that the number of calls by Liquid Bulk vessels decreased to 307 vessels in 1987 - 88 as against 349 vessels in 1985-86.

5-3 Characteristics of Cargo Throughput at Calcutta/Haldia

(1) Historical Trend of Total Cargo Traffic

1) During the 12 years from 1976/77 to 1987/88 the total cargo traffic though Calcutta/Haldia gradually increased from 8.4 million tonnes to 13.1 million tonnes except for a decrease in 1977/78 (the annual growth rate of cargo traffic is approximately 4.1 percent during these 12 years). This is mainly due to the increase of import cargo.

2) The historical trend of cargo traffic by port shows the following characteristics.

① The total cargo handled at Haldia exceeded that at Calcutta in 1979/80 and share of Haldia is gradually increasing.

② While the total cargo handled at Haldia rapidly increased during these 12 years with the volume in 1987/88 3 times that in 1976/77, the total cargo volume handled at Calcutta remained stable in the rage from 3.8 million tonnes to 4.6 million tonnes except for the year 1976/77.

③ The ratio of import cargo to export cargo handled at Haldia is gradually decreasing, that is, although the import cargo volume is larger than the export cargo volume, the increase rate of import cargo is less than that of export cargo.
However in Calcutta the ratio of import cargo to export cargo is gradually increasing because of the shares decrease of export cargo.

④ The shares of import cargo are roughly 40 percent at Calcutta and 60 percent at Haldia after 1977/78.

⑤ The share of export cargo at Calcutta dropped sharply from 89 percent in 1976/77 to 28 percent in 1986/87.
The share of export cargo at Haldia, on the other hand, increased sharply.

Table 5-3-1 Cargo Traffic at Calcutta and Haldia

	Cargo volume ('000 tonnes)			Share (%)		
	Calcutta	Haldia	Total	Calcutta	Haldia	Total
1976/77	5,713	2,645	8,358	68.4	31.6	100
77/78	4,350	3,456	7,806	55.7	44.3	100
78/79	4,391	3,847	8,238	53.3	46.7	100
79/80	3,842	4,953	8,795	43.7	56.3	100
80/81	4,066	5,446	9,512	42.7	57.3	100
81/82	4,448	5,478	9,926	44.8	55.2	100
82/83	4,575	6,116	10,691	42.8	57.2	100
83/84	4,088	6,380	10,468	39.1	60.9	100
84/85	3,988	6,536	10,524	37.9	62.1	100
85/86	4,163	7,964	12,127	34.3	65.7	100
86/87	4,047	8,025	12,072	33.5	66.5	100
87/88	4,393	8,678	13,071	33.6	66.4	100

(Unit: '000 tonnes, %)

	Import						Export					
	Calcutta		Haldia		Total		Calcutta		Haldia		Total	
	Volume	Share	Volume	Share	Volume	Share	Volume	Share	Volume	Share	Volume	Share
1976/77	2,768	55.0	2,263	45.0	5,031	100	2,945	88.5	382	11.5	3,327	100
77/78	1,694	41.4	2,399	58.6	4,093	100	2,656	71.5	1,057	28.5	3,713	100
78/79	2,397	44.4	2,998	55.6	5,395	100	1,994	70.1	849	29.9	2,843	100
79/80	2,232	36.5	3,891	63.5	6,123	100	1,611	60.3	1,061	39.7	2,672	100
80/81	2,653	37.4	4,445	62.6	7,098	100	1,413	58.5	1,001	41.5	2,414	100
81/82	2,876	42.2	3,940	57.8	6,816	100	1,572	50.5	1,538	49.5	3,110	100
82/83	3,145	44.4	3,939	55.6	7,084	100	1,430	39.6	2,177	60.4	3,607	100
83/84	2,946	42.5	3,992	57.5	6,938	100	1,142	32.4	2,388	67.6	3,530	100
84/85	2,821	39.9	4,247	60.1	7,068	100	1,167	33.8	2,289	66.2	3,456	100
85/86	3,162	37.1	5,358	62.9	8,520	100	1,001	30.3	2,306	69.7	3,307	100
86/87	2,978	36.4	5,212	63.6	8,190	100	1,069	27.5	2,813	72.5	3,882	100
87/88	N.A	-	5,321	-	N.A	-	N.A	-	3,357	-	N.A	-

Chapter 6 Present Situation of Port Management and Operation

6-1 Organization

There are eleven major ports in India. Development and management of these major ports is constitutionally the responsibility of the Government of India. The Indian Ports Act, 1908 provides the statutory authority for management and the Major Port Trusts Act, 1963 contains the statutory provisions for the constitution of Port Trust Boards and vesting in them the administration, control and management of the major ports.

6-2 Cargo Handling Operations

The present situation of the cargo handling operations at Calcutta and Haldia are analysed as follows;

(1) lack of necessary information exchange among the port related parties: communication system between Haldia and Calcutta is very poor.
(2) lack of necessary cargo handling equipment such as tractors/trailers and forklift trucks.
(3) inefficient layout of berths: narrow apron, location of the quay side cranes and congested access to the yard.
(4) lack of skilled laborers for the cargo handling equipment.

6-3 Container Terminal Operation

The Container Terminal Project at D-NSD is now under way with 3 rubber tired transfer cranes, 17 nos tractors, 36 nos 40' trailers, 32 nos forklift trucks and 1,284 grand slots of CPY and likely to be completed by March, 1990.

The following items should be considered from the viewpoint of the future development of container operations;

(1) There is no fully autonomous unit which controls the entire flow of containers throughout the container terminal. The operation of the container terminal should ideally be established as a unified system in order to maximize the utilisation of the premises and equipment.

(2) The FCL containers, which should be delivered without unstuffing at the CY, are generally unstuffed in the port. The number of private warehouses nominated by the Customs for stuffing and unstuffing increased recently. This policy should be developed further.

(3) Stuffing and unstuffing of containers is carried out at the Open Storage Yard and the drayage of unstuffed cargoes not only decreases the cargo handling efficiency but also increases cost, cargo damage and traffic congestion in the terminal.

6-4 Documentation Flow

The Jetty Challan functions as a basic document in import procedures and the Jetty Challan, the Bill of Entry, the Bill of Lading and the Delivery Order are surrendered at least twice to different CPT sections. Since these procedures are very cumbersome, they should be improved to facilitate streamlining of documentation flow.

There are four Collection Office at Calcutta and it is convenient for the port users that they are located near each site. However, the working hours are too short except at Calcutta Jetty.

In the case of Haldia, there is no Collection Office, and both Import Section and Export Section which are available on Sundays have been established at G/C berth with opening hours of 9 AM to 5 PM instead.

6-5 Communication System

The break-down of communication system related to port operation deals the port a fatal blow. The break-down of telecommunication system often occured in Calcutta due to heavy rain and communication network between Calcutta and Haldia is very poor.

Local, national and international communication systems should be developed as the infrastructure by the ministry concerned and internal communication system should be improved by the port itself.

6-6 Financial Performance

The Working Ratios of the past 5 years exceeded 80 % except 1984/85. The Operating Ratios also exceeded 80 % except 1984/85.

The Rate of Return on Net Fixed Assets were less than 10 % except 1984/85.

However, CPT increased the scale of Rates on March 10, 1988 part of which were changed again on May 5, 1988. Therefore, it is expected that the financial performance of CPT will be improved from 1988/89 onward.

Chapter 7 Future Trend of Shipping Technology

7-1 Future Trends of Shipping Technology

(1) The average vessel size around the world is believed to be increasing over the next decade or so.

(2) The future change in the shipping technology will be seen in the following fields.

(a) In the field of information technology and electronic data interchange.

(b) In the field of navigation system, such as GPS, VTS and SAR.

(3) At present, the major vessel size range for respective commodities is as follows.

	Number	Capacity
(a) Liquid Bulk Carrier	25,000 - 40,000 DWT	250,000 - 320,000 DWT
(b) Dry Bulk Carrier	25,000 - 40,000 DWT	25,000 - 40,000 DWT
(c) Fully Cellular Container Vessels	15,000 - 30,000 DWT Less than 500 TEU Type	30,000 - 50,000 DWT Over 2,500 TEU Type
(d) General Cargo Vessels	5,000 10,000 DWT	15,000 30,000 DWT

(4) The dimension of the above vessels is as follows.

	L (m)	d (m)	B (m)	L (m)	d (m)	B (m)
(a) Liquid Bulk Carrier	179-206,	10 - 11.3,	23.9-27.9,	359-387,	18.5-19.8,	50.7-54.9
(b) Dry Bulk Carrier	167-196,	9.8- 11.0,	24.1-28.4,	167-196,	9.8- 11.0,	24.1-28.4
(c) Fully Cellular Container Vessels	162-211,	8.7- 11.0,	23.8-29.3,	211-257,	11 - 13,	29.3-34.2
	Less than 144,	7.9,	21.7,	Over 242,	12.4,	32.7
(d) General Cargo Vessels	111-137,	6.6- 7.9,	15.3-18.5,	154-189,	8.8 - 10.6,	20.6-24.9

(5) Judging from the historical trend, the following vessel size range will be increasing in the future.

(a) Liquid Bulk Carrier 25,000 - 40,000 DWT

80,000 - 100,000 DWT

(b) Dry Bulk Carriers — 25,000 - 40,000 DWT
60,000 - 80,000 DWT

(c) Fully Cellular Container Vessels — Over 2,500 TEU Type

(d) General Cargo Vessels — 5,000 - 10,000 DWT

(6) The dimension of the above vessels is as follows.

(a) Liquid Bulk Carrier

	L	d	B
25,000 - 40,000 DWT	179 - 206m,	10 - 11.3m,	23.9 - 27.9m
80,000 - 100,000 DWT	255 - 272m,	13.7 - 14.5m,	35.0 - 37.6m

(b) Dry Bulk Carrier

	L	d	B
25,000 - 40,000 DWT	167 - 196m,	9.8 - 11.0m,	24.1 - 28.4m
60,000 - 80,000 DWT	228 - 247m,	12.2 - 13.1m,	32.7 - 36.1m

(c) Fully Cellular Container Vessels

	L	d	B
over 2,500 TEU Type	Over 242m,	12.4m,	32.7m

(d) General Cargo Vessels

	L	d	B
5,000 - 10,000 DWT	111 - 137m,	6.6 - 7.9m,	15.3 - 18.5m

(7) On the other hand, the following vessel size range is forecast to be increase by using the simulation model.

(a) Liquid Bulk Carrier — 60,000 - 100,000 DWT

(b) Dry Bulk Carrier — Less than 40,000 DWT

(c) Fully Cellular Container Vessels — Over 2,500 TEU Type

(d) General Cargo Vessels — 5,000 - 10,000 DWT

(8) The dimension of the above vessels is as follows.

(a) Liquid Bulk Carrier

	L	d	B
60,000 - 100,000 DWT	233 - 272m,	12.6 - 14.5m,	31.8 - 37.6m

(b) Dry Bulk Carrier

	L	d	B
Less than 40,000 DWT	Less than 196m,	11.0,	28.4m

(c) Fully Cellular Container Vessels

	L	d	B
Over 2,500 TEU Type	over 242m,	12.4m,	32.7m

(d) General Cargo Vessels

	L	d	B
5,000 - 10,000 DWT	111 - 137m,	6.6 - 7.9m,	15.3 - 18.5m

7-2 Trend of Maritime Container Traffic in the Region

Presently, Calcutta and Haldia Dock Systems are served predominantly by feeder vessels from/to Colombo, Singapore and Madras, with the vessel sizes being 300 - 400 TEUs loader to Calcutta and 400 TEUs loader to Haldia in the main.

It is generally opined that the feeder service networks in the South Asian Region will be further reorganized in the future in accordance with the growth of the maritime trade and container penetration as well as the development of the container transport links/terminals in the Region.

As shipping lines/users seek to optimize schedules and cargo volumes, and to minimize costs, feeder vessel sizes are likely to be increased and frequencies improved.

Judging from the transport cost and the container throughputs at Calcutta/Haldia in the future, although they will primanly remain as feeder ports fed by Colombo/Singapore/Madras with the vessel sizes increasing to 500 TEU or more, the direct service to Haldia may also be expected to increases in some routes as the traffic sufficiently increases and the efficiency of the port handling as well as the inland transport links are improved.