

FINAL REPORT
THE DEVELOPMENT STUDY ON THE
NATIONWIDE FERRY SERVICE ROUTES
IN THE REPUBLIC OF INDONESIA

March 1993



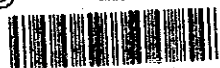
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PREFACE

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct the development study on the Nationwide Ferry Service Routes and entrusted the study to the Japan International Cooperation Agency(JICA).

JICA sent to Indonesia a study team headed by Mr. Haruo Okada, Executive Director of the Overseas Coastal Area Development Institute of Japan, four times between January 1992 and February 1993.

The team held discussions with the officials concerned of the Government of Indonesia, and conducted field surveys at the study area. 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 the Republic of Indonesia for their close cooperation extended to the team.

March 1993



Kensuke Yanagiya

President

Japan International Cooperation Agency

LETTER OF TRANSMITTAL

March, 1993

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency

Dear Mr. Yanagiya,

It is my great pleasure to submit herewith the Final Report for the Development Study on the Nationwide Ferry Service Routes in the Republic of Indonesia.

The report is the result of studies carried out by the Overseas Coastal Area Development Institute of Japan(OCDI) and Pacific Consultants International as per the contract with the Japan International Cooperation Agency(JICA). The study team conducted four field surveys between January 1992 and February 1993.

Based on the findings of these surveys and on data and information collected and analyzed in Japan, the master plan for appointed nine routes was formulated with a target year of 2010 and the short-term development plan for four routes selected in these nine routes was formulated with a target year of 1998 including a feasibility study.

The study shows that ferry development is important and essential as a socioeconomic infrastructure not only to improve living standards in those areas but also to contribute to the improvement of regional economic disparity and the stability of public welfare in Indonesia. Therefore, I earnestly hope that measures will be taken to implement this project.

It may also be noteworthy that during their stay in Indonesia, the study team carried out a seminar/workshop aiming at the transfer of technology with respect to ferry transport development in Indonesia.

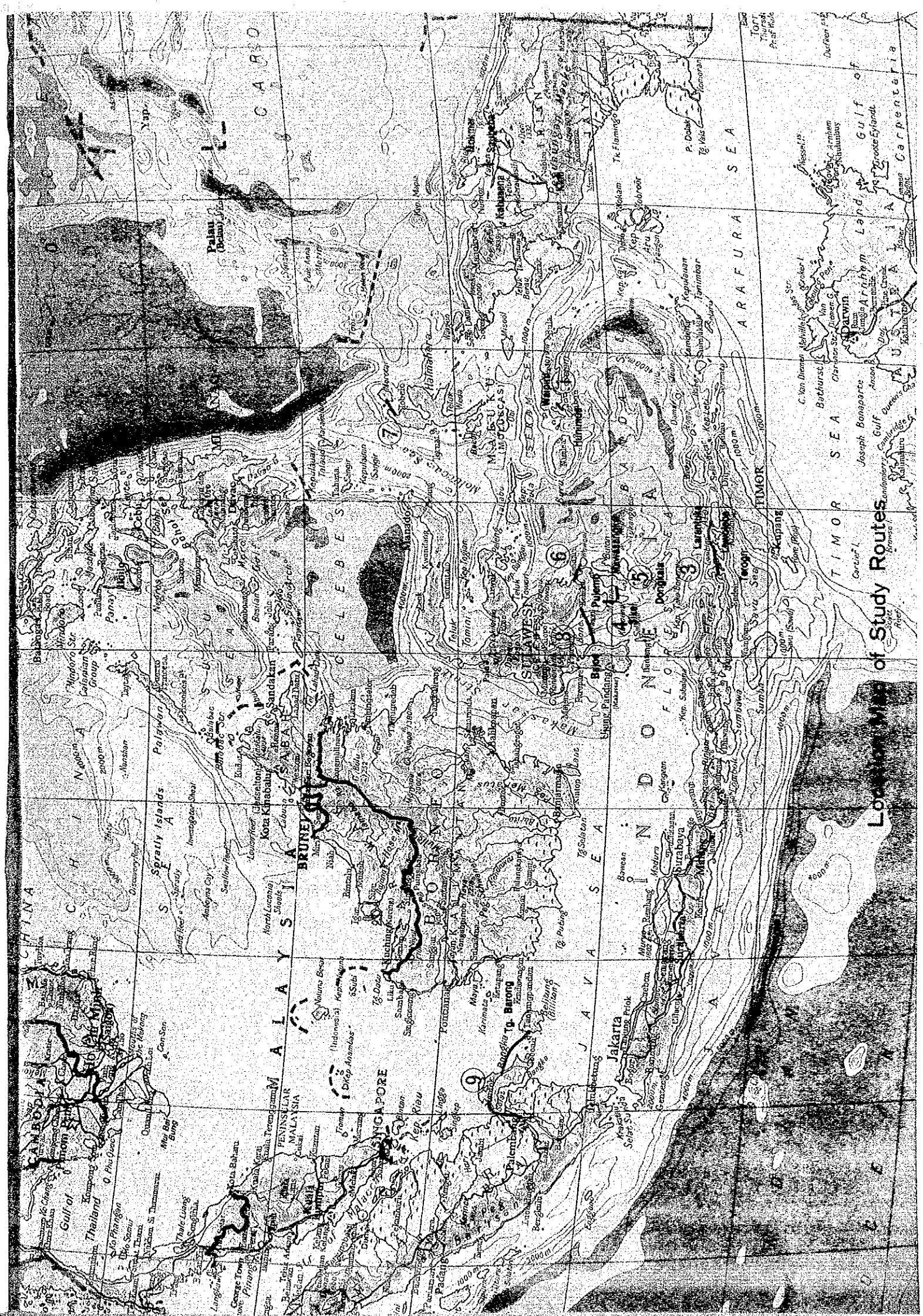
On behalf of the study team, let me express my heartfelt thanks for the generous cooperation, assistance and warm hospitality extended to the study team during their stay in Indonesia of Indonesian Government firstly Directorate General of Land Transport and Inland Waterways of Ministry of Communications and other related organizations.

Our thanks are also due to the Japan International Cooperation Agency, the Ministry of Foreign Affairs, the Ministry of Transport and the Japanese Embassy in Indonesia and the JICA Indonesian Office for their valuable advice and support during the field survey and preparation of this report.

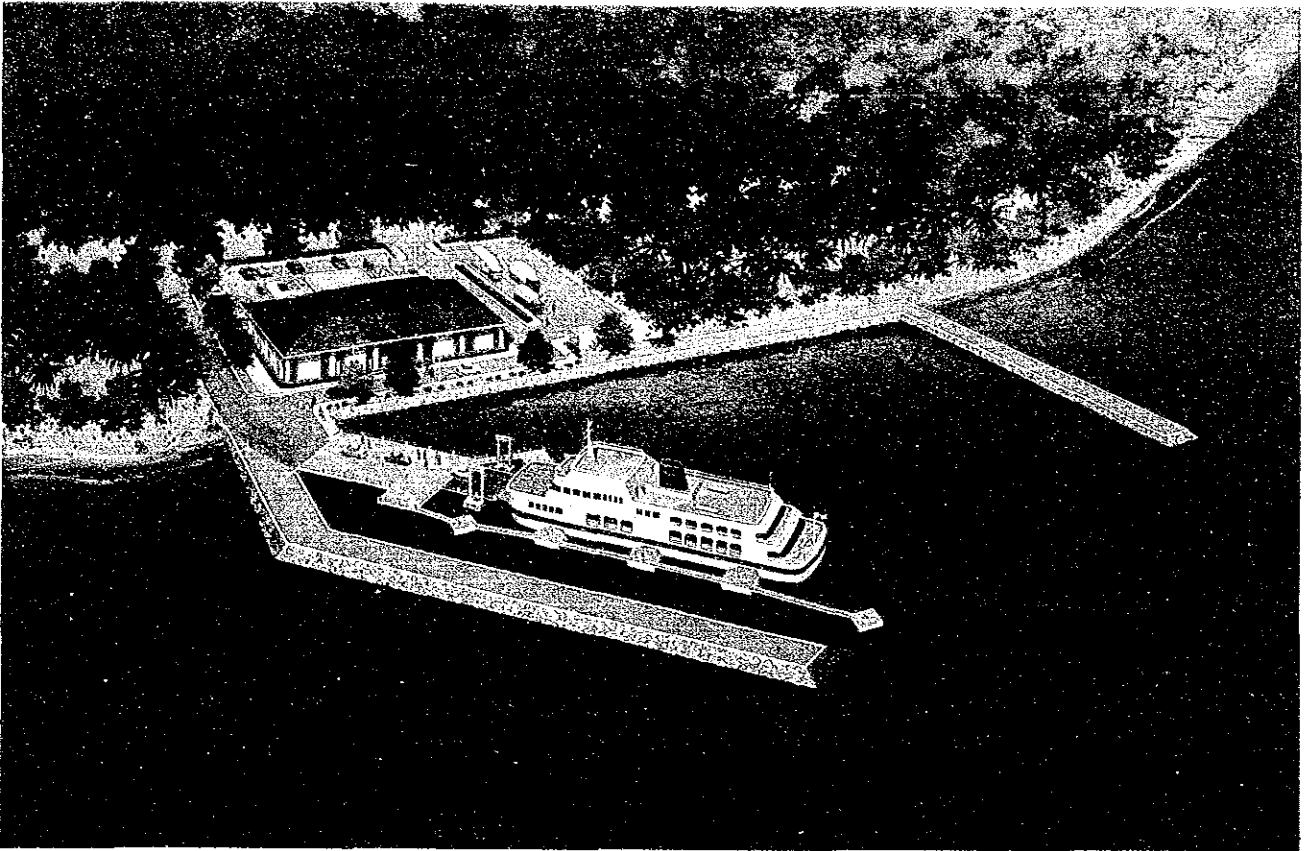
Yours faithfully,



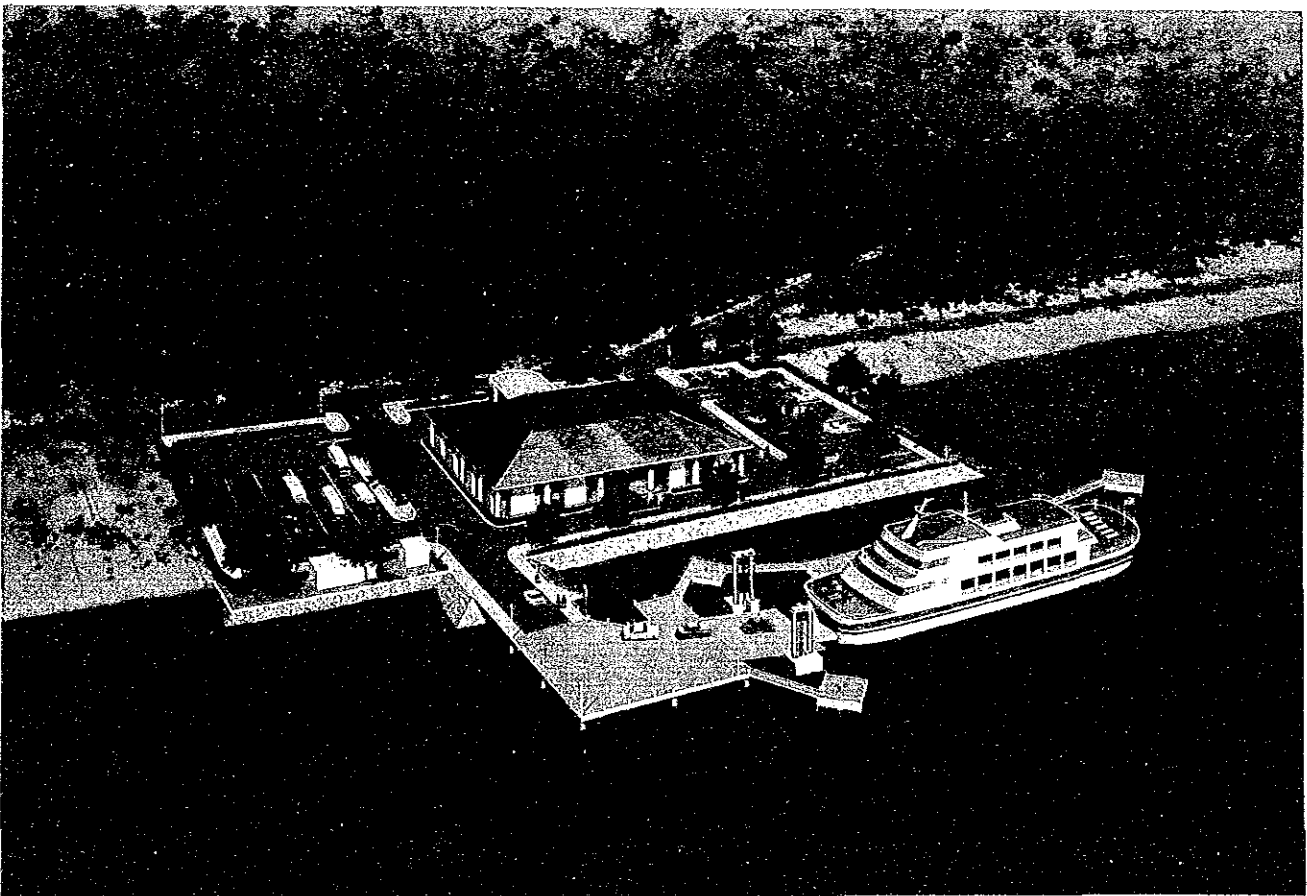
Haruo Okada
Leader
Japanese Study Team for the development Study
on the Nationwide Ferry Service Routes
(Executive Director, The Overseas Coastal
Area development Institute of Japan)



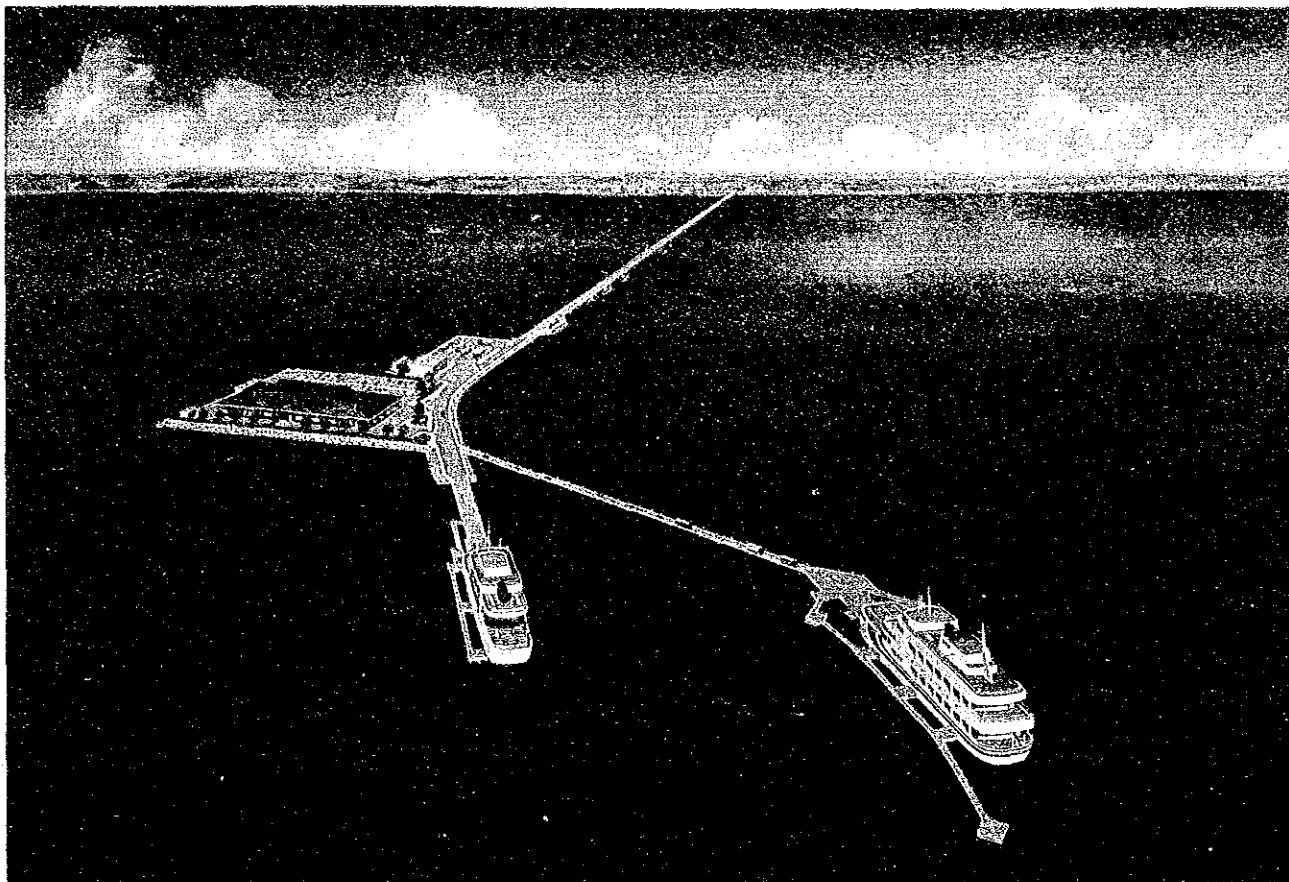
Location Map of Study Routes



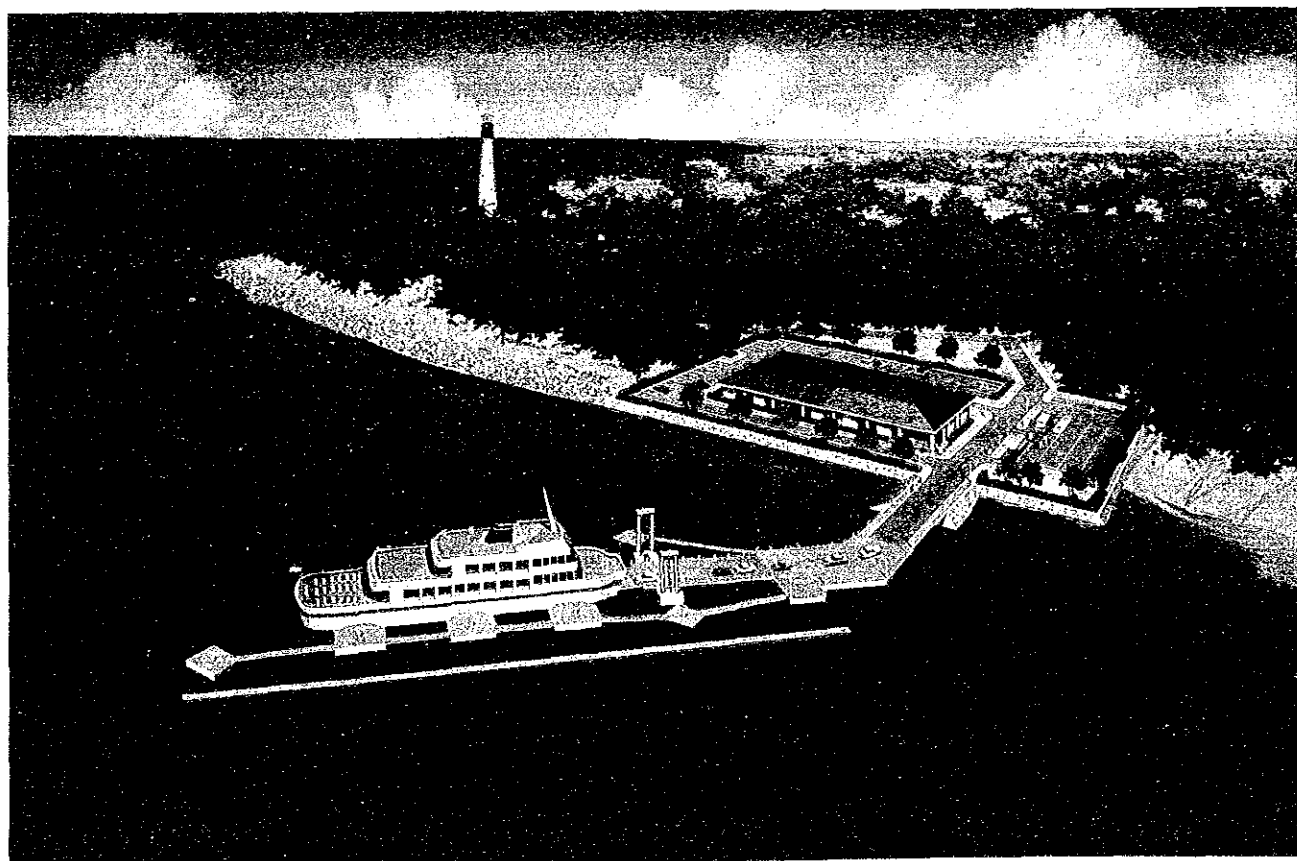
Mokmer Ferry Terminal



Lewoleba Ferry Terminal



Bajoe Ferry Terminal



Montok Ferry Terminal

ABBREVIATION LIST

B	BM	Bench Mark
	B/C	Benefit Cost Ratio
C	CD	Chart Datum(Lowest Low Water Level)
	Commod.	Commodity
D	DGLT	Directorate General of Land Transport and Inland Waterways
	DGSC	Directorate General of Sea Communications
	DWT	Dead Weight Tonnage
E	EIRR	Economic Internal Rate of Return
F	FD	Draft in Full Load
	FIRR	Financial Internal Rate of Return
G	GRDP	Gross Regional Domestic Product
	GRT	Gross Registered Tonnage
	GT	Gross Registered Tonnage
H	HWL	High Water Level
	HWS	High Water Spring
I	IBRD	International Bank for Reconstruction and Development
	Is.	Island
	Isl.	Island
K	Kab.	Kabupaten
	Kec.	Kecamatan
	Km	Kilometer
	Kot.	Kotamadya
	Kt	Knot
L	LCM	Land Craft Motor

	LOA	Length Over ALL (of a vessel)
	LWL	Low Water Level
	LWS	Low Water Spring
M	MB	Breadth Molded
	MOC	Ministry of Communications
	MSL	Mean Sea Level
N	NPV	Net Present Value
O	OD	Origin and Destination
P	Passen.	Passenger
	PASDP	Perum Angkutan Sungai Danau dan Penyeberangan
	Perum ASDP	Perum Angkutan Sungai Danau dan Penyeberangan
	Pu.	Pulau
	PC	Prestressed Concrete
	PLN	Persahaan umum Listrik Negara
R	Ro/Ro	Roll on / Roll off
	RC	Reinforced Concrete
	Rp.	Rupiah
	R.T	Round Trip
T	Tg.	Tanjung
	Tk.	Teluk
	Trans.	Transportation
U	UKC	Under Keel Clearance
V	Veh.	Vehicle
	Veh.-4	Four-wheeled Vehicle
	Veh.-2	Two-wheeled Vehicle
	VOC	Vehicle Operating Cost
	Vol.	Volume

EXCHANGE RATE

US\$1.00 = Rp.2,015 = ¥125
(November 1992)

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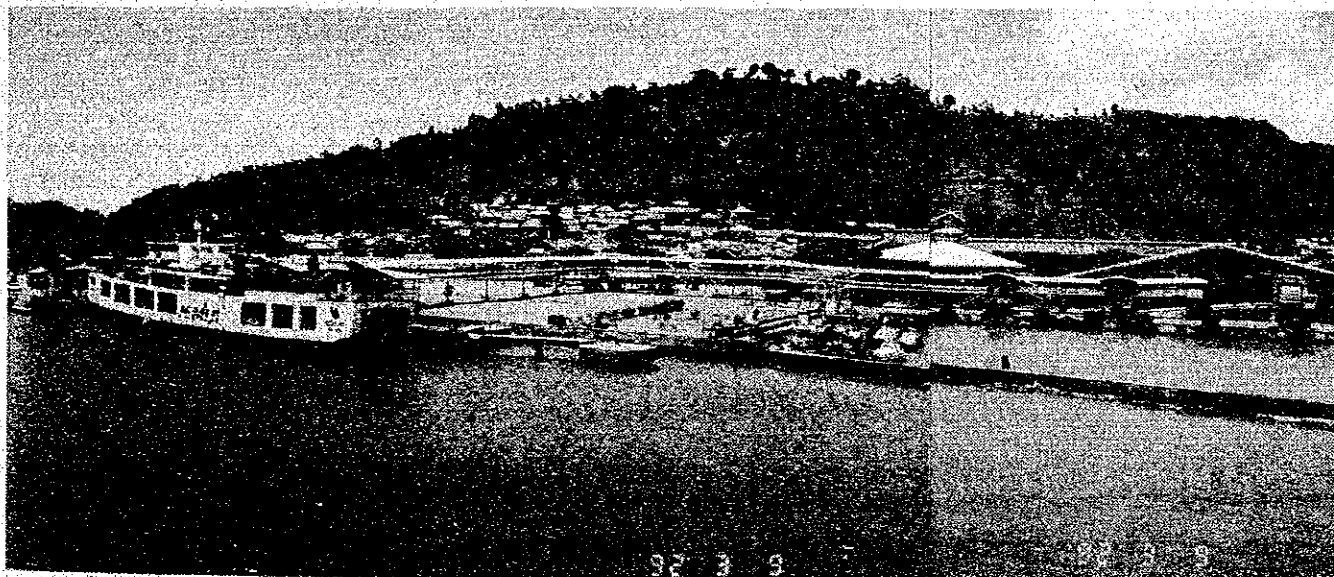
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CONCLUSIONS AND RECOMMENDATIONS



Bakauheni Terminal

Conclusions and Recommendations

I. Conclusions

Master Plan Study

1. At present, the shipping operations in Indonesia are performed by Perum ASDP(public corporation) and 15 private companies. Since private companies have participated in the comparatively profitable routes, the number of passengers transported by private shipping companies already exceeds twice of that transported by the Perum ASDP.

In the case of the existing routes, although a participating private company will have to run business in competition with the Perum ASDP and/or other private companies, it is important for the government to give permission to the private company to introduce private funds to this field as much as possible.

The development of ferry transportation in eastern Indonesia has been playing a role in rectifying the unbalanced living standard between the eastern part and the western part of Indonesia, thus becoming an important government policy. The Perum ASDP, as a public corporation, assumes the task of spearheading the government policy. Granting this role of the Perum ASDP, the government regularly gives ferry boats to the Perum ASDP without charge. It is considered that this kind of government aid will and should continue.

In the eastern regions ferry service should be provided to surrounding small islands connecting with the main islands of Sulawesi, Maluku and Irian Jaya to break the isolation. In terms of providing inter-regional ferry service (connection among main islands), a triangular network formed by connecting Jawa, Kalimantan and Sulawesi should be given priority.

2. The Study Team conducted a field reconnaissance survey to make the development plan of nine ferry routes and select the most suitable terminal sites. The routes 1, 8 and 9 are now operated and a change of terminal site is not required in all of the terminal sites of the three routes except the Kayu Arang terminal of Route 9. At the mouth of the river, in the middle of which the Kayu Arang terminal is located, sedimentation has continued and the shallowing water depth makes ferry sailing through the mouth difficult and delays in arrival or destination changes have increased. The construction of a

ferry terminal at a new site is proposed.

DGLT proposed a ferry route connecting Flores Island and Alor Island with the distance of 130 km. The field reconnaissance survey shows that current social and economic connection between the islands seems to be weak and the ferry transportation demand in planned year seems to be small. On the other hand, a large transportation demand is estimated at two routes, Flores-Adonara/Lomblem route and Alor-Pantar route based on the current sea transportation volume and route distance. The above-mentioned two routes were added to the Master Plan Study.

The main items of evaluation for the terminal site selection are oceanographic conditions, topographic conditions, accessibility from/to main cities & road condition and land use condition. Appropriate terminal sites in each ferry route have been selected.(See Table 2-1)

3. The future socioeconomic framework(population and GRDP) of each province is prepared based on the growth rates in "REPELITA V 989/90-993/94), referring to the projections by the Demographic Institute, the past growth rate. In deciding hinterlands, the Study Team selects those areas which will be served by the related ferry route on the island or kecamatan level. Small islands and towns generally depend on nearby big cities for their daily necessities.

Forecasted items are passenger, cargo(truck), general car and motorcycle. For demand forecasting the past data is used to predict future traffic with some adjustment by the growth rate estimated from the above-mentioned future socioeconomic framework on existing rates, while for the new routes, two formulas are adopted depending on the distance of ferry route and the future traffic is predicted with the same procedure as the case of the existing routes.(See Table 3-5)

The modified gravity model used for the forecast of the number of passengers on the new routes has a high correlation coefficient.

4. The Study Team has set up five model types of ferryboat in the proposed routes, 150GRT, 300GRT(two types), 500GRT, 1000GRT according to the study of natural conditions in the Indonesian Sea Area and the traffic demand in 2010. The principle dimensions and characteristics such as length over all, breadth molded speed were determined referring to the existing ferry boats and the ferry boats under construction in Indonesia.

In connection with allocation of the optimum type of ferry boat in each

route two fundamental criterions are adopted: the natural conditions and traffic demand of the route. From the above mentioned two factors, it was concluded that a larger type of ferryboat should be allocated as far as it is practical.

5. 25 terminal sites were selected for the nine study routes. Most of the terminals selected seem not to require breakwaters although further detailed survey will be necessary at some terminal sites such as Mokmer, Saubeba, Pulemo and Muntok.

In Indonesia, there exist three types of rolling-on system at mooring facilities, that is, movable bridge type, pontoon type and fixed type. Based on the sea condition (tidal range) at terminal sites, the movable bridge type is adopted for design.

Since the existing rolling-on system in Routes 1 and 8 is a fixed type, new mooring facilities with a movable bridge type are planned. The existing facilities can be utilized to cope with the increase of demand of passengers/cargo further in future with the reinforcements. According to the demand forecast and the ferry operation plan, one berth is sufficient for mooring facilities in each ferry terminal even in 2010.

6. The land for the construction of a new terminal on the standard design is prepared by readjustment of natural beach neighboring to the planned mooring facilities as much as possible to make the construction cost minimum. However if it is impossible, land for terminal is prepared by reclamation.

Parking lots should have sufficient area not only for vehicles ready for loading but also for vehicles (for example mini-bus) waiting for arriving passengers.

A causeway and/or a trestle are constructed from on-land terminal until the water depth needed for accommodation of ferry, at the tip of which mooring facilities with mooring dolphin and breasting dolphin are planned. A concrete top with pile foundation is designed as breasting /mooring dolphins.

The typical layouts of terminals for each route have been prepared. These layouts should be modified in accordance with the actual topographic and hydrographic situation of each terminal site.

7. The project cost of each proposed ferry route consists of the construction cost of the new ferry terminal facilities, the rehabilitation cost of the existing facilities and the procurement cost of new ferry boats to be introduced on the

planned routes.

The basic costs of the works and unit prices of materials and laborers for the construction of ferry terminals are taken from the latest applied contract prices in the relevant provincial government. The procurement cost of new ferry boats is estimated based on the construction cost of the ferry boats under construction in Indonesia.

8. Four ferry routes for Feasibility Study were selected for the Master Plan study routes(although there are nine routes according to the Master Plan, the actual number of routes is thirteen).

The selected evaluation items are 1) ferry transportation demand (passengers/cargoes), 2) project scale, 3) development efficiency(ratio of "development cost per one passenger" /ratio of "development cost per one tonnage of cargo"), 4) necessity of reinforcement/improvement of the existing sea transportation services, 5) others(item to judge regional balance of ferry service network development).

Feasibility Study routes were selected from Alternative A from the viewpoint of the profitability of ferry service and because three of the selected four routes are located in the Eastern Area. The four selected routes are as follows:(See Table 8-1)

Route 2-1(Mokmer-Saubeba)

Route 3-1(Larantura-Terong-Lewoleba)

Route 8 (Bajoe-Kolaka)

Route 9-1(Palembang-Muntok)

Feasibility Study

9. Based on the Master Plan up to the year of 2010, ferry terminal facilities are developed step by step according to the increase of passenger/cargo demand.

Route 3-1 is extended further to the east in the future and the sea condition(waves and tidal current) becomes severe, which requires the introduction of larger ferry boats(500GRT) although 300GRT ferry boats are planned to be introduced in this route in the Short-Term Plan. Therefore, an on-land ferry terminal(passenger terminal, parking lots) is designed for 300GRT ferry boat in Short Term Plan. Mooring facilities are designed for 500GRT considering the construction cost of mooring facilities including long-term plan

and the difficulty of ferry operation using the mooring facilities to be improved during the improvement work.

Any enlargement of facilities in the other three routes is not required up to 2010 because the maximum size of ferry boat to be introduced in 2010 is the same as that in 1998.

10. In order to obtain the present natural condition on Feasibility Study eight ferry terminal, the topographic and hydrographic survey, the tide and current observations and soil investigation were carried out. The subsoil in Terong site consists of very dense sandy gravel and gravelly sand. Pile foundation type mooring facilities are difficult to be installed, thus gravity type foundation is designed.

In Mokmer, Saubeba and Muntok, the construction of breakwaters is required to protect berthing area judging from the topographic and sea conditions. Waves in these sites were hindcasted from wind data. The following design waves have been determined for each terminal sites.

Site	Wave Height ($H_{\frac{1}{3}}$)	Wave Period ($T_{\frac{1}{3}}$)	Wave Direction
Mokmer	3.0 m	4.8 sec.	WSW
Saubeba	3.0 m	4.2 sec.	W
Muntok	1.0 m	4.0 sec.	SSE

11. Ferry operation plans for the four study route in 1998 were made as follows:

- 1) Route 2-1(Mokmer-Saubeba) one round trip/day with 300GRT ferry

One round trip/day is enough to meet the demand for Short-Term Plan and it is necessary to forecast accurately the daily cargoes/passengers movement between the two islands to decide the departure port in the morning.

- 2) Route 3-1(Larantuka-Terong-Lewoleba) one round trip/day, 300GRT

Although the ferry service on this route has been operated as an extended part of the route from Kupang to Larantuka, in this Study ferry boats are operated between Larantuka-Lewoleba as one route.

- 3) Route 8(Bajoe-Kolaka)

According to the estimated traffic demand in 1998, the required service frequency by 1000GRT ferry boat is three round trips a day. The

present transporting capacity with five ferry boats under service is insufficient to meet the demand in 1998 and a 1000GRT ferry boat should be introduced on this route at a frequency of one round trip a day.

4) Route 9-1(Palembang-Muntok)

Although daily one round trip service will be maintained on this route by the two existing ferry boats, their full transporting capacity is insufficient in 1998 and a 500GRT ferry boat is additionally introduced.

12. Main large-scale construction works of the ferry terminals are as follows:

Construction of breakwater: Mokmer, Saubeba(rubble mound type)
Muntok(curtain wall type)

Reclamation work for passenger terminal and parking lots:

Bajoe(on the shoal 3km far from the coast), about 20,000m²

Kolaka(in front of the existing terminal), about 20,000m²

Dredging work:Mokmer(mooring basin etc.), about 5,000m²

Bajoe(mooring basin, access channel), about 65,000m²

New mooring facilities for 500GRT ferry boat at existing Palembang terminal are planned and a new passenger terminal is constructed in the present terminal area. As the existing parking area is insufficient even for Short-Term Plan, the parking lot is enlarged.

On-land terminals at Mokmer, Saubeba, Terong and Lewoleba are planned between the existing public road and the coast.

(Layout of each ferry terminal is shown in Fig.5.1-5.8)

13. The construction costs of feasibility Study routes are as follows:

Route	x Million Rupiah
Mokmer-Saubeba	10,900
Terong-Lewoleba ¹⁾	14,600
Bajoe-Kolaka	26,700
Palembang-Muntok	19,900

1)The existing terminal facilities in Larantuka can be used at least up to 2010.

The total construction cost of the planned route for the Feasibility Study comprises 1)direct construction cost, 2)consulting cost of the engineering services including soil investigation etc., detailed design and construction supervisory services, 3)physical contingency for the construction works and 4) value added tax for the contract.

The implementation period of the construction of each route is estimated to be three years. In the first year of the project, the surveys, soil investigations, detailed design of all the facilities and preparation of the tender documents will be completed in six months, and thereafter the tender period and conclusion of the contract will take a further six months. The construction works of each route will be started at the same time by one packaged contract after one year of above engineering study and tender procedure, and will be completed in 24 months.

14. Assessment on the effect of the projects on the surrounding environment is conducted on following environmental impacts and environmental factors.

- 1) Effect on water quality in the sea area by Cat. 1 and 2
- 2) Effect on topography by Cat. 2
- 3) Effect on animals/plants by Cat. 1 and 2
- 4) Effect on landscape by Cat. 2
- 5) Effect on socio-economics by Cat. 3
- 6) Others

Cat.1:Effect of the construction works of the ferry terminals

Cat.2:Effect of the existence of ferry terminals

Cat.3:Effect of the operation of ferry service

The assessment was conducted qualitatively and judging from project scale, topographic conditions of the terminal sites and the layout of the terminals, the effect on surrounding environment is estimated to be negligible. However, an appropriate monitoring system may be required during the dredging and reclamation works and the work procedure may be modified.

15. The economic benefits derived from implementation of the development /improvement of ferry terminals and ferry operation plans including the introduction of the proposed ferry boats are analyzed. In this economic analysis, the ferry users' benefits of travel time cost saving(for passengers) and vehicle operating cost are treated as the quantified economic benefits.

The results of the economic analysis are as follows:

Route	EIRR
Route 2-1	12.3%
Route 3-1	2.6%
Route 8	16.0%
Route 9-1	10.9%

These results indicate that implementations of the development of Route 2-1, 8 and 9-1 are economically feasible. The economic analysis result of Route 3-1 in terms of quantified benefits is unfavorable. However, taking the following enormous unquantified effects specifically expected for the related regions into consideration, development of Route 3-1 is also worthy of implementation.

- 1) Incentive effects for regional development by promotion of inflow of vehicles especially such as construction equipment and agricultural equipment/machines for Adonara and Lomblen Islands.
- 2) Improvement effect of the unfavorable transportation condition of passengers bringing large volumes of cargo by hand.
- 3) Improvement effect of increase of safety of sea transportation between Terong-Lewoleba which is affected by strong current.
- 4) Incentive effects for tourism sector development of Adonara and Lomblen Islands by shortening of access time.
- 5) Incentive effects for increased medical and educational opportunities for people in Adonara and Lomblen Islands.
- 6) Incentive effects for development of a trunk traffic corridor throughout the whole Flores Islands area.
- 7) Incentive effects for long-term increase of welfare of the people living in the related area.

16. At the present stage, the Indonesian government does not consider ferry port facilities managed by MOC to be profitable. Therefore, the method of evaluation is intended to show the subsidy amounts for this project.

75% of the construction costs is raised by soft foreign loans in this financial analysis. A soft loan for this project is assumed to be as follows:

Loan period: 30 years, including a grace period of 10 years

Interest rate: 2.6% per annum

Repayment: fixed amount repayment of principal

25% of the construction costs for the project is assumed to be raised by government funds. The government funds are assumed to be free of repayment and interest.

For the estimation of port charge, the tariffs are assumed to increase by two thirds the increase of GDP per capita in Indonesia every five years. Judging from the analysis, the project can be regarded as financially feasible if the port charge is increased by 15% every five years from the current tariff.

II. Recommendations

(1) Nationwide Ferry Network Plan

17. DGLT has formulated the nationwide ferry network plan which was authorized by Directorate General of Land Transport and Inland Waterways in November, 1992. This is really an ambitious plan in that it aims ultimately to cover the whole nation with nearly two hundred ferry routes.

Setting aside relatively short-distance ferry routes serving small islands around major islands and/or connecting small islands with each other, long haul routes connecting major islands for example have a lot of uncertain factors in their viability. Therefore, it is recommended to launch necessary studies without any delay on demand projection, comparison analyses with other transportation means and so on, taking the regional development plan into consideration.

18. It will be helpful to establish suitable criteria for classification of ferry routes in determining development priority and allocation of government investment. In this study, ferry routes were classified by accessibility to provincial capital, demand level or geographical characteristics.

(2) Establishing safe operation system of ferry service

19. Based on experience it is recommendable to take possible certain steps as soon as possible such as the comprehensive operation supervision, the modernization of facilities concerned and the training of a capable task force including crew to ensure the highest degree of safety and create a promising ferry service.

(3) On Detailed Design of the Ferry Terminal Facilities of the Feasibility Study

20. The ferry terminal preliminary design for the Feasibility Study routes was conducted using the results of the natural condition surveys executed in November of 1992. Based on the obtained soil condition under sea bottom in Terong, concrete caisson type is applied for breasting & mooring dolphins.

However at the neighboring sea port, steel pile type was applied for the mooring facilities. This shows that the soil condition under sea bottom around the area might be undulated and complicated. Therefore more detailed surveys on soil condition are recommended for the detailed design of the mooring facilities in Terong terminal.

(4) Appropriate Allocation of Budget for Maintenance of the Facilities

21. Rusted steel structures and cracks of reinforced concrete structures were often seen during site surveys. And it was observed that some navigation aids have been damaged or are missing. In general, present budgets allocated for maintenance seems to be too small. More funds should be allocated for maintaining terminal facilities and navigation aids.

22. Quick and continuous repairs are important for ordinary operations. This is useful for providing passengers with more comfort and minimizing the total terminal operation costs in future and also for maintaining safe ferry operation.

(5) Preservation of Statistical Data on Passengers, Vehicles and Cargoes in Appropriate Form for Future Use

23. Statistical data related to ferry traffic activities should be collected continuously for a long period of time. These present and past data are indispensable for drafting improvement plans and development plans. Data should be prepared in an appropriate form to conduct future demand forecasting, especially for cargoes. Information on vehicles should be divided into two categories, one for transporting cargoes, the other for transporting passengers. Periodical O-D surveys on existing ferry route will provide useful information not only for the improvement plan of the related ferry terminal but also for the development plan of a new ferry terminal under similar conditions.

(6) Appropriate Environmental Monitoring in the Development of Ferry Route

24. The environmental assessment is conducted qualitatively in the Study. In general the impact of the development plan of the four ferry routes on the surrounding environment is estimated to be very small based on the topographic and hydrographic conditions of the ferry terminal sites, the ferry operation plans, the layouts of ferry terminal and construction method of ferry terminals. It will be necessary, however, to introduce appropriate systems to monitor the water quality in the related sea area when executing dredging and reclaiming works and work procedures may be modified, if necessary.

INTRODUCTION



Walpiri Terminal

INTRODUCTION

1. General

1. In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct the Development Study on the Nationwide Ferry Service Routes in the Republic of Indonesia (hereinafter referred to as "the Study").

2. In accordance with the relevant laws and regulations in force in Japan, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, undertook the Study in close cooperation with the Directorate General of Land Transport and Inland Waterways, Ministry of Communications (hereinafter referred to as DGLT) on behalf of the Government of the Republic of Indonesia.

3. This report was prepared on the basis of the "Scope of Work" and the "Minutes of Meeting" signed by JICA and DGLT on March 13, 1991.

2. Background

4. The Indonesian archipelago of 14,000 islands stretches over a distance of some 5,100 km, affording the marine sector an important role in the domestic transportation system.

5. The recent national economic growth of the country is notable and on the whole has helped improve the national welfare; however, it has created larger gaps of economic disparity between some advanced regions and other local regions of the country. So, as one of the main policy issues, the Government now seeks to further develop the national transportation system not only to face the growing transportation demand but also to improve regional economic disparity.

6. The Indonesian Government has been developing a nationwide ferry service as a principal transportation infrastructure of the country. At present, there are

35 ferry service routes with 75 ships which handle 70% of the passenger traffic between the islands and 40% of the cargo traffic.

7. However, the present ferry services are not sufficient to meet the demand and there are other problems that remain to be solved. Steadier, safer, more comfortable, and more frequent ferry services need to be provided. The introduction of a new ferry route to serve as the principal means of transportation for the people concerned is also strongly recommended.

8. Based on this situation, the Government of Indonesia, which has already started ferry ports improvement and ferry ship construction, requested the Government of Japan to conduct the Study. In response to the request, the Government of Japan entrusted the Study to JICA, which sent a preliminary study team headed by Mr. Yasumasa Suzuki. On March 13, 1991, both sides formalized the Scope of Work for the Study.

3. Objectives

(1) The objectives of the Study

9. 1) To conduct a master plan study on the nationwide ferry service routes
- 2) To conduct a feasibility study on the Short-term Development Plan of selected ferry routes.

(2) Ferry routes for the Master Plan

10. The ferry routes proposed for the formulation of the Master Plan are as follows :

1. Ambon - Seram
2. Biak - Yapen - Irian Jaya
3. Flores - Alor
4. South East Sulawesi - West Kabaena
5. East Kabaena - Muna
6. Kendari - Wawonii
7. Morotai - Halmahera

8. South Sulawesi - South East Sulawesi
9. South Sumatera - Bangka - Belitung

4. Scope of the Study

(1) Analysis of the Existing Data and Information

11. Collection and analysis of all the relevant data and information related to the Study on socioeconomic features, natural conditions, engineering data, present ferry service system and the public and private sector development plans.

(2) Field Survey

12. Field survey at ferry ports, terminals, access roads and other related facilities.

(3) Establishing Socioeconomic Framework

13.
 - 1) Analysis of the national and regional socioeconomic features
 - 2) Establishing the socioeconomic framework for the year 2000

(4) Demand Forecast

14.
 - 1) Analysis of the existing Origin-Destination data
 - 2) Forecast of the ferry traffic demand by cargo and passenger up to the year 2010

(5) Formulation of Master Plan

15.
 - 1) Preparation of the basic concept of the ferry network
 - 2) Preparation of the basic ferry operation plan
 - 3) Preparation of ferry terminal development plans
 - 4) Prioritization of the ferry routes for the Short-term Development Plan

(6) Feasibility Study on the Short-term Development Plan

16.
 - 1) Engineering survey on the natural conditions by sounding, boring, current

- estimation, wave estimation, etc. at each selected terminal area, if necessary
- 2) Preparation of the ferry operation plan on each route
 - 3) Layout plan, preliminary design and cost estimation for the ferry terminals and related facilities
 - 4) Implementation program at each route
 - 5) Economic and financial analysis at each route
 - 6) Recommendations on the ferry terminal management system

5. Study Schedule

17. The study was conducted as follows:

- (1) Presentation of the Inception Report,
the first field survey,
presentation of the Progress Report(I): Jan.-Apr. 1992
- (2) Presentation of the Interim Report
the second field survey: Jun.-Jul. 1992
- (3) Presentation of the Progress Report(II)
the third field survey: Oct.-Nov. 1992
- (4) Presentation of the Draft Final Report: Jan.-Feb. 1993
- (5) Submission of the Final Report: Mar. 1993

6. Organization of the Study Team

18. The JICA study team is composed of eleven specialists. Their names and responsibilities are listed below.

Name	Responsibility
Haruo OKADA	Team Leader, Overall Management
Takeshi SOEJIMA	Port Planning(I)
Noriyuki MOCHIZUKI	Port Planning(II)
Kenji SHIMADA	Demand Forecast

Norio UEMURA	Port Operation Management/Financial Analysis
Nobuaki KOJIMA	Ferry Operation Plan
Nobuaki NAGAO	Facility Design
Atsushi SATO	Construction Planning/Cost Estimation
Masatoshi KANEKO	Economic Analysis
Toru WATANABE	Natural Conditions(I)
Mitsuhiko HASEGAWA	Natural Conditions(II)

