ASSOCIATION OF SOUTHEAST ASIAN NATIONS (ASEAN)

THE MASTER PLAN AND FEASIBILITY STUDY ON THE ESTABLISHMENT OF AN ASEAN ROLL-ON/ROLL-OFF (RO-RO) SHIPPING NETWORK AND SHORT SEA SHIPPING

FINAL REPORT

Volume 2 - Development Potentials, Directions and Plannings

March 2013

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

ALMEC CORPORATION
Japan Marine Science Inc.
The Overseas Coastal Area Development Institute of Japan (OCDI)

EI
JR
13-069

ASSOCIATION OF SOUTHEAST ASIAN NATIONS (ASEAN)

THE MASTER PLAN AND FEASIBILITY STUDY ON THE ESTABLISHMENT OF AN ASEAN ROLL-ON/ROLL-OFF (RO-RO) SHIPPING NETWORK AND SHORT SEA SHIPPING

FINAL REPORT

Volume 2 - Development Potentials, Directions and Plannings

March 2013

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

ALMEC CORPORATION
Japan Marine Science Inc.
The Overseas Coastal Area Development Institute of Japan (OCDI)

Exchange rates used in the report

US$	1.00	=	JPY	81.48			
EURO	1.00	=	JPY	106.9	=	US$	1.3120
BN$	1.00	=	JPY	64.05	=	US$	0.7861
IDR	1.00	=	JPY	0.008889	=	US$	0.0001091
MR	1.00	=	JPY	26.55	=	US$	0.3258
PhP	1.00	=	JPY	1.910	=	US$	0.02344
THB	1.00	=	JPY	2.630	=	US$	0.03228

(as of 20 April, 2012)

TABLE OF CONTENTS

Volume 2 – Development Potentials, Directions and Plans

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

ACCC	ASEAN Connectivity Coordinating Committee
ADB	Asian Development Bank
ADPEL	*Administrator Pelabuhan*, Port Administrator
AEC	ASEAN Economic Community
AFAFGIT	ASEAN Framework Agreement on the Facilitation of Goods in Transit
AFAFIST	ASEAN Framework Agreement on the Facilitation of Inter-State Transport
AFAMT	ASEAN Framework Agreement on Multimodal Transport
AFAS	ASEAN Framework Agreement on Services
AFF	Agriculture Fishery Forestry
APRIS	ASEAN-EU Programme on Regional Integration Support
ARMM	Autonomous Region in Muslim Mindanao
ASDP	Indonesia Ferry Company
ASEAN	Association of Southeast Asian Nations
ASITA	Association of the Indonesia Tour & Travel Agencies
ASW	ASEAN Single Window
ASYCUDA	Automated System for Customs Data
ATA	Admission Temporaire/Temporary Admission
B/L	Bill of Lading
BAPPEDA	*Badan Perencana Pembangunan Daerah*, Regional Development Planning Agency of Indonesia
BD	Brunei Dollar
BDWW	Butterworth Deep Water Wharves
BIMP-EAGA	Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area
CAMFFA	Cambodia Freight Forwarder Association
CAMPI	Chamber of Automotive Manufacturers of the Phils.,Inc.
CBD	Central Business District
CBU	Completely Built Unit
CFS	Container Freight Station
CHARO	Chassis RO-RO
CIF	Cost, Insurance and Freight
CIQS	Custom, Immigration, Quarantine and Security
CLC	International Convention on Civil Liability for Oil Pollution Damage
CLMV	Cambodia, Lao PDR, Myanmar, and Vietnam
COLREG	Collision Regulation
CPA	Cebu Port Authority
CPO	Crude Palm Oil
CPTFWG	ASEAN Customs Procedures and Trade Facilitation Working Group

CRT TV	Cathode Ray Tube Television
CTIC	Chaophaya Terminal International Co., Ltd.
CVLB	Commercial Vehicle Licensing Board
CY	Container Yard
DG	Directorate General
DGLT	Directorate General of Land Transportation, Indonesia
DGST	Directorate General of Sea Transportation, Indonesia
DMDI	*Dunia Melayu Dunia Islam*, Malay Muslim Community
DOR	Department of Roads
DOTC	Department of Transportation and Communications, Philippines
DWT	Dead Weight Tonnage
EIA	Environmental Impact Assessment
EO	Executive Order
EPU	State Economic Planning Unit
ERP	Electronic Road Pricing
EU	European Union
e-VIS	Electronics Vehicle Information System
EWEC	East-West Economic Corridor, GMS
FAO	Food and Agriculture Organization (of the United Nations)
FCL	Full Container Load
FEU	Forty-foot Equivalent Unit
FIRR	Financial Internal Rate of Return
FOB	Freight on Board
FTF	Frequent Traveler Facility
FY	Fiscal Year
GAIKINDO	*Gabungan Industri Kendaraan Bermotor Indonesia*, Association of Indonesia Automotive Industries
GATT	General Agreement for Tariffs and Trade
GDP	Gross Domestic Product
Gensan	General Santos City, Philippines
GHG	Greenhouse Gas
GMS	Greater Mekong Subregion
GMS-CBTA	Greater Mekong Sub-regional Cross Border Transport Agreement
GRDP	Gross Regional Domestic Product
GT/GRT	Gross Tonnage/Gross Registered Tonnage
GTAP	Global Trade Analysis Project
ICC	International Chamber of Commerce
ICD	Inland Container Depot
ICP	International Circulation Permit
IDL	International Driver's License
IDP	International Driving Permit
IDR/Rp	Indonesia Rupiah
IHR	International Health Regulations

ILO	International Labour Organization
IMF	International Monetary Fund
IMO	International Maritime Organization
IMSO	International Mobile Satellite Organization
IMT-GT	Indonesia-Malaysia-Thailand Growth Triangle
INMARSAT	International Marine/Maritime Satellite
INSA	Indonesian National Shipowners' Association
IOFC	International Offshore Financial Centre
IOPP Certificate	International Oil Pollution Prevention Certificate
IRF	International Road Federation
IRR	Internal Rate of Return
ISM Code	International Management Code for the Safe Operation of Ship and for Pollution Prevention
ISPS Code	International Ship and Port Facility Security Code
ITF	International Transport Workers' Federation
JAGS-CT	Jose Abad Santos-Glan-Sarangani Province Cooperation Triangle
JBIC	Japan Bank of International Coordination
JCCI	Japan Chamber of Commerce Industry
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JPA	Johor Port Authority
JPY	Japanese Yen
KADIN	*Kamar Dagang dan Industri Indonesia*, Chamber of Commerce and Industry, Indonesia
KL	Kuala Lumpur
KOICA	Korea International Cooperation Agency
KRW	Korean Won
Lao PDR	Lao People's Democratic Republic
LCC	Low Cost Carrier
LCL	Less than Container Load
LDA	Labuan Development Authority
LDT	Light Displacement Tonnage
LIFFA	Lao International Freight Forwarder Association
LLMC	Limitation of Liability for Maritime Claims
LNG	Liquefied Natural Gas
LOA	Length Over All
LO-LO	Lift-On, Lift-Off
LPG	Liquefied Petroleum Gas
LRT	Light Rail Transit
LTFRB	Land Transportation Franchising and Regulatory Board, Philippines
LTO	Land Transportation Office
LWS	Low Water Spring
M/V	Motor Vessel or Merchant Vessel

MAA	Malaysia Automotive Association
MALINDO	Malaysia-Indonesia
MARINA	Maritime Industry Authority
MARPOL	International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978
MCTPC	Ministry of Communication, Transport, Post and Construction, Lao PDR
MHHW	Mean Higher High Water
MIMAROPA	Mindoro Marinduque Rombion Palawan
MISR	Malaysia International Ship Registry
MLIT	Ministry of Land, Infrastructure, Transport and Tourism, Japan
MLLW	Mean Lower Low Water
MLWS	Mean Low Water Spring
MOU	Memorandum of Understanding
MP3EI	*Masterplan Percepatan dan Perluasan Pembangunan Ekonomi Indonesia*, Master Plan for Acceleration and Expansion of Indonesia's Economic Development
MPA	Maritime and Port Authority
MPAC	Master Plan on ASEAN Connectivity
MPV	Multi-purpose Vehicles
MPWT	Ministry of Public Works and Transport, Cambodia and Lao PDR
MRI	Mitsubishi Research Institute, Japan
MRT	Metro Rail Transit, Philippines
MT	Metric Ton
MTO	Multimodal Transport Operators
MTWG	Maritime Transport Working Group
MYR/RM	Malaysia Ringgit
NBCT	North Butterworth Container Terminal
NCIA	Northern Corridor Implementation Authority
NCV	Non-Conventional Vessel
NGO	Non Government Organization
NILIMJ	National Institute for Land and Infrastructure Management of Japan
nm	Nautical Mile
NORSULMIN	North Sulawesi-Mindanao
NSO	National Statistics Office, Philippines
NTC	National Transport Committee
NTFC	National Transport Facilitation Committee
NTTCC	National Transit Transport Coordinating Committee
OCDI	Overseas Coastal Area Development Institute of Japan
O-D/OD	Origin - Destination
ODA	Official Development Assistance
OPRC	Oil Pollution Preparedness, Response and Co-operation
OTC	Office of Transport Cooperatives, Philippines
OTS	Office of Transport Cooperatives

P&I Insurance	Protection and Indemnity Insurance
PAT	Port Authority of Thailand
PBCT	Prai Bulk Cargo Terminal
PCBSI	Prudential Customs Brokerage Service Inc.
PCC	Pure Car Carrier
PCG	Philippine Coast Guard
PCTC	Pure Car/Truck Carrier
PELINDO	*PT Pelabuhan Indonesia*, Indonesia Port Corporations
PELNI	*PT Pelayaran Nasional Indonesia*
PELRA	*Pelayaran Rakyat* (Traditional Shipping)
PHP	Philippines Peso
PKA	Port Klang Authority
PKS	Palm Kernel Shells
PLTC	Public Land Transport Commission, Malaysia
PMMA	Philippine Merchant Marine Academy
PMO	Project Management Office
PNG	Independent State of Papua New Guinea
PPA	Philippine Ports Authority
PPC	Port Penang Commission
PPD	Port Police Division
PPP	Public–Private Partnership
PPSB	Penang Port Sdn. Bhd.
PPUR	Puerto Princesa Underground River
RFID	Radio Frequency Identification
RHD/LHD	Right Hand Drive/Left Hand Drive
RICMT	Roadmap Towards an Integrated and Competitive Maritime Transport in ASEAN
ROPAX	RO-RO Passenger
RO-RO	Roll-On, Roll-Off
RRTS	RO-RO Terminal System
RT	Revenue Ton
RTG	Rubber Tyred Gantry Crane
SEOM	ASEAN Senior Economic Officials Meeting
SGD	Singapore Dollar
SOCCSKSARGEN	South Cotabato, Cotabato, Sultan Kudarat, Sarangani, General Santos
SOLAS	November 1995 amendments to Chapter II-1 of the International Convention for the Safety of Life at Sea
SOP	Standard Operating Procedure
SOSEK MALINDO	Socio-Economic Exchange for Malaysia-Indonesia
SPA	Sabah Ports Authority
SPAD	Suruhanjaya Pengangkutan Awam Darat, Land Public Transport Commission, Malaysia
SPSB	Sabah Port Sdn. Bhd.

SRNH	Strong Republic Nautical Highway
SRRFPDP	Social Reform Related Feeder Ports Development Program
SSF	Shanghai Shimonoseki Ferry
SSS	Short Sea Shipping
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
STOM	ASEAN Senior Transport Officials' Meeting
SUA Convention 88	Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation
TBFT	Tanjung Belungkor Ferry Terminal
TCCP	Tariff and Customs Code of the Philippines
TEN-T	Trans-European Transport Network
TEU	Twenty-foot Equivalent Unit
TIICTD	Transport, Infrastructure, ICT Development
TOR	Terms of Reference
TPB	*Terminal Petikemas Bitung*, Bitung Container Terminal
TPL	Third Party Liability
TRB	Toll Regulatory Board, Philippines
TTCB	Transit Transport Coordinating Board
TTR	Transit Transport Route
UK	United Kingdom of Great Britain and Northern Ireland
UN	United Nations
UNCLOS	United Nations Convention on Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNWTO	World Tourism Organization
USA	United States of America
USD	US Dollar
VAMA	Vietnam Automobile Manufacturing Association
VLCC	Very Large Crude Carrier
WCO	World Customs Organization
WTO	World Trade Organization

Part III

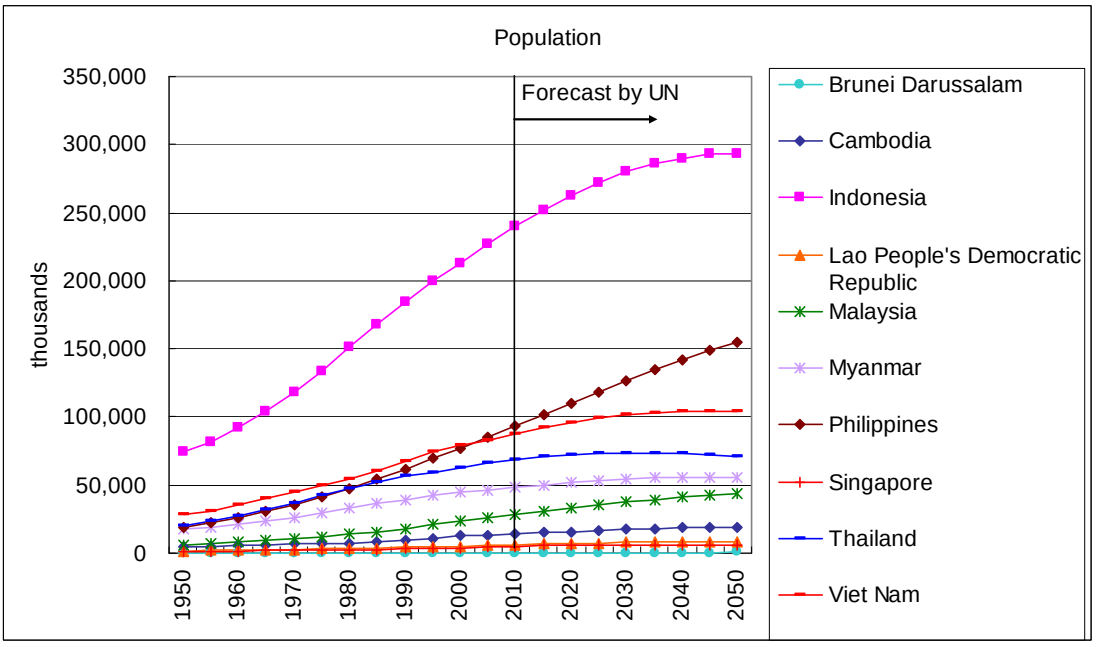
Development Potentials and Directions

11 DEVELOPMENT OPPORTUNITIES OF ASEAN RO-RO SHIPPING

11.1 Intra-ASEAN Trade and Shipping

1) Regional Socio-economic Development

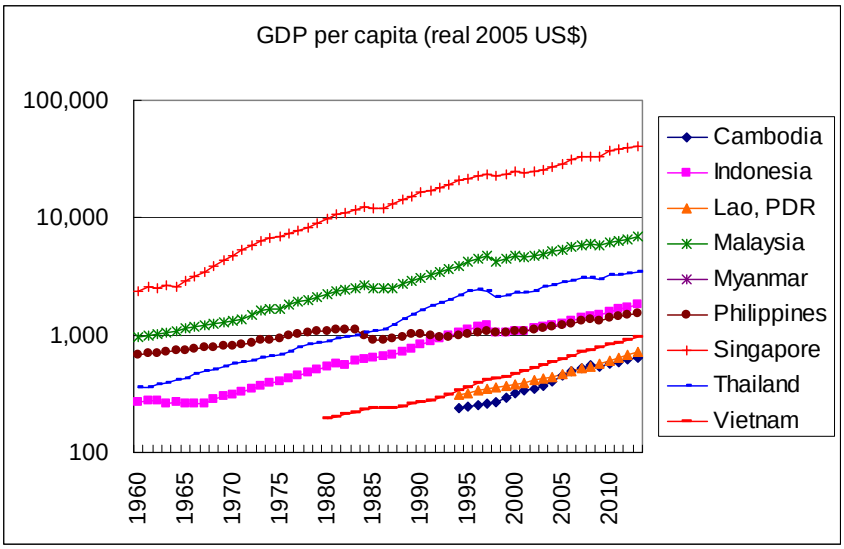
Any market, including that of RO-RO shipping, is affected by the magnitude of and trends in demography and economy. The population of the ten (10) countries in ASEAN was estimated by UN at 592 million in 2010, accounting for 8.6% of the world's population. The UN forecasts the number will reach about 756 million in Year 2050, so there is no doubt that the consumer market in ASEAN is growing at a steady pace. The top three most populous ASEAN countries are Indonesia, the Philippines and Vietnam (see Figure 11.1).



Source: UN

Figure 11.1 Population in ASEAN

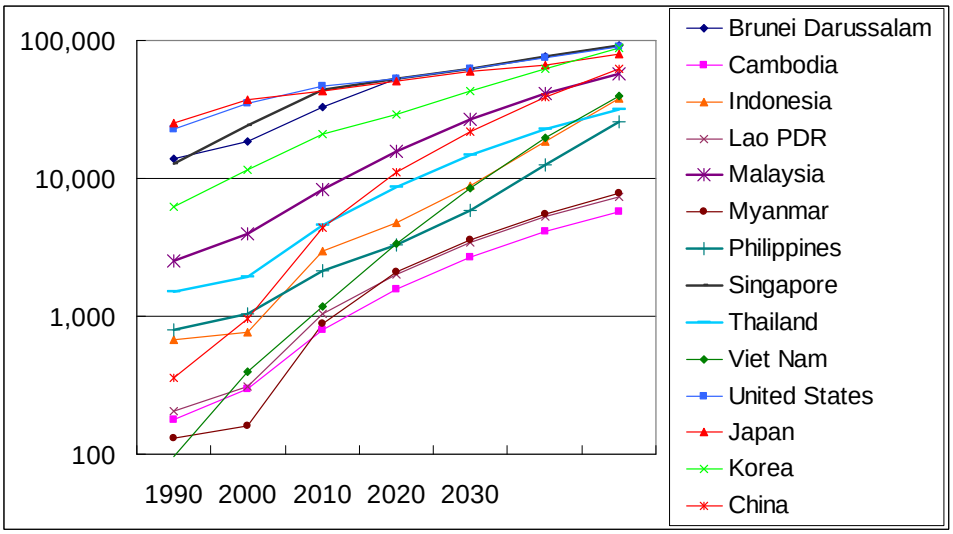
On the other hand, the top three from the view point of GDP per capita are Singapore, Malaysia and Thailand (see Figure 11.1). The growth of GDP per capita comes from the rise in productivity of industries and increases the affordability of the consumer market. Since both of them develop trade and tourism, there is a possibility that international RO-RO shipping can contribute to the market.



Source: World Bank

Figure 11.2 GDP per capita (Source: World Bank)

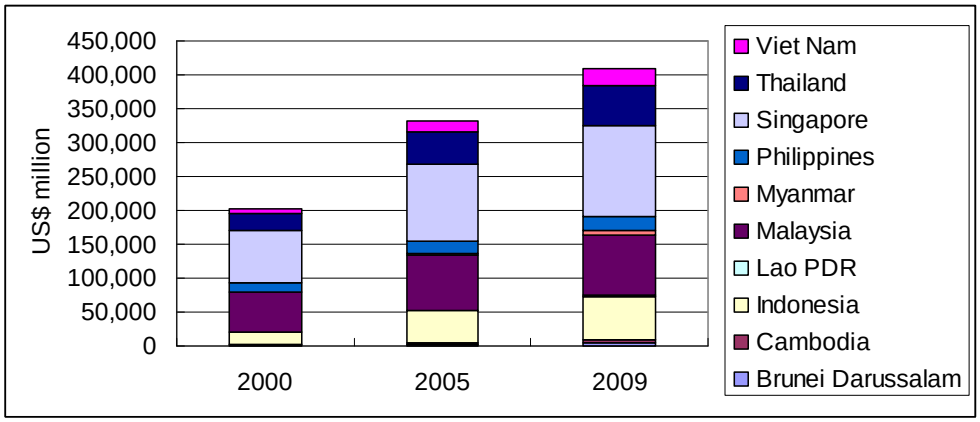
There are many assumptions about future GDP per capita. Although each country has its target, it is hard to forecast under the variations of the assumptions of the world economy. In this study, one assumption used for the estimation of future traffic demand is the estimated GDP growth ratio. This is not the forecast but the assumption. Figure 11.3 shows the GDP per capita in ASEAN countries and USA, Japan, Korea and China by the same method. Singapore is the richest country in ASEAN and Asia. In the near future, both Singapore and Brunei Darussalam will be richer than the USA and Japan. In the distant future, Malaysia will catch up with China. Thailand, Indonesia and Vietnam will be the next group of affluent countries, with the Philippines coming close. By 2040, the Philippines would have reached Korea's present economic level, while Korea will overtake Japan. Cambodia, Lao PDR and Myanmar will be the third group which would almost be at the same levels as Thailand and Malaysia at present.



Source: JICA Study Team

Figure 11.3 Future GDP per capita

The mutual trading volume among ASEAN countries is rapidly increasing in the past years, and has doubled in this decade (see Figure 11.4 and Table 11.1). Because ASEAN is one of most rapidly developing areas in the world, this growth trend is presumed to continue until all ASEAN countries are developed at some level. Although at present the major players in mutual trading are Singapore, Malaysia, Indonesia and Thailand, sooner or later Vietnam and the Philippines will join the group and Myanmar, Cambodia, Brunei Darussalam and Lao PDR will follow.

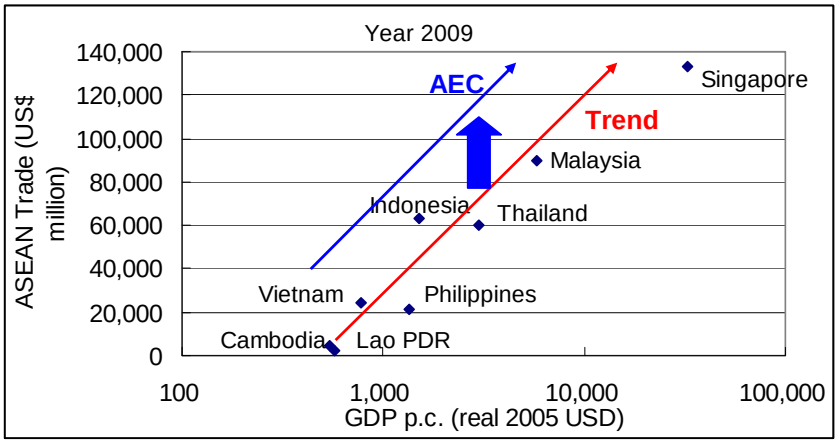


Source: Direction of Trade (IMF, July 2010) Note: Some data may not be complete

Figure 11.4 ASEAN Mutual Trade Market

Trade among ASEAN countries grows in proportion to GDP per capita, but the growth curve is an attenuation curve and not a linear curve because the X-axis is shown by logarithmic number (see Figure 11.5). Although it is an attenuation curve, there is a possibility to increase more following the resolution of customs and other regulatory barriers while vigorous connectivity of the world economy is pushing up total trade in the world. The relation between ASEAN trade and GDP per capita is important in the growth of the RO-RO shipping market.

There is also a possibility to further shift up this relation by the formation of the ASEAN Economic Community (AEC) by the year 2015 which envisages the realization of 'one market and production base' in the region. It is thus expected to increase regional trade.



Source: Direction of Trade (IMF, July 2010)

Figure 11.5 Intra-ASEAN Trade by GDP per Capita

Table 11.1 Trade Matrix in ASEAN

Unit: million US$		Import Country										ASEAN10
Export Country	Year	Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam	
Brunei Darussalam	2000		0	25	0	7	0	0	239	461	0	732
	2005		0	1,089	0	12	0	1	135	184	0	1,421
	2009		0	2,059	0	65	0	66	83	100	0	2,373
Cambodia	2000	0		2	3	10	0	1	18	23	19	76
	2005	0		1	0	9	0	2	70	15	46	143
	2009	0		2	0	12	0	1	380	71	167	634
Indonesia	2000	26	52		1	1,972	65	820	6,562	1,026	361	10,884
	2005	39	94		2	3,431	78	1,419	7,837	2,246	678	15,825
	2009	42	121		3	4,668	175	1,575	12,962	3,483	1,165	24,193
Lao PDR	2000	0	0	1		0	0	0	1	69	96	167
	2005	0	0	0		12	0	0	1	204	89	306
	2009	0	1	0		0	0	0	0	424	217	643
Malaysia	2000	254	71	1,707	2		231	1,727	18,050	3,550	475	26,068
	2005	353	109	3,322	6		246	1,974	22,010	7,585	1,160	36,765
	2009	421	152	5,140	9		221	2,270	24,572	8,099	1,990	42,875
Myanmar	2000	0	0	20	0	63		2	100	233	3	422
	2005	0	0	13	0	122		1	99	1,623	42	1,899
	2009	0	0	25	0	120		3	107	2,549	60	2,865
Philippines	2000	4	2	183	0	1,377	10		3,124	1,206	75	5,983
	2005	9	8	476	1	2,457	9		2,706	1,169	312	7,146
	2009	9	7	491	0	1,361	9		3,876	1,574	281	7,609
Singapore	2000	486	426	3,410	30	25,042	436	3,387		5,872	2,091	41,179
	2005	496	303	22,109	40	30,405	596	4,185		9,431	4,421	71,987
	2009	865	720	26,121	37	30,972	890	5,066		10,094	6,990	81,753
Thailand	2000	40	347	1,338	381	2,813	504	1,082	5,997		838	13,340
	2005	68	913	3,954	769	5,781	707	2,042	7,641		2,348	24,222
	2009	117	1,575	4,657	1,637	7,641	1,540	3,014	7,553		4,666	32,399
Vietnam	2000	2	142	249	71	414	6	478	886	372		2,619
	2005	0	556	469	69	1,028	12	829	1,917	863		5,743
	2009	0	1,252	743	131	1,698	29	1,727	2,062	1,271		8,913
ASEAN10	2000	811	1,041	6,936	487	31,698	1,252	7,497	34,977	12,813	3,958	101,470
	2005	966	1,984	31,433	888	43,256	1,648	10,453	42,415	23,321	9,094	165,458
	2009	1,455	3,828	39,238	1,817	46,537	2,863	13,722	51,595	27,666	15,537	204,257

Note: Prepared by JETRO

Source: Direction of Trade (IMF, July 2010)

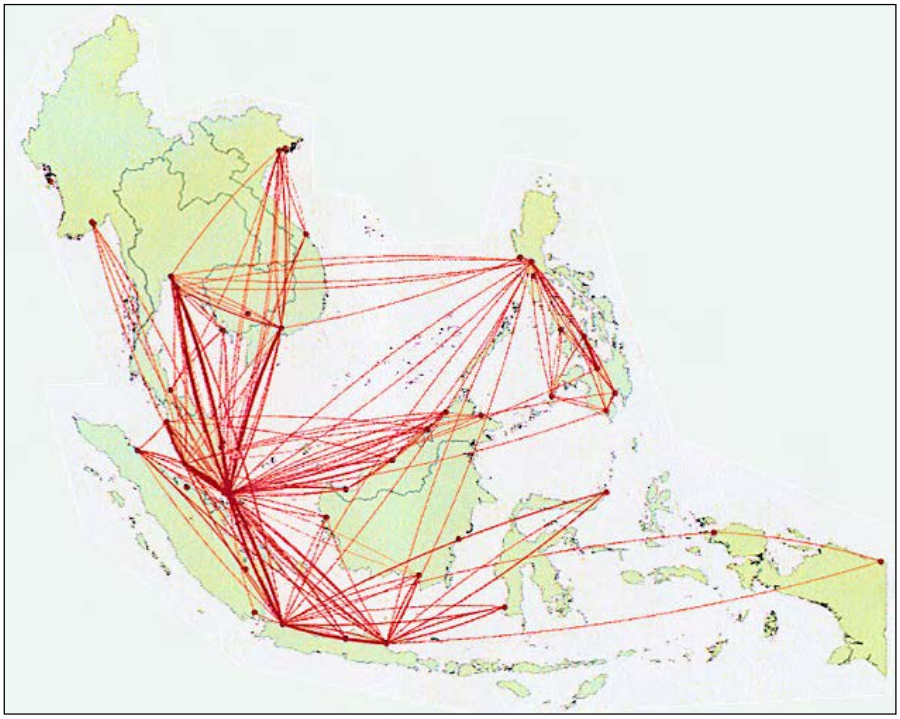
2) Relevant Regional Development Market Segments for RO-RO Shipping

This section analyzes essential RO-RO shipping market demand segments and competition with other transport services in ASEAN. With reference to RO-RO shipping experiences in other regions (Chapter 2) and to domestic shipping in Indonesia and the Philippines (Chapter 3), they include:

- Container traffic;
- Food trade;
- Tourist traffic;
- Other people movement such as overseas medical care and working opportunities;
- Vehicle population; and
- Severe competition with low cost air carriers.

(1) Container traffic

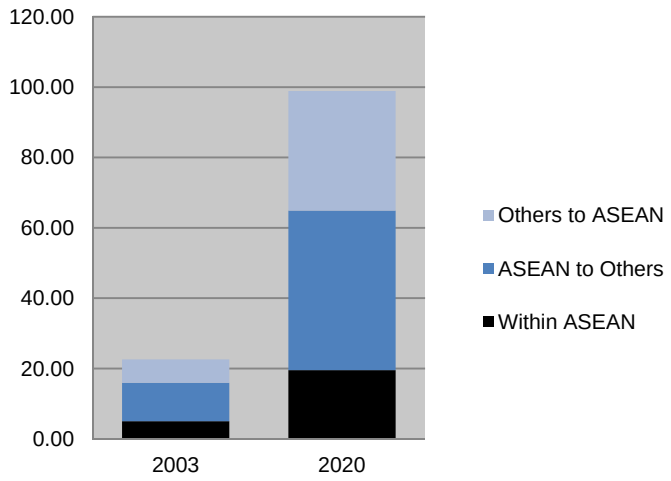
ASEAN has a developed container shipping network consisting of regional hub ports and feeder ports. Larger vessels are allocated on trunk routes to enjoy the economy of scale for less shipping cost. Feeder vessels are operated between hub ports and feeder ports to efficiently connect with trunk routes. Where cargo demand is not enough for feeder shuttling service, feeder vessels may call on several such small ports in a circular route. As a result, this vessel assignment leads to a hub and spokes network. The ASEAN container shipping network is illustrated in Figure 11.6.



Source: MDS Transmodal Containership Databank in 2008

Figure 11.6 Container Liner Routes in ASEAN

According to the Research Report No. 40 of the National Institute for Land and Infrastructure Management of Japan (NILIMJ) in 2009[1], container traffic in relation to ASEAN in 2020 is projected at 98.9 million TEU, 19.5 million TEU of which will be intra-ASEAN traffic. During the period 2003-2020, the regional container traffic will substantially increase by 4.4.times (see Figure 11.7). Among such expanding container traffic, there may be a suitable demand segment to be served by RO-RO shipping.



Source: NILIMJ Research Report, 2009

Figure 11.7 Container Traffic in ASEAN, 2003 and 2020

(2) Food trade

In ASEAN, food self-sufficiency ratios are different by country (see Table 11.2). The gap in domestic food sufficiency is filled in by importation from the world market. Since some of them can be imported from neighboring countries, they will be the demand of intra-ASEAN trade.

Table 11.2 Food Self-Sufficiency Ratio in Year 2007

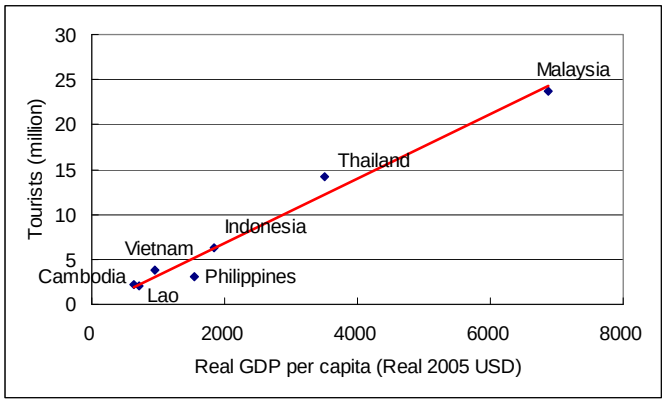
	Indonesia	Malaysia	Philippines	Thailand
grains	91.8	22.6	85.1	161.7
rice	103.9	73.5	88.6	197.1
sugar	63.0	9.2	116.8	281.1
pulses	91.7		48.0	110.9
vegetable	94.5	50.3	96.9	112.3
fruit	100.7	76.8	121.9	152.4
meat	96.4	88.0	92.9	118.0
egg	99.6	117.0	99.6	102.0
fish	109.6	94.0	98.5	144.5

Source: FAO, FAOSTAT: Food Balance Sheets

[1] 'Model Development of Multimodal International Logistics Flow in East and Southeast Asia and Policy Evaluation of Logistics Infrastructure in ASEAN Countries' by Ryuichi SHIBASAKI and Tomihiro WATANABE.

(3) Tourist arrivals

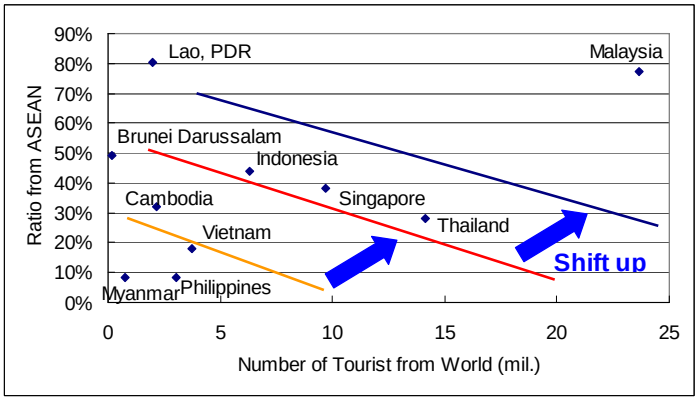
The tourist market is also important for RO-RO shipping demand. Because the growth of GDP per capita stimulates the upgrading of facilities for tourists and the promotion of tourism industries, the number of tourists will increase commensurately, as shown in the following figure. For sure, the GDP per capita in ASEAN countries will grow in the future, therefore the tourist market will keep getting larger steadily.



Source: Tourist Market (as indicated below)

Figure 11.8 Tourist Market in ASEAN Countries

The expansion of tourist markets might push up the ratio of ASEAN tourists as shown in the figure. The increase of tourists from neighboring countries needs various kinds of transportation modes, including railway network, road network, air network and ship network. Their interconnection is expected. RO-RO shipping is one of the networks and is expected to interconnect with land transportation.



Source: Tourist Market

Brunei	Tourist Development Department, Ministry of Industry and Primary Resources
Cambodia	Ministry of Tourism
Indonesia	BPS-Statistics
Lao PDR	Lao National Tourism Administration
Malaysia	Malaysia Tourism Promotion Board
Myanmar	Ministry of Hotels and Tourism
Philippines	Department of Tourism
Singapore	Singapore Tourism Board (Data exclude Malaysian citizens arriving by land)
Thailand	Ministry of Tourism and Sports
Vietnam	Vietnam National Administration of Tourism (for data of 2008) General Statistics Office of Vietnam (for data of 2009)

Figure 11.9 Mutual Tourist Market in ASEAN

The intra-ASEAN tourist OD is shown in the following table. This OD is made by destination base and some data are unknown.

Table 11.3 Outbound Travel from ASEAN by Destination (Year 2008, persons)

Country of Origin	Destination									
	Brunei	Cam-bodia	Indo-nesia	Lao PDR	Malaysia	Myanmar	Philippines	S'pore	Thai-land	Viet-nam
Indonesia		9,198		2,043	2,428,605	1,904	27,830	1,765,429		
Malaysia		80,738	1,117,454	15,625		8,268	69,676	647,480		174,008
Singapore		40,945	1,397,056	4,866	11,003,492	8,599	100,177			158,405
Thailand		109,020	76,842	891,448	1,493,789	27,311	31,499	333,905		183,142
Total of ASEAN	98,039	552,461	2,794,607	1,285,531	16,567,282	44,178	254,077	3,571,408	3,934,779	746,793

Note: The data of outbound travel are the number of arriving tourists in each destination country, and not the statistics of the country of origin.

Source: World Tourism Organization (UNWTO)

(4) Other people movement

The purpose of travel is not only for leisure but also for medical purpose. Three countries in ASEAN, namely Malaysia, Singapore and Thailand, attract many medical patients from the world because of the competitive costs and high technology of their healthcare services (see Table 11.4).

Table 11.4 Foreign Patients Traveling to Hospitals (000 persons)

To Malaysia	300	(Year 2006)
To Singapore	410	(Year 2004)
To Thailand	1,200	(Year 2005)

Source: Health-Tourism.com

The international labor market for long-term work among ASEAN countries is not so large at present, but short-term business trips and temporary work are estimated to be very large according to the increase of air passengers and mutual investments with other ASEAN countries (see Tables 11.5 and 11.6). After the AEC formation, this is expected to increase more.

Table 11.5 Number of Indonesian Overseas Workers Processed by the Ministry of Manpower

Region	2001	2002	2003	2004	2005
Malaysia/Singapore	144,785	168,751	95,542	131,141	88,750
Middle East	121,180	241,961	183,770	226,688	50,535
Other	73,027	69,681	14,382	24,685	13,654

Source: Indonesia Department of Labor (Departemen Tenaga Kerja)

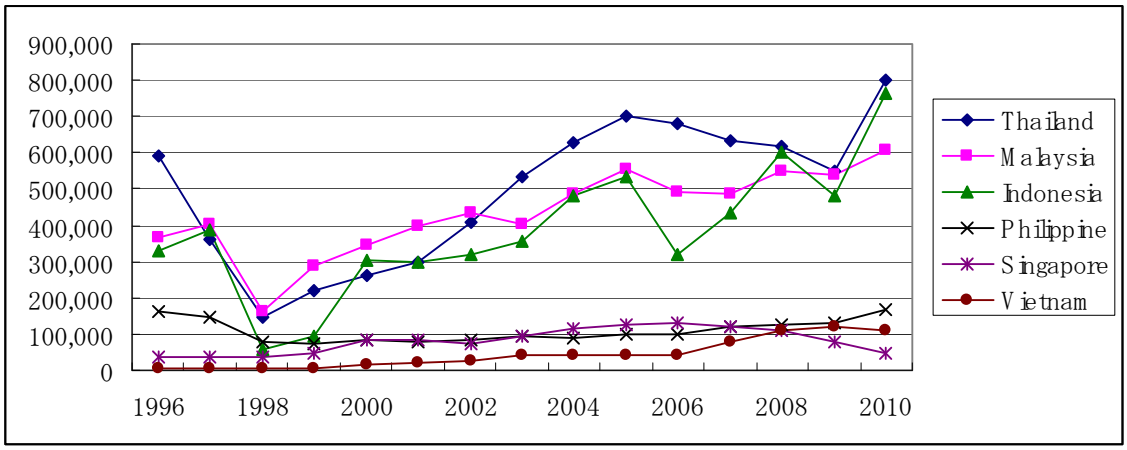
Table 11.6 Number of Philippine Workers (New Hires and Rehires)

Country	2000	2005	2010
Brunei Darussalam	13,649	9,083	7,907
Cambodia	355	691	1,499
Indonesia	1,507	2,186	4,084
Lao PDR	118	164	734
Malaysia	5,450	6,599	9,802
Myanmar	153	152	194

Source: Philippine Oversea Employment Administration

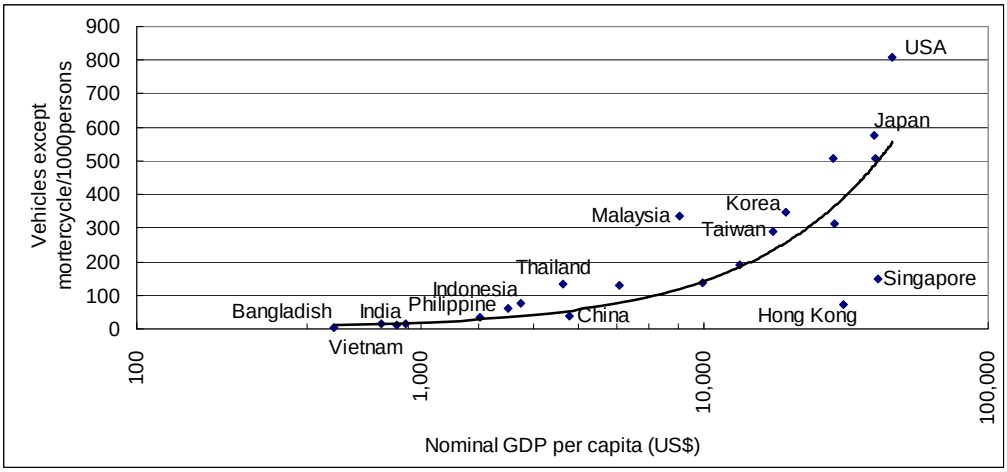
(5) Vehicle population

The infrastructure for land transportation to support the demand of RO-RO shipping routes are cars and road network. In the last decade, the volume of car sales in ASEAN is quickly increasing, especially in Thailand, Indonesia and Malaysia (see Figure 11.10). In other ASEAN countries, the ratio of car ownership will grow according to GDP per capita (see Figure 11.11). With the expansion of car ownership, people expect connectivity with land transportation and sea transportation not only for cargo movement but also for their personal movement, therefore the diffusion of car is a key factor for mobility in traffic networks. RO-RO ship connections can absorb the demand for mobility regardless of the competition from airlines because the car is the most convenient way to move from origin to destination directly.



Source: Thailand-Toyota Motor Thailand, Malaysia-Malaysia Automotive Association (MAA), Indonesia-Association of Indonesia Automotive Industries (GAIKINDO), Philippines-Chamber of Automotive Manufacturers of the Phils., Inc. (CAMPI), Singapore-Asian Automotive Business Review and Motor Traders Association of Singapore and Land Transport Authority, Vietnam-Vietnam Automobile Manufacturing Association (VAMA).

Figure 11.10 Volume of Car Sales per Year



Source: UN (National Accounts Main Aggregates Database) & IRF (World Road Statistics 2010)

Figure 11.11 Car Ownership by GDP per Capita

(6) Severe competition with low cost air carriers

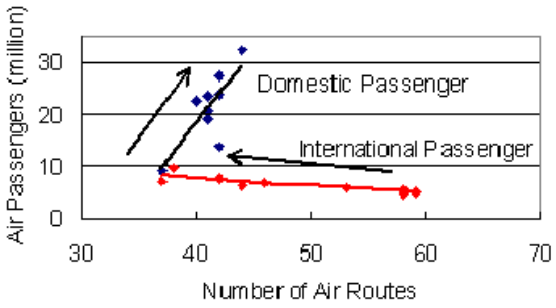
Today, ship passenger transportation is at a disadvantage in the competition with air transportation. Many Low-Cost Carriers (LCCs) are established in ASEAN, as well as in the world, and they sell cheap tickets. Because the price is sometimes set too competitively under promotional programs, passengers especially those who do not bring heavy luggage prefer to travel by air because of its speed. The load factor of aircraft is nearly 85% because the route and the frequency of airlines can be changed according to the demand. The RO-RO ship does not have so much flexibility and the load factor is lower.

Table 11.7 Sample of Air vs. Ship Fare Competition

RO-RO Ship Candidate Route	**One-way Airfare** (one day Sample in Feb. 2012)
Zamboanga City (Philippines) - Muara (Brunei Darussalam)	US$ 70 (Zamboanga -Manila) US$ 105 (Manila - Bandar Seri Begawan)
Davao City - General Santos (Philippines) - Bitung (Indonesia)	US$ 140 (Davao - General Santos) US$ 70 (General Santos - Manila) US$ 124 (Manila - Singapore) US$ 229 (Singapore - Manado)
Johor (Malaysia) - Sintete (Indonesia)	US$ 15 (Johor Bahru - KL) US$ 56 (KL - Jakarta) US$ 38 (Singapore - Jakarta) US$ 183 (Jakarta - Pontianak)
Sandakan (Sabah) - Tarakan (Indonesia) - Pantoloan (Sulawesi, Indonesia)	US$ 72 (Sandakan - KL) US$ 56 (KL - Jakarta) US$ 37 (Tarakan - Balikpapan) US$ 45 (Balikpapan - Palu)
Brooke's Point (Palawan, Philippines) - Labuan (Malaysia) - Muara (Brunei Darussalam)	
Dumai (Indonesia) - Malacca (Malaysia)	US$ 195 (Pekanbaru - KL) US$ 30 (KL - Malacca)
Belawan (Indonesia) - Penang (Malaysia)	US$ 23 (Medan - Penang)
Phuket (Thailand) - Belawan (Indonesia)	US$ 37 (Medan - KL) US$ 86 (KL - Phuket)

Source: Relevant Airlines

LCCs get more passengers and more routes in domestic markets year by year, but in the international connections the screening of air routes is going on. Airline companies in each country can plan to tap the international market but they have to compete with big international airlines in the world market. As a result, the international routes of LCCs do not increase so quickly. Therefore, the unserved or underserved market of LCCs will be the market for RO-RO shipping.



Source: AP-II

Figure 11.12 Air Route and Passengers in Indonesia from Year 2002 to Year 2009

Another possible advantage of the RO-RO ship over the LCCs is the ability to supply more convenience like a good cabin, direct land connection by bus, and facilities at the ports. The latter, however, will depend on the cooperation between the private company and the government at the port.

11.2 Potential Alternative Role to Container Shipping

1) Lessons Learned from International and Domestic RO-RO Shipping

Shipping companies which will operate intra-ASEAN RO-RO services should offer an attractive level of service to cargo owners while they consider the demand of every route. From lessons learned in other countries and regions reviewed in Chapter 2 and 3, a guideline for the level of RO-RO services would be as follows:

- Route length: RO-RO routes of more than 1,200 nm no longer have any chance of competing with LO-LO services and as such the routes are not profitable.
- Frequency and capacity: The minimum frequency should be a round trip a week but the more frequent operation would be better because the kind of cargo that select RO-RO services (e.g., vegetables, fresh and frozen fish, electronic products, etc.) requires frequent and small-lot transportation. The most frequent operations are observed in shorter routes with a distance of less than 100 nm, such as Dover, UK – Calais, France (22 nm, 41 round trips a day) and Aomori – Hakodate, Japan (61 nm, 13 round trips a day). Smaller vessels would be more suitable for short-distance routes while taking demands and seaworthiness into account. In contrast, RO-RO services in long-distance routes, which are more than 300 nm, tend to gain a smaller share while a few larger and faster vessels are deployed with a lower frequency, once or twice a week. Those long-distance services with small shares, however, can be maintained thanks to high demands of the routes. The capacity of vessels on long-distance routes in Northeast Asia and Japan is up to 300 TEU.
- Speed: In most cases, the speed of RO-RO vessels is 20 knots at minimum. Higher service speed is essential in RO-RO shipping to compete with LO-LO services. In Japan, new ROPAX vessels with a service speed of 30 knots are deployed in Maizuru – Kushiro route.
- Shipping without delays: Transportation services with strict punctuality and advanced booking shall allow cargo owners to make detailed production and shipment plans. Fast shipping cannot be realized if a vessel departs when it becomes fully loaded, which is a common operating method found in Philippines and Indonesia. RO-RO operators should also request every port to offer a berth with a wide yard and to give higher priority to the operators so as to avoid delays due to congestion of the port or inefficient cargo handling.
- Late cut-off time: Setting a later cut-off time would be another selling point for the faster shipment. It will be four hours before the departure in the afternoon, or at 4 PM or later in case of departure in the night or morning. However, it will require cooperation with customs authorities.

Furthermore, operators should also consider the following points although they have nothing to do with the level of service:

- Freight tariff should dominate the revenue structure and passenger tariff should be regarded as a secondary gain. If passenger tariff is a prime source of revenue, suddenly a route might no longer be profitable someday when LCCs capture almost all passenger demands with their new route, as experienced in Medan – Penang.

- Operators should be encouraged to replace aged vessels with new vessels, and establish and commit safe operation and maintenance system or practices. It should be borne in mind that in the Philippines and Indonesia, aged vessels, particularly modified RO-RO vessels, got involved in several maritime disasters.

Although costs increase for those quality services and are hardly passed on to tariff in transportation of general cargoes, RO-RO operators can capture demand of high-value added cargoes from LO-LO shipping by modern, fast and reliable transportation services.

2) Improvements of Freight Transport Time after Introduction of RO-RO Services in ASEAN

RO-RO shipping service mainly features its rapidness, which can reduce lead times for shipment and allow cargo owners to improve their business. This section gives two examples showing possibilities to reduce freight transport time after the introduction of RO-RO shipping services in the Penang – Belawan and Malacca – Dumai routes. Using a RO-RO service may increase shipping cost as earlier mentioned but it is difficult to estimate tariff of RO-RO service now because it depends on the level of service and the deployed vessels. Therefore, only shipping times are compared.

As shown in Tables 11.8 and 11.9, 49 hours and 41 hours will be saved by RO-RO services in Penang – Belawan and Malacca – Dumai routes, respectively. Those estimates are based on the following assumptions:

- Customs clearance and loading at the origin port: Current situation with 6 hours is quick enough and further expedition may not be expected.
- Shipping: It is assumed that a 20-knot vessel and a 10-knot vessel are deployed in Penang – Belawan route and Malacca – Dumai route, respectively. Their assumed scheduled speeds are 18 knots and 8 knots.
- Unloading and customs clearance at the destination port: Since RO-RO vessels realize much quicker unloading, only 2 hours is assumed. Cooperation between customs and shipping companies can simplify customs clearance by means of preliminary examination, expanding goods types subject to the green line, approval for withdrawing goods prior to import permit, extension of office hours, and so on. Japan Customs Hakata Branch cooperates with Shanghai Super Express and as such cargoes imported at Hakata Port can be withdrawn within the arrival date.

Table 11.8 Comparison of Shipping Times in Penang – Belawan Route

Location / Activity	Distance (nm)	Current Condition (hours)	Condition with RO-RO (hours)
Penang Port - Customs clearance and loading		 6	 6
Shipping from Penang to Belawan	140	15	8
Belawan Port - Unloading - Customs clearance		 8 48	 2 12
Total		**77**	**28**

Source: Estimated and compiled by JICA Study Team based on Logistics Development Study of the Indonesia-Malaysia-Thailand Growth Triangle (IMG-GT)

Table 11.9 Comparison of Shipping Times in Malacca – Dumai Route

Location / Activity	Distance (nm)	Current Condition (hours)	Condition with RO-RO (hours)
Malacca Port			
- Customs clearance and loading		6	6
Shipping from Malacca to Dumai	57	6	7
Dumai Port			
- Unloading		8	2
- Customs clearance		48	12
Total		**68**	**27**

Source: Estimated and compiled by JICA Study Team based on Logistics Development Study of the Indonesia-Malaysia-Thailand Growth Triangle (IMG-GT)

3) Potential OD Pairs for Intra-ASEAN RO-RO Shipping

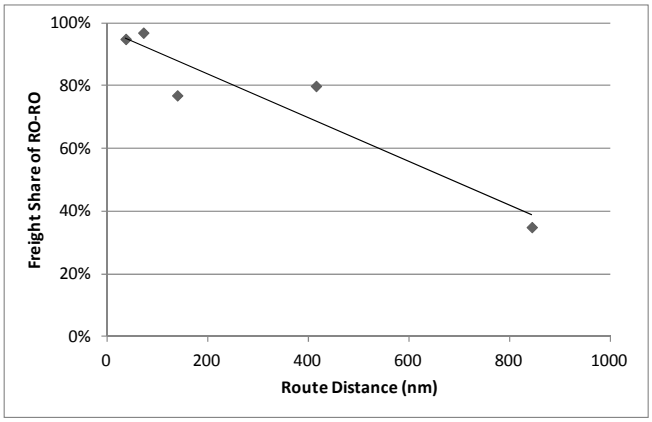
This section suggests OD pairs which have potential to realize profitable intra-ASEAN RO-RO shipping routes based on OD tables in 2003 and 2020 made in the NILIMJ Research Report 2009.

At first, a model of the modal share by RO-RO was developed. As shown in Table 11.10 and Figure 11.13, the share of RO-RO between UK and other European countries tends to decrease along with the route distance. In this table, an average distance is a weighted mean of route distances with the service frequency.

Table 11.10 Average Distance and Share of RO-RO Services by Shipping Route in Europe

Route	Average Distance (nm)	Share of RO-RO
UK - Near Continental	139	77%
UK - Channel	36	95%
UK - Irish Sea	71	97%
UK - Scandinavian	414	80%
UK - Baltic	843	35%

Source: Estimated and compiled by JICA Study Team based on the statistics in UK Short Sea Freight RO-RO and LO-LO Capacity Analysis & Report



Note: The line in the figure shows the fitted linear function.

Source: JICA Study Team

Figure 11.13 Relationship Between the Share of RO-RO and the Route Distance in Europe

The following linear function was assumed to describe the trend:

$$(\text{Share of RO-RO}) = a \times (\text{Route Distance}) + b,$$

where a and b are parameters and fitted with the least-square method as

$a = -0.0006968$ and

$b = 0.9775$

with a coefficient of determination $R^2 = 0.8877$.

In ASEAN, where RO-RO shipping will be introduced from now on, the share of RO-RO in 2020 cannot be expected as high as the current situation in Europe and it is reasonable to consider the share will be similar to the moderate value of Northeast Asia (12%). Because the average length of routes in Bohai Sea and Yellow Sea where RO-RO shipping is most active is around 300 nm, the modal share mode was determined by re-scaling the above-mentioned function with the condition of the share of 0.12 at the distance of 300 nm. Hence,

$a = -0.0001088$ and

$b = 0.1526$.

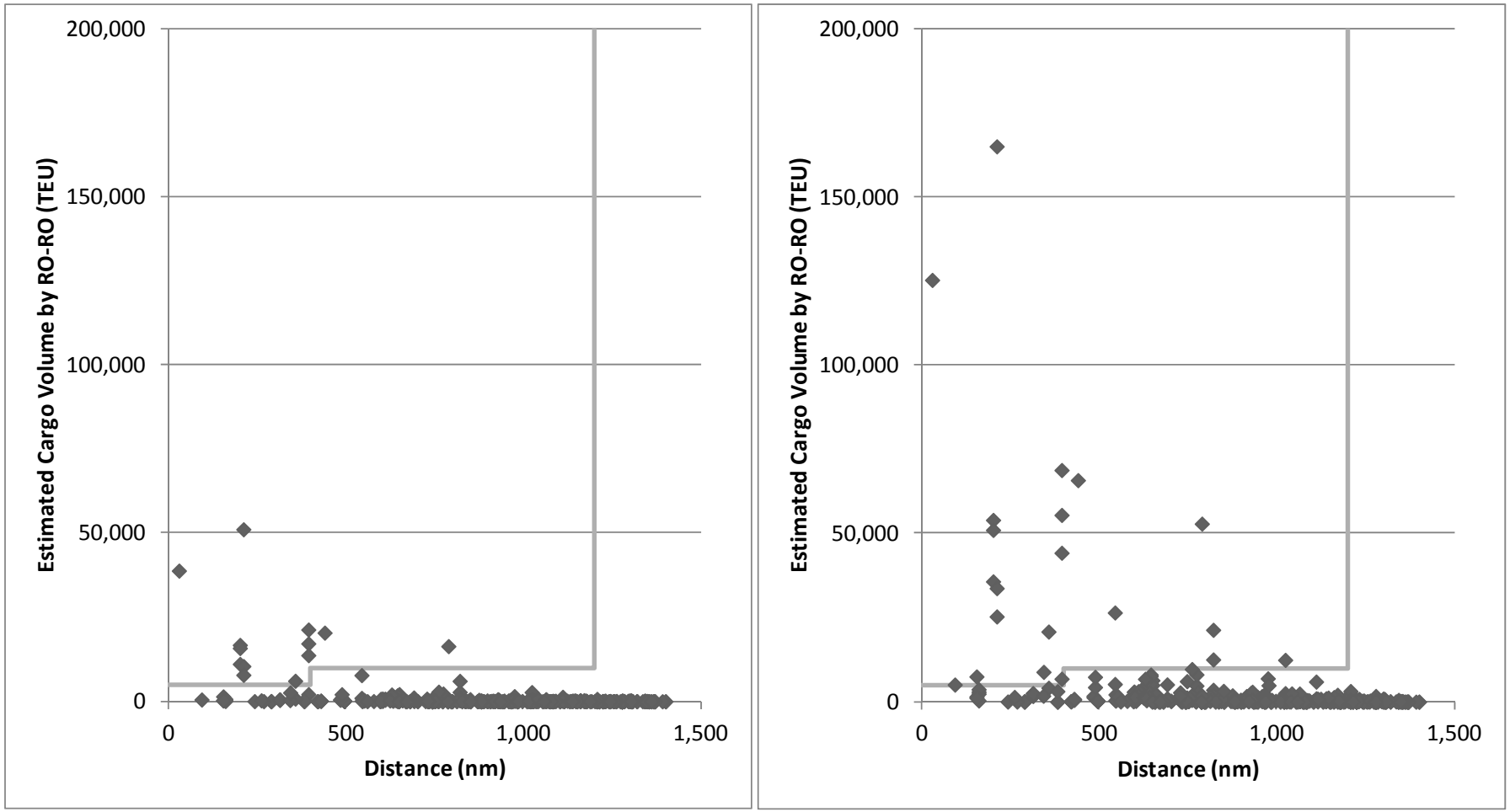
Next, the cargo volumes carried by RO-RO were estimated for every OD pair based on the cargo traffic OD tables in 2003 and 2020 with the developed RO-RO share model. For this purpose, distances between zones were assumed to be the same as the route distances between the nearest ports, which were referred to the shipping network setting in the NILIMJ Research Report 2009. All inland zones were omitted in this calculation.

Figure 11.14 shows the estimated cargo volumes carried by RO-RO in every OD pair with the distance between the OD zones. The gray lines show the minimum requirements of profitability which has already been reviewed in Chapter 2. There are 13 and 21 OD pairs above the profitable line in 2003 and 2020, respectively.

Tables 11.11 and 11.12 list the potential OD pairs and their estimated cargo volumes in 2003 and 2020. Since there will be competition between maritime and land transportation in some OD pairs among Singapore, Malaysia, Thailand and Brunei, the potential OD pairs are divided into two categories, that is, with and without competition with land transportation. It should be noted that the inter-zonal cargo volumes do not show inter-portal cargo volumes immediately because there are many candidate paths in the traffic network, and that the cargo volumes do not include re-exported cargo volumes by transshipment. Inter-portal cargo volumes as a result of traffic assignment are necessary to discuss feasibility of each shipping route.

For a conservative observation, OD pairs which seem profitable in 2003 should be considered as having a “higher” potential because there is apprehension that the cargo volumes in 2020 forecast in the NILIMJ Research Report 2009 might be overestimated. It forecasts each cargo generation and attraction volume in 2020 by converting the trade value, estimated by GTAP (Global Trade Analysis Project) Model, with a basic unit of a ratio of cargo volume to trade value in 2003. Although the sectoral share may change and the amount of high-value added products is expected to increase along with the economic growth, those possible changes are not taken into account in their estimates.

The RO-RO shipping practices in other regions in Chapter 2 indicate that ROPAX routes are generally shorter than freight RO-RO routes and they meet more diversified local needs. It implies that short-distance routes among the potential RO-RO shipping routes based on container cargo identified in this section would become ROPAX routes.



Source: Estimated by JICA Study Team based on NILIMJ Research Report 2009

Figure 11.14 Distances and Estimated OD Cargo Volumes Carried by RO-RO in 2003 (left) and 2020 (right)

Table 11.11 List of Potential OD Pairs without Any Competition with Land Transport with RO-RO Shipping

Zone 1	Zone 2	Estimated Cargo Volume by RO-RO in 2003 (TEU)			Estimated Cargo Volume by RO-RO in 2020 (TEU)		
		Zone 1 to 2	Zone 2 to 1	Total	Zone 1 to 2	Zone 2 to 1	Total
Sarawak, Malaysia	Singapore	14,242	6,164	20,406	46,777	19,073	65,851
Sabah, Malaysia	Singapore	11,446	4,954	16,401	37,597	15,330	52,927
Sumatra, Indonesia	Singapore	3,756	2,345	6,101	15,023	5,825	20,848
Java (West), Indonesia	Singapore	4,776	2,983	7,759	19,105	7,408	26,513
Kalimantan, Indonesia	Singapore	1,598	998	2,596	6,391	2,478	8,869
Sumatra, Indonesia	Selangor and Kuala Lumpur, Malaysia	1,015	417	1,431	6,080	1,426	7,507

Note: The first three OD pairs are considered as the ones with higher potentials.

Source: Estimated by JICA Study Team based on NILIMJ Research Report 2009

Table 11.12 List of Potential OD Pairs where Land Transport Competes with RO-RO Shipping

Zone 1	Zone 2	Estimated Cargo Volume by RO-RO in 2003 (TEU)			Estimated Cargo Volume by RO-RO in 2020 (TEU)		
		Zone 1 to 2	Zone 2 to 1	Total	Zone 1 to 2	Zone 2 to 1	Total
Selangor and Kuala Lumpur, Malaysia	Singapore	35,700	15,452	51,152	117,260	47,813	165,073
Johor, Malaysia	Singapore	27,112	11,735	38,846	89,050	36,310	125,360
Perak, Malaysia	Singapore	14,890	6,445	21,334	48,906	19,941	68,847
Kedah, Malaysia	Singapore	12,004	5,195	17,199	39,426	16,076	55,502
Kelantan, Malaysia	Singapore	11,686	5,058	16,744	38,383	15,651	54,034
Pahang, Malaysia	Singapore	11,041	4,779	15,820	36,266	14,787	51,053
Penang, Malaysia	Singapore	9,574	4,144	13,718	31,446	12,822	44,269
Terengganu, Malaysia	Singapore	7,737	3,349	11,085	25,411	10,361	35,772
Negeri Sembilan, Malaysia	Singapore	7,300	3,159	10,459	23,976	9,776	33,752
Malacca, Malaysia	Singapore	5,482	2,373	7,855	18,007	7,343	25,350
Singapore	Bangkok and surroundings, Thailand	3,130	2,933	6,063	12,933	8,443	21,375
Johor, Malaysia	Bangkok and surroundings, Thailand	1,441	1,309	2,750	7,471	5,086	12,556
Selangor and Kuala Lumpur, Malaysia	Bangkok and surroundings, Thailand	1,426	1,295	2,720	7,389	5,030	12,419
Perlis, Malaysia	Singapore	1,477	639	2,116	4,852	1,978	6,830
Sabah, Malaysia	Brunei	514	10	525	5,056	18	5,075

Note: The first ten OD pairs are considered as the ones with higher potentials.

Source: Estimated by JICA Study Team based on NILIMJ Research Report 2009

11.3 RO-RO Shipping System in ASEAN

1) RO-RO Ship Size and Type

(1) General

A RO-RO ship, to enter into a service of a specific route, shall meet the following conditions, at least.

- Freight loading capacity and characteristics of freight to be loaded (sea containers, trucks or passenger cars, heavy cargo, long size cargo, dangerous goods or chemicals, refrigerated goods etc.)
- Passenger capacity and characteristics (business or tourism, individual or group etc.)
- Wharf or terminal conditions (water depth, connection to ramp way and/or boarding facility, parking lot or container yard etc.)
- Port and harbor conditions (Approach channel, anchorage, fueling and water supply, provisions, port congestion and etc.)
- Navigation area conditions (Sea roughness-swell, waves and winds, distance, availability in port of refuge on route, international safety code of ship design and shipping, security level of seas and etc.)
- Operation frequency and traveling time (departure and arrival timing, sea speed, loading and unloading speed, fleet size and etc.)
- Profitability (initial cost and operational cost vs. expected income)

Those details must be examined per candidate route to come to a preferable ship design. In principle, RO-RO ship size is defined by the matrix of route distance and sea condition as illustrated in Figure 11.15. The decisive factor of ship type is marketing strategy and anticipated demand.

In relation to port infrastructure, it is designed to accommodate RO-RO ships in terms of ship length, depth, turning water area and ramp position. Figure 11.16 shows RO-RO ship types by ramps.

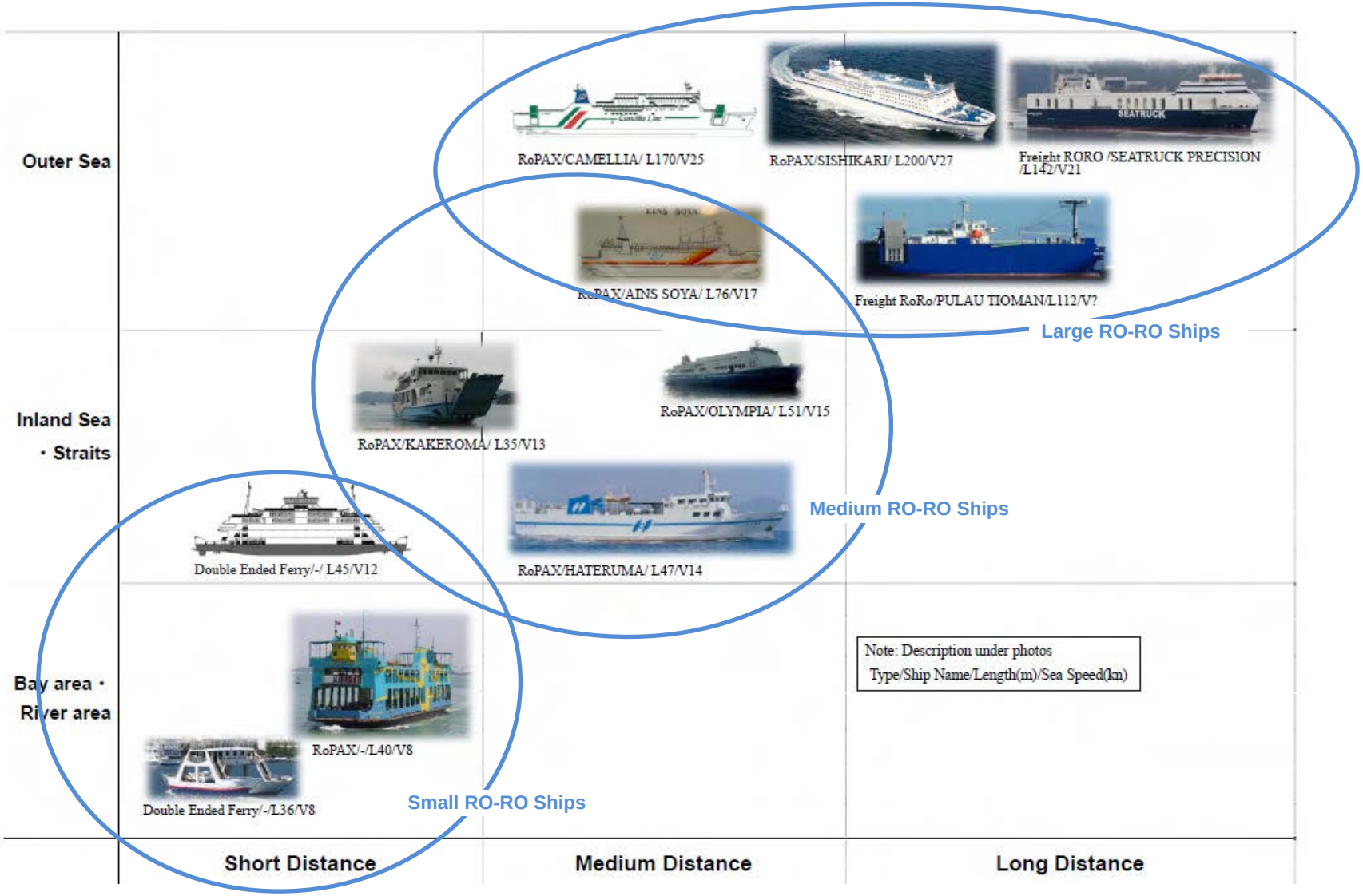


Figure 11.15 Matrix of RO-RO Ship Types by Route Location and Distance

A RO-RO ship with quarter ramps – ships dock alongside quay wall – this type of RO-RO ships is capable of docking at a general berth without a dedicated shore facility for vehicle

A RO-RO ship with stern ramp and/or bow ramp – this type RO-RO ships usually dock at L-shape berth where a shore ramp is equipped – car deck space of a RO-RO ship will be fully utilized to accommodate vehicles or cargoes in comparison with a RO-RO ship with quarter ramps – small ships is likely to be this type

Figure 11.16 Two Types of RO-RO Ships by Ramp Ways

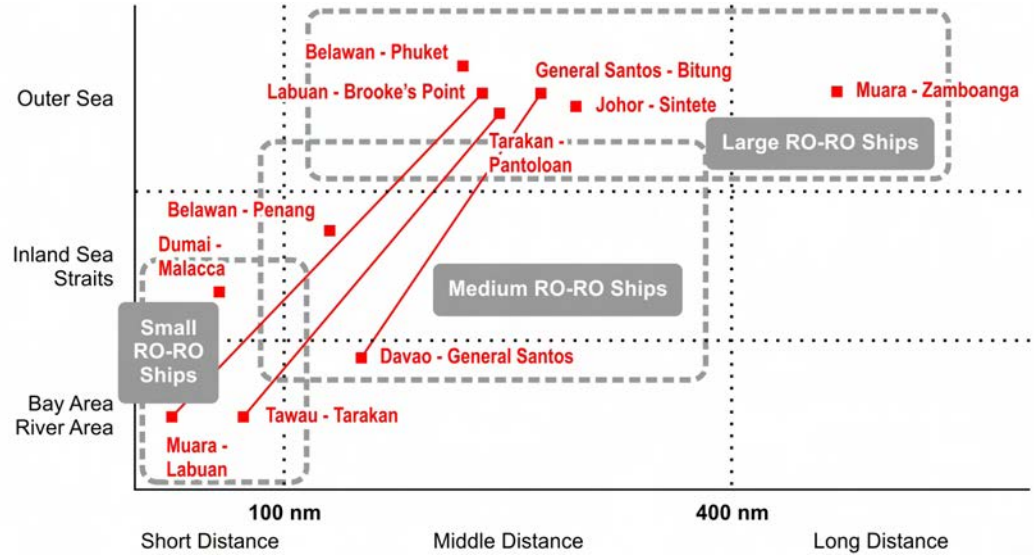
(2) Classification of the ASEAN Survey Routes in the Study

ASEAN selected 8 RO-RO shipping candidate routes for the Study. When classifying these 8 routes by the ship size matrix of distance and location, the following characteristics are found:

- 7 routes are short- and middle-distance routes and only one for long-distance over 400 nm.
- Their oceanic conditions also vary encompassing bay area, strait and outer sea conditions.

The route classification results reveal difficult ship assignment on some routes. For example, the Muara – Labuan – Brooke's Point route consists of the short-distance and bay area section and the middle-distance and outer sea section. It is almost impossible to design one RO-RO ship to fit on the two sections. Similar difficulty is found on the Tawau – Tarakan – Pantoloan route.

In the case of the Davao – General Santos – Bitung route, both the divided sections belong to middle-distance and one vessel may serve the whole stretch. The vessel must have enough seaworthiness at the outer sea to connect with Bitung. It may be over-designed when it serves only between Davao and General Santos.



Source: JICA Study Team

Figure 11.17 Eight ASEAN Survey Routes on the Matrix of RO-RO Ship Type

2) RO-RO Terminal and Facilities

(1) General

RO-RO vessels and ROPAX vessels are expected to arrive at and depart from a terminal on schedule. Vehicles and passengers may get on and off the vessel at a terminal and pass through the road in the port area day and night. Therefore, the safety of vessels, vehicles and passengers is the most important factor in planning, design and operation.

The location of a terminal shall be decided based on the features of the RO-RO or ROPAX service, conditions of the channel and basin, the required scale and usage conditions of the terminal, the traffic lines in the port, and access conditions to the hinterland considering the relation to the location and use of the other port facilities. In addition, from the viewpoint of users, convenience, seamless port procedures and a comfortable environment shall be arranged.

The terminal shall have a berth, loading/discharging facilities for vehicles, parking areas of waiting for boarding, a gangway, check-in gate and CIQ offices (inbound and outbound), a road to the terminal in the port and approach and exit gates and facilities for securing safety and to meet the ISPS Code. In the case of a ROPAX terminal, boarding facilities and concourse of passengers, and a passenger building are necessary. The types and scales of facilities shall be decided based on the type and size of design vessels, number and size of design vehicles, number of passengers, etc.

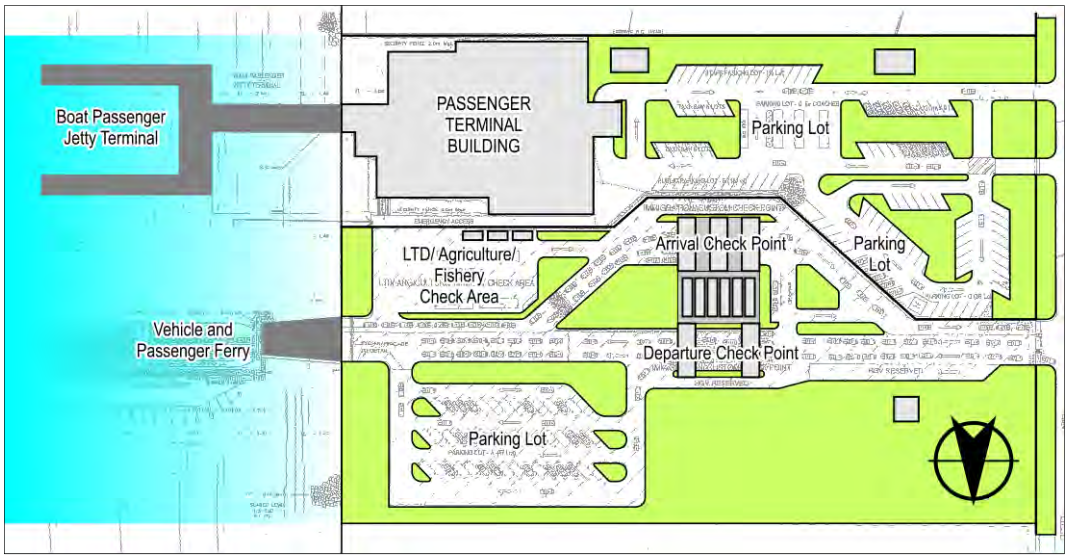
For reference, the outline, layout and main facilities at the port of Muara (Serasa Terminal) for a small-sized ROPAX vessel and those at the port of Johor (Tanjung Belungkor) for a middle-sized ROPAX vessel are shown below. These two terminals were designed and constructed as international ROPAX terminals. As a terminal for RO-RO vessels, a sample of the port of Hakata is shown. The berth type of RO-RO terminal depends on the position of the ramp; a vessel with a side ramp may use an ordinary berth.

(2) Terminal for a Small-Sized ROPAX Vessel at the Port of Muara (Serasa Terminal)

Outline

Vessel in operation	Name: Shuttle Hope Size: 360 GT, LOA : 49.90 m, Draft:2.65 m Capacity: 200 pax +36 cars (equivalent to 5 trucks size 12 m + 6 cars)
Terminal	Constructed as a dedicated ROPAX terminal
Marine facilities	Fixed Ramp, Mooring Piles Depth of the mooring water
Terminal facilities	Gate of the terminal Parking areas of waiting for boarding and roads in the port Check-in gate and CIQ offices (inbound and outbound) Parking areas for transportation of passengers Ticket shop, Fences under ISPS code etc.

Layout



Main facilities

Gate

Ticket Shop

CIQ gate

CIQ gate

Fixed Ramp

Mooring Pile

Fixed Ramp

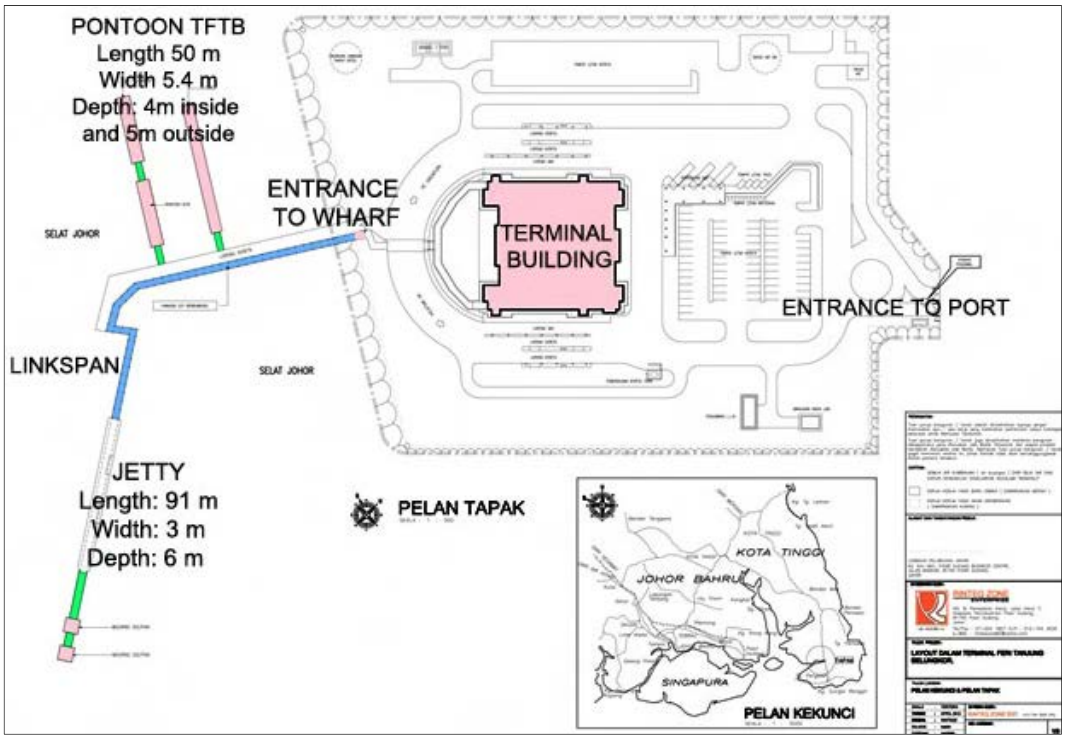
Marine Structures

(3) Terminal for a Middle-Sized ROPAX Vessel at the Port of Tanjung Belungkor

Outline

Vessel in operation	Not in operation
Terminal	Constructed as a dedicated ROPAX terminal
Marine facilities	Movable Link Span, Mooring Piers (175 m + dolphins) Mooring depth: 6 m on the east side, 5 m on the west side
Terminal facilities	Gate of the terminal Parking areas of waiting for boarding and roads in the port Check-in gate and CIQ offices (inbound and outbound) Parking areas for transportation of passengers Passenger building with CIQ offices and ticket shops Concourse of passengers Gangway of vehicles and concourse of passengers on a bridge to mooring facilities. Ticket shop, Fences under ISPS code etc.

Layout



Main facilities

 Gate	 Parking
 CIQ clearance gate (Outbound/passenger)	 Concourse
 CIQ clearance gate (Outbound/Vehicles)	
 Berth	 Berth

	
Movable Ramp	Movable Ramp

(4) RO-RO Terminal of the Port of Hakata

Outline

Vessel in operation	Name: Shanghai Super Express Size: 16,350 GT, LOA : 146 m, Draft: 6.5 m Capacity: 121 FEU (242 TEU)
Terminal	A part of the International Container Logistics Zone
Berth	Caisson Type Quay: 190 m in Length Depth in front of the quay: -11 m
Terminal facilities	Cassis, Reach Stacker

Layout

Source: Web-site of Hakata Port

Loading/Discharging

(5) Ports on the ASEAN Survey Routes

The Study has found some imbalanced port situations regarding the relation between port and ship on the selected ASEAN surveyed routes. They are:

- On the Muara – Labuan – Brooke's Point route, the existing RO-RO terminals at Muara and Labuan cannot accommodate a large RO-RO vessel to navigate on the outer sea. Brooke's Point Port currently operates as a local port. Its shallow front water (3.5 m) may not accommodate a RO-RO vessel suited to the outer sea too.
- A similar problem is raised at Sintete Port which is a small river port with shallow water depth (3.4 m) but the connecting RO-RO shipping route is classified as a middle-distance and outer sea route.

There is a large flexibility to plan a new RO-RO terminal. When a RO-RO vessel uses the existing multi-purpose berth, a side/quarter ramp is fitted in vehicle RO-RO operation.

In the next chapter, the present conditions of the ports included in this study, are assessed and the possibilities and candidate locations of the RO-RO terminal at each port are examined.

12 DEVELOPMENT DIRECTIONS OF THE SURVEYED ROUTES

12.1 The Belawan – Penang Route

1) Traffic Demand

Substantial economic expansion is expected to continue at the two large economies, Medan and Penang. As the economy of Medan and its vicinity grows, the Port of Belawan will deal with increased cargo throughput at a faster pace than that of the Port of Penang (see Table 12.1).

However, the existing volume of direct strait crossing trade between the two ports is small. The field survey observed only three wooden ships regularly plying the route. Direct container shipping service was suspended around 2010 while many container vessels departing from Belawan go to regional hub ports such as Port Klang and Singapore. Fast passenger boats were forced to suspend their operation in 2010 due to severe competition with LCCs (refer to Section 5.2 for detailed information).

Table 12.1 Growth Forecast at Ports and Their Hinterlands by Various Sources

Source	Region	Annual Demand Forecast	2010	2015	2020
(1)	Belawan	Container Cargo (000 TEU)	609	1,044	1,526
		Break Bulk Cargo (000 MT)	14,214	17,595	19,706
	Penang	Container Cargo (000 TEU)	866	996	1,122
		Break Bulk Cargo (000 MT)	1,262	1,114	928
(2)	Sumatra -> Penang	Container Cargo (TEU)			14,163 (2.4%)
	Penang -> Sumatra				3,322 (0.6%)
Source	**Region**	**Annual Growth Ratio**	**2010-2015**	**2015-2025**	**2025-2035**
(1)	Belawan	Container & Break Bulk	4.7%	2.6%	
	Penang	Container & Break Bulk	-0.2%	-0.6%	
(3)	North Sumatra	Population	0.7%	0.2%	
		GDP per capita	4.7%	6.2%	
	Pulau Pinang	Population	0.2%	-0.3%	
		GDP per capita	5.7%	7.6%	
	Corridor Traffic N. Sumatra - Penang	Cargo (weight, two-way)	9.3%	6.0%	
		Sea Passengers	4.3%	3.7%	
(4)	Indonesia	Population	1.0%	0.8%	0.5%
		GRDP per capita	5.0%	5.4%	7.1%
		Intra-ASEAN Trade	2.4%	2.2%	2.3%
		Intra-ASEAN Tourists	3.6%	3.0%	3.0%
	Malaysia	Population	1.6%	1.4%	1.1%
		GRDP per capita	6.7%	5.9%	4.9%
		Intra-ASEAN Trade	2.1%	1.6%	1.2%
		Intra-ASEAN Tourists	2.7%	2.0%	1.4%

Note: Some data of target ports are not forecasted by the other studies and they are cleaned in the table.
Some related ports are included although some data do not correspond with target ports.

Source: (1) Project Priority to Upgrade Performance and Capacity by JICA, OCDI, MRI, Ides in March 2011; (2) NILIMJ Research Report , December 2009; (3) ADB Report TA No.4204-INO (BIMP-EAGA/IMT-GT) *Corridor traffic includes speculative addition; and (4) This JICA study

Under such situations, divertible traffic from the existing direct shipping service is marginal. It is difficult to understand the actual OD pairs of Belawan and Penang only by tracing vessel movement. According to the NILIMJ Research Report, if a new RO-RO ferry route is opened between Belawan and Penang, the service demand is estimated at 58,154 TEU in 2003 and 295,552 TEU in 2020 as the results of traffic assignment using the OD matrices of the years 2003 and 2020. After 2020, it is assumed to increase as the container growth rate at the Port of Belawan.

It should be noted that Medan/Belawan represents Sumatra Island as a whole in the OD matrix. RO-RO service is considered advantageous to transport high-value products, fresh and perishable goods. Typical cargo segments suitable for RO-RO service are shown below:

Table 12.2 Average Daily Tonnage of Exported Commodities from North Sumatra

Unit: Ton

	2005	2006	2007	2008	2009
Food & live animals	3,955	4,126	3,597	4,370	3,963
Beverages & tobacco	74	82	90	105	105
Manufactures goods	1,737	1,450	1,269	1,155	1,090
Articles of apparel clothing accessories	130	126	124	124	136

Source: North Sumatra in Figures 2010, Statistics of North Sumatra

The defeat of the ferry in the competition with the airlines means that there are many passengers on this Strait crossing. Therefore, if passengers want to drive their cars in another country and can do it easily and comfortably, the demand might be actualized again in the future. Passengers with their own cars and with tourism bus coaches should be distinguished from passengers alone. Especially so since according to the study by University Malaysia, Penang attracts 61% of medical tourists in Malaysia while Malacca and Kuala Lumpur only receive 19% and 11%, respectively. Additionally, most medical tourists come from Sumatra, so driving a car will have more advantages for medical trips with family than by air.

However, ASEAN has little experience particularly in international RO-RO vessels servicing mass tourism sites such as Penang Island. As described in Section 2.3, the Pusan – Hakata RO-RO ferry route, at 115 nm is similarly long like the Belawan – Penang route (140 nm) with many tourists and tourism coaches. In 2011, the overall Pusan – Hakata corridor traffic including sea and air was 1,006 thousand passengers, 171 thousand of which were carried by RO-RO ferry service. The market share of RO-RO ferry was 17%. The Study employs this as a target share. The current air passenger traffic on the corridor is around 700 thousand. The number will increase in line with the growth of intra-ASEAN tourists in Indonesia and Malaysia, i.e. 3.2% in 2011-2015, and 2.5% in 2016-2025.

Table 12.3 Daily RO-RO Shipping Demand Forecast

	Present	2015	2020	2025
Daily Passengers	none	382	432	489
Daily RO-RO Cargo (TEU equivalent)	not by RO-RO (15 tons)	502	809	920
Export Items from Belawan	Vegetables, Fruits, Fish			
Export Items from Penang	Machinery, Equipment			

Source: JICA Study Team

2) RO-RO Ship Type and Size

The distance between Belawan and Penang is approximately 140 nm and sea conditions en route across the strait is generally calm except during monsoon seasons. The ship must have enough seaworthiness and enough space for vehicles and passengers. Roughly speaking, preferably two medium-sized RO-RO vessels, say ROPAX length of 100 m – 120 m will enter into service and they will depart every 12 hours, sailing the distance within 8 hours and spending 4 hours to load and unload. In practice, one vessel will be initially assigned on the route to take a pioneering role.

3) RO-RO Terminal and Facilities

Port of Belawan: A candidate site for the RO-RO terminal in the port of Belawan is Belawan Lama. PELINDO is implementing a passenger terminal construction project. The objective of the project is to shift the present passenger terminal which is located in the front edge area of the port to the area near the entrance of the port. Belawan Lama is fairly busy at present but it is expected that the necessary space for the RO-RO terminal can be obtained near the passenger terminal construction project site.

There are several matters to be surveyed in detail, namely: usage conditions of the water area in front of the berth, possibility of acquisition of sufficient space, and possibility of construction of specified facilities for RO-RO vessels such as a ramp and L-shape berth and others.

Port of Penang: There are two candidate sites for a RO-RO terminal. One is the area of Swettenham Pier for a ROPAX vessel and the other is an old container terminal at Butterworth Deep Water Wharves for a RO-RO vessel. The advantage of the former is that is located in the vicinity of the cruise terminal. On the other hand, it may be easy to coordinate use of the berth in the latter site because some portion of the cargo volume will be shifted to NBCT. After the consultation with the Penang Port Commission, the Study looks at the latter, currently the multi-purpose wharf of Butterworth for RO-RO terminal planning.

Figure 12.1 Location of Swettenham Pier and Butterworth Deep Water Wharves

4) Overall Development Direction

Penang and Medan face each other across the Malacca Strait with a sailing distance of 140 nm. They have strong historical, social and economic ties. For instance, their people movement by air, registered at 700 thousand in 2011, is larger than the Medan – KL route (455 thousand in 2010).

The Belawan – Penang route seems to be the largest potential route among the eight (8) surveyed routes in the Study. This is why a medium-sized ROPAX vessel is planned to be assigned on the route.

The pilot RO-RO operation in 2005 provides essential lessons to the organizations which are keen on RO-RO shipping development on the route. The lessons are summarized into two: (1) the need for an integrated RO-RO terminal for passengers and vehicles/chassis to be prepared at the Penang side, and (2) the need to allow temporary admission to road vehicles without depositing a customs guarantee bond at the Medan side.

Unfortunately, the field survey observed that both these issues have not been solved yet. Government efforts and coordination are critically important to develop the necessary business environment for shipping operator(s) to provide RO-RO service.

During the field survey, some RO-RO operators in Indonesia expressed their interest to open such a new route. In addition to the public sector's roles including the above issues, there are some critical paths to make it happen, including RO-RO ship finance and construction or procurement, safe ship operation and management, ancillary services to customers' seamless logistics chains, joint marketing with local traders and tourism agents, and so on. A doable implementation plan is badly needed where public and private sectors' roles are explicitly described in a coordinated manner.

12.2 The Belawan – Phuket Route

1) Traffic Demand

The Study observed that there was no cargo flow and no passenger flow between Phuket and Belawan during the first half of 2012. As gathered from the results of the meetings with the stakeholders, such as chambers of commerce and tourism associations, they have not prepared any business plans to connect the two economies directly.

Table 12.4 Growth Forecast at Ports and Their Hinterlands by Various Sources

Source	Region	Annual Demand Forecast	2010	2015	2020
(1)	Belawan	Container Cargo (000 TEU)	609	1,044	1,526
		Break Bulk Cargo (000 MT)	14,214	17,595	19,706
	Phuket	Container Cargo (000 TEU)			
		Break Bulk Cargo (000 MT)			
(2)	Sumatra -> South Thailand	Container Cargo (TEU)			12,218 (2.1%)
	South Thailand -> Sumatra				5,591 (1.9%)
Source	**Region**	**Annual Growth Ratio**	**2010-2015**	**2015-2025**	**2025-2035**
(1)	Belawan	Container & Break Bulk	4.7%	2.6%	
(3)	North Sumatra	Population	0.7%	0.2%	
		GDP per capita	4.7%	6.2%	
(4)	Indonesia	Population	1.0%	0.8%	0.5%
		GRDP per capita	5.0%	5.4%	7.1%
		Intra-ASEAN Trade	2.4%	2.2%	2.3%
		Intra-ASEAN Tourists	3.6%	3.0%	3.0%
	Thailand	Population	0.5%	0.3%	0.1%
		GRDP per capita	6.7%	5.9%	4.9%
		Intra-ASEAN Trade	2.6%	1.9%	1.4%
		Intra-ASEAN Tourists	3.5%	2.5%	1.7%

Note: Some data of target ports are not forecasted by the other studies and they are cleaned in the table. Some related ports are included although some data do not correspond with target ports.

Source: (1) Project Priority to Upgrade Performance and Capacity by JICA, OCDI, MRI, Ides in March 2011; (2) NILIMJ Research Report, December 2009; (3) ADB Report TA No.4204-INO (BIMP-EAGA/IMT-GT) *Corridor traffic includes speculative addition; and (4) This JICA study

Following are some reasons why cargo flow on the route does not exist or is totally negligible:

(1) The industrial characteristics such as agro-industry, forestry, mining, are quite similar between North Sumatra and Southern Thailand. There is little need for trade and, thus, marginal direct trading is sufficient.

(2) According to trade statistics, North Sumatra imports manufacturing goods from Thailand. But they are shipped out from the Bangkok area and not from or via Southern Thailand.

(3) The Thai government prioritizes Phuket Island as a tourism destination. Even if the Port of Phuket is the deepest seaport among southern Thailand ports, the government policy does not encourage cargo transactions at the port.

Although the IMT-GT initiative started in the early 1990s, significant achievements have not been observed in the fields of trade and industry such as divisions of manufacturing process between Southern Thailand and North Sumatra.

Tourism cooperation is an important pillar in the IMT-GT initiative. However, there is no tourism product covering Phuket and North Sumatra such as Lake Toba for offering to Europeans and Russians who are major tourists at Phuket. There is no direct flight between Phuket and the populous Medan.

Since there is neither any anticipated diverted traffic as is the fact nor induced traffic according to the stakeholders' perception, any likely RO-RO shipping traffic cannot be forecast at least in the near future by 2015.

2) RO-RO Ship Type and Size

The distance between Belawan and Phuket is approximately 240 nm and sea conditions across the route is generally calm except during monsoon seasons. During the monsoon seasons, the maximum wave height is expected to reach more or less three meters locally, but large ships which are more than 50 m in length and have sufficient draft are not hindered directly by waves in their marine operation. If the ships will be commonly used with those for the Belawan-Penang route, any concern will be arising in terms of marine environment.

It is advised that the facilities and accommodations of the RO-RO ships must be carefully considered from the viewpoint of passengers' comfort and convenience to withstand the competition against LCCs.

3) RO-RO Terminal and Facilities

Port of Phuket: The sea conditions such as wave and tidal range are fairly severe for small vessels to run punctually and safely throughout the year. It is necessary to study measures to cope with such conditions. An appropriate location and sufficient space for the international RO-RO terminal in or near the port shall be examined.

Port of Belawan: The same discussion as in the previous section.

4) Overall Development Direction

Since Phuket is designated as a regional tourism hub, RO-RO shipping development primarily intends to attract tourists. As discussed in the demand forecast, however, it is difficult to expect tourism traffic on the Belawan – Phuket route in the near future.

But on the Penang – Phuket corridor, cross-border people movement on the Thai – Malaysian land border has sharply increased from 1,655 thousand in 2005 to 3,403 thousand in 2011. The experience of Catamaran ferry service between Phuket and Penang in the 1990s suggests a more seaworthy vessel is required against rough sea conditions particularly during the southwest monsoon from May to October.

If a RO-RO route is opened at Phuket, it is better to be operated on the triangle route among Belawan, Penang and Phuket with the following advantages:

- Taking rough seas during the monsoon season into account, a similar middle-to-large ROPAX vessel on the Belawan – Penang route is suitable to pay a port-of-call at Phuket.
- The triangle route will be able to enhance vessel operation occupancy by way of diversified RO-RO marketing and route setting.

12.3 The Dumai – Malacca Route

1) Traffic Demand

The Port of Dumai is active in the trade with the Malay Peninsula in the segments of passenger and general cargo. Opening a new RO-RO route with Malacca, a large city with the shortest strait crossing distance from Dumai, will be able to explore new shipping markets such as tourist groups with tourism coaches, and containerized cargo.

It is said that about one-third of the fast ferry passengers from Dumai go to Malacca, or a daily traffic of 200-300 international passengers across the sea border. Because there is no competing air route, RO-RO service may take some part of this sea shipping traffic by offering lower tariff than that of the existing fast ferry passenger service and create a new demand by carrying passengers with their vehicles.

If it is estimated that some 10-20 wooden ships carry about 100 tons per ship every 10 days, with the daily volume of about 200 tons. In the other forecast (2) in the following table, the yearly total container cargo between Sumatra and Malacca is forecast to be 8,000 TEU in 2020. If one TEU is assumed to be about 10-12 tons, the daily cargo volume is also about 200 tons. Although the share by RO-RO ship might be unknown, about 100 tons daily will be expected if RO-RO can get half of this traffic.

Table 12.5 Growth Forecast at Ports and Their Hinterlands by Various Sources

Source	Region	Annual Demand Forecast	2010	2015	2020
(1)	Dumai	Container Cargo (000 TEU)	5	8	12
		Break Bulk Cargo (000 MT)	596	772	905
	Malacca	Container Cargo (000 TEU)			
		Break Bulk Cargo (000 MT)			
(2)	Sumatra -> Malacca	Container Cargo (TEU)			6,866 (1.2%)
	Malacca -> Sumatra				1,611 (0.6%)
Source	**Region**	**Annual Growth Ratio**	**2010-2015**	**2015-2025**	**2025-2035**
(1)	Dumai	Container & Break Bulk	5.4%	3.3%	
(3)	Riau	Population	3.3%	3.1%	
		GDP per capita	2.7%	4.1%	
(4)	Indonesia	Population	1.0%	0.8%	0.5%
		GRDP per capita	5.0%	5.4%	7.1%
		Intra-ASEAN Trade	2.4%	2.2%	2.3%
		Intra-ASEAN Tourists	3.6%	3.0%	3.0%
	Malaysia	Population	1.6%	1.4%	1.1%
		GRDP per capita	6.7%	5.9%	4.9%
		Intra-ASEAN Trade	2.1%	1.6%	1.2%
		Intra-ASEAN Tourists	2.7%	2.0%	1.4%

Note: Some data of target ports are not forecasted by the other studies and they are cleaned in the table. Some related ports are included although some data do not correspond with target ports.

Source: (1) Project Priority to Upgrade Performance and Capacity by JICA, OCDI, MRI, Ides in March 2011; (2) NILIMJ Research Report, December 2009; (3) ADB Report TA No.4204-INO (BIMP-EAGA/IMT-GT) *Corridor traffic includes speculative addition; and (4) This JICA study

Table 12.6 Daily RO-RO Shipping Demand Forecast

	Present	2015	2025	2035
Daily Passengers	250	300	360	420
Daily RO-RO Cargo (ton)	Not by RO-RO (100)	150	180	210
Export Items from Dumai	Seeds, Fish, Fruits, Vegetables			
Export Items from Malacca	Fertilizer, Daily commodities			

Note: More specific demand forecast is shown in Section 14.4.2 based on detailed traffic surveys and stakeholder interviews.

Source: JICA Study Team

2) RO-RO Ship Type and Size

The distance between Dumai and Malacca is approximately 58 nm. The traveling distance is so short that even ships, say 40-60 m in length and sailing speed of 8-10 knots, can easily go and return in a day.

Further considering the distance and goods to be transported, not sea containers but trucks or vans might be the major RO-RO cargoes. A cargo volume of 150 tons can be interpreted into 50 medium-sized trucks (around 5 tons capacity) or 25 trailers (10 tons capacity).

The ship can be a medium ROPAX or a small ROPAX. Even double-ended ferry for the convenience of maneuvers at berthing will be acceptable if the ship is designed considering sufficient seaworthiness, which is considered to be suitable in a very short distance service and in a calm sea area. The port conditions and berthing facilities shall be investigated along with the ship design.

3) RO-RO Terminal and Facilities

Port of Dumai: A candidate site for a RO-RO terminal in the port of Dumai is the ASDP RO-RO Terminal. The existing port facilities are suitable for ROPAX type ferry for short distance. In case another type of RO-RO vessel (larger in size) is put in service, the terminal facilities need to be re-examined. If necessary, some modification to the shore facility may be implemented to receive the vessel. Since the terminal is currently used exclusively for domestic service, it is required to additionally install CIQS facilities in the terminal area.

Malacca: A candidate site for a RO-RO terminal in Malacca is located at the proposed cruise terminal jetty off Malacca Island. The State of Malacca promotes the cruise terminal project although there is no RO-RO terminal function included as of October 2012.

4) Overall Development Direction

During the field survey, the JICA Team met some potential RO-RO operators in Dumai and the appointed operator from the State of Malacca. Judging from their presence at both sides of the Malacca Strait, the RO-RO shipping business opportunity on the route is considered mature.

There are two explicit critical paths to make this RO-RO service happen, namely: (1) RO-RO ship accommodation capability at Malacca, and (2) Indonesian Customs' acceptance of transit vehicles without depositing a customs guarantee bond.

12.4 The Muara – Labuan – Brooke's Point Route

1) Traffic Demand

Currently, only the RO-RO service between Muara and Labuan is operated daily, and there is no connection by sea between Labuan and Brooke's Point. Although the trade between Sabah and Visayas/Mindanao is substantial, it is almost nil between Brunei Darussalam and the Philippines. Brunei imports considerable cargo from Sabah, while there is almost no backload cargo due to the country's economic structure.

Table 12.7 Growth Forecast at Ports and Their Hinterlands by Various Sources

Source	Region	Annual Demand Forecast	2010	2015	2020
(1)	Muara	Container Cargo (000 TEU)	120	135	157
		Break Bulk Cargo (000 MT)	568	688	848
	Labuan & Brooke's Point	Container Cargo (000 TEU)	n.a.	n.a.	n.a.
		Break Bulk Cargo (000 MT)	n.a.	n.a.	n.a.
(2)	Brunei->Sabah	Container Cargo (TEU)			128 (0.7%)
	Sabah -> Visayas/Mindanao			*) not on route	13,426 (1.2%)
	Visayas/Mindanao -> Sabah			*) not on route	18,485 (8.5%)
	Sabah --> Brunei				35,450 (3.3%)
Source	**Region**	**Annual Growth Ratio**	**2010-2015**	**2015-2025**	**2025-2035**
(1)	Muara	Container & Break Bulk	3.6%	4.1%	
(3)	Sabah incl. Labuan	Population	3.6%	3.3%	
		GDP per capita	2.1%	3.5%	
	Palawan	Population	3.2%	3.2%	
		GDP per capita	2.8%	4.1%	
(4)	Brunei Darussalam	Population	1.7%	1.3%	1.0%
		GRDP per capita	6.7%	2.4%	1.9%
		Intra-ASEAN Trade	1.4%	0.5%	0.4%
		Intra-ASEAN Tourists	1.7%	0.6%	0.4%
	Malaysia	Population	1.6%	1.4%	1.1%
		GRDP per capita	6.7%	5.9%	4.9%
		Intra-ASEAN Trade	2.1%	1.6%	1.2%
		Intra-ASEAN Tourists	2.7%	2.0%	1.4%
	Philippines	Population	1.7%	1.5%	1.3%
		GRDP per capita	4.2%	5.0%	7.1%
		Intra-ASEAN Trade	2.4%	2.4%	2.6%
		Intra-ASEAN Tourists	4.0%	3.6%	3.6%

Note: Some data of target ports are not forecasted by the other studies and they are cleaned in the table. Some related ports are included although some data do not correspond with target ports.

Source: (1) Project Priority to Upgrade Performance and Capacity by JICA, OCDI, MRI, Ides in March 2011; (2) NILIMJ Research Report, December 2009; (3) ADB Report TA No.4204-INO (BIMP-EAGA/IMT-GT) *Corridor traffic includes speculative addition; and (4) This JICA study

In the future, RO-RO service will be able to continue between Muara and Labuan because there is no competition with road and air transport. Taking into account the current RO-RO service and the small population and economy at both sides, the current demand may not be boosted in a short period. Therefore, the future traffic demand will be proportional only to the population and the number of tourists.

Traffic demand between Labuan and Brooke's Point does not exist at present. During the field survey, explicit business plans and ideas which will affect RO-RO shipping demand were never disclosed among the stakeholders at Muara, Labuan and Brooke's Point. They seemed to find difficulty in identifying direct shipping needs. Under such situations, induced traffic cannot be expected in the near future by 2015.

Table 12.8 Daily RO-RO Shipping Demand Forecast

Muara – Labuan	Present	2015	2025	2035
Daily Passengers	400	440	500	550
Daily Cargo (ton)	50	50	60	70

Source: JICA Study Team

2) RO-RO Ship Type and Size

The distance between Muara and Labuan is approximately 20 nm, while the distance between Labuan and Brooke's Point is 261 nm. Any type of RO-RO ship can be assigned to the Muara-Labuan route but the demand of an extension route to Brooke's Point is so unclear that the ship type or size is hardly specified.

3) RO-RO Terminal and Facilities

Port of Muara: There is a terminal which was designed and constructed as an international RO-RO terminal. The terminal provides mooring facilities with a ramp, an access bridge and roads with separated passenger lanes, facilities and equipment for passport control, customs clearance and quarantine procedures, waiting rooms and parking area and ticket selling booths, etc.

When another RO-RO line is introduced at the port, it is considered appropriate to use this terminal. Thus, it is necessary to examine the possibility of shared use. However, if a different type or size of design vessel is deployed, it should be re-examined whether the present facilities are appropriate or not. Appropriate measures need to be taken as necessary.

Port of Labuan: There is a terminal which is used by a RO-RO vessel from/to the port of Muara. When another RO-RO line is introduced at the port, the appropriateness of using this terminal should be re-examined as well.

Existing facilities at the RO-RO terminal are poorly equipped. Therefore, it is necessary to assess the present layout of the terminal and to examine the conditions of facilities as well as the possibility of shared use. Appropriate measures should be taken as necessary.

Port of Brooke's Point: A new RO-RO terminal will have to be constructed when opening a new RO-RO route.

4) Overall Development Direction

The Muara-Labuan RO-RO operation shows a good example in relation with ASEAN RO-RO shipping development in terms of efficient customs clearance, mutual recognition of vehicles and vehicle insurances, and good access roads to RO-RO terminals. The RO-RO operator intends to increase its daily frequency from one round trip to two round trips. In this connection, the Labuan RO-RO terminal needs to be improved for smooth vehicle movement.

Between Labuan and Brooke's Point, there is no possible diverted traffic in both cargo and passenger. One developmental point is to modernize the existing NCV service to RO-RO service. In fact, it is reported that Brooke's Point has small NCV traffic to Borneo, such as Kudat, the nearest port town in Sabah.

When introducing RO-RO service on the route, Brooke's Point will need a RO-RO terminal while the other two connecting ports, Labuan and Muara, will need terminal expansion considering that a much larger RO-RO vessel, compared with MV Shuttle Hope (482 GT), is planned due to much longer sailing distance on the outer sea condition.

From a route development viewpoint, Muara and Labuan are far from Brooke's Point, (261-281 nautical miles) and little backload cargo is expected. It is realistic to elaborate RO-RO shipping service on a shorter route on the corridor where at least NCV trade is currently robust.

12.5 The Muara – Zamboanga Route

1) Traffic Demand

Although the ports of Muara and Zamboanga deal with some cargo handling volume, the Study does not observe any direct seaborne traffic between the two ports, nor air traffic for that matter. The situation may be explained by the long sailing distance (537 nm) and the little need for trade. According to trade statistics, the Philippines exports non-alcoholic beverage and chicken to Brunei Darussalam to some extent while almost no backload cargo is recorded. The NILIMJ study predicts a small quantity of container traffic (388 TEU) between Visayas/Mindanao and Brunei Darussalam in 2020. It is noted that stakeholders at Muara and Zamboanga did not show any business plans and ideas which may stimulate traffic on the route.

Due to no existing and possibly diverted traffic and no likely induced traffic on the route, it is not practical to expect any traffic demand to justify a new RO-RO shipping operation.

The Zamboanga – Sandakan route (249 nm) is supposed to be the northern half of the surveyed route. The route has provided international cargo and passenger shipping services since 2001. NILIMJ predicts 24,543 TEU on the route in 2020 as a result of traffic assignment exercise if RO-RO service is provided between Zamboanga and Sandakan.

Table 12.9 Growth Forecast at Ports and Their Hinterlands by Various Sources

Source	Region	Annual Demand Forecast	2010	2015	2020
(1)	Muara	Container Cargo (000 TEU)	120	135	157
		Break Bulk Cargo (000 MT)	568	688	848
	Zamboanga	Container Cargo (000 TEU)	66	81	92
		Break Bulk Cargo (000 MT)	714	835	930
(2)	Brunei -> Visayas/Mindanao	Container Cargo (TEU)		*) not on route	98 (0.5%)
	Visayas/Mindanao -> Brunei			*) not on route	290 (0.2%)
Source	**Region**	**Annual Growth Ratio**	**2010-2015**	**2015-2025**	**2025-2035**
(1)	Muara	Container & Break Bulk	3.6%	4.1%	
	Zamboanga	Container & Break Bulk	3.3%	2.2%	
(3)	Western Mindanao	Population	1.8%	1.6%	
		GDP per capita	4.0%	5.3%	
(4)	Brunei Darussalam	Population	1.7%	1.3%	1.0%
		GRDP per capita	6.7%	2.4%	1.9%
		Intra-ASEAN Trade	1.4%	0.5%	0.4%
		Intra-ASEAN Tourists	1.7%	0.6%	0.4%
	Philippines	Population	1.7%	1.5%	1.3%
		GRDP per capita	4.2%	5.0%	7.1%
		Intra-ASEAN Trade	2.4%	2.4%	2.6%
		Intra-ASEAN Tourists	4.0%	3.6%	3.6%

Note: Some data of target ports are not forecasted by the other studies and they are cleaned in the table. Some related ports are included although some data do not correspond with target ports.

Source: (1) Project Priority to Upgrade Performance and Capacity by JICA, OCDI, MRI, Ides in March 2011; (2) NILIMJ Research Report, December 2009; (3) ADB Report TA No.4204-INO (BIMP-EAGA/IMT-GT) *Corridor traffic includes speculative addition; and (4) This JICA study

2) RO-RO Ship Type and Size

The distance between Muara and Zamboanga is approximately 537 nm. The Sulu Sea is generally calm but rough sea conditions could be a concern. The ship can be over a medium-sized RO-RO vessel from the viewpoint of distance regardless of traffic demand.

3) RO-RO Terminal and Facilities

Port of Muara: The same as discussed in the previous section.

Port of Zamboanga: No RO-RO terminal is available in the port. It must be newly developed at an adequate location in the port.

4) Overall Development Direction

Demand shortage is the most critical issue when opening a RO-RO route between Zamboanga and Muara. Considering the existing trade and relevant stakeholders' perceptions, this issue may not be solved in the short term. In the long term, two approaches will be taken simultaneously: (1) expanding trade, and (2) introducing RO-RO service on a shorter section of the whole stretch.

It is, therefore, suggested that the initial RO-RO shipping route be between Zamboanga and Sandakan. However, both the ports need to develop RO-RO terminals. Next, the RO-RO shipping route will be extended to the west coast of Borneo such as Kudat, Kota Kinabalu, and finally accessible to Muara.

Figure 12.2 Existing Route and New RO-RO Route

12.6 The Davao / General Santos – Bitung Route

1) Traffic Demand

Manado is the mother city of Bitung port and the city holds a sister city relationship with Davao. The economic and social connection of the two large cities is strategically important in both South Mindanao and North Sulawesi. General Santos is located nearer to Manado and it is linked with Davao by an intercity highway of 161 km.

The Study is faced with difficulty in grasping shipping traffic volume on the route due to the unsuccessful introduction of modern liner shipping in the past and the prevailing so-called barter trade by NCVs using the Sangihe Islands as a midway point.

Several sources indicate seaborne traffic and related socio-economic indicators as shown in Table 12.10.

The NILIMJ Research Report 2009 projects a container flow of 3,822 TEU between Mindanao and Sulawesi in 2020. However, the volume does not include unofficial trade activity such as barter trade.

At present, there is no liner shipping service between Bitung and Davao/Gensan. Most of the general cargo, grain foods, bagged cargo and perishable goods are traded at Tahuna, the Sangihe Islands. In 2011, steel-hulled general cargo vessels traded 39,767 tons (refer to Table 8.9 and Table 8.10).

Table 12.10 Growth Forecast at Ports and Their Hinterlands by Various Sources

Source	Region	Annual Demand Forecast	2010	2015	2020
(1)	Davao	Container Cargo (000 TEU)	355	444	524
		Break Bulk Cargo (000 MT)	114	134	149
	General Santos	Container Cargo (000 TEU)	118	162	203
		Break Bulk Cargo (000 MT)	200	234	261
	Bitung	Container Cargo (000 TEU)	80	131	184
		Break Bulk Cargo (000 MT)	597	1,140	1,970
(2)	Mindanao -> Sulawesi	Container Cargo (TEU)			271 (0.2%)
	Sulawesi -> Mindanao				3,551 (1.8%)
Source	**Region**	**Annual Growth Ratio**	**2010-2015**	**2015-2025**	**2025-2035**
(1)	Davao	Container & Break Bulk	4.3%	3.1%	
	General Santos	Container & Break Bulk	4.5%	3.2%	
	Bitung	Container & Break Bulk	13.4%	11.1%	
(3)	Southern Mindanao	Population	2.1%	1.9%	
		GDP per capita	3.6%	4.8%	
	North Sulawesi (incl. Gorontalo)	Population	0.6%	0.3%	
		GDP per capita	5.6%	7.3%	
	Corridor Traffic N. Sulawesi - C. Mindanao	Cargo (weight, two way)	11.0%	7.0%	
		Sea Passengers	2.6%	2.1%	
(4)	Philippines	Population	1.7%	1.5%	1.3%
		GRDP per capita	4.2%	5.0%	7.1%
		Intra-ASEAN Trade	2.4%	2.4%	2.6%
		Intra-ASEAN Tourists	4.0%	3.6%	3.6%
	Indonesia	Population	1.0%	0.8%	0.5%
		GRDP per capita	5.0%	5.4%	7.1%
		Intra-ASEAN Trade	2.4%	2.2%	2.3%
		Intra-ASEAN Tourists	3.6%	3.0%	3.0%

Note: Some data of target ports are not forecasted by the other studies and they are cleaned in the table. Some related ports are included although some data do not correspond with target ports.

Source: (1) Project Priority to Upgrade Performance and Capacity by JICA, OCDI, MRI, Ides in March 2011; (2) NILIMJ Research Report, 2009; (3) ADB Report TA No.4204-INO (BIMP-EAGA/IMT-GT) *Corridor traffic includes speculative addition; and (4) This JICA study

Currently, the corridor has small passenger traffic by means of both air and sea. Taking the corridor characteristics into account, substantial passenger demand cannot be anticipated as follows:

- The route is lengthy. The sailing route is 302 nautical miles and, thus, it must take 18 hours sailing at a speed of 17 knots on the average.
- On the route, a large flow of workers and immigrants cannot be expected since job opportunities with their wage scales are not so different between South Mindanao and North Sulawesi.
- There is no mass tourism center on the routes, like Bali and Phuket.

The Study does not anticipate substantial passenger demand by RO-RO vessel.

Table 12.11 Daily RO-RO Shipping Demand Forecast

	Present	2015	2020	2025
Daily Passengers	None	No. of drivers + α	No. of drivers + α	No. of drivers + α
Daily RO-RO Cargo (TEU equivalent)	None	29	42	59

Source: JICA Study Team

2) RO-RO Ship Type and Size

The distance between Davao and General Santos is approximately 154 nm and the distance between Bitung and General Santos is 302 nm. The suitable ship size mainly depends on the service frequency expected; roughly expecting two round trip services a week, a medium-sized RO-RO service will be investigated in a further study.

3) RO-RO Terminal and Facilities

Port of Bitung: Pier II (Alexa) is a candidate site for RO-RO operation. Taking a suitable RO-RO ship size into account, site availability will be carefully assessed including berth occupancy, traffic lines, car parking, passenger facility, etc.

Port of Davao: There is a plan which includes such components as the rehabilitation of present facilities, expansion of port area, construction of a RO-RO terminal, and relocation of plant/animal quarantine office. The port (Sasa) is now very congested. The numerous holes on the concrete pavement of the wharf pose danger to both vehicles and people. The site of the proposed RO-RO terminal is now occupied by informal settlers. Under such situations, it is difficult for international RO-RO vessels to pay port-of-calls to Davao for the coming several years.

Figure 12.3 Congested and Deteriorated Sasa Wharf (Davao Port)

Port of General Santos: There are RO-RO facilities at the west edge of the port area. In addition, a passenger terminal and a gate complex are planned to be constructed near the RO-RO facilities. In contrast to Sasa Port, the port (Makar) has recently expanded and the wharf is not crowded, and in good condition.

Based on the proposal of the study, applicability of the present RO-RO facilities to the proposed plan are assessed and the plan of a passenger terminal and a gate complex shall be reviewed. If they may be applicable for the proposed plan with not much modification, the plan of a RO-RO terminal shall be prepared there.

4) Overall Development Direction

Past attempts to introduce modern shipping eventually failed due to demand shortage. The stakeholders who were involved in those attempts pointed out poor preparation for opening a new international route. Collaboration works between both the sides must be highly appreciated, including joint PR and marketing, CIQS and other institutional coordination, etc.

Shipping modernization must focus on NCVs engaged in unofficial barter trade. Due to its unofficial status, there is no data and statistics to analyze such NCV services. It is important to understand their situations and modern shipping needs among NCV users. In this sense, a traffic and interview survey is a prerequisite prior to the modernization challenge.

On the route, cargo demand is uncertain and passenger demand is questionable as stated earlier. If substantial passenger demand segments could not be found among the stakeholders, a ship design would allocate very moderate passenger space for only vehicle drivers and a few more passengers.

As a result of the comparative ocular surveys, the Study has selected General Santos Port (Makar Wharf) rather than Davao Port (Sasa Wharf) as a counterpart port of Bitung. Makar will be able to accommodate an international RO-RO vessel with minor improvement by 2015.

Road can efficiently connect General Santos with Davao. If seaway is selected, the inter-city route must be detoured around the Davao Gulf and the Sarangani Bay or 285 km in total. But the intercity highway is much shorter, at 161 km. If there is small consignment such as 10-ton cargo on the route, a trucker charges this service at around US$ 234, allowing 5 hours for delivery. However, there is no such small consignment shipping service available on the route. Only truck is the prevailing service while shipping may not compete with it in the case of small consignment.

12.7 The Johor – Sintete Route

1) Traffic Demand

Malaysia designates the Tanjung Belungkor Ferry Terminal (TBFT) as the subject to the Study. TBFT currently accommodates only passenger boats.

The Study observed no direct liner shipping service between Sintete Port and Johor. Sintete Port is a small river port which can accommodate up to a 1,000 GRT vessel. In 2009, the port received 400 domestic shipping vessels and 162,626 GRT in total, 407 GRT per vessel on the average. There are some traded goods between West Kalimantan and Johor State and the trading volume, particularly container cargo, will be expanding according to NILIMJ. If Sintete Port would participate in such Johor trade, the port should improve its port facilities as well as the access channel and the access road.

Passenger movement between Johor and West Kalimantan by means of both air and sea is almost nil. As a result, almost no diverted traffic is anticipated when a new RO-RO shipping service is introduced.

It is more difficult to expect induced traffic along with new shipping service, as was gleaned from discussions with the stakeholders of West Kalimantan during the field survey.

Table 12.12 Growth Forecast at Ports and Their Hinterlands by Various Sources

Source	Region	Annual Demand Forecast	2010	2015	2020
(1)	Johor	Container Cargo (000 TEU)	856	920	967
		Break Bulk Cargo (000 MT)	2,297	3,044	3,805
	Pontianak	Container Cargo (000 TEU)	120	152	165
	*) not target port	Break Bulk Cargo (000 MT)	1,348	1,581	1,678
(2)	Johor -> Kalimantan	Container Cargo (TEU)		*) not on route	2,901 (0.3%)
	Kalimantan -> Johor			*) not on route	12,367 (5.0%)
Source	**Region**	**Annual Growth Ratio**	**2010-2015**	**2015-2025**	**2025-2035**
(1)	Johor	Container & Break Bulk	4.7%	3.8%	
(3)	West Kalimantan	Population	1.2%	0.8%	
		GDP per capita	3.2%	4.1%	
(4)	Malaysia	Population	1.6%	1.4%	1.1%
		GRDP per capita	6.7%	5.9%	4.9%
		Intra-ASEAN Trade	2.1%	1.6%	1.2%
		Intra-ASEAN Tourists	2.7%	2.0%	1.4%
	Indonesia	Population	1.0%	0.8%	0.5%
		GRDP per capita	5.0%	5.4%	7.1%
		Intra-ASEAN Trade	2.4%	2.2%	2.3%
		Intra-ASEAN Tourists	3.6%	3.0%	3.0%

Note: Some data of target ports are not forecasted by the other studies and they are cleaned in the table. Some related ports are included although some data do not correspond with target ports.

Source: (1) Project Priority to Upgrade Performance and Capacity by JICA, OCDI, MRI, Ides in March 2011; (2) NILIMJ Research Report, December 2009; (3) ADB Report TA No.4204-INO (BIMP-EAGA/IMT-GT) *Corridor traffic includes speculative addition; and (4) This JICA study

2) RO-RO Ship Type and Size

The distance between Johor and Sintete is 321 nm. Generally speaking, a medium size RO-RO ship at least shall be opted although the route demand may not be sufficient and the port of Sintete cannot receive such a medium-size vessel or a vessel of some thousand GRT.

3) RO-RO Terminal and Facilities

Port of Belungkor, Johor: There is a terminal which was designed and constructed as a RO-RO terminal. The terminal provides mooring facilities with a ramp, an access bridge and roads with separated passenger lanes, facilities and equipment for passport control, customs clearance and quarantine procedures, waiting rooms and parking area and ticket selling booths, etc. At present, only a part of the facilities is used by passenger vessels; facilities for vehicles are not used.

If and when RO-RO service starts again, this terminal may be used. However, if a different type or size of design vessel is deployed, it should be examined whether present facilities are suitable or not. Appropriate measures should be taken as necessary.

Port of Sintete, West Kalimantan: The port has fundamental problems, i.e., shallow access channel, short quay and small port land area. This means that it is difficult to prepare a RO-RO terminal in the port at present. When the port must accommodate RO-RO vessels, a new RO-RO terminal will have to be constructed at a new site next to the present port or nearby.

4) Overall Development Direction

The two ports have different conditions and thus different approaches to develop ASEAN RO-RO shipping are taken.

Port of Belungkor: Johor State intends to develop sub-regional RO-RO routes from the Port of Belungkor to Singapore, Batam, other Riau ports and others, in line with various investments in the state. The port is located near the mouth of Johor River, 90 km away from Johor Bahru. It is not convenient from the state capital. But, as many investment projects are ongoing along the Johor River and the eastern seaboard of the state, the location will become more strategic. The RO-RO connection with West Kalimantan is one option in spite of having no current shipping demand.

Port of Sintete: It is a small river port with sluggish cargo throughput in recent years. To use this port, port infrastructure must be improved and a RO-RO terminal must be developed on an expanded site. Only one advantage to use the port for the trade with Johor is its proximity to Johor. But the existing access road to Pontianak is damaged. Without access road improvement, locational advantage cannot be actualized.

Under the current situation of almost no diverted traffic from the existing shipping activities and no induced traffic ideas among the stakeholders, it is not realistic to introduce an international RO-RO shipping route on the corridor in the near future by 2015.

To foster such a new shipping opportunity, the Study suggests the following route preparation works in line with the improvement of Sintete Port with its access road:

- Cargo demand: The present domestic shipping route between Sintete and Batam, Tanjung Pinang and other Riau ports located in front of Johor State will be activated and commercialized from the current subsidized status, including export cargo to Johor.
- Vehicle and passenger demand: A pioneer (subsidized) RO-RO route will be developed between Sintete and Tanjung Pinang or Batam while a similar government trial will be done between Johor and Kuching, Sarawak. They intend to primarily stimulate vehicle and passenger traffic between domestic markets across the South China Sea without any inter-state institutional barriers.

Through those efforts, it is expected that a new international RO-RO shipping market will emerge in the long run.

Figure 12.4 Existing Subsidized Routes and New RO-RO Route

12.8 The Tawau – Tarakan – Pantoloan Route

1) Traffic Demand

On this route, there is a certain possibility to open a RO-RO service because there is ferry demand and barter trade cargo movement at present between Tawau, Sabah and Tarakan, East Kalimantan. However, the volumes are not so large and local economies do not eagerly desire additional and/or new shipping services. In this connection, it is noted that one ADB report forecasts a sharp cross-border cargo traffic growth by 10.7% between Sabah and East Kalimantan during the period 2011-2015.

On the other hand, the Tarakan – Pantoloan route intends to connect two Indonesian ports as an extension of international RO-RO service. There exists no domestic liner service, including RO-RO vessel. Central Sulawesi exports cargo to Malaysia, i.e. $154 million in 2009 or 53% of the total export value. In the same year, 130,000 MT of export cargo was shipped out from Pantoloan Port via Jakarta or Surabaya.

Table 12.13 Growth Forecast at Ports and Their Hinterlands by Various Sources

Source	Region	Annual Demand Forecast	2010	2015	2020
(1)	Tawau	Container Cargo (000 TEU)			
		Break Bulk Cargo (000 MT)			
	Balikpapan	Container Cargo (000 TEU)	88	144	201
	*) not target port	Break Bulk Cargo (000 MT)	103	119	125
(2)	Sabah -> Kalimantan	Container Cargo (TEU)		*) not on route	2,739 (0.3%)
	Kalimantan -> Sabah			*) not on route	11,675 (4.7%)
Source	**Region**	**Annual Growth Ratio**	**2010-2015**	**2015-2025**	**2025-2035**
(3)	Corridor Traffic	Cargo (weight, two way)	10.7%	6.6%	
	E. Kalimantan - Sabah	Sea Passengers	4.4%	0.8%	
(4)	Malaysia	Population	1.6%	1.4%	1.1%
		GRDP per capita	6.7%	5.9%	4.9%
		Intra-ASEAN Trade	2.1%	1.6%	1.2%
		Intra-ASEAN Tourists	2.7%	2.0%	1.4%
	Indonesia	Population	1.0%	0.8%	0.5%
		GRDP per capita	5.0%	5.4%	7.1%
		Intra-ASEAN Trade	2.4%	2.2%	2.3%
		Intra-ASEAN Tourists	3.6%	3.0%	3.0%

Note: Some data of target ports are not forecasted by the other studies and they are cleaned in the table. Some related ports are included although some data do not correspond with target ports.

Source: (1) Project Priority to Upgrade Performance and Capacity by JICA, OCDI, MRI, Ides in March 2011; (2) NILIMJ Research Report, December 2009; (3) ADB Report TA No.4204-INO (BIMP-EAGA/IMT-GT) *Corridor traffic includes speculative addition; and (4) This JICA study

If RO-RO service could capture all the shipping passengers and cargoes between Tawau and Tarakan instead of the current fast passenger boats and NCVs for barter trade, the daily volume would be 60 persons and 40 tons under the present situation. It is considered the maximum diverted traffic. The volume will increase according to the growth ratio of intra-ASEAN trade and intra-ASEAN tourists.

If new products, such as fishery products, orange and rattan products promoted by the province, are developed in Central Sulawesi, the cargo volume can be pushed up. And the plan to develop a 35 hectare industrial area in Tarakan within the next ten (10) years will also generate cargo demand. But it may be difficult to attract more passengers because of the current competition with LCCs.

Table 12.14 Daily RO-RO Shipping Demand Forecast based on Diverted Traffic between Tawau and Tarakan

	Present	2015	2025	2035
Daily Passengers	(60)	70	110	140
Daily RO-RO Cargo (Ton)	(40)*	60	70	90
Export Items from Tawau	Manufacturing goods, Sugar			
Export Items from Tarakan/Pantoloan	Food, Agricultural Products			

*) not by RO-RO

Source: JICA Study Team

On the Tarakan – Pantoloan route, there is no possible diverted traffic since there is no existing shipping service, as well as there is no likely induced traffic as results of the stakeholder meetings in Palu showed.

2) RO-RO Ship Type and Size

The distance between Tawau and Tarakan is approximately 82 nm. Looking at the small traffic demand and required service frequency, further sea conditions, a small or medium size RO-RO ship will be opted. Ship details need to be elaborated along with the particular berth conditions.

On the Tarakan – Pantoloan route (281 nm), however, it is sufficiently long to assign over middle-sized RO-RO ship and it must have enough seaworthiness on the outer sea condition.

3) RO-RO Terminal and Facilities

Port of Tawau: The barter trade wharf can be a candidate RO-RO terminal from the viewpoints of location, usage conditions, the structure and the available parking area adjoining the wharf. However, the tidal range of the port waters is more than 3.0 meters and there are big difficulties including the cost for improving the facility in order to meet such a large tidal difference. The area where floating pontoon type passenger terminals are located is also a candidate, but the depth of the water area basin is too shallow for RO-RO vessels to use.

There is no ready-made site for a RO-RO terminal. It may be prepared by making use of the present infrastructure with minimal improvement.

Port of Tarakan: Similarly, the tidal range of the port waters reaches more than 3.5 meters in spring and this would also entail major costs for improving the facility to meet such a large tidal difference.

If the existing domestic ferry terminal (Juwata Port) is used for international RO-RO service, additional improvement may be small. However, the location is a bit far, 12km away from the city center.

In the case of Malundung Port, a new RO-RO terminal must be prepared like Tawau.

Port of Pantoloan: It is presumed that the natural conditions pose no crucial problems for RO-RO operation. However, the existing facilities are not good for a RO-RO terminal. In addition, shortage of capacity is one of the problems of the port and there may not be room to accommodate RO-RO vessels.

It is necessary to construct a new terminal for RO-RO operation if the RO-RO service operation is planned at the port. The possibility of using Taipa Port located near the port of Pantoloan shall be examined as well as construction of a terminal at the port of Pantoloan.

4) Overall Development Direction

(1) Tawau – Tarakan

The two economies have a historical daily traffic of people and cargo. The navigational distance, 82 nm, is regarded suitable to assign RO-RO vessels. To make it operational, however, this candidate route must overcome the following issues:

- Passenger: Presently, air and fast boat services compete on the Tawau – Tarakan route. The latter users are considered cost-sensitive. The relatively slower RO-RO service must set a lower tariff to urge the existing fast boat users to use the RO-RO.
- Vehicle: Tawau's road network in Sabah is in good condition. On the other hand, Tarakan is an island society without a bridge to the mainland. When Tarakan is bridged with the mainland, which is expected to be completed in 2014, active vehicle movement will happen on the corridor.
- Cargo: Some barter trade items are durable and they prefer least cost transportation service such as that by NCVs. Marketing efforts are inevitable to find suitable local cargo to be transported by RO-RO service.
- Demand in Nunukan: Nunukan, an Indonesian border town, is located between Tawau and Tarakan. It has strong economic and social ties with Tawau. When preparing a RO-RO service route, it is advisable to drop by Nunukan as long as the port can accommodate a RO-RO vessel.
- Ship and Terminal: Taking local demand size and route distance into account, the suitable RO-RO vessel size may be a compact one. But there is a big tidal variation on the route. Suitable RO-RO terminals as well as RO-RO vessels must be designed for such big tidal variation.

(2) Tarakan - Pantoloan

It is a domestic route, 281 nm, across the Makassar Strait. If there would be a large RO-RO shipping demand to Sabah, Malaysia, a direct RO-RO shipping service could be applicable via Tarakan. At present, however, there is no domestic RO-RO service even between Tarakan and Pantoloan.

The Study Team observed that the province of Central Sulawesi is keen on agricultural plantation expansion and agro-industry such as orange and cacao. Sabah, Malaysia is considered a potential market in the future. To realize local aspirations to expand international markets, the following development direction is suggested:

- Firstly, a new domestic RO-RO route will have to be developed between Tarakan and Pantoloan. Tarakan is the gateway city to Sabah. The Central Sulawesi economy will try to access the market in Sabah through Tarakan.
- Secondly, when the market access volume from Central Sulawesi to Sabah becomes significantly sizeable, a new international RO-RO shipping service will be discussed between Tawau and Pantoloan probably via Tarakan.
- During the first phase, the existing RO-RO terminal (Taipa Port) will be used. During the second phase, a new RO-RO terminal will be considered at Pantoloan Port depending on the RO-RO ship type and size.

Figure 12.5 Existing and New RO-RO Routes

13 PRIORITY ROUTES

13.1 Selection Criteria

1) Criteria from Study Inception

The Brunei Action Plan (ASEAN Strategic Transport Plan) 2011-2015 describes RO-RO shipping development in two phases: by 2012 this Study would be conducted, and by 2015 the proposed measures of the Study shall be implemented.

The Study has surveyed and analyzed eight (8) RO-RO shipping candidate routes. The list originally came from the TOR prepared by ASEAN with some amendments during the deliberation on the Inception Report.

In the previous chapters, the Study observed that the candidate routes vary according to potential demand, available infrastructure and institutional preparedness. This situation makes it far too impractical to implement RO-RO shipping at all the candidate routes by 2015.

In order to prepare for early implementation by 2015, the Inception Report states that a couple of routes out of all the candidate routes will be selected as priority RO-RO shipping development routes in the form of a shortlist.

In the selection process, priority routes may have the following criteria:

(1) There must be existing traffic and part of it would be diverted to RO-RO shipping;

(2) RO-RO shipping service can be introduced by 2015 as a sustainable transport system, consisting of vessel, terminal, access road and others; and

(3) Route countries commit to provide efficient CIQS services and an attractive regulatory framework for RO-RO shipping operators in their investment planning and marketing.

The foregoing statement was approved during the 23rd ASEAN Maritime Working Group Meeting at Yangon in March 2012. Therefore, it was adopted as the selection criteria.

2) Some Associated Factors with the Selection Criteria

In order to expect a larger impact of the Study under the context of technical assistance with joint undertaking between ASEAN and Japan and likely implementation phase after the Study, the following associated factors are considered:

- To appreciate local enthusiasm to introduce international RO-RO shipping service: Local enthusiasm is defined to prepare RO-RO shipping service, conduct a pilot project and discuss such undertakings at the route connecting countries and local economies;
- To select different types of RO-RO vessels to enhance technical assistance impact: RO-RO shipping has a variety of types in terms of route, demand and assigned vessel. Provided that priority routes would be studied by limited resources, different shipping types could be selected to enhance the impact of technical assistance; and
- To evaluate business profitability and sustainability: The priority routes which would be developed by 2015 must have sound financial viability to continue operation in a sustainable manner.

13.2 Route Evaluation

1) Findings in the First Field Survey

(1) Existing traffic that can be diverted

In regard to the first criterion, the Survey observed only two routes which have existing shipping traffic. They are both Malacca Strait crossings:

- The Belawan – Penang route; and
- The Dumai – Malacca route.

The Study observed two more sections which have existing traffic on parts of the routes. They are:

- The Muara – Labuan section of the Muara – Labuan – Brooke's Point route; and
- The Tawau – Tarakan section of the Tawau – Tarakan – Pantoloan route.

Two sections have international shipping traffic, although they are not exactly on the surveyed routes:

- An international cargo and passenger shipping route between Zamboanga and Sandakan along the Zamboanga – Muara route; and
- A historical trading route between Manado and Glan via Sangihe Islands or its minor route variations along the Davao – General Santos – Bitung route.

The Study did not observe any international shipping traffic on the remaining two routes of Phuket – Belawan and Johor – Sintete.

For route evaluation, existing traffic conditions are divided into three ranks such as A, B and C by route section. Rank C routes are not suitable for early implementation.

- Rank A (observed existing traffic on the entire stretch):
  - The Belawan – Penang route
  - The Dumai – Malacca route
- Rank B (observed existing traffic on part of the route):
  - The Zamboanga – Muara route
  - The Davao/Gensan – Bitung route
  - The Muara – Labuan – Brooke's Point route
  - The Tawau – Tarakan – Pantoloan route
- Rank C (observed no existing traffic):
  - The Belawan - Phuket route
  - The Johor – Sintete route

(2) Available infrastructure

The Study observed that all of the seventeen (17) surveyed ports have adequate access roads but two ports suffer from shallow access channels. They are Brooke's Point (2.3 m) and Sintete (3.4 m).

International RO-RO shipping service is currently provided at the Muara – Labuan section, and both the ports have RO-RO terminals for small RO-RO vessels and with CIQS facilities. The Tanjung Belungkor Ferry Terminal is operated for international service. Other ports are

classified as either an available RO-RO terminal without CIQS facilities or a RO-RO terminal itself is not available.

For route evaluation, existing port conditions are divided into four ranks such as A, B, C, and D:

- Rank A (international RO-RO terminal available):
  - Muara Port (only for small RO-RO)
  - Labuan Port (only for small RO-RO)
  - Johor Port
- Rank B (RO-RO terminal available without CIQS):
  - Belawan
  - Phuket
  - Dumai
  - General Santos
  - Bitung
  - Tarakan (only for small RO-RO)
  - Pantoloan (only for small RO-RO)
- Rank C (No RO-RO terminal available):
  - Penang
  - Malacca
  - Zamboanga
  - Davao
  - Tawau
- Rank D (Incapable of acceptance of RO-RO vessel):
  - Brooke's Point
  - Sintete

For early implementation, the Rank C ports are faced with difficulty. It is urgently required for the responsible port authority/operator to designate an international RO-RO terminal site with the necessary construction/modification budget. The Rank D ports are physically disqualified.

For route evaluation, a more problematic port among the ports on the route must be representatively rated.

(3) Institutional arrangement

Since international shipping movement is orderly regulated under the principle "freedom of the sea" among the five (5) surveyed countries, the Study has not observed any international shipping-related institutional issue at large. But many issues may be brought about by international vehicle movement or transit vehicular traffic in a foreign country.

Through the discussions with responsible authorities, it is understood that Brunei Darussalam, Malaysia and Thailand have accepted foreign transit vehicles from both sea and land by their own regulatory frameworks. However, the customs authority of Indonesia treats a sea-borne transit vehicle as temporary imported goods, requiring the vehicle driver

to deposit a customs guarantee bond. The Philippines treats transit vehicles only as imported goods and, thus, requires payment of a regulated import duty. In regard to imported vehicles, right-hand-drive vehicles are strictly not permitted to enter the country. In addition, vehicles that are five years old or older are not allowed to be brought in.

Under the current customs administration, any international RO-RO shipping route cannot be opened with Indonesia or the Philippines. However, all the (8) eight surveyed routes in the Study are connected with Indonesia or the Philippines or connected with each other. Therefore, it is highly expected that the transport authorities of Indonesia and the Philippines would successfully coordinate with their customs authorities to grant temporary admission to road vehicles.

For route evaluation, existing institutional development and actual arrangement in relation to international RO-RO shipping has two rankings:

- Rank A (possible acceptance of foreign transit vehicles without tax and guarantee deposit):
  - Brunei Darussalam
  - Malaysia
  - Thailand
- Rank B (difficult acceptance of foreign transit vehicles without tax and guarantee deposit):
  - Indonesia
  - Philippines

For route evaluation, a more problematic country on the route must be representatively rated.

2) Evaluation Results

The evaluation results are tabulated below. The results show that there is no ideal candidate route which may be rated triple-A in demand, infrastructure and institutional readiness.

For early implementation, two Malacca Strait crossing routes seem viable since they have likely convertible traffic. However, Malaysia has a port issue and Indonesia has an institutional issue to be overcome by 2015.

It is observed that the Dumai – Malacca route has higher business viability than the Belawan – Penang route because the route distance and calm sea conditions allow small ROPAX. On the other hand, middle to large ROPAX is suitable on the Belawan – Penang route, taking the longer distance and seasonal rough sea conditions into account. It must require much more marketing efforts to make it financially sustainable.

Among the routes which are ranked B in demand, the route between Bitung and General Santos has few port issues since they are the rank B ports. The Davao Port manager agrees with their delayed participation in an international RO-RO route due to the port's obsolete wharf conditions.

In Tawau Port, the existing wharf is not sufficient to develop a RO-RO terminal. However, there is no plan and budget to extend port infrastructure for this purpose.

The Serasa Terminal at Muara Port cannot accommodate over middle-sized RO-RO

vessels although the Zamboanga – Muara route must assign such a vessel due to the long route distance and sea conditions. New RO-RO terminals would be necessary if development of this route would be pursued.

Through a series of consultation meetings with international RO-RO shipping related regulatory agencies among the five (5) route connecting countries, it appears that Brunei Darussalam, Malaysia and Thailand may temporarily admit foreign road transport vehicles without security deposit and the like. On the contrary, it is understood that Indonesia imposes security deposit on foreign transit vehicles from seaways. The Philippines has no temporary admission scheme and thus impose import duty against all foreign vehicles. Since all the eight (8) surveyed routes are connected with Indonesia and/or the Philippines, they all face these institutional issues.

Lastly, the routes without existing traffic (ranked C in traffic) or non-accessible ports by RO-RO vessels (ranked D in infrastructure) may be disregarded in the rating for priority routes. These include the routes of Belawan – Phuket, Johor – Sintete, and Labuan – Brooke's Point.

Based on the aforementioned evaluation and screening exercise, the remaining five (5) candidate routes are duly ranked for prioritization in Table 13.1.

Table 13.1 Priority Evaluation by Route

Rating	Route	Connecting Countries	Divertible Existing Traffic	Available Infrastructure	Institutional Arrangement	Proposed Ship
1	Dumai – Malacca	Indonesia, Malaysia	A	B (Dumai) **C (Malacca)**	**B (Indonesia)** A (Malaysia)	Small ROPAX
2	Belawan – Penang	Indonesia, Malaysia	A	B (Belawan) **C (Penang)**	**B (Indonesia)** A (Malaysia)	Middle to Large ROPAX
3	Davao/General Santos – Bitung	Philippines, Indonesia	B	B (Gensan) B (Bitung) **C (Davao)**	**B (Indonesia)** **B (Philippines)**	Middle RO-RO
4	Tawau – Tarakan – Pantoloan	Malaysia, Indonesia	B	**C (Tawau)** B (Tarakan) B (Pantoloan)	**B (Indonesia)** A (Malaysia)	Small ROPAX
5	Muara – Zamboanga	Brunei Darussalam, Philippines	B	C (Muara) **C (Zamboanga)**	A (Brunei Darussalam) **B (Philippines)**	Middle ROPAX
-	Muara – Labuan – Brooke's Point	Brunei Darussalam, Malaysia, Philippines	B	A (Muara) A (Labuan) **D (Brooke's Point)**	A (Brunei Darussalam) A (Malaysia) **B (Philippines)**	
-	Belawan – Phuket	Indonesia, Thailand	C	**B (Belawan)** **B (Phuket)**	**B (Indonesia)** A (Thailand)	
-	Johor – Sintete	Malaysia, Indonesia	C	A (Tj. Belungkor) **D (Sintete)**	**B (Indonesia)** A (Malaysia)	

Note 1: Divertible Existing Traffic
A - observed existing traffic on the entire stretch
B - observed existing traffic on part of the route
C - no observed existing traffic

Note 2: Available Infrastructure
A - international RO-RO terminal available
B - RO-RO terminal available without CIQS
C - no RO-RO terminal available
D - incapable of acceptance of RO-RO vessel

Note 3: Institutional Arrangement
A - possible acceptance of foreign transit vehicles without tax and guarantee deposit
B - difficult acceptance of foreign transit vehicles without tax and guarantee deposit

Note 4: More critical evaluation results are written in bold.

Source: JICA Study Team

3) Additional Associated Factors to be Considered

(1) Local Enthusiasm

The two Malacca Strait crossing routes (Dumai – Malacca and Belawan – Penang) have shown local readiness to open RO-RO shipping routes. Riau Province has sent some missions to Malacca to discuss this agenda while the Malacca State has appointed a RO-RO operator. The pilot RO-RO shipping project was conducted between Belawan and Penang in 2005.

South Mindanao and North Sulawesi have continuous discussions for economic development and transport linkage including modern liner shipping and regular air service. In November 2012, the local chambers of commerce including Davao City and North Minahasa Regency and other local and private entities signed the Memorandum of Cooperation for the Davao – Gensan – Bitung route.

(2) Technical Assistance Impact

Some vessel types are proposed on the surveyed routes. They are:

- Small ROPAX vessel on the Dumai – Malacca Route and the Tawau – Tarakan route;
- Middle to large ROPAX vessel on the Belawan – Penang route and the Zamboanga – Muara route; and
- Middle RO-RO vessel on the Davao/Gensan – Bitung route.

A couple of routes are selected for priority routes. If different ship types are selected and individual implementation plans are forged out, it may enhance the impact of technical assistance with limited study resources.

(3) Business Profitability and Sustainability

During the first field survey, the Team obtained some additional information on the Penang – Phuket route although it is not listed in the surveyed routes in the Study. They are reported in Chapter 5 and summarized as follows:

- Recently increasing cross-border road traffic between Malaysia and Thailand including tourism bus coaches to Phuket (it is also confirmed at Phuket); and
- Suspended RO-RO shipping operation between Penang and Phuket in the 1990s.

In most cases, the ship is the largest investment in the shipping business. It is important to assign a ship with an adequate workload. In the case of middle ROPAX, it can carry some thousand tons of cargo and some hundred passengers at once. A vessel to be assigned on the Belawan – Penang route must challenge it. It is an interesting idea that a ship will extend from Penang to Phuket as long as substantial demand is there.

13.3 Selected Priority Routes

Based on the foregoing criteria and considerations, the JICA Study Team has selected three priority routes after examining route advantages and business risks. The 24th MYWG as well as the 34th STOM approved them:

(1) **The Dumai – Malacca Route**

Route profile and advantages

i. Various demand segments (passenger, vehicle and cargo) can be anticipated.
ii. Technical ease to assign small ROPAX vessels on the calm and short route.
iii. High local aspiration at both Riau and Malacca as well as high central government priority.

Anticipated risks

i. An appropriate international RO-RO terminal will not be prepared in Malacca.
ii. The Indonesian customs will not accept foreign transit vehicles without security deposit.
iii. Anticipated demand will not be realized due to competition with passenger shipping service, etc.

(2) **The Belawan – Penang – Phuket Route**

Route profile and advantages

i. The Belawan – Penang route has a large potential despite its currently small direct shipping movement.
ii. Due to the route condition, middle to large ROPAX vessel is desirable on the Belawan – Penang route.
iii. One destination of increased land cross-border traffic between Malaysia and Thailand is Phuket as a regional tourism hub. Diverted traffic to RO-RO shipping is expected.
iv. Taking the proposed ship size (middle to large ROPAX) and year-round operation into account, a triangle route with high ship utilization will be more sustainable than a shuttle route.

Anticipated risks

i. An appropriate international RO-RO terminal will not be prepared in Penang.
ii. The Indonesian customs will not accept foreign transit vehicles without security deposit.
iii. An appropriate middle-to-large ROPAX will not be procured or newly constructed due to financial and/or technical reason(s).
iv. Anticipated demand will not be realized due to competition with container shipping, air service, etc.

(3) The Davao/General Santos – Bitung Route

Route profile and advantages

i. Although no liner operation is observed on the route, some attempts were made in the past. The local economies at both sides are keen on introducing modern shipping in line with trade expansion.
ii. Some diverted traffic is anticipated from the historical NCV trade at the Sangihe Islands on the midway.
iii. Judging from route distance and oceanography, middle RO-RO vessel is suitable. Because of very thin air traffic demand and no passenger shipping service on the route, the ship may be dedicated to freight service.
iv. The Port of Davao (Sasa Wharf) is extremely congested and deteriorated. Since it poses danger to the movement of vehicles and passengers, it is advisable to use the Port of General Santos (Makar Wharf) as a RO-RO shipping gateway for South Mindanao for the time being.

Anticipated risks

i. The Indonesian customs and/or the Philippine customs will not accept foreign transit vehicles without security deposit and/or import duty.
ii. Competent RO-RO operator(s) will not come forward to serve the route.
iii. An appropriate middle RO-RO vessel will not be procured or newly constructed due to financial and/or technical reason(s).
iv. Anticipated demand will not be realized.

Dumai – Malacca Route

Belawan – Penang – Phuket Route

Davao/ General Santos – Bitung Route

Figure 13.1 Priority Routes

Part IV

Development Plans

14 THE DUMAI – MALACCA ROUTE

14.1 Planning Methodology

This section describes planning methodology to be commonly adapted to the selected three (3) priority routes.

1) Understanding of RO-RO Shipping Demand in the Study

(1) Potential Demand Segments

A new transport service on a certain route may have three demand segments regardless of transport mode. They are (1) converted traffic from other current services, (2) induced traffic from existing economies and societies, and (3) developmental traffic which will be generated from the new investment.

Taking inherent RO-RO shipping services into account, the three demand segments are further clarified as follows:

i. **Converted traffic**: In the case of RO-RO shipping, the new service may expect existing cargo, vehicle and passenger traffic to be converted to a RO-RO vessel. In particular, containers in a container ship, vehicles driving on roadways and passengers by air or other passenger shipping service may be converted based on users' preference. The competitive edge of RO-RO shipping includes fast and seamless service.

ii. **Induced traffic**: It will be realized after new or more transport services are provided. For example more local residents can go abroad and more local products can be traded after new international RO-RO services are provided. In other words, induced traffic is potential traffic and thus traffic count cannot catch it. In order to estimate such induced traffic, there are two effective tools: stakeholders' interview and traffic modeling.

iii. **Developmental traffic**: The third one also shows new traffic but it is generated from new investment when new or more transport services contribute to better transport environments and thus attract new investment. Therefore it usually takes some time to observe developmental traffic after new or more transport services are provided. In abroad sense, for example, if a RO-RO shipping network is developed and incorporated into road and rail networks, more investment opportunities could be brought about. In order to estimate such developmental traffic without any explicit investment projects, traffic growth projection in line with hinterland economic development is adequate.

As is already obvious, the three traffic demand segments are closely related to each other in response to transport input. When City A decides to develop an outer ring road, it is expected to convert existing traffic to ease traffic congestion at the city center (converted traffic). At the same time, suburban people may use more vehicles and increase trips because of more convenient road network (induced traffic). Finally, new investment will come along the outer ring road to develop factories and shopping malls. Those facilities will attract and generate new traffic (developmental traffic).

Table 14.1 Traffic Demand Segments for RO-RO Shipping

Demand	Cargo	Passengers
Converted Traffic	- General cargo (bagged, boxed) - Container cargo - Reefer container cargo - Other perishable goods	- Price conscious passengers such as overseas workers - Tourists with cars and bus coaches
Induced Traffic	- New international trade items among local productions - New traded cargoes by direct, seamless and small-consignment delivery	- Tourists on new tourism products specially designed with RO-RO shipping - More frequent visitors to meet relatives and receive medical care - Salespeople by hand carry and by car
Developmental Traffic	- Valuable products and parts to be transported under regional division of works in their manufacturing process - More cash crops (vegetables and fruits) and fresh fishery products	- More frequent and diversified people and vehicle movement as the result of an expanded society and economy across the borders

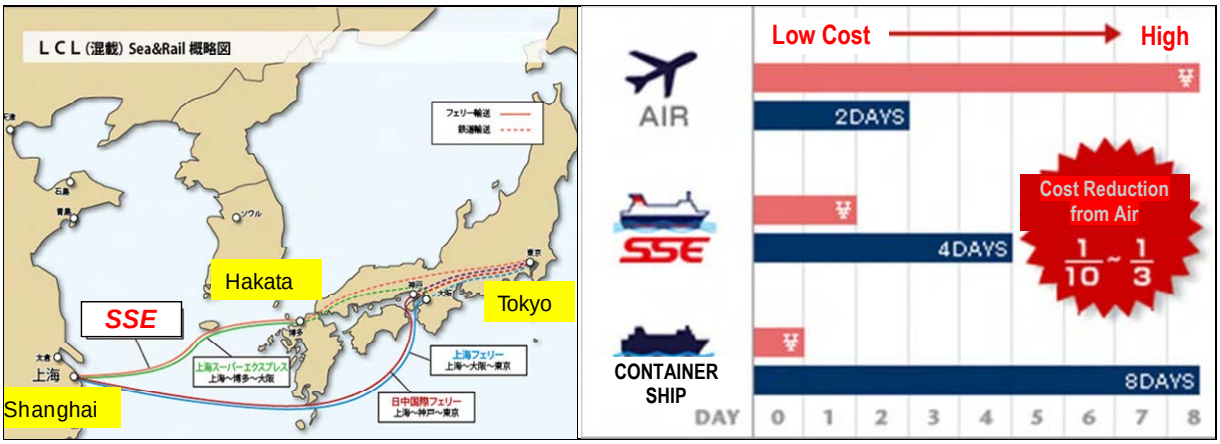
Source: JICA Study Team

(2) Affordable and Niche Market to RO-RO Shipping

Prior to the Study, JICA conducted the international RO-RO shipping study tour with ASEAN participants from Indonesia and the Philippines at Hakata Port in September 2011. They observed the actual RO-RO operation of MV Shanghai Super Express (SSE) which plies between Shanghai and Hakata three times a week or 28 hours per trip.

SSE provides so-called 'SPAT (sea price air time)' service to exploit a niche market between air freight service and container shipping service. Although the freight rate is not officially published, the operator says that SSE reduces travel time by half but the cost doubles in comparison with container ship service on the route from Shanghai's port hinterland to Tokyo where the same connecting rail service is used between Hakata and Tokyo.

SSE and RO-RO shipping in general tries to exploit such an affordable and niche market where faster service than ordinary shipping carriers is provided and lower cost than air carriers is offered.



Note: Cost and time above cover the logistics chain between Shanghai and Tokyo.

Source: SSE Advertisement

Figure 14.1 Location and Market of SSE Service

Source: JICA World, November 2011

Figure 14.2 JICA's RO-RO Shipping Study Tour at Hakata Port

Regional RO-RO shipping experience is limited in ASEAN and thus it is difficult to identify affordable and niche markets to RO-RO shipping services based on their experiences. Under such a situation, other regions' experiences may help ASEAN reveal their RO-RO shipping markets. Since the Study has analyzed regional RO-RO shipping practices in Northeast Asia (Japan, Korea and China) and Europe as reported in Chapter 2, the relevant regional experiences to ASEAN are summarized below:

(Freight service)

- RO-RO shipping mainly transports break-bulk cargo on truck and container on chassis. Northeast Asia's experience shows that RO-RO shipping is competitive on the routes within 400 nm when cargo demand is over 5,000 TEU. RO-RO shipping requires more cargo over 10,000 TEU on longer distance. However extendable distance is up to 1,200 nm (refer to Figure 2.25)

- Even if a regional RO-RO shipping route is successfully introduced, it can hardly overwhelm other ordinary shipping services such as container shipping. For instance, RO-RO shipping accounts for twelve percent (12%) in all sea-borne container traffic among the surveyed 230 container and RO-RO/ROPAX vessels in Northeast Asia in 2010 (refer to Figure 2.2). Twelve percent (12%) is considered the benchmark of RO-RO shipping share in container traffic and it may be applicable to ASEAN.
- RO-RO shipping takes a dominant role to transport containers on UK connecting SSS (short sea shipping) routes, with over 70% on the average (refer to Table 2.17). In the case of Europe, however, RO-RO shipping network was developed before the advent of containerization. In this sense, Northeast Asia's experience is more relevant to ASEAN when partly converting container shipping traffic to RO-RO shipping.
- In some ASEAN waters, NCVs still work actively to meet short shipping needs. However, there may be no experience in Northeast Asia to modernize NCV service to RO-RO shipping. NCVs carry break-bulk cargoes such as bagged and boxed and some bulky cargo. RO-RO vessels can carry those cargoes and therefore NCV cargoes are convertible.

(Passenger service)

- The experiences of Northeast Asia and Europe show that passenger RO-RO service is more sensitive to distance compared with freight RO-RO service. One European study reported that RO-RO and ROPAX have no maritime competitor for short distance up to approximately 280 nm.
- Although LCC service becomes prevalent in Northeast Asia and Europe, ROPAX vessels still keep their operation. Passengers in vehicles are an important and stable clientele of ROPAX service while walk-in-passengers may be affected by LCC service.

(Vessel space utilization)

- For freight RO-RO vessel, a sustainable cargo load factor is estimated at around 50% and more. High load factor is expected by less frequency service such as semiweekly rather than daily due to more cargo collecting time at port.
- For ROPAX vessel, a sustainable vehicle space occupancy rate is estimated at around 50% and more. High occupancy rate is expected by less frequency service such as semiweekly rather than daily due to more vehicle collecting time at port. A low passenger cabin occupancy rate is acceptable since it is designed to capture peak-time demand.

2) Common Assumptions for Demand Forecast

The assumptions described below are applied to all routes.

i) The growth ratio of intra ASEAN trade is formulated by the following on the average between two countries:

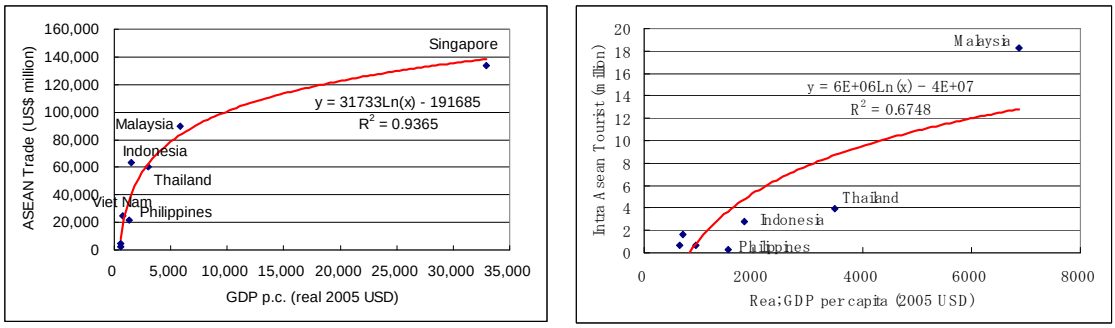
$$Y = 31733 * LN(GDP_{PC}) - 191685 \qquad (R^2 = 0.9365)$$

This formula is estimated by a correlation model of the relations between GDP per capita and intra trade in ASEAN countries, which is shown in Figure 14.3 (left). In this study, only the growth ratio calculated by the model is applied to the volume in the base year by the port to forecast the future because each port has its own characteristic potential and the starting value is different by port.

ii) The growth ratio of intra ASEAN tourists is formulated by the following on the average between two countries:

$$Y = 6081613.6 * LN(GDP_{PC}) - 40914475 \qquad (R^2 = 0.821)$$

This formula of tourists is also estimated by GDP per capita and the number of intra tourists in ASEAN. The growth ratio which is calculated according to this model is used to forecast the future volume.



Note: The figures are discussed in the former chapter.

Source: JICA Study Team

Figure 14.3 Model Formula for Trade and Tourists

iii) The number of vehicles is calculated based on passengers and cargo volume. Passengers in ship include drivers.

iv) The number of passengers is further divided into passengers in cars, passengers in buses and non-vehicle passengers. Average passengers per vehicle are also assumed as 2 per passenger car, 30 per bus and 1.5 per truck. On the General Santos – Bitung route, bus and bus passengers are not forecast as the result of the stakeholder interview.

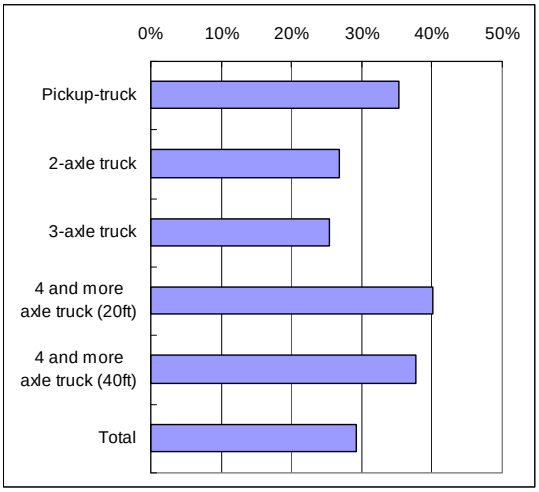
Table 14.2 Assumptions of Passenger Vehicles and Trucks

Average passengers	Passenger car	2	Passenger Transportation Mode	
	Bus	30		
	Truck Driver	1.5	Passenger car	20%
Truck	Average Loaded Ton	8	Bus passenger	70%
	Loaded Truck Ratio	70%	Walking	10%

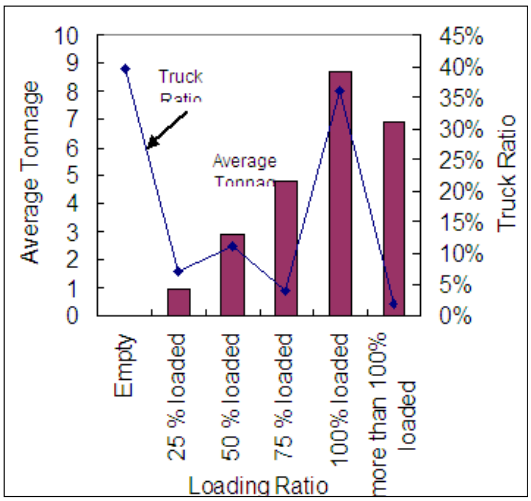
Source: JICA Study Team

v) The average tonnage of trucks with their empty ratio of trucks in this study is assumed as 8 tons with 30% empty ratio. Truck drivers are also counted as passengers in ship.

The empty ratio (30%) was attested by various statistics and surveys. For instance, the Ministry of Land, Infrastructure, Transport and Tourism of Japan published the Automobile Transportation Statistics in 2010, indicating about 30% of empty trucks. JICA studies in the ASEAN region observed an empty truck ratio of around 30% at Tanjung Priok, Indonesia in 2002 and near Ho Chi Minh City, Vietnam in 2011.



Source: JICA Study near Ho Chi Minh in 2011



Source: JICA Study at Tanjung Priok in 2002

Figure 14.4 Examples of Empty Truck Ratio (left) and Empty and Loaded Trucks (right)

vi) The calculated number of passengers and the calculated tons of cargo are rounded off to the nearest ten (10) units.

3) Route-wide Development Planning

The Study has selected the three priority routes in Chapter 13. They are considered pioneering projects for ASEAN and thus they are to be implemented by 2015 as the MPAC envisages. As pioneering undertakings, it is important to make a doable plan to develop a suitable RO-RO shipping system by route. With a plan, infrastructure and institutional development will be suggested with necessary investment in RO-RO vessel. Foreseeable project constraints are addressed at the same time. After the implementation of the priority routes, the experiences will be able to transfer to, or replicated in other ASEAN routes in 2016 and afterwards.

The uniqueness of priority route planning lies on this time requirement. For early implementation, existing infrastructure must be utilized as long as we can even though it limits designing freedom of ship as well as shipping route capacity. It is also assumed that an alternative RO-RO shipping system will exist with other existing shipping services. It means that RO-RO shipping does not need to meet all identified potential demand and change the current transport corridor by way of fierce competition. In this sense, a proposed RO-RO system will be able to enjoy a lions' share only from traffic that is suitable to RO-RO shipping.

Therefore, planning works must be interactive with each other particularly in two connections below: (Refer to Figure 14.5)

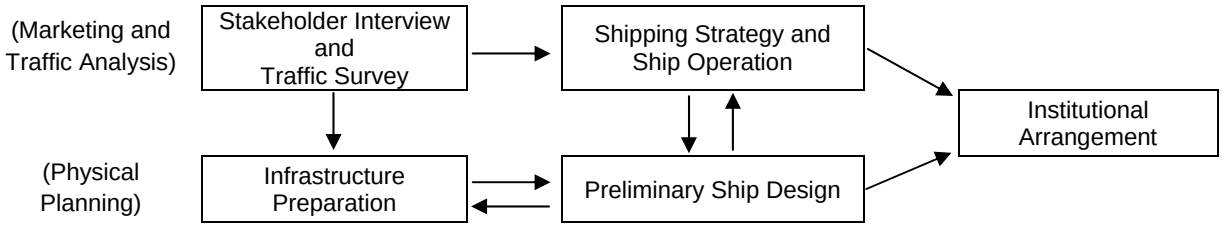
- Port infrastructure, route condition and ship design

  A RO-RO ship is preliminarily designed to have enough seaworthiness on a route and use existing port infrastructure.

- Shipping demand, ship operation and ship design

  Shipping demand at the opening year of 2015 is set at meeting part of potential demand and occupying 50-75% of vehicle/cargo floor in a ship. Ship operation is planned from a marketing viewpoint. A RO-RO ship is also designed for efficient vehicle/cargo operation and attractive passenger space.

Necessary feedback works should be done to work out an optimal RO-RO shipping system.



Source: JICA Study Team

Figure 14.5 Priority Route Planning Workflow

It is assumed that the existing legal and institutional issues for smooth international RO-RO shipping identified in the previous chapters could be overcome by route connecting countries' efforts and the ASEAN cooperation mechanism for ASEAN connectivity development. Those institutional arrangements are suggested in the last section.

14.2 Stakeholders' Views

1) Stakeholder Interview Survey

Stakeholder interview surveys were conducted between August and October 2012 in the key influence areas covered by the three priority RO-RO shipping routes. These surveys aimed to gather data and information on the existing business operations of a sample of target users of the planned RO-RO routes, as well as these stakeholders' future business projections, perceptions and opinions in relation to the planned routes.

The stakeholder interview survey for the Dumai-Malacca route covered a total sample of 23 respondents, including 11 in Pekanbaru, 4 in Dumai, and 8 in Malacca (see Table 14.3). Most of the companies are in Pekanbaru, being Riau Province's center for trade, industry and tourism, where most of administrative offices are based. Some companies also operate factories in Dumai. The Pekanbaru/ Dumai survey included an agricultural producer, a non-agricultural manufacturer, 2 traders, 6 forwarders, and 5 travel and tour operators. The Malacca survey also covered 3 traders, 3 tour operators, a hotel operator, and a hospital operator.

Table 14.3 Profile of Survey Respondents for Dumai-Malacca Route

Region	Shipper/ Manufacturer/ Processor	Trader/ Distributor/ Retailer	Forwarder	Tourism-Related Organizations	Total
Pekanbaru	0	1	5	5	11
Dumai	2	1	1	0	4
Malacca	0	3	0	5	8
Total	**2**	**5**	**6**	**10**	**23**
% Share	**8.7**	**21.7**	**26.1**	**43.5**	**100.0**

Source: Pekanbaru/ Dumai and Malacca Stakeholder Surveys, JICA Study Team, 2012

Based on employment size, majority of the companies are small and medium-sized, while three are considered large. The major exports and imports handled by the cargo stakeholders include margarine, cooking oil, coal, CPO, palm shells, palm kernel expellers, pulp and paper, biodiesel, fertilizer, wood, fertilizer, methanol, fish, petroleum products, beverages, and clothes and accessories.

The travel and tour operators handle mainly ticketing and hotel reservations, outbound and inbound tours, transport services, and general sales agent services for airlines. The hotel and hospital cater mostly to medical tourists.

2) Dumai Stakeholders' Views to Use New RO-RO Shipping Service

(1) General Opinions

Both the government and private sector stakeholders in Riau Province welcome the new RO-RO shipping service between Dumai and Malacca. In fact, the Riau Provincial Government has been pursuing bilateral initiatives with Malacca to open the Dumai-Malacca RO-RO connection for the past several years. The IMT-GT meetings noted the following:

- In 2002, the IMT-GT meeting recommended the Dumai-Malacca RO-RO shipping route; and
- After some bilateral discussions, Riau Province and Malacca State agreed in 2006 to develop port infrastructure on the Dumai-Malacca RO-RO shipping route.

This project is one of the priority activities under the Memorandum of Understanding (MOU) between Riau and Malacca in 2009, with a proposal for ASDP to operate the RO-RO ship. Riau's Transportation Agency, with assistance from the Regional Development Planning Agency (BAPPEDA), prepared a feasibility study on the RO-RO route in 2009. The study found the project feasible, but the main challenge identified is the customs regulation that requires a temporary customs import bond for any foreign vehicle entering the Indonesian border. The Riau Government allocated IDR57 billion to prepare the Dumai side, which partly funded the new RO-RO jetty facility near the Dumai Port. This facility is currently being used by the domestic RO-RO ferry services between Dumai and Rupat Island. An international passenger terminal still needs to be constructed.

The Riau stakeholders, however, find their Malacca counterparts to be very slow in preparing its side for the RO-RO service despite bilateral meetings and follow-ups over the last few years. Until now, it still has not been decided which port in Malacca will be designated for the RO-RO connection, which decision is still being awaited from the Federal Government.

Meanwhile, the Riau Government continues to pursue plans to construct the 135 km Pekanbaru-Dumai toll road. Both the government and private sector stakeholders see the realization of this new toll road to be crucial to the increase in the cargo and passenger throughput at the Dumai Port. About 1,000 trucks a day pass through the presently narrow and poorly conditioned 199 km Pekanbaru-Dumai asphalt road, which contributes to the congestion and further deterioration of the road. It has been reported that funds have been allocated for the toll road construction but these have not yet been released. The road project, which is currently in the land acquisition stage, is expected to be completed by 2015.

Increased trade and tourism are the main economic benefits the stakeholders expect from the RO-RO shipping connections between Dumai and Malacca. The RO-RO service should look into how it can support Riau Province's key industries including CPO, pulp and paper, coal, agriculture and fisheries, and in developing their downstream industries. Tourism is another priority sector being promoted by the government, with Rupat Island and Bengkalis, off the coast of Dumai, being positioned as a tourism gateway to domestic destinations. There are now more domestic tourists than international in the province, and airport traffic is more than sea traffic. Tourists from Pekanbaru/ Dumai can go to Malacca for cultural tourism, aside from medical purposes.

The Dumai-Malacca connectivity is already being discussed at the IMT-GT, IMS-GT (1995), SOSEK MALINDO Forum, and DMDI (Melayu Muslim Community). Perhaps, there is a need to push the project more at the ASEAN level. The Riau Government is requesting assistance of the JICA project to assist in convincing the Central Government to realize the project.

(2) Perceived Advantages and Disadvantages of the RO-RO Shipping Service

The following are the perceived advantages and disadvantages of the Dumai-Malacca RO-RO shipping service according to stakeholders in Riau Province:

i) Shippers, traders, forwarders and shipping agents favor the opening of the new RO-RO shipping service between Dumai and Malacca as this can increase the current levels of trade and business between Riau Province and Malacca, as well as with other foreign countries that can use Malacca as a transshipment port. The Dumai-Malacca shipping route is a preferred route for most exports of Pekanbaru/ Dumai stakeholders to Malaysia. There is currently significant cargo trade between Dumai and Malacca, either by traditional wooden-hulled boats, barges or container vessels. There is an association of small (traditional) traders under KADIN, who transport their cargoes (e.g., fruits, vegetables, fish, charcoal, CPO, cigarettes, fertilizer, cement, rice, sugar, soybean, palm kernel, consumer goods, etc.) on wooden-hulled boats. Any official cargo data on traditional trade only captures those from the PELINDO port in Dumai and excludes those traded outside the port, which is estimated to be more than 50% of the total traditional trade. The traders hope to increase their trading activities if the RO-RO becomes operational.

ii) Some stakeholders, such as the associations of freight forwarders (GAFEKSI/ ALFI/ ILFA), shipping operators (INSA) and stevedoring companies (APBMI) are still uncertain as to what products can go by RO-RO, but they expect the RO-RO service to help the local economy. They think that the RO-RO service may also be used to transport coffee, food products and beverages, plywood, construction materials, rubber, mineral products, and machinery and equipment (for CPO and oil refineries, etc.) for repair in Malaysia, among others.

iii) The Association of Travel and Tour Operators (ASITA) in Dumai informed that there are more outbound than inbound tourists from Riau to Malaysia. Indonesian tourists also use Malacca as a gateway to Kuala Lumpur. Tourist traffic declined when the ferry service to Malacca stopped, but picked up again when the air services of LCCs (Wings, Firefly, etc.) started. They opined that, generally, tourists would prefer airlines than the RO-RO. Nevertheless, the tour operators will support the RO-RO project.

iv) Dumai Port faces competition from other transport infrastructure. Pekanbaru is a river port along the Siak River stretching 150 km up to the coastline. The river is deep enough to accommodate vessels of up to 4,000 GT. Pekanbaru currently accounts for 70% of total cargo volume in the province (with Dumai handling the remaining 30%) because most of the cargoes from the hinterland are collected in the 18 ports (a few, such as Parawang Port, are even bigger than Dumai Port) along the river and go to Pekanbaru. These are mainly general cargoes, both for domestic and export markets. INDOMAR Express used to ferry passengers from Pekanbaru to Malacca but when the load factor decreased, it transferred its operations to the Dumai-Malacca route. The Siak Regency Government plans to open a passenger ferry service along the Siak River to Malacca, using a 150-passenger capacity vessel. Due to the low passenger demand, the planned service will only be once a week. The Siak Government is trying to promote this project with the Malacca Government. There is also a traditional vessel port a few kilometers from Dumai Port. It is operated by the provincial government for both domestic and international cargoes. Loading

and unloading are mainly done manually onto many medium-sized hauling trucks parked inside the port. The boats also have cranes for loading/ unloading heavy items. The port draft is very shallow and the boats wait for high tide to dock. Some cargo stakeholders believe that part of the Pekanbaru cargo could be diverted through Dumai when the toll road becomes operational.

v) Port Klang meets most of the shipping needs in Malacca mainly because there are many international ship calls and because of its cheap port tariffs. One company ships out 10,000 TEU of pulp and paper products a month from Pekanbaru to Port Klang and ships in 1,200 TEU a month of fertilizer from Port Klang. Other products are also shipped through Port Klang as transshipment port. If the Pekanbaru-Dumai toll road is built, however, some shippers say they will use Dumai Port to ship to Port Klang and Malacca.

vi) Many businesses are currently doing their shipping by their own vessels and ports. The RO-RO service will compete with existing shipping operators. INSA opined that local private shipping operators may not be interested to operate the RO-RO vessel.

vii) Currently, Malaysia prohibits the entry of certain products into Malacca, including mango, salak and batik.

viii) There is some apprehensions that the new RO-RO connection might increase smuggling if proper controls (e.g., customs) are not put in place.

ix) Some tour operators fear that the RO-RO service might not be attractive to tourists--for example, because passengers will be going with cargo and the travel time may be too long--and may lose to competition from the LCCs.

(3) Stakeholders' Expectations from the RO-RO Shipping Service

The Riau stakeholders expect the following to be considered in the operation of the Dumai-Malacca RO-RO shipping service:

i) The RO-RO shipping service should provide safe, efficient and cost-effective services in order to attract cargo stakeholders to use it. According to INSA, the average freight rate from Pekanbaru to Malacca is USD650 per TEU. The Dumai-Malacca RO-RO service should be able to provide competitive shipping rates. For passengers, the RO-RO fares should be cheaper than airfare.

ii) The operation of the RO-RO shipping services should address potential legal and institutional issues that may affect both the operator's and users' viable operations. These may include very specific vehicle requirements (e.g., car window tint, year model), customs and quarantine restrictions (e.g., no mango, batik, etc.) at the Malaysian side, and vehicle importation issues at the Indonesian side.

iii) Aside from the necessary RO-RO facilities at both partner ports, complementary transport infrastructure that would contribute to seamless transport should be put in place. For the Indonesian side, priority attention should be placed on completing the Pekanbaru-Dumai toll road.

iv) The promotion of the new RO-RO service should be supported by bilateral agreements, such as trade agreement to address barriers to trading of certain commodities, CIQS simplification, etc.

3) Malacca Stakeholders' Views to Use New RO-RO Shipping Service

(1) General Opinions

The local government stakeholders in Malacca are still pursuing efforts to establish the Dumai-Malacca RO-RO connection. In response to the MOU with the Riau Provincial Government in 2009, the Malacca State Government conducted a port study in 2011 which proposed a RO-RO jetty to be attached to the existing port infrastructure of Tanjung Bruas. However, the Federal Ministry of Transport had not approved the proposal as of July 2012 due to operation hindrance and port safety considerations. The Malacca State organized a meeting between the Federal Ministry of Transport and the JICA Study Team in October 2012, wherein the idea to include an international RO-RO terminal in the proposed cruise terminal jetty off the coast of Pulau Melaka was presented by Malacca State.

The Malacca cargo stakeholders have many years of experience in trading with Indonesia through Dumai, using either traditional wooden-hulled boats or conventional container vessels. There is also significant tourism across the border, especially in recent years, mainly by air through Pekanbaru and by ferry boat through Dumai.

The Malacca stakeholders generally view the opening of the Dumai-Malacca RO-RO shipping route as a positive development. They see the new route as a way to stimulate increased trade, business development, tourism and travel between Malaysia and Indonesia.

(2) Perceived Advantages and Disadvantages of the RO-RO Shipping Service

The following are the perceived advantages and disadvantages of the Dumai-Malacca RO-RO shipping service according to stakeholders in Malacca:

i) It will be good for economic activities at both sides and can increase trade. Sumatra exports fish, vegetables (e.g., tomato, cabbage) and fruits (e.g., pineapple) while Malacca exports sugar, biscuits and processed food products. Perishable goods can be transported in good quality across the route. In addition, electric appliances (e.g., air conditioners), machinery and equipment, and construction materials (e.g., tiles, cement, wood, roof plates, etc.) can be transported on the RO-RO.

ii) The new shipping service can encourage more people to travel. The Dumai-Malacca route currently supports medical tourism between Indonesia and Malaysia. The generally affluent Indonesian medical tourists are usually accompanied in Malacca by relatives who stay in local hotels and do some sightseeing and shopping when not busy attending to their relatives' healthcare service activities. The Malacca State government is prioritizing tourism development in association with RO-RO shipping, rather than freight trade. Aside from the expected boost in medical tourism, Malacca residents may also utilize this new RO-RO route to go shopping on weekends with their own cars, both for personal consumption and for commerce.

iii) Aside from traders and tourists, the new shipping service stands to facilitate the movement of Indonesian workers and their relatives to Malacca, where many of them are employed in factories, construction, hotel and restaurant, and domestic service businesses.

iv) Increased international trading will have to comply with the necessary rules and regulations. For example, importers of fish and other products must obtain import

license and be allocated "quota", which may be obstacles to expanding trade. Strict quarantine regulations will also have to be complied with.

v) If Malacca and Peninsular Malaysia close or restrict their market to protect domestic producers through import registration, quota, etc., Singapore may become an alternative market for Indonesian and Thai products. An increase in Thai trucks to Singapore through the Malaysian North-South Expressway is recently observed.

(3) Stakeholders' Expectations from the RO-RO Shipping Service

The Malacca stakeholders expect the following to be considered in the operation of the Dumai-Malacca RO-RO shipping service:

i) There should be strict security for vehicles, particularly the cars and motorcycles, riding on the RO-RO. This is especially in view of the recent spate of vehicle theft in Malacca, where it has been reported that an average of 10 motorcycles are stolen daily.

ii) In the case of the Dumai-Malacca route at present, if there is a patient that needs to go back to Dumai accompanied by a nurse because of serious illness, they use the passenger ferry and ask the patient to lie down on the seats, which is uncomfortable for the patient. If the RO-RO can accommodate the medical facilities with lower cost than the plane, then the demand for medical tourism is expected to increase. Medical emergency vehicles (e.g., ambulance) can also go on the RO-RO vessel.

iii) The passenger fare on the RO-RO should be cheaper than that of airlines or speed boat. At least one-third of the price of an air ticket would be preferable or about USD40. The Pekanbaru-Malacca airfare on Wings Air or Sky Airlines is around USD60-80 one-way. Flights, however, are limited.

iv) The RO-RO shipping frequency should at least be one roundtrip per day in the starting year, and may be made more frequent when demand increases. The vessel should have a 200-passenger capacity, preferably with special cabins with beds for health service patients.

v) The tour operators are willing to consider bringing their vehicles across the RO-RO route if the driver's license will be recognized, the drivers will become familiar with the roads and traffic regulations, and safety and security conditions will be ensured at the Indonesian side.

vi) Customs regulations that will be applicable to the RO-RO shipping services should be further discussed, with a view to finding measures to facilitate cargo and passenger movement across the route. In both Indonesia and Malaysia, despite some differences in approach, customs regulations and procedures based on national customs laws will still apply regardless of any special bilateral/ regional integration trade arrangement such as the ASEAN RO-RO project. Both sides should look into any preceding regulations or bilateral agreements that can be used as best practices for the ASEAN RO-RO project on the proposed routes (e.g., Labuan-Muara RO-RO route between Malaysia and Brunei Darussalam).

4) Convergence of Dumai - Malacca Stakeholders' Views

The converging and diverging views of the stakeholders for the Dumai-Malacca RO-RO shipping service are summarized in Table 14.4.

In general, the stakeholders at both sides of the route welcome the planned RO-RO service and are willing to support it. They anticipate that the new service will contribute to their local economies through increased trade, business and tourism. They expect the RO-RO service to attract cargo and passenger users if it can provide safe, secure, efficient, reliable and cost-effective services.

Table 14.4 Summary of Stakeholder Views on the Dumai-Malacca RO-RO Shipping Service

Aspect	Converging Views	Diverging and/or Singular Views
Overall Economic Benefits	- The RO-RO service can benefit businesses and the local economies by increasing trade, business, investment and tourism across the route.	- The State of Malacca prioritizes tourism development in association with RO-RO shipping rather than freight trade.
Market	- Cargo stakeholders and tour operators are generally willing to use the RO-RO service. - Certain cargoes currently being transported by wooden-hulled boats, general cargo, and conventional container vessels may possibly be carried on the RO-RO service. - Port Klang is seen as a competitor port to the Dumai-Malacca shipping connection.	- Some tourism stakeholders think that RO-RO passenger service may not be attractive to tourists who might prefer to travel by air. Others believe that the RO-RO can complement existing air and ship passenger services and can attract certain travel market segments such as traders, overseas workers, and medical tourists (especially those requiring travel lying down). - Malacca residents may utilize the new route to go shopping on weekends with their own cars, both for personal consumption and for commerce.
Infrastructure	- Malacca still has to identify which port will be designated for the RO-RO service.	- Riau stakeholders consider the building of the Pekanbaru-Dumai toll road as a critical infrastructure to support the RO-RO route.
Legal and Institutional Issues	- CIQS issues that may hinder the effective operation of the RO-RO service and may affect the movement of the cargo and passengers using the RO-RO, need to be addressed. - Bilateral agreements on trade, tourism, CIQS, etc. may support and help promote the sustainability of the RO-RO service.	- Riau stakeholders think their Malacca counterparts are moving very slow on bilateral commitments to open the RO-RO shipping connection.
Costs	- RO-RO shipping freight costs should be competitive with existing shipping costs. - RO-RO passenger fare should be cheaper than that of low cost carriers and speed boats (over USD50 per roundtrip).	-
Ship Facilities	- RO-RO shipping service should provide safe, secure, efficient and cost-effective services in order to attract cargo and passengers. - RO-RO shipping service should have adequate cargo and passenger capacity and operate on a suitable frequency.	- Some Malacca tourism stakeholders suggest the RO-RO vessel to have special cabins with beds for medical tourists.

Source: Pekanbaru/Dumai and Malacca Field Surveys, JICA Study Team, 2012

14.3 Detailed Traffic Demand Survey

1) NCV Traffic Survey in Dumai

(1) Survey Sites

According to the trade statistics of Riau Province, an annual trade volume of 2,750 thousand tons or 7,500 tons per day is recorded between Riau and Malaysia in 2011. Among such Malacca Strait trade, break bulk cargoes such as general cargo and perishable goods are mainly transported by non-conventional vessels (NCVs), which fly the Indonesian flag. On the other hand, there is no scheduled container shipping service between Dumai and the Malay Peninsula.

The Dumai port traffic survey was conducted in October 2012. The survey method consisted of collection of NCV ship call records and interview of NCV captains/crews. The survey sites were Pokala Wharf within Dumai Port operated by PELINDO-I, and Sungai Dumai Port managed by ADPEL Dumai.

Figure 14.6 Location of Sungai Dumai Port

Figure 14.7 Cargo Handling of NCV at Sungai Dumai Port

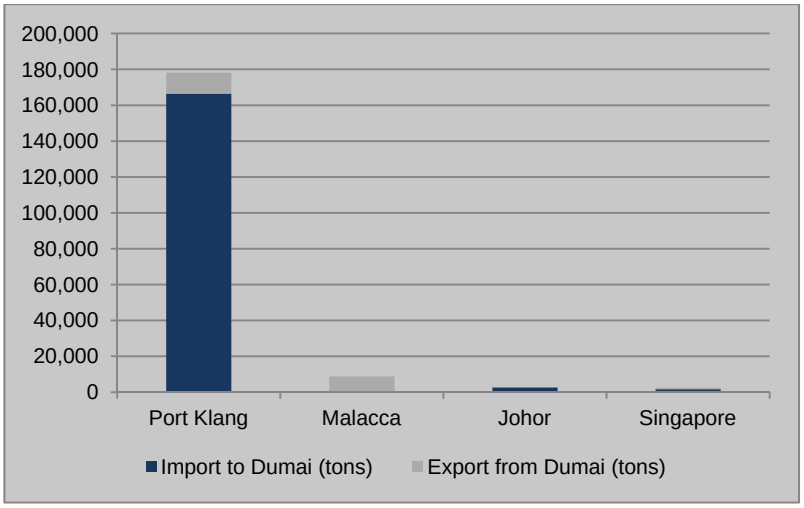
(2) Survey Results

The survey compiled the ship call records at Pokala Wharf and Sungai Dumai Port between January and June 2010, resulting in the following characteristics:

- The number of outgoing (export) ships to Malaysia was 142 vessels carrying a total of 21,281 tons (see Figure 14.8). Of these, 77 vessels directly sailed to Malacca from Pokala Wharf, carrying 8,693 tons of cargo.
- The number of incoming (import) ships from Malaysia was 708 vessels with an aggregated cargo of 171,149 tons, 687 vessels of which came from Port Klang, carrying 166,486 tons cargo. Only 2 vessels were recorded from Malacca.
- In Malacca, most of the NCVs called at Kuala Linggih, a small fish port near the border with Negeri Sembilan State. Due to shallow water, however, the average NCV was only 41GT in contrast to Port Klang, where the average NCV size was 149 GT (see Figure 14.9).

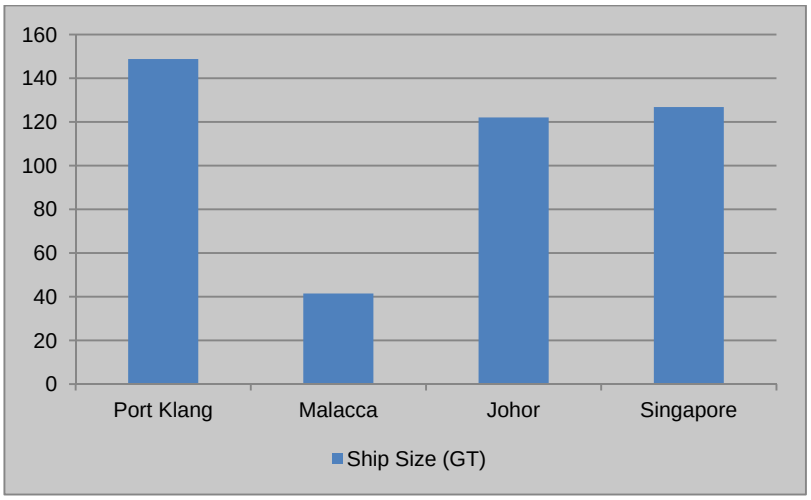
The traffic survey results have two implications. First is Port Klang's dominant role in the Malacca Strait NCV trade with Dumai. Second is the poor condition of Malacca port since there is no sufficient port even for NCV trade. If Malacca develops an appropriate port for small vessels up to some hundred tons like NCVs, more ship calls are expected due to its proximity to Dumai.

The traffic survey observed more imported cargo than exported cargo, by as much as 20 times, at the surveyed ports of Dumai. However, break bulk cargo trade is balanced across the Malacca Strait. According to the interview with local traders/forwarders, there is a container barge service from Pekanbaru Port and the NCV fleet exporting Indonesian goods from Bengkalis Island. Dumai may attract such export cargoes to some extent when the Pekanbaru – Dumai toll road construction is completed and a direct break-bulk shipping route between Dumai and Malacca is opened.



Source: PELINDO-I, ADPEL Dumai, Data processed by JICA Study Team

Figure 14.8 Malacca Strait Trade with Dumai (From January to June 2012)



Source: PELINDO-I, ADPEL Dumai, Data processed by JICA Study Team

Figure 14.9 Average NCV Size Engaged in Dumai Trade at Malaysian Ports

(3) Potential Cargo by Interviewed Stakeholders

At Dumai and Pekanbaru, Riau Province, the Team interviewed 2 shippers, 3 traders and 6 forwarders. They revealed some potential cargo to be transported on the proposed Dumai – Malacca RO-RO shipping route in 2015 (see Table 14.5). They expect to export some local raw products and import Malaysian finished products.

Table 14.5 Potential Cargo for RO-RO Shipping by Dumai/Pekanbaru Stakeholders

Potential Exports 2015			
Commodity	**Ave, Monthly Tonnage (in tons)**	**Port of Origin**	**Port of Destination**
Palm Shell	8,000	Pekanbaru	Melaka
Cooking oil	15,000	Dumai	Malaysia, China, Europe
CPO	42,000	Dumai	Malaysia, China, Europe
Total	**65,000**		

Potential Imports 2015			
Commodity	**Ave, Monthly Tonnage (in tons)**	**Port of Origin**	**Port of Destination**
Food products and beverages	5,000	Malaysia	Pekanbaru
Methanol	10,000	Malaysia, South Korea	Dumai
Total	**15,000**		

Source: Dumai Pekanbaru Stakeholder Survey, JICA Study Team, 2012

In Malacca, the Team interviewed 3 traders/distributors. Since they were not familiar with Sumatra trade, they didn't have specific business plans to use a RO-RO shipping route with Dumai. In principle, they had the similar perception shown by the Dumai/Pekanbaru stakeholders.

14.4 Infrastructure Preparation

1) Basic Direction of Infrastructure Preparation

(1) Terminals of the Route

The Indonesian side plans to develop a RO-RO terminal at Pangkalan Sesai, West Dumai. Port water facilities have been completed and are used by a ROPAX vessel connecting with the port at Rupat Island. The facilities are designed for vessels of 500 GT, LOA of 47 m and width of 12 m. The land area of the RO-RO terminal is already reserved, but the facilities have not yet been constructed. The plan of its land use was changed according to the relocation plan of the existing ferry terminal at the Dumai Port to this site.

On the other hand, the location of a terminal at Malacca has not been decided. Several ports are located in Malacca, namely the municipal ferry terminal which ferry vessels from Ports of Bengkalis and Dumai use, the port of Tanjung Bruas which is located 10 km from the center of the city, and the port of Kuala Linggih which is located 30 km from the city center. The Municipal terminal can provide only a shallow basin due to its location at the mouth of the Malacca River. The port of Tanjung Bruas is a busy port which handles bulk cargo. The port of Kuala Linggih is located far from the city.

There is no port that satisfies the requirements for RO-RO service. Several challenging projects can be seen at the coastal zone of Malacca at present. A marina was constructed at the right bank of the Malacca River but the depth of the basin sheltered by breakwaters is 0.5 m to 1.0 m only. A man-made island is being developed offshore at the left bank of the river and the depth of the sea at front line of reclamation is 2.0 m. Due to such shallow depth, it is difficult to look for an appropriate site for a RO-RO terminal in front of Malacca town. Expansion of the reclamation area towards offshore or construction of an offshore jetty, which is connected with a land area by an access bridge, may be the solutions. However, it is not realistic that such measures are taken only for RO-RO terminal development since a huge investment is required.

Malacca State has examined the possibility of a RO-RO terminal at the port of Tanjung Bruas which is operated by SPPG under a concession contract with Malacca Port Authority. However, the port is fairly busy and handles bulk cargo and it has been difficult to reach an agreement among the parties concerned. On the other hand, a development plan of an international cruise terminal about 1000 m offshore of Malacca town was proposed. The feasibility of the project has not yet been examined but Malacca State Government has shown interest in the project.

(2) Requirements of Terminal

It is required to have sufficient capacity of navigation channel and anchoring area to accommodate the ROPAX vessel of 61 m long and 3.3 m draft at any time. The navigation channel should have a water depth of 4.3 m and minimum width of 90 m. Anchoring area should have a water depth of 4.3 m and minimum radius of 80 m.

It is required to have sufficient capacity of mooring facility to accommodate ROPAX vessel of 61 m long in calm water area. It is also required to have sufficient berth window allowing the ROPAX ship to stay one hour when the vessel calls at the terminal twice a day.

It is necessary to provide facilities through which passengers can embark and disembark and vehicles can get on a vessel and go ashore safely by connecting with a ship ramp. A

connecting road to the land area has to be prepared because the facilities are or will be located offshore.

At RO-RO terminals, it is required to have a passenger terminal building with enough space for 250 passengers, with facilities for CIQS control. At both ports, it is assumed that existing passenger buildings shall be availed of.

It is also required to have sufficient land space to set up a cars/trucks checking area for customs/immigration and ordinary parking area. The cars/trucks checking area should have segregated lanes for inbound and outbound vehicles which enable drivers to go through customs/immigration formalities without leaving their vehicles. In addition to this, a parking space for 16 vehicles that wait for the formalities and another separate parking space for the vehicles waiting for loading onto the ship after completion of all formalities need to be prepared.

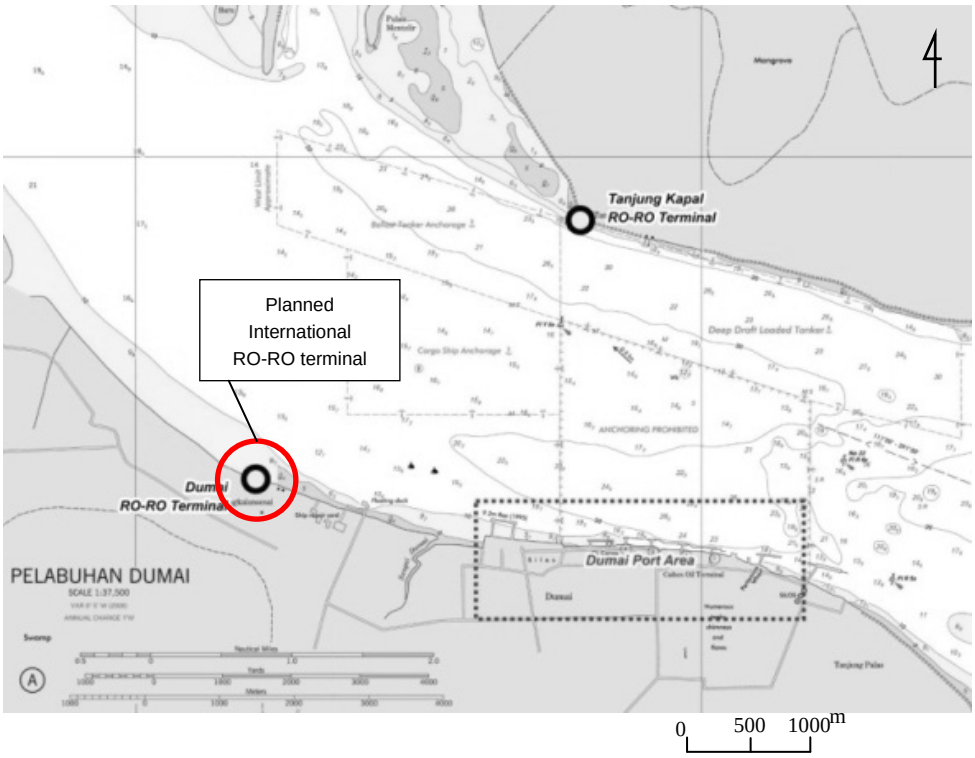
Strict control is required for the following areas: the area where the vehicles park and passengers stay after landing from the ship but before conducting inbound customs/immigration formalities and the area where the vehicles park and passengers stay before being loaded onto the ship but after outbound customs/immigration formalities have been completed. In addition, the terminal area has to be managed as a restricted area under the ISPS Code.

2) Dumai Port

(1) Location of Terminal

The International RO-RO terminal is planned at Pangkalan Sesai, West Dumai where a RO-RO terminal has been constructed based on the discussion at IMT-GT. Another jetty and connecting bridge have been completed at the neighboring sea area of the existing RO-RO jetty by DGST based on the relocation plan of the international and domestic ferry terminal at Dumai Port under PELINDO 1.

The original land use plan for the existing RO-RO terminal was changed according to the relocation plan. The new plan is prepared by Riau Province under the precondition that the passengers of original plan and ferry passengers use the building. Works are currently in the preparation stage.



Source: JICA Study Team

Figure 14.10 Location of the Planned International RO-RO Terminal at Dumai

(2) Main Facilities

The following facilities are required at the terminal at Dumai to receive international RO-RO service:

- Port water facilities: Channel, Basin, Mooring facilities, Vehicle loading/Passenger boarding facilities, Access way
- Passenger terminal: Passenger building, CIQ facilities (in the building), Car parking
- Vehicle terminal: Check-in post, Security post, CIQ booth, Car waiting area for boarding, Inspection Area

i) Port waters (Channel and Basin)

The depth of the sea area surrounding the existing jetty is about 5 m and there have been no reports of problems regarding navigation of the RO-RO vessel that calls at the port at present. Hence, there is no obstacle for the planned ROPAX vessel to use the port waters.

ii) Mooring facilities

The existing mooring facilities are designed for a vessel of 500 GT (LOA: 47 m, B: 12 m). The displacement ton is not shown in the reference materials obtained by the Study Team but fenders attached to the breasting dolphin have enough performance for a 1,000 DWT vessel. The structures of the existing facilities shall be accessed based on the vessel which is actually deployed but from the above point, it seems that the planned vessel can use the existing facilities by mooring carefully.

According to the operation plan of the ROPAX vessel connecting with Rupat Island, the vessel calls and stays at the terminal from 08:45 to 10:00, from 11:45 to 13:00, 14:45 to 16:00, and from 17:45 to 07:00 of the following day. The terminal is occupied by the vessel at such times but it is possible to prepare berth window for two additional calls of the planned ROPAX vessel by adjusting the present ship calls. The area where the planned vessel stays at night has to be prepared at another location.

iii) Vehicle loading/ passenger boarding facilities

Passengers embark and disembark and vehicles get on a vessel and go ashore through a 6 m wide shore ramp, which is installed at the terminal. The elevation of the ramp can be adjusted to the level of ship ramp and the planned vessel can use this ramp. The crane which controls the elevation does not work at present but Riau Province plans to repair it.

iv) Access way

The access road on a 110 m long causeway and a 300 m connecting bridge is situated between the vehicle loading facilities/ passenger boarding facilities and a land area. A two-lane road 6 m in width and a walkway with a width of 1.2 m are prepared on the access road whose crown height is 4.74 m. It is reported that the road is designed to allow use by large trucks. Riau Province plans to install roofs on the walkway.

Passengers and vehicles which intend to get on a vessel stay at the end of the access road until all passengers and vehicles get off the vessel. However, it is necessary to prepare a waiting area in a land area in order to separate strictly the flow of inbound and outbound passengers and vehicles in case of international service.

v) Passenger terminal

The original land use plan of the area of 150 m by 80 m has been revised in response to a new situation. A two-storey passenger building with facilities for border formalities, an office building, and a parking area are included in the new plan. Riau Province drafted the plan and Dumai City is preparing to implement the construction work. Passengers of the planned ROPAX vessel can use this passenger building in order to clear border formalities.

The movement of passengers from the passenger building to the entrance of access way or vice-versa should be strictly controlled.

vi) Vehicle terminal

Vehicles which use the ROPAX vessel park at the open space of the reserved area at present. However, vehicles which use international service have to park at the restricted area where CIQ facilities and a waiting area before boarding needs to be reserved. Such area is not included in the new land use plan of the abovementioned area. Hence, it is necessary to reserve an area for a vehicle terminal next to the passenger terminal area.

At the entrance of the vehicle terminal, a security post and a check-in post are installed. Along with the arranged lane (width 3 m), a customs inspection booth and

an immigration inspection booth are installed in parallel. The length of the lane shall be 30 m, minimum, enabling two large-sized vehicles to park one after the other for customs inspection and immigration inspection, respectively, at the same time. The number of lanes shall be two lanes each for inbound and outbound.

A parking area of 850 m^2 to accommodate a maximum of 17 vehicles (maximum loadable capacity of the planned ROPAX vessel) shall be provided for the vehicles waiting to board the ship after completion of authorities' inspection. Because inbound vehicles go out of the terminal area passing through the arranged lanes for border formalities, the waiting area is generally not necessary. However, for those occasions when it becomes necessary to wait for such formalities, a certain space is reserved. In addition, a customs inspection area shall be provided and an office building for relevant agencies and related companies shall be installed in the terminal. The area necessary for vehicles to move from the terminal to the entrance of the access way should be strictly controlled.

Considering the layout of these facilities, a 4,800 m^2 area shall be reserved.

vii) Controlled area

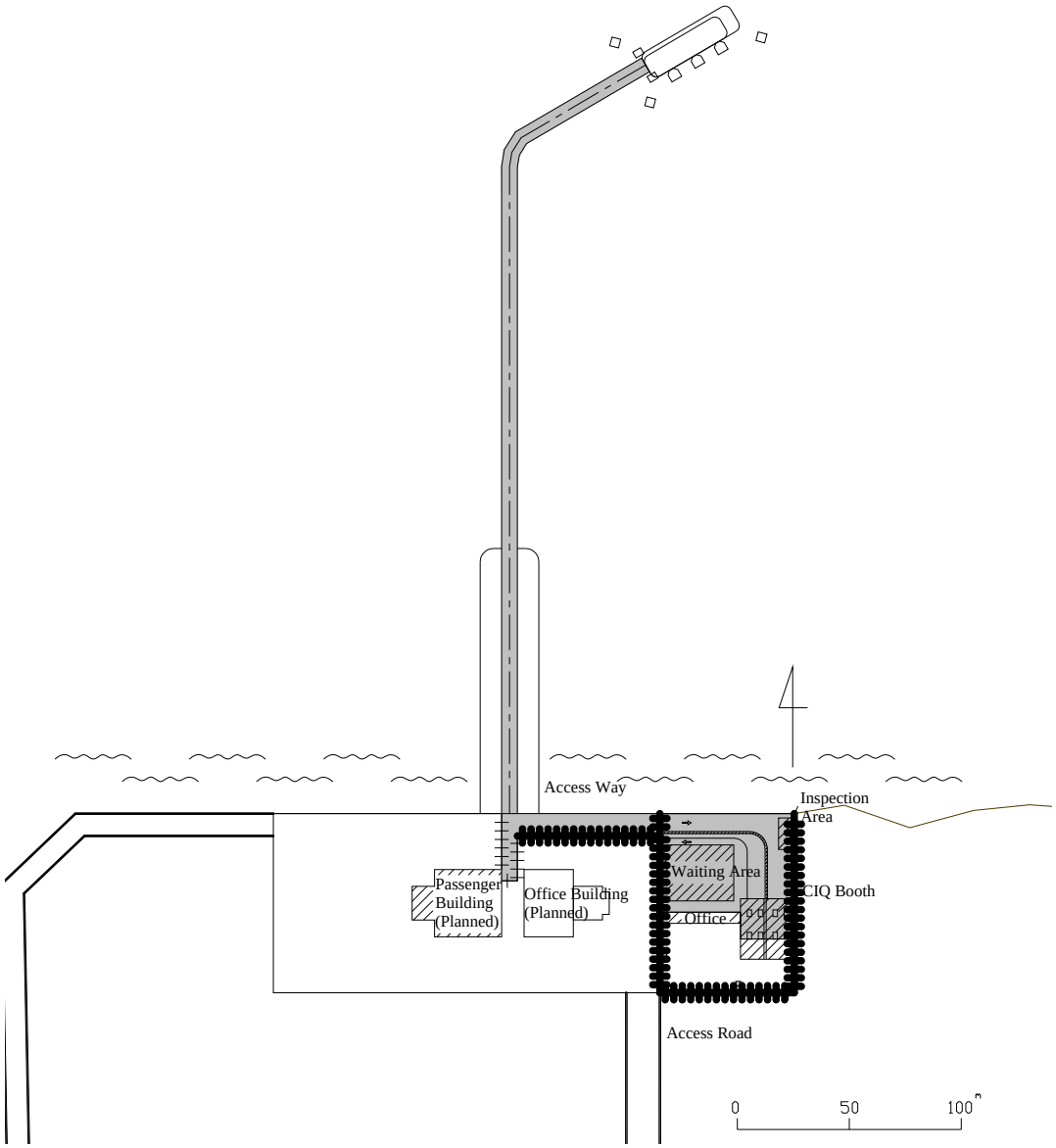
When an international ROPAX vessel uses the terminal, port water facilities and a certain area of the passenger building have to be managed strictly as a border area. The vehicle terminal is used only by inbound/outbound vehicles from/to Malacca and always controlled as a border area. Therefore, the area is enclosed by a fixed fence and also designated as the restricted area in compliance with the ISPS Code.

The terminal facilities at Dumai Port are summarized in Table 14.6. The layout of the whole area of the terminal is shown in Figure 14.11. The layout is drafted in order to show the required size and a possible location of facilities. The layout shall be decided based on the types and size of vehicles which will actually use the RO-RO service. The shaded area indicates the area which should be controlled as an international RO-RO terminal.

Table 14.6 Required Facilities of International RO-RO Terminal at Dumai

Port water facilities	
Channel and basin	No special arrangement necessary General use with other vessels
Mooring facilities	Use the existing facilities General use with other vessels
Vehicles loading / Passenger boarding facilities	Use the existing facilities General use with other vessels, passengers and vehicles
Access way	Use the existing facilities General use with other passengers and vehicles
Passenger Terminal	
Terminal building	Use the new terminal to be constructed according to another development plan General use with other passengers
CIQ facilities	Use the facilities to be set up according to another development plan General use with other passengers
Regular parking area	Use the new terminal to be constructed according to another development plan
Vehicle Terminal	
Check-in post	To be installed
Security post	To be installed
CIQ booth	To be installed
Vehicle waiting area (for boarding)	Define within the vehicle terminal
CIQ inspection area	Define within the vehicle terminal
Office Room	To be installed
Terminal Area	
Outer ward	To be installed
Site	To be acquired

Source: JICA Study Team



This layout is only an appropriate representation.

Source: JICA Study Team

Figure 14.11 Terminal Layout at Dumai

(3) Improvement of Facilities

For the handling of international RO-RO service at Dumai, the basic facilities which should be newly installed are as follows. All others are mostly covered by the existing facilities and the development projects by Riau Province.

Table 14.7 Required Facilities at Dumai Terminal

Facilities to be installed at the Vehicle Terminal	
Reclamation	Reclamation of the area of 4,800 m^2
Pavement	Lanes, Parking areas, Roads etc.
Check-in post	1 unit
Security Post	1 unit
CIQ booth	4 posts for Customs and 4 posts for Immigration
Office room	1 unit (for administrative agency and company use)
Fence	Fixed fence, Movable fence

Source: JICA Study Team

The total cost involved for the above facilities is roughly estimated at US$ 1.3 million. The estimation is based on consultation with concerned parties and information on similar types of project, therefore the estimation amount is subject to further review depending upon the results of the detailed study of the project site. The cost for land acquisition is not included.

It is assumed that it takes 12 months for planning and authorization of the project and detailed design as well as coordination with stakeholders and the construction work will commence at the beginning of 2014 and terminate in the middle of 2015.

	2013		2014		2015	
Planning						
Coordination/Procedures						
Detailed Design						
Construction						
Operation						*

Source: JICA Study Team

Figure 14.12 Schedule of Improvement of Dumai Terminal

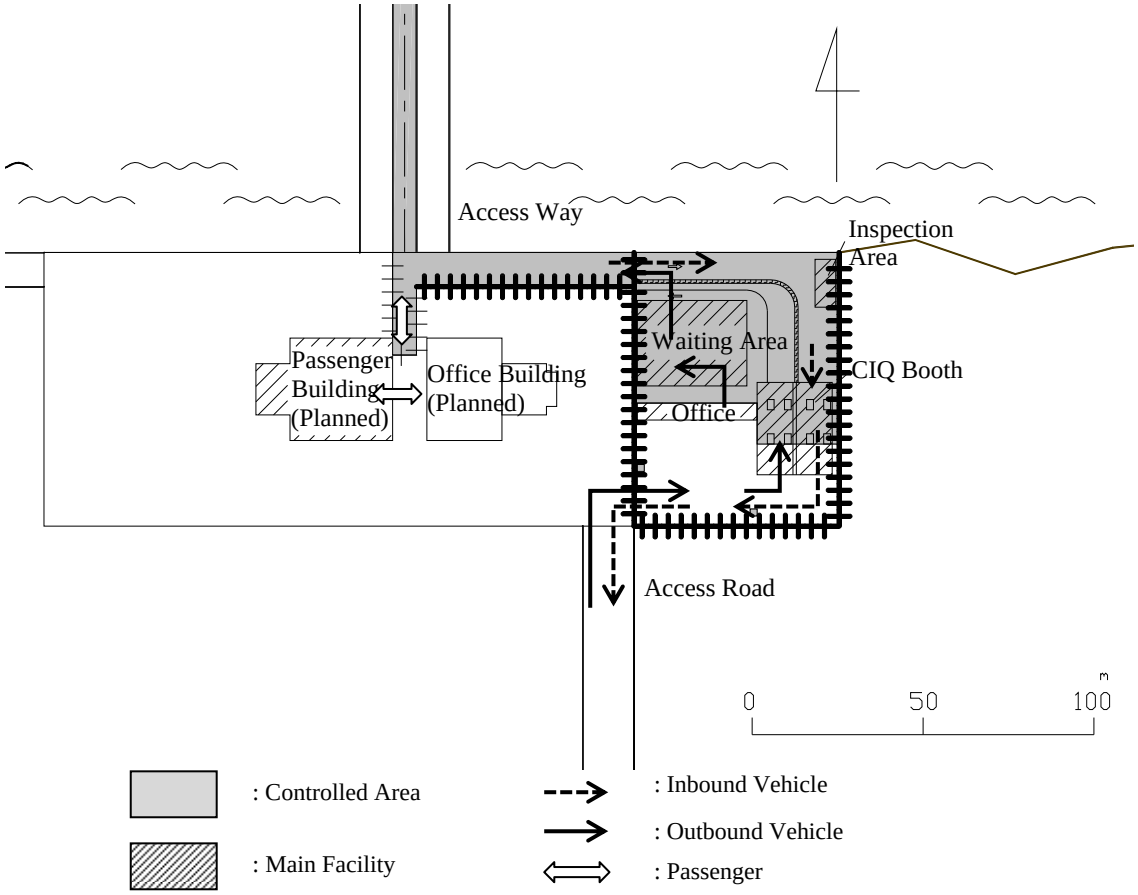
(4) Terminal Use

Due to the size of the planned vessel, pilot service is compulsory. The liner type service is usually given preferential treatment such as exemption from pilot arrangement after showing prudent performance of the services for a certain period of time. No other time-consuming formalities are expected for ships entering and departing the port.

Inbound passengers go to the passenger building and go through the border formalities. They leave the terminal after clearing these formalities. Inbound vehicles which reach the vehicles terminal move to the CIQ booth directly for going through the border formalities. They leave the terminal after clearing these formalities.

Outbound passengers and vehicles enter the terminal via the approach road. Passengers go through border formalities at the passenger building and wait for boarding in the building. Vehicles go through the border formalities at CIQ booths in the vehicle terminal and wait for boarding at the parking area. Once the boarding is announced after all inbound passengers and vehicles reach the passenger building or the vehicles terminal, outbound passengers and vehicles move to the entrance of the connecting road and go to the offshore jetty via the connecting road. It is necessary to avoid the passing of inbound and outbound passengers/vehicles through the access road at the same time.

The flow of passengers and vehicles for loading and discharging is illustrated in Figure 14.13.



Source: JICA Study Team

Figure 14.13 Traffic Flow in Dumai Terminal

(5) Management and Operation

The existing facilities were constructed by Riau Province and ADSL, who carries out operation of RO-RO vessel, manages the terminal under an annual contract with Riau Province.

Regarding the passenger building, Riau Province owns the land property and is responsible for the construction. The passenger terminal is used not only by the passengers of international RO-RO service but also those of international and domestic ferry service and domestic RO-RO service. There may be several ways of managing and operating the passenger terminal, as follows: operation by Riau province, operation by Dumai Municipality under entrustment of Riau Province, or operation by a private company based on a concession contract with Riau Province.

On the other hand, as the vehicle terminal is used only by vehicles of the international RO-RO service, the ship operator may manage the area based on a concession contract or a yearly contract.

CIQ formalities are undertaken by the concerned authorities utilizing the facilities installed in the passenger terminal and vehicle terminal.

(6) Connection with Hinterland

The Dumai – Pekanbaru road is part of the Trans-Sumatra road which is designated as ASEAN Highway No.25 as well as Transit Transport Route (TTR). The Government of Indonesia's development blueprint (MP3EI) includes the Trans-Sumatra road.

The Dumai – Pekanbaru road currently has a two-lane carriageway at most of the road alignment (199 km). Jasa Marga, a public toll road operator, will construct and operate a parallel toll road (135 km). The Provincial Government of Riau is now engaged in land acquisition. The toll road will be open in 2015.

After completion of the toll road, driving time, currently 5-6 hours, can be reduced to less than 2 hours. The toll road will also ensure smooth traffic for large-sized trucks. The Port of Pekanbaru handled an international cargo of 1.0 million tons in 2009 through the Siak River to connect the navigational route of the Malacca Strait. With the toll road, considerable Pekanbaru cargo may be diverted and shipped out from the Port of Dumai which is larger in port capacity and facing the Malacca Strait.

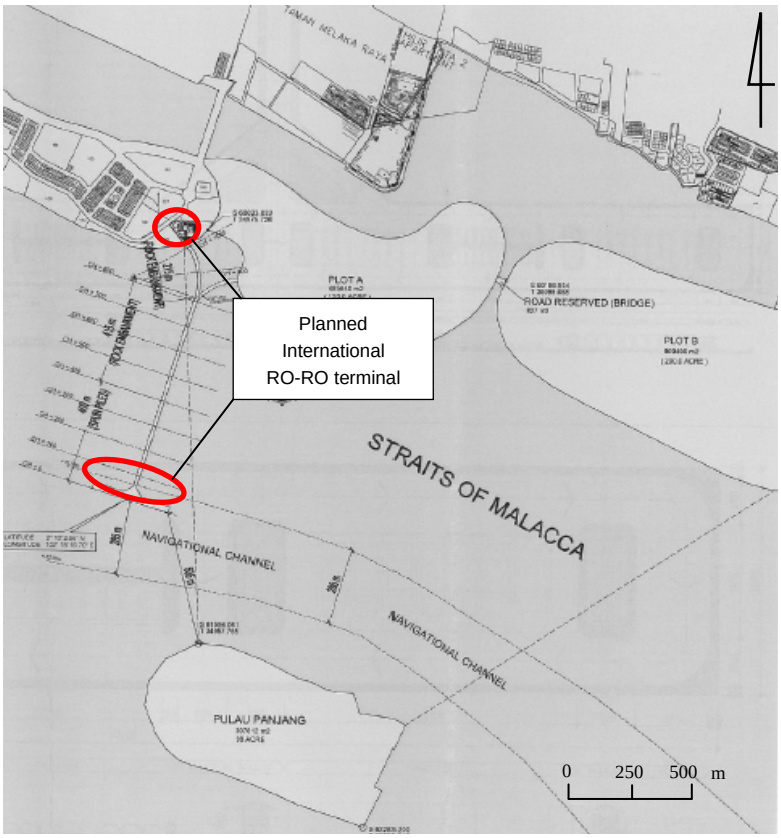
Source: JICA Study Team

Figure 14.14 Dumai – Pekanbaru Road

3) Malacca Port

(1) Location of Terminal

The International RO-RO terminal at Malacca is examined at the proposed site of the international cruise terminal development project. The proposed jetty is located approximately 1,000 m offshore of the man- made island and the depth of the sea there is approximately 12 m. The jetty is connected with the island with a 630 m long causeway and a 400 m long bridge.



Source: Proposed Development of Cruise Terminal Jetty off coast of Pulau Melaka (alternative 1): Kaj Development Sdn. Bhd.

Figure 14.15 Location of the Planned International RO-RO Terminal at Malacca

(2) Main Facilities

The following facilities are required at the terminal of Malacca to receive international RO-RO service:

- Port water facilities: Channel, Basin, Mooring facilities, Vehicle loading/Passenger boarding facilities, Access way
- Passenger terminal: Passenger building, CIQ facilities (in the building), Car parking
- Vehicle terminal: Check-in post, Security post, CIQ booth, Car waiting area for boarding, Inspection Area

i) Port waters (Channel and Basin)

The jetty of the proposed cruise terminal development project will be constructed at the water area with a depth of around 12 m. It is planned that the mooring facility of the ROPAX vessel makes use of part of the jetty. The ROPAX vessel can approach to the mooring facility directly from the open sea area. Hence, there is no obstacle to handle the planned ROPAX vessel.

Strong winds and high waves are observed sometimes in this sea area in the monsoon season. Therefore, operation needs to be managed carefully during this season.

ii) Mooring facilities and vehicles loading /Passenger boarding facility

Land side headlines of the jetty of the proposed project are used as a mooring facility. In order for the ROPAX vessel to be able to use the mooring facility at all tidal conditions, two mooring places are reserved. The west side of the access way is used at high tide and the east side is used at low tide. Fenders and bollards shall be installed at the land side of the proposed jetty.

Two fixed shore ramps are installed at both corners of the intersection of the jetty and the access way respectively. A ramp used at high tide is installed at the west corner and a ramp used at low tide is installed at the east corner.

iii) Access way

A 1,030 m long access way, which is composed of a 400 m long bridge and a 630 m long causeway, is planned in the proposed project. The access way provides a two-lane road (8 m in width) and walkways (1.2 m in width each) at both sides. It is planned that large buses will use the road and the passengers of the planned RO-RO service will move from the jetty to the terminal building by buses via this road.

iv) Passenger terminal

The passenger building is planned in the proposed project. It is assumed that the passengers of the planned RO-RO service also use the passenger building.

v) Vehicle terminal

The proposed project aims at developing a cruise terminal and the vehicle terminal is not included in the plan. The vehicle terminal, which provides the border formalities and parking area and other facilities, shall be installed next to the passenger terminal. The facilities to be installed in the vehicle terminal are same as that of Dumai. It is assumed that its layout is same as that of Dumai and the area of 4,800 m^2 is reserved for the vehicle terminal. The land is owned by a private enterprise and it is necessary to make negotiations on land use with the company.

vi) Controlled area

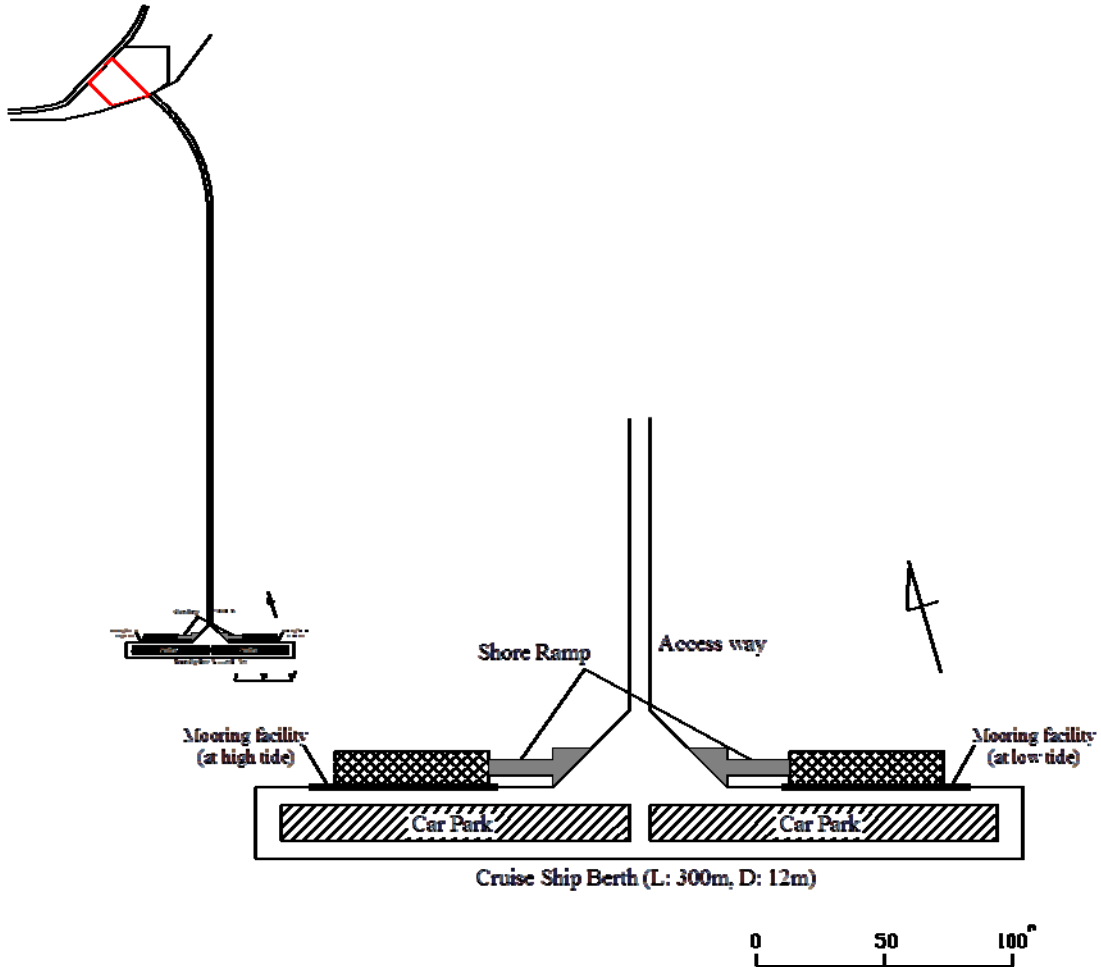
The port water facilities, the passenger building and the vehicle terminal have to be managed strictly as border facilities. The vehicle terminal area shall be enclosed by a fixed fence and also designated as the restricted area in compliance with the ISPS code.

Terminal facilities at Malacca are summarized in Table 14.8.

Table 14.8 Required Facilities of the International RO-RO Terminal at Malacca

Port Water Facilities	
Channel and basin	No special arrangement necessary General use with other vessels
Mooring facilities	To be installed (Use a part of the jetty to be developed in the proposed cruise terminal development project)
Vehicle loading / Passenger boarding facilities	To be installed
Access way	Use the access way to be developed in the proposed cruise terminal development project General use with other passengers and vehicles
Passenger Terminal	
Terminal building	Use the terminal building to be developed in the proposed cruise terminal development project General use with other passengers
CIQ facilities	Use the facilities to be installed in the proposed cruise terminal development project
Regular parking area	Use the area to be constructed in the proposed cruise terminal development project
Vehicle Terminal	
Check-in post	To be installed
Security post	To be installed
CIQ booth	To be installed
Vehicle waiting area (for boarding)	Define within the vehicle terminal
Custom inspection area	Define within the vehicle terminal
Office Room	To be installed
Terminal Area	
Outer ward	To be installed
Site	To be acquired

Source: JICA Study Team



Source: JICA Study Team

Figure 14.16 Terminal Layout at Malacca

(3) Improvement of Facilities

For the handling of international RO-RO service at Malacca, basic facilities which should be installed are shown in Table 14.9. It is assumed that all others are mostly covered by the proposed cruise terminal development projects.

Table 14.9 Required Facilities at Malacca Terminal

Port Water Facilities	
Mooring facility	Bollards and fender at the land side of jetty
Shore ramp	Two ramps connecting with the planned jetty
Vehicle Terminal	
Pavement	Lanes, parking areas, roads, etc.
Check-in post	1 unit
Security post	1 unit
IQ booth	4 posts for Customs and 4 posts for Immigration
Office room	1 unit (for administrative agency and company use)
Fences	Fixed fence, Movable fence

Source: JICA Study Team

The total cost involved for the above facilities is roughly estimated at US$ 2.3 million. The estimation is based on the consultation with the concerned parties and information on similar types of projects, therefore the estimated amount is subject to further review depending on the results of the detailed study of the project site. The cost for land acquisition is not included.

It is assumed that it takes 12 months for planning and authorization of the project and detailed design as well as coordination with stakeholders and the construction work will commence at the beginning of 2014 and terminate in the middle of 2015.

	2013		2014		2015	
Planning						
Coordination/Procedures						
Detailed Design						
Construction						
Operation						*

Source: JICA Study Team

Figure 14.17 Schedule of Improvement of Malacca Terminal

(4) Terminal Use

Pilotage is compulsory for the planned vessel. The liner type service is usually given preferential treatment such as exemption of pilot arrangement after showing prudent performance of the services for a certain period of time. No other time-consuming formalities are expected for ships entering and departing the port.

It is different that passengers move by bus on the connecting road but passengers and vehicles follow almost the same steps for getting on and getting off the vessel as in the case of Dumai Terminal.

(5) Management and Operation

Malacca State is responsible for preparing infrastructures of the international RO-RO terminal. It is deemed that the facilities to be installed are constructed by Malacca State and a shipping operator of the planned RO-RO service carries out terminal operation under a concession contract or a yearly contract with Malacca State. Regarding installation of fenders and bollards at the jetty and construction of fixed shore ramps, another option would be for the project owner of the cruise terminal project to install these facilities as a part of the project and give permission to use these facilities to a shipping operator. It is necessary to decide the ROPAX facilities preparation system considering the implementation method of the proposed project.

CIQ formalities are undertaken by the concerned authorities utilizing the facilities installed in the passenger terminal and vehicle terminal.

(6) Connection with Hinterland

The proposed Malacca Cruise Terminal is located in front of the reclamation island at the city center. It is 30 km away from the nearest interchange, Ayer Keroh, from the Malaysian North-South Expressway. The connecting road has a four-lane carriageway but it experiences daily road congestion during morning and evening peaks. There is no truck ban into the city center.

The Malaysian North-South Expressway is designated as ASEAN Highway No.2 as well as TTR. Although the connecting road to the city center is not included in the ASEAN Highway network, when opening a new RO-RO route at Malacca, it is necessary to accept transit vehicles from a RO-RO ship not only on the connecting road but also other city roads to tourism sites.

14.5 Shipping Strategy and Ship Operation Plan

1) RO-RO Shipping Market Analysis

(1) Cargo

To attract cargo demand to the new RO-RO service, it is essential to convert part of the existing break bulk cargo trade, mostly done by NCVs, and realize potential cargo demand among local stakeholders. Based on the results of the port traffic survey and stakeholders' interviews, those traffic volumes are summarized as follows:

Table 14.10 Survey Summary for Potential RO-RO Cargo Demand

	From Dumai to Malacca	From Malacca to Dumai
Convertible Cargo Demand *	42,562 tons	342,298 tons
Inducible Cargo Demand **	65,000 tons	15,000 tons
Total	107,562 tons	357,298 tons

*) Anticipated NCV trade between Dumai and the Malay Peninsula in 2012 based on the collected ship records of strait-crossing traffic at Dumai during the period January to June 2012

**) Potential cargo volume in 2015 among interviewed stakeholders

Source: JICA Study Team

RO-RO shipping service is quite different from NCV service. RO-RO shipping carries cargo on truck including container on chassis while NCV service relies on manpower stevedoring without cargo handling equipment. Thus, NCV service obviously provides cheaper service than any other break bulk shipping services including RO-RO service. For example, the tariff of NCV service between Dumai and any port of the Malay Peninsula ranges from IDR 150,000 to 175,000/ton as of October 2012.

In order to take part of the NCV market, RO-RO shipping can provide the following competitive service:

- Due to poor port conditions, only very small NCVs, 41GT on the average, can enter into Malacca Port (Kuala Linggih). Most of the NCVs use Port Klang. A RO-RO vessel which is designed to carry over 100 tons cargo will be assigned on the route in order to increase cargo volume on the shortest route between Dumai and the Malay Peninsula. (It is further analyzed in 'Demand Forecast' Section, page 14-37)
- NCVs are slow in sailing, e.g., 4-5 knots on the average, 7-8 knots at the maximum effort. When transporting perishable goods, NCVs likely damage them due to slow sailing and manual stevedoring. In this sense, RO-RO shipping is much superior to NCV service. It will sail much faster than NCVs, e.g., 14-15 knots. No cargo handling is required but ample electricity is available for cold chain haulage. Therefore, RO-RO shipping will focus on perishable goods and valuable goods.
- NCVs are good at trading durable general cargoes such as clothes and plastic ware. In this demand segment, however, RO-RO shipping will provide new opportunities such as personal trading and shopping tour with their vehicles. In the tour, Malaysians can enjoy personal wholesale purchase of reasonably priced Indonesian products. According to the Malacca customs office, clothes are not in the list of import duties.

(2) Passenger

Both sides of local economies expect inbound tourism promotion in line with opening a new RO-RO shipping route. In recent years, particularly since 2004 when Malacca was listed in the UNESCO World Heritage list, foreign visitors to Malacca have sharply increased.

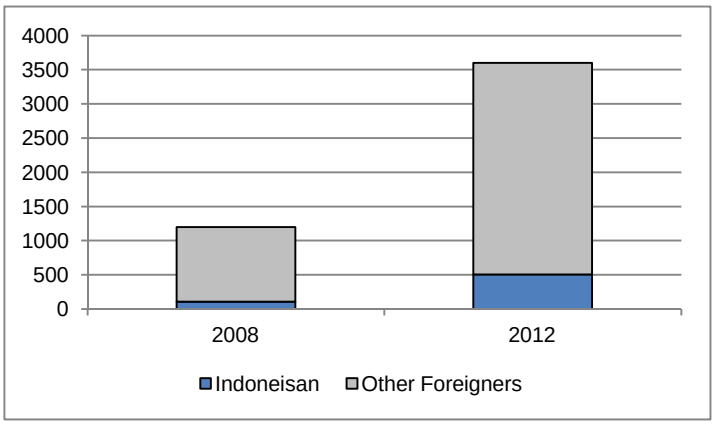
Indonesians are the third group, followed by Chinese and Singaporean, among Malacca foreign visitors in 2008 and 2012 (the first half), registering a sharp increase from 106 thousand in 2008 to 504 thousand in 2012 (estimated).

In 2008, there was only ferry service available between Malacca and Dumai. According to the ferry operator, the share of Indonesians and Malaysians is 7:3. It was supposed that most of the Indonesian visitors to Malacca came from Dumai by ferry. At present, however, one more ferry and three airline routes provide direct service between Riau Province and the Malay Peninsula, as follows:

- Bengkalis – Malacca (ferry, 3 round trips per week)
- Pekanbaru – Malacca (Lion Air, 70-seat, everyday)
- Pekanbaru – KL Subang (Firefly, everyday)
- Pekanbaru – KLIA (Air Asia, everyday)

One unique tourist group from Indonesia are the medical tourists, where Indonesian patients are hospitalized or stay at Malacca hotels from several days to two weeks sometimes with their families. The number of Indonesian medical tourists is estimated at 90 thousand in 2012.

Several years ago, Indonesian visitors to Malacca were mostly workers. Today, many affluent Indonesian tourists visit and enjoy Malacca.



Note: Year 2012 figures are estimated from actual data from January to June 2012.

Figures indicate thousand people.

Source: Malacca State Tourism Statistics

Figure 14.18 Foreign Tourists to Malacca

On the other hand, the Riau tourism market is still small. Integrated road development and tourism investment must come in at Rupat Island and other potential tourism destinations.

Taking the aforementioned situations into account, the new RO-RO shipping will create a new tourism market focusing on different demand segments from current ferry and air services. These are:

- Group tours by tourism coach buses towards Malacca and other tourism destinations in the vicinity of Malacca in the Malay Peninsula. Incremental demand is expected from group tours to Riau tourism sites;
- Medical tourism by vehicle particularly those traveling with their families and/or on stretcher or for handicapped walkers; and
- Other passenger movement by vehicle.

2) Demand Forecast

(1) Further Cargo Analysis

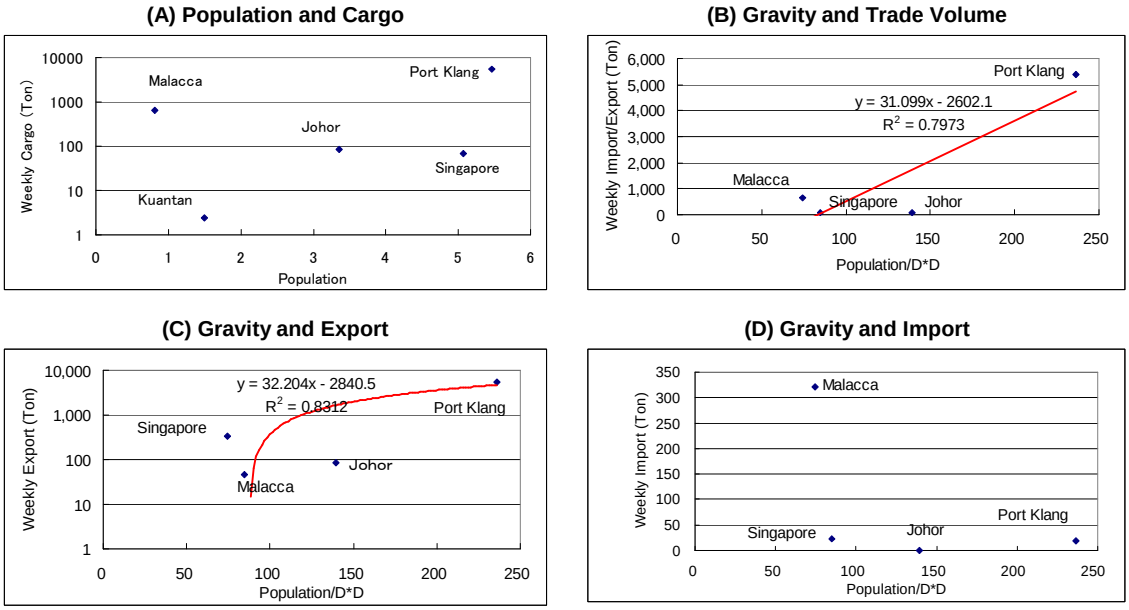
The Team identified several cargo demand segments for RO-RO shipping as follows:

i) Existing strait crossing traffic by NCVs (refer to Table 14.10);
ii) Inducible cargo demand responded by local stakeholders (refer to Table 14.10);
iii) Construction materials responded by local stakeholders without specific quantity;
iv) Machineries and heavy equipment currently exported from Malacca via Singapore responded by local stakeholders without specific quantity. Such heavy cargo cannot be transported by NCV, while RO-RO vessel can handle such cargoes;
v) Paper products currently exported from Pekanbaru to Port Klang and fertilizer products in reverse. The cargo volume is reported to be 10,000 TEU monthly. Part of them may be converted to the Dumai-Malacca route because of the on-going Pekanbaru-Dumai toll road.
vi) Further perishable goods (fish, fruits, vegetables, etc.) from Dumai to Singapore via Malacca like growing reefer van traffic from Thai to Singapore via the Malaysian North-South Expressway recently.

Among them, (1) is considered as the core demand segment since it is existing and convertible break-bulk. Due to presently poor port infrastructure in Malacca, many NCVs call at Port Klang, located some 100 km away from Malacca. Using available statistical data, possible port traffic at Malacca under no infrastructure constraint is analyzed.

With Figure 14.19, existing cargo at Dumai is analyzed as follows:

- At the Dumai port, international trade cargoes are transported by small ships to the opposite shore, such as Malaysia and Singapore. The freight volume is almost proportional to the population in the hinterland as Port Klang, Johor and Kuantan. But traffic volume in Malacca is larger while that of Singapore is smaller than other ports, so they are not proportional. (Refer to Figure 14.19-A)
- According to the gravity model of the distance and the population in the hinterland as shown in Figure 14.19-B, the freight volume of export to/import from Port Klang is reasonable. The total volume of export and import in Malacca is larger than other ports by the estimated line of the gravity model.
- On exports, the freight to Malacca and Port Klang are plotted on the modeling line as shown in Figure 14.19-C. It looks like the exported cargo from Dumai is transported directly to the large consumer market in Kuala Lumpur, and the cargo to Singapore is also large because Singapore is a transshipment port.
- On imports as shown in Figure 14.19-D, the volume from Malacca is very large despite the not-so-large population in the hinterland, therefore, a big part of import cargo to Dumai might be transshipped through Malacca.

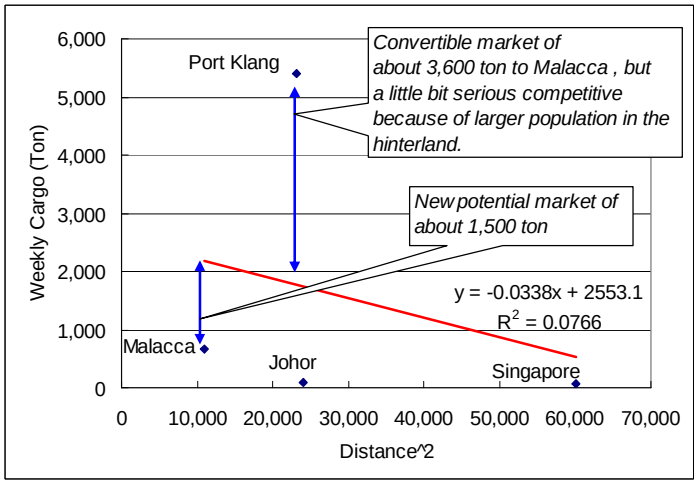


Source: Pokala Port in PELINDO and Sungai Dumai Port in ADPEL

Figure 14.19 Weekly Cargo at Dumai Port

One gravity model has been developed to estimate Dumai trade volumes at opposite strait cities without consideration of port infrastructure availability and constraint. The model assumes that cargo volume is inversely proportional to the square of port distances. Figure 14.20 shows the calculation results, indicating more trade volume at Malacca by approximately 1,500 tons weekly and decreased trade volume at Port Klang.

According to Dumai Port Administration Office, the major export item to Port Klang is palm kernel and the major import item from Port Klang is construction materials. It is noteworthy that Malacca stakeholders mentioned construction materials as possible export cargo from Malacca to Dumai on the RO-RO shipping route. However small NCVs, 41 GT on the average, allowed to enter in Malacca Port presently, are not suitable to carry such heavy cargo in bulk.



Source: Pokala Port in PELINDO and Sungai Dumai Port in ADPEL
Estimated by JICA Study Team

Figure 14.20 Possible Cargo Increase between Dumai and Malacca

To incorporate the above estimation results, the traffic survey results in Table 14.11 particularly convertible cargo demand to RO-RO shipping has been revised and projected at 2015 volume accordingly.

Convertible Cargo Demand (revised) in 2015

= (Existing Dumai–Malacca cargo by NCVs + Possible cargo increase) x Traffic growth rate [2015/2012]

= (17,586 tons + 78,000 tons) x 1.075

= 102,755 tons

Table 14.11 Potential RO-RO Cargo Demand (revised)

	Between Dumai and Malacca
Convertible Cargo Demand in 2015 *	102,755 tons
Inducible Cargo Demand in 2015**	80,000 tons
Total	182,755 tons

*) Anticipated NCV trade between Dumai and Malacca in 2015 based on the collected ship records of strait-crossing traffic at Dumai during the period January to June 2012

**) Potential cargo volume in 2015 among interviewed stakeholders

Source: JICA Study Team

(2) RO-RO Shipping Traffic Plan

On the route, the Study designs a medium-size ROPAX vessel which allows mooring to the existing Dumai RO-RO terminal. Both the local governments of Malacca and Riau intend to assign two RO-RO operators from Malaysia and Indonesia when opening the route. Taking such on-going inter-related works into account, the Study has prepared RO-RO shipping traffic plan on the route between 2015 and 2035.

In the plan, vehicle floor occupancy rate which is an important RO-RO shipping operation indicator, is set at 54% in the opening year. It is considered adequate to manage vessel space under frequent 2-round daily service.

The plan result includes passenger vehicles (cars and buses) and trucks. Provided that one bus and one truck are equivalent to 3 cars, respectively, trucks account for around 40% of the vehicle space in ship. It is the lowest truck share among the 3 priority routes. It reflects the stakeholders views at both Malacca and Riau as well as both the local governments, promoting tourism development by RO-RO shipping.

Table 14.12 RO-RO Shipping Traffic Plan (Dumai and Malacca, weekly traffic, 2015-2035)

Weekly Two-Way Traffic			2015	2020	2025	2030	2035
(A) Dumai & Pekanbaru (B) Malacca	Passenger	Total person	2,000	2,280	2,560	2,860	3,180
		(non vehicle)	(190)	(220)	(230)	(280)	(310)
	Vehicle	Car	189	215	242	271	301
		Bus	44	50	57	63	70
		Truck	78	86	94	102	112
	Cargo	Tonnage	430	470	510	560	610
	Characteristics	(A) => (B)	- Medical tour with family, Genting Highland tour, Malacca & Singapore sightseeing tours - Vegetables, fish, paper products, palm shell, cooking oil				
		(B) => (A)	- Shopping tour for daily commodities, Golf tour - Sugar, onions, biscuits, processed food products, construction materials				

Source: JICA Study Team

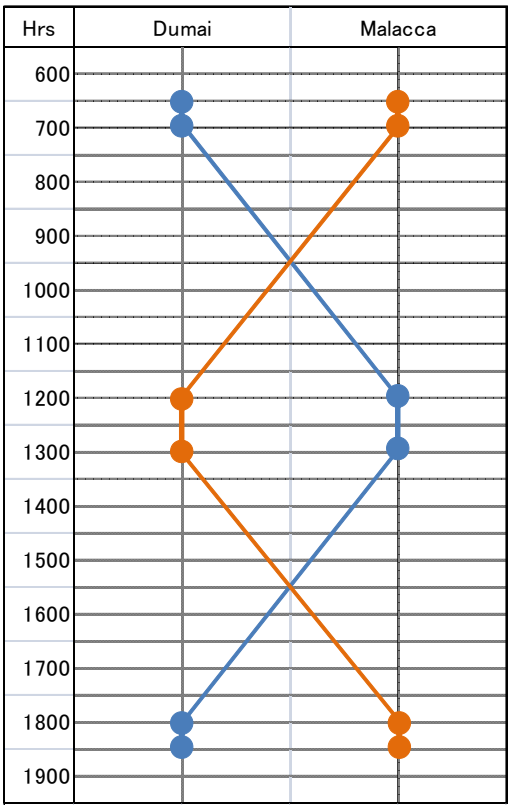
As a result, the year 2015 cargo demand gives some implications with the estimated convertible and inducible cargo demand in 2015. The year 2015 cargo demand on the route is equivalent to 12.2% of the convertible and inducible cargo demand in 2015 although it may include other demand from other existing trading routes and some additional inducible demand.

Since the demand forecast sets walk-in passengers at only 10%, the rest of the passengers with vehicles must be a new market for RO-RO shipping. When applying the same nationality share with the fast ferry service (i.e., 7 for Indonesians and 3 for Malaysians), the new service will take 36 thousand Indonesians to Malacca in 2015. This can be absorbed by the Malacca tourism market since it has expanded by three (3) times in the recent 5 years and the number of Indonesian visitors has sharply increased to 504 thousand in 2012, accordingly.

3) Ship Operation Plan

The Malacca State Government has appointed a RO-RO shipping operator. The Riau Provincial Government has not done the same arrangement. In Indonesia, MOT is responsible to appoint such an international shipping operator on a certain route. Some public and private operators which operate RO-RO vessels serving for Indonesian domestic shipping showed interest in the route to the Study Team during the field survey.

Since the Dumai – Malacca route is short and mostly calm, 2 medium RO-RO vessels are planned to serve on the route with high frequency. The Malacca Strait around the route has a large shipping traffic volume. Large vessels navigating along the Strait sometimes face difficulty in watching small vessels during nighttime navigation. Therefore, the proposed RO-RO vessels will ply to and from Dumai and Malacca during daytime only, with two round trips per day.



Source: JICA Study Team

Figure 14.21 RO-RO Vessel Assignment Plan between Dumai and Malacca

14.6 Preliminary Ship Design

1) Design Conditions

In addition to the requirement regarding cargo and passenger loading capacity indicated in the demand forecast in the previous section, the following facts and conditions are considered in a comprehensive manner in the preliminary ship design for the Dumai - Malacca route.

(1) Port to port distance

The port to port distance between Dumai and Malacca is approximately 58 nm.

(2) Sea conditions

Sea conditions of this water are described as “sea state is invariably smooth or slight in Malacca strait”.[1]

(3) Expected shipping service

Two ships will be allocated on this route.

Daily two-round trips will be plied by two ships on this route, preferably in daylight time to avoid crossing the Malacca Strait after sunset where vessel traffic is rather heavy from the viewpoint of marine safety. This consideration is realized by ship speed of around 14 knots or more.

(4) Docking conditions

At Dumai port, the use of an existing RO-RO facility, which is designed for a ROPAX ship with bow and/or stern ramp, is intended. At Malacca, a similar boarding facility will be provided.

2) Outline of the Ship

Principal particulars of the proposed ROPAX for the Dumai-Malacca route are shown in Table 14.13, and the general arrangement plan is shown in Figure 14.22.

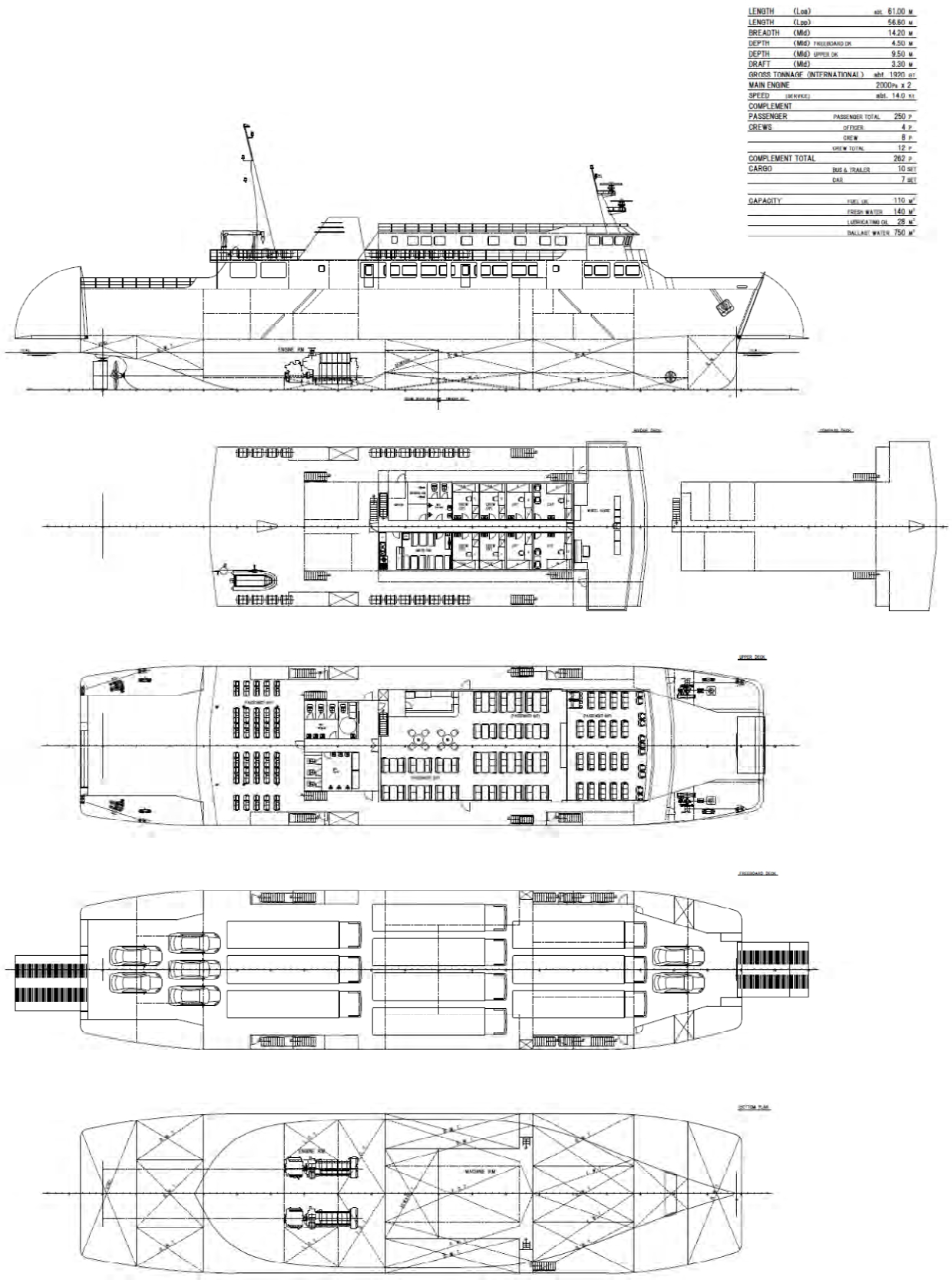
Table 14.13 Principal Particulars

Length over all	Approx. 61.0	m
Length between perpendiculars	56.6	m
Breadth	14.2	m
Depth	9.5	m
Draft (design)	3.3	m
Gross tonnage (international)	1920	T
Main engine	2942	kw
Service speed	Approx. 14.0	Kt
Loading capacity		
- Truck	10	Unit
- Passenger car	7	Unit
- Passenger	250	Person
New shipbuilding cost [2]	25	Mil $

Source: JICA Study Team Note: Dimension of truck is Length 12 m x Width 2.5 m

[1] Malacca Strait and West Coast of Sumatera Pilot, NP44, The Hydrographer of the Navy.

[2] To estimate new shipbuilding cost, information indicated in a recent published paper prepared by the Ministry of Land, Infrastructure and Transport of Japan is used.



Source: JICA Study Team

Figure 14.22 General Arrangement Plan

14.7 Institutional Arrangement

1) Dumai Port

(1) Port Policy

The Provincial Government of Riau constructed the existing RO-RO terminal at Dumai in 2009. The terminal is now used for only domestic RO-RO service to Rupat Island. However, Riau Province intends to expand its capacity for international use by the Dumai – Malacca RO-RO shipping service. The Shipping Law No.17/2008 gives a greater role of commercial port development and management to local governments.

Due to limited local government finance, however, the RO-RO terminal can accommodate only one small RO-RO vessel at a time. The terminal becomes a physical condition to make a Dumai – Malacca RO-RO shipping service plan in the study. When expanding service volume considerably, a more powerful port developer will have to come in.

(2) Customs Regulations

The main hindrance to the advancement of the international RO-RO shipping service in the Port of Dumai would be the treatment of vehicles in transit, as is the case in most Indonesian ports included in the surveyed routes. Presently, a vehicle that would enter the port would be treated as an importation and, therefore, subject to import duties and taxes or bond guarantee if declared by the declarant and approved by Customs as temporarily imported.

Notwithstanding the present situation, an alternative solution can still be found to surmount this problem by means of studying related BIMP-EAGA MOUs in the island of Borneo and their practices. They enable vehicles to cross the borders without paying import taxes and duties. The same principles and guidelines embodied in this agreement can be suggested to be adopted to the RO-RO shipping service to be operated on this route.

The treatment of RO-RO cargo should also be such that it would be cleared with dispatch and minimum impedance of movement.

The development of a RO-RO service and the growth of trade that it will foster on this route would also exert pressure on Customs services to be on guard against contraband goods, especially illegal drugs. The necessary office and equipment should already be in place before the opening of the service. It would be best if a consolidated CIQS building would be built to house the different agencies for better and more efficient services.

(3) Immigration Regulations

The immigration procedures should be straightforward, similar to immigration procedures in international airports. Since most of the passengers of the RO-RO service would be of ASEAN nationality and just for a short stay only, the visa requirement would not be a problem. If ever there is an additional requirement for an ASEAN citizen it should be just an exit ticket.

However, considering that the RO-RO service would also mean more movement of people, the immigration officials should also be on the lookout against human trafficking and cross-border movement of unwanted elements. Immigration and other databases must be updated to be aware of any imminent threats.

An appropriate office for the Immigration should also be provided in a consolidated CIQS

building to provide better and more efficient services.

(4) Quarantine Regulations

The quarantine procedures are necessary to safeguard against the spread of diseases, whether it be on persons, plants or animals. For the same reason that the RO-RO service would foster greater movement of people and goods, which would also include plant and animal products, quarantine services should also be strengthened.

An appropriate office for the Quarantine should also be provided in a consolidated CIQS building to provide better and more efficient services.

(5) Port Security

Security is a growing concern everywhere, especially in places where people congregate, like ports and airports. The International Maritime Organization (IMO) has formulated the International Shipping and Port Facilities Security (ISPS) Code to provide guidelines in ensuring safety and security of shipping services and port facilities. Even if the port is not ISPS Code rated, it would still be good policy to apply the ISPS provisions. The access to the international passenger terminal, the holding area for international RO-RO vehicles or container chassis and the port apron for international operations should be controlled. Only authorized personnel should be allowed in these areas.

An appropriate office for the Port Security should also be provided in a consolidated CIQS building to provide better and more efficient services and faster coordination among concerned agencies.

(6) Recognition of Driver's License and Vehicle Registration

The recognition of driver's license is not a contentious issue as it is a usual courtesy given in almost all countries to foreign visitors, as long as it is in a language recognized by the host country. For drivers between Indonesia and Malaysia it is even easier as both the languages are closely related, and there is almost no need for translation.

The fact that both countries involved in the route are right-hand-drive (RHD) countries adds an incentive for drivers that they could or would also drive in the other country.

The recognition of vehicle registration (and the related vehicle insurance) would not present a formidable issue as seen in the cross-border movement of vehicles in the island of Borneo. The same principles and guidelines can be applied to cross-border movement via the RO-RO service, and would greatly contribute to the success of the service.

2) Malacca Port

(1) Port Policy

The State of Malacca envisages that an international RO-RO terminal will be attached to the proposed cruise terminal jetty off the coast of Pulau Melaka. This study report accepts this idea. However, it is not explicit about the responsible entities of port construction, management and operation. Roles' demarcation must be clearly stated among the federal government, the state government, Port Klang Authority, and a port operation concessionaire.

(2) Customs Regulations

Previous experiences in the Penang – Belawan route have shown that the Malaysian side

has a more relaxed application of Customs procedures with regard to vehicles in transit coming from Indonesia. It is also expected that the same treatment will be accorded to vehicles coming to this port.

The treatment of RO-RO cargo should also be such that it would be cleared with dispatch and minimum impedance of movement.

Nonetheless, the Customs operations must be reinforced to handle the additional movement of goods being traded across the route. Special concern should also be shown on the threat to use the route as a mode for the transport of contraband goods, especially illegal drugs.

Considering that the envisaged port to serve Malacca is still to be developed, the provision for a consolidated CIQS building would be highly desirable to afford better service to clients and more efficient operations at the port.

(3) Immigration Regulations

The same immigration procedures similar to immigration procedures in international airports should also be applied at the port. Since most of the passengers of the RO-RO service would be of ASEAN nationality, and would be just for a short stay, the visa requirement would not be a problem. If ever there is an additional requirement for an ASEAN citizen it should be just an exit ticket, and not on the “allowance money” of the guest.

However, considering that the RO-RO service would also mean more movement of people, the immigration officials should also be on the lookout against human trafficking and cross-border movement of unwanted elements. Immigration and other databases must be updated to be aware of any imminent threats.

An appropriate office for the Immigration should also be provided in a consolidated CIQS building to provide better and more efficient services.

(4) Quarantine Regulations

The same quarantine requirements as in Dumai Port would also have to be provided at the designated port to serve Malacca. Even during the preliminary planning stage for the port, an appropriate office should be designed for quarantine services at the consolidated CIQS building.

(5) Port Security

The fact that the port to serve Malacca would be a new port would serve well for a well-designed port with modern security features. A modern passenger terminal, complete with modern security screening equipment integrated into the total port security system, can be expected. This would redound to a more relaxed, secured atmosphere, which would be an asset to the RO-RO service. The security system can be so designed as to comply with ISPS Code requirements, even if the port would not be ISPS rated.

(6) Recognition of Driver’s License and Vehicle Registration

The recognition of driver’s license is not a contentious issue as it is a usual courtesy given in almost all countries to foreign visitors, as long as it is in a language recognized by the host country. For drivers between Indonesia and Malaysia it is even easier as both the languages are closely related, and there is almost no need for translation.

The fact that both countries involved in the route are right-hand-drive (RHD) countries adds an incentive for drivers that they could or would also drive in the other country.

The recognition of vehicle registration (and the related vehicle insurance) would not present a formidable issue as seen in the cross-border movement of vehicles in the island of Borneo. The same principles and guidelines can be applied to cross-border movement via the RO-RO service, and would greatly contribute to the success of the service.

15 THE BELAWAN – PENANG – PHUKET ROUTE

This chapter aims at forming a RO-RO shipping system on the Belawan – Penang – Phuket route. The same planning workflow and demand forecast assumptions are adopted as indicated in Section 14.1.

15.1 Stakeholders' Views

1) Stakeholder Interview Survey

A total of 85 cargo and tourism stakeholders responded to the stakeholder surveys in Medan/ Belawan (35 companies), Penang (40 companies) and Phuket (10 companies). Of these, 36 are forwarders or shipping agents, 30 are tourism-related organizations, 11 are agricultural producers or non-agricultural manufacturers, and 8 are traders (see Table 15.1). Nearly half of the total samples are either forwarders, ship operators or shipping agents mostly from Medan and Penang. The second biggest group includes travel and tour operators, hotel operators, transport service operators, and tourism destination operators mostly based also in Penang and Medan. Less than a fourth of the sample are agricultural/ fishery producers, non-agricultural manufacturers, and traders.

Table 15.1 Profile of Survey Respondents for Belawan-Penang-Phuket Route

Region	Shipper/ Manufacturer/ Processor	Trader/ Distributor/ Retailer	Forwarder/ Shipping Agent	Tourism-Related Organizations	Total
Medan/ Belawan	6	4	15	10	35
Penang	3	3	18	16	40
Phuket	2	1	3	4	10
Total	**11**	**8**	**36**	**30**	**85**
% Share	**12.9**	**9.4**	**42.4**	**35.3**	**100.0**

Source: Medan/Belawan, Penang and Phuket Stakeholder Surveys, JICA Study Team, 2012

Majority of the companies are small to medium-sized while seven (7) are large companies. The major foreign trade products handled by the cargo stakeholders are areca nuts, betel nuts, cinnamon skin, nutmeg skin, steel billets, resin stone, plastic materials, glycerin, CPO, rubber and rubber products, latex gloves, construction materials, lumber, fiberboard, glass panels, plywood, furniture, coffee, fish, vegetables, fertilizer, animal feeds, gypsum powder, chemicals, electronics, cars, automobile spare parts, agricultural and industrial machinery, textile, and general cargoes.

The tourism-related organizations deal with outbound and inbound tour operations, ticketing and hotel reservation services, transport, hotel operations, and tourism destination operations.

2) Medan/Belawan Stakeholders' Views to Use New RO-RO Shipping Service

(1) General Opinions

For this proposed triangle route, it is the Belawan-Penang route that has historical and current experience in significant trading and passenger movement. A RO-RO cargo and passenger ferry service on this route was even operated in 2005, but this was short-lived

and was unsustainable due to economic, technical and institutional factors.[1] The Belawan-Penang passenger ferry services also collapsed in 2010 mainly due to competition from the LCCs. However, container shipping shuttle service has been revived between Penang and Belawan since May 2012.

There is no existing shipping connection between Phuket and Penang or Belawan. The Air Asia Medan-Phuket flights only lasted for three months because the schedule was only during weekends.

Despite the failed initial attempt at establishing RO-RO shipping services to connect to Penang, stakeholders in Medan and Belawan are quite optimistic about the planned new service under the ASEAN RO-RO project. Both the government and private sector are willing to support the establishment of the new RO-RO service which is expected to expand international trade and tourism across the route. However, they point to the need to learn from the lessons of the past and to address the market, costs, technical and institutional requirements that could make RO-RO shipping more sustainable this time.

(2) Perceived Advantages and Disadvantages of the RO-RO Shipping Service

The following are the perceived advantages and disadvantages of the Belawan-Penang-Phuket RO-RO shipping service according to stakeholders in the Medan/ Belawan influence area:

i) There is significant trading between North Sumatra and Penang. Much of the cargoes (e.g., vegetables, frozen fish, spices, etc.) is currently being transported by traditional wooden-hulled boats. These products can potentially use the new RO-RO shipping service if costs are competitive and the frequency of service is adequate.

ii) Belawan Port is a hub port for North Sumatra, Aceh, Bengkulu and Padang where most of the cargoes come from. From Belawan, these are shipped to international destinations. Penang can continue to serve as the transshipment port for exports from Belawan to Singapore and other foreign markets and for imports from other countries.

iii) There appears to be no potential cargo from Belawan to Phuket, maybe only passengers.

iv) The RO-RO service can be a cheaper and convenient alternative for passenger transport as it can carry both passengers and their vehicles. It can potentially cater to some of the Indonesian medical tourists to Penang as well as to traders, businessmen, overseas workers, among others.

(3) Stakeholders' Expectations from the RO-RO Shipping Service

The Medan/ Belawan stakeholders expect the following to be considered in the operation of the Belawan-Penang-Phuket RO-RO shipping service:

i) The RO-RO service should provide enough cargo capacity to accommodate current and projected cargo volumes. It must have a regular and reliable schedule and competitive freight rates compared to other modes of transport.

[1] Despite a limited subsidy from the North Sumatra government, the RO-RO operations was beset with the lack of dedicated RO-RO facilities at both the Belawan and Penang ports, the customs bond requirement for vehicles entering the Indonesian border, high fuel and port handling charges at Belawan Port, and lack of marketing and promotion of the new route. As a result, only 15% of the target load factor of the RO-RO shipping operation was achieved.

ii) There is a need for common tariffs at the Belawan and Penang Ports, including those for terminal handling, container handling, and destination port handling.

iii) There is also a need to look at CIQS regulations which should not result in delays in cargo movement and high costs of operations for traders and businessmen. There should be more simplified standard operating procedures adopted by Indonesia, Malaysia and Thailand to be implemented consistently no matter who sit in the regulatory agencies. The private sector is optimistic about the RO-RO service if regulations are simplified and costs are reduced.

iv) The fares of the RO-RO should be cheaper than airfare. Data from the manpower agency indicates that 20-25 passengers from Belawan/ Medan go to Penang everyday to work. They may take the RO-RO if fares are cheaper.[2] A subsidized fare scheme may be considered to achieve the appropriate fare. Local traders may also use the RO-RO service if they are not in a hurry. They may be willing to bring over their cars to Penang if CIQS issues like temporary importation of vehicles, vehicle age and technical requirements (e.g., car window tint), etc. are addressed. The ATA CARNET agreement on license, etc. may be adopted.

v) During the Belawan-Penang ferry operation, the Immigration office used to have border control machines and visa-on-arrival equipment. If the RO-RO service will be implemented by 2015, they should request the DG in Jakarta to bring back these equipment to Belawan. Perhaps the visa-on-board issuance before the passengers disembark may be explored. It would be better for passengers to have passports than just travel permit letters (per trip) because it would be cheaper.

vi) Trade and business exchanges between Indonesia, Malaysia and Thailand should be strengthened to promote cross-border trade. Medan business people have regular forums/ exchanges with Penang business people every three months. These include the holding of the Penang and North Sumatra Trade Fairs.

vii) The Customs Office is willing to support the ASEAN RO-RO project. However, the RO-RO shipping service is expected to comply with all national customs policies because there is no distinction between RO-RO and other kinds of cargo. The customs bond for temporary imported vehicles may be waived as long as there is an organization to guarantee that vehicles will go back and will assume the liability for any non-compliance. There will be no need for the guarantor to have an export/ import license.

viii) The port facilities at Belawan should be improved, including the deepening of the port draft and provision of dedicated RO-RO facilities. It is reported that these improvements are included in the port development plans.

[2] At present, there are 4 passenger ferries from Tanjung Balai Asahan (4 hours from Belawan) to Port Klang (4 hours from Penang) and 3 vessels plying vice-versa. The two-hour trip costs about USD29/ passenger per one-way. They carry 120-200 passengers per vessel daily, going up to 175-250 passengers during peak season. Most of the passengers are immigrant workers, students, visiting relatives, and tourists. Outbound traffic is more than inbound.

3) Penang Stakeholders' Views to Use New RO-RO Shipping Service

(1) General Opinions

The Penang-Belawan-Phuket route is in line with the IMT-GT cooperation blueprint, possibly developing Penang as an IMT-GT hub port. However, it is not certain if RO-RO shipping service on this route can be sustained. The JICA ASEAN RO-RO study can help assess the route's viability. The Penang State Government supports the RO-RO project, as part of the strategy to develop an integrated seaport development, with RO-RO shipping as complementary to existing transport modes.

Since the failed attempts at RO-RO shipping connections between Indonesia and Penang years ago,[3] there have been many changes in the business environment. Government and private sector stakeholders in Penang generally think that with more business and industries, more cargo and passenger traffic, and better port facilities, the potential for RO-RO service has increased. Especially if the legal/institutional issues that hinders its operations can be addressed, and if it is adequately marketed and promoted, the Penang-Belawan RO-RO shipping service may work.

The stakeholders believe that RO-RO shipping can complement other modes of transport and help establish an integrated transport and logistics infrastructure. This will contribute to expanding product markets, business, trade and tourism, thus, accelerating the growth of the local economies and increasing jobs and incomes.

(2) Perceived Advantages and Disadvantages of the RO-RO Shipping Service

The following are the perceived advantages and disadvantages of the Belawan-Penang-Phuket RO-RO shipping service according to stakeholders in Penang:

i) The present cargoes from Belawan to Penang consist of barter trade cargo on wooden-hulled boats, cargo on small vessels ("*tongkan*"), and container cargo. Containerized cargo traffic is not much but the cargo on wooden-hulled boats is significant. Belawan supplies frozen fish, seafoods, vegetables, coffee, cocoa, cassava chips, spices, palm kernel shells (PKS), other agricultural products, etc. In return, Penang brings back palm oil, charcoal, consumer goods (including goods from China), etc. Potential trade also includes scrap rubber (in bales) from Indonesia. At least part of this trade can be captured by the new RO-RO shipping service.

ii) With the opening up of its economy to the world and with the aggressive economic policies of the new governor, Aceh is becoming an important trading center in the region. It is a major supplier of fish, seafoods, vegetables, spices, coconut, CPO, PKS, charcoal, etc. Aceh needs a lot of things as it imports 90% of its consumer goods from Jakarta, which makes them 20-100% more expensive. Most of the barter trade cargo from North Sumatra are so-called "weekend cargo" because traders collect the cargo in Medan or Belawan and ship them out only during weekends. From Aceh, Sabang, etc. the cargoes are brought to Medan for warehousing, then to Belawan where they are shipped out to Port Klang or Singapore onwards to Penang. Shipping directly from Aceh, Sabang, etc. to Penang would be very difficult because the North Sumatra ports are only feeder ports with poor facilities, and freight rates are

[3] Aside from the failed Belawan-Penang RO-RO shipping service in 2005, it was mentioned by stakeholders that there was also an ENRO and a Yogyakarta-Penang RO-RO shipping service that tried to operate, but failed, about 30 years ago.

crucial.[4] Logistics costs are driven up by too many transport/ handling equipment and services. The RO-RO service can potentially reduce these costs and can increase transshipment cargo to Penang. Therefore, Medan/ Belawan may still be a transshipment option. It may be possible to consolidate cargo by small boats to Medan or Belawan, where bigger ships can bring them to Penang for processing and/or repacking, then shipping off to foreign markets.

iii) There is enough cargo in Penang to support a new shipping service. The RO-RO service can serve as a feeder service to complement container shipping. Penang can be a transshipment port where imported goods from the world going to Port Klang onwards to Penang can be transshipped to Belawan. For example, imports from China can be converted to break bulk at Penang and then shipped to Belawan.

iv) According to the Northern Corridor Implementation Authority (NCIA) in Penang, an investor is going to build an automobile hub/ manufacturing park in mainland Penang which will manufacture completely built units (CBUs). Within 18 months, the company will relocate from Thailand mainly because of floods, dominance of big players, and other factors. NCIA is also discussing with a potential investor that is looking into establishing a manufacturing plant for CRT TVs and washing machines (using old technology) which, apparently, have a niche market in smaller towns. The appliances and cars could be potential cargo for the RO-RO service to Indonesia. The new shipping service can also support the logistics hub at the industrial park.

v) While there is potential cargo trade with Thailand, Phuket may not be the ideal partner port as most of the cargo movement is in Kantang Port, a river port in Thailand. However, Kantang's shallow waters (max. 5 m) and limited port facilities are more suitable for barges. The Phuket connection is more for passengers, but it is already served by cruise lines and LCCs.

vi) Shipping agents in Penang mainly deal with containerized cargo. They feel that RO-RO shipping seems to be a return to the "old form" of break bulk cargo shipping instead of modern containerized shipping. While RO-RO service is intended to complement container shipping by transporting cargo that is not serviced by container, it is important to put in efficient CIQS services to make loading/ unloading fast and to adopt competitive freight rates. To address the lack of containers, maybe treating the trailer as part of the RO-RO vessel should be looked into. Nevertheless, it would be expensive if the prime mover stays on the vessel for a week.

vii) There is heavy air passenger traffic between Medan and Penang. There are about 330,000 medical tourists a year in Penang, 80% of whom are from Indonesia (including Medan, Surabaya, Bandung, Jakarta and other areas with direct flights to Penang; some come from Borneo). They seek healthcare services at the Malaysian hospitals known for high quality services and ethics. Many of them have become rich from the palm oil business. With the LCCs, airplanes have been the preferred mode of transport across the route. Aside from medical tourism, Indonesians also go to Penang to work, visit relatives, send their children to school, buy property, or go sightseeing. Tourism organizations in Penang are promoting heritage tours in this UNESCO world heritage site (George Town). More than the medical tourists, the RO-RO may be able to attract passengers, especially traders and workers from Medan/

[4] In line with a sisterhood agreement between Aceh and Penang, the Aceh government is planning to build a new and bigger port. Aceh's road network is not good nor safe; it is better to transport goods by sea or river ports.

Belawan, especially since the fast ferry services between Medan and Penang stopped their operations in 2010. These ferries used to carry about 400 passengers a day (RM220 return and RM150 one-way fare). A six-hour or less travel time on the RO-RO vessel will be alright, especially for traders who can bring their cargo across the route safer. The service, however, will need to be promoted well.

viii) The State Economic Planning Unit (EPU) of Penang reported that an Indonesian investor is interested to revive the RO-RO service between Medan/ Belawan and Penang but they have not come forward yet to EPU. Developing RO-RO services may be less expensive as there will be less investments in cargo handling equipment and facilities.

ix) Trading of some commodities, such as vegetables, across the Belawan and Penang route is threatened by the entry of cheap imports from China. This may reduce the volume of trade that can go on the RO-RO.

x) Vehicle movement across the borders through the RO-RO services may increase road traffic in Penang.

xi) Malaysia has some regulations that contribute to high operation costs of traders and reduced cargo volume. These include high port tariffs, high customs duties, a per kilo levy imposed by the Fisheries Department on fish trucks transporting fish in Penang, fumigation requirements for agriculture products, and unloading of certain products (e.g., fish, coconuts) only at certain ports. Trading of some products in Sumatra, in Aceh for example, is controlled by a few monopolies.

xii) Though Penang Port is the gateway to the Malacca Strait, Port Klang is still the preferred port in the region. Some traders prefer to use Port Klang than Penang Port due to the former's cheaper port fees and labor costs. Penang is also considered to have more limited demand for household consumables compared to Port Klang.

(3) Stakeholders' Expectations from the RO-RO Shipping Service

The Penang stakeholders expect the following to be considered in the operation of the Belawan-Penang-Phuket RO-RO shipping service:

i) The RO-RO operations should be efficient and should adhere to the high international standards for international routes. The vessels should not be old but modern and advanced and managed by a reputable group. It is important to ensure the efficiency of RO-RO operations (e.g., no delays, regular schedules, trained staff). Perhaps the RO-RO service should not compete by lowering costs but by looking for market segmentation/ specialization.

ii) The Belawan-Penang RO-RO service may be feasible if port charges are at least comparable to those of Port Klang. Freight costs of the RO-RO should also be competitive to attract shippers and traders. In addition, the RO-RO connection may attract passengers if the fare is cheaper than the low cost carriers, say, less than USD75 per roundtrip according to surveyed tour operators.

iii) The RO-RO operations may need some subsidy until the load factor has stabilized and operations become profitable.

iv) The CIQS procedures should be put in place before the RO-RO operations. However, government regulations should be liberalized and simplified to make the shipping operations easier and less costly.

v) For passengers, the RO-RO vessel should have safe, comfortable and convenient facilities. Passenger service also requires a high frequency of service.

vi) The RO-RO shipping service should be supported by adequate publicity, media campaign, marketing and promotion efforts.

4) Phuket Stakeholders' Views to Use New RO-RO Shipping Service

(1) General Opinions

Despite the absence of any existing cargo and passenger shipping service between Phuket and Penang or Belawan, a few of the cargo shippers in Phuket think that their businesses would potentially benefit from the new RO-RO shipping service.

It is, however, the tourism industry stakeholders who seem to be more optimistic about the prospects of increased tourist traffic between Phuket and Malaysia and Indonesia with the opening of the new shipping service. This is not surprising as Phuket is more of a tourist than a cargo destination.

(2) Perceived Advantages and Disadvantages of the RO-RO Shipping Service

The following are the perceived advantages and disadvantages of the Belawan-Penang-Phuket RO-RO shipping service according to stakeholders in Phuket:

i) The RO-RO shipping service can open up new markets for certain export products (e.g., gloves) in Malaysia or to other foreign markets using Penang as transshipment port. The new service can also provide an alternative route to import some products (e.g., lumber) and can allow some shippers/ traders to import 1 or 2 containers of cargo at a time instead of renting a whole ship.

ii) The RO-RO shipping service will be relatively cheaper than using air transport.

iii) The new shipping service can potentially increase tourist traffic especially from Malaysia and, therefore, contribute to more business opportunities, jobs and incomes in the local tourism industry.

iv) For tourists who usually rent vehicles while on travel, the RO-RO service will make it convenient for them to travel to more destinations.

v) Unlike most foreign tourists, Thai tourists generally do not like to travel by ship. Potential Thai tourist clientele for the RO-RO service may be limited.

vi) The Phuket Port currently caters mostly to passenger shipping. Its cargo facilities will need to be improved to handle the RO-RO shipping operation.

(3) Stakeholders' Expectations from the RO-RO Shipping Service

The Phuket stakeholders expect the following to be considered in the operation of the Belawan-Penang-Phuket RO-RO shipping service:

i) The transport time and cost from the factory to Phuket Port onwards to Penang Port on the RO-RO vessel should be less than the current trucking cost from the factory to Penang.

ii) For smooth cargo movement, the schedule of the RO-RO vessel to Penang should be synchronized with the schedule of the ship calls in Penang.

iii) Especially for passengers, the frequency and schedule of the RO-RO shipping service should be efficient. Travel time and punctuality of service are very important to travelers.

iv) The RO-RO vessel facilities should be adequate to meet the requirements of the passengers. The acceptable passenger fare on the RO-RO, according to surveyed tour operators, should be USD50.

5) Convergence of Belawan – Penang – Phuket Stakeholders' Views

The converging and diverging views of the stakeholders for the Belawan-Penang-Phuket RO-RO shipping service are summarized in Table 15.2.

Despite failures in the initial introduction of RO-RO shipping services along part of this route in the past, the stakeholders particularly in Belawan and Penang are more optimistic of the potential success of the proposed new RO-RO route. They think there is enough cargo that can be converted to RO-RO shipping, if transport costs are made competitive and certain trade and CIQS regulatory issues are effectively addressed. The Belawan-Penang RO-RO service is also expected to contribute to the currently thriving medical tourism industry as well as open up new tourist niche markets. They, therefore, welcome and are willing to support the RO-RO project.

However, making the RO-RO connection to Phuket successful seems to be seen as more challenging and difficult. This is mainly due to the absence of cargo movement between Phuket and Penang or Belawan. The Phuket Port may not be the appropriate trading partner port. While there is some optimism in potentially boosting tourism across the Thai, Malaysian and Indonesian marine borders, the current profile of the tourist markets in the area may not be particularly suitable to RO-RO passenger shipping. Tourism traffic through the RO-RO is further dampened by the presence of LCCs and cruise services which will compete with the RO-RO services.

Table 15.2 Summary of Stakeholder Views on the Belawan-Penang-Phuket RO-RO Shipping Service

Aspect	Converging Views	Diverging and/or Singular Views
Overall Economic Benefits	- The RO-RO route is in line with the IMT-GT cooperation blueprint. The RO-RO service can benefit businesses and increase trade and tourism across the route.	
Market	- Despite past failed attempts of RO-RO shipping between Indonesia and Malaysia, changes in the business environment attested by bigger local economies, increased cargo and passenger traffic and improved port facilities, are now more favorable to introducing RO-RO shipping again. - There is significant volume of cargo trading across the Belawan-Penang route, which is currently shipped by wooden-hulled boats, small vessels, and container vessels. These and other potential cargoes such as electronic appliances and various consumer products currently via Jakarta may possibly use the new RO-RO service. - Belawan and Penang cargo stakeholders do not see much trade potentials with Phuket. This route may be better for passenger traffic. - The RO-RO service can potentially cater to the needs of medical tourists as well as niche markets including traders, businessmen, overseas workers, students,	- Some Penang tourism stakeholders think that RO-RO service may not be suitable for most medical tourists, who would rather prefer the more convenient airline transport. - Aside from medical tourism, tourism organizations in Penang are also promoting heritage tours in this world heritage city. - The new shipping service can potentially increase tourism traffic especially between Penang and Phuket, which are both major tourism destinations.

Aspect	Converging Views	Diverging and/or Singular Views
	visiting relatives, and backpackers. - Port Klang is seen as a competitor port to the Belawan-Penang shipping connection.	
Infrastructure	- Dedicated RO-RO facilities should be put in place in Belawan, Penang and Phuket ports.	-
Legal and Institutional Issues	- CIQS regulations should be more simplified, standardized, liberalized and should not result in delays in cargo movement and high operating costs for the shipping operator and users. - Common port tariffs at the Belawan and Penang Ports should be adopted for the RO-RO service. - Certain trade regulations in Penang that contribute to high trading operation costs should be looked into, including port tariff, import duty on fish and fumigation requirements on agricultural products. - Trade and business exchanges between Indonesia, Malaysia and Thailand should be strengthened to promote cross-border trade. - RO-RO shipping service should have adequate publicity, marketing and promotions support.	-
Costs	- RO-RO shipping freight costs should be competitive with existing trucking and shipping costs. - RO-RO passenger fare should be cheaper than that of low cost carriers and ferry boats (ranging from USD50 to 75 per roundtrip).	- Penang cargo stakeholders prefer if port charges for the Belawan-Penang RO-RO service would at least be comparable to those of Port Klang. - Penang stakeholders think that the RO-RO operations may need to be subsidized initially until it becomes sustainable.
Ship Facilities	- RO-RO shipping service should have an adequate cargo capacity to accommodate current and projected cargo volumes. - It must observe a regular and reliable shipping schedule. - It should have safe, comfortable and convenient facilities for passengers.	

Source: Medan/Belawan, Penang and Phuket Field Surveys, JICA Study Team, 2012

15.2 Detailed Traffic Demand Survey

1) Direct Shipping Survey on Belawan – Penang Route

Belawan – Penang is a historical trading route. But the assigned vessels on the route have varied from time to time. For instance, a container shipping shuttle service was suspended in 2008 and was newly revived in May 2012. Since the new RO-RO shipping will provide frequent feeder service, it may act as a competitor or supplementary/ complementary service provider to the existing shipping operators. The Study Team surveyed such direct shipping services consisting of NCV trade and container shipping by means of the analysis of Belawan ship calls recorded at the Belawan Port Authority and interviews with NCV captains at Belawan Lama.

(1) Interviews with NCV Captains

In September 2012, the Team interviewed four (4) NCV captains about their shipping business at Belawan Lama. Their business profile is summarized in Table 15.3. Some characteristics are noted as follows:

- NCVs usually transport vegetables, fruits, fresh fish and other general cargoes such as bagged fertilizer.
- The Malaysian government instructs Indonesian NCVs to use Lumut Port for unloading fresh fish and others. Therefore, their NCV trade now becomes a triangle (Belawan – Lumut – Penang).
- The Malaysian government likely discourages this NCV trade by way of increasing port charges and customs duties, imposing obligatory fumigation of agricultural products, etc. As a result, the number of NCVs has remained despite the incremental cargo demand.

Table 15.3 Results of Interviews with NCVs

Date	Company and Vessel Name	GT	DWT	Route	Capacity	Cargo	Load/ Unload	Remarks
17/09/12	PT Suka Maju Makmur MV Setia Jaya	192	450	Belawan - Lumut	80 tons	Vegetables such as cabbage, potatoes, pumpkins. Vegetables came from Brastagi	Load	Routes are Penang – Belawan – Penang; Lumut – Belawan – Lumut; and Lumut – Belawan – Penang depending on cargo destination. Frequency is around 3 or 4 times in a month. Cargoes carried from Penang are usually manufacture spare parts, coffee, accessories, tobacco, industrial flour.
17/09/12	PT DPS Orient Star	140	203	Lumut – Belawan - Lumut	81 boxes	Empty fish boxes To be loaded with fresh fish on the next day	Unload	Orient Star alternately with Indomas II serves Lumut – Belawan every 3-4 days. Usually they load fresh fish such as Kembung fish, Tongkol fish, Selayang fish from Aceh, Singkil, Lhokseumawe and Medan, around 100–150 tons on each shipment.
21/09/12	PT DPS Orient Star	140	203	Lumut – Belawan - Lumut	63 boxes	Empty fish boxes. To be loaded fresh fish on the next day	Unload	Orient Star alternately with Indomas II serves Lumut – Belawan every 3-4 days. Usually they load fresh fish such as Kembung fish, Tongkol fish, Selayang fish from Aceh, Singkil, Lhokseumawe and Medan, around 100–150 tons on each shipment.
24/09/12	PT MJS MV Mitra Utama	195	290	Belawan - Penang	50 tons	Vegetables, fruits such as salak, processed salak, fertilizer. Vegetables came from Brastagi	Load	Inbound cargo that were unloaded already were buffalo skin, spare parts. But sometimes they also carried spare parts and cement, coffee, tobacco and other general cargo with a very small amount.

Source: Belawan Field Survey, JICA Study Team, 2012

Source: JICA Study Team

Figure 15.1 Triangle Zone of NCV Trade

MV Setia Jaya (192 GT)

Cargo on Deck, MV Setia Jaya

Cargo in Hull, MV Setia Jaya

MV Mitra Utama (195 GT)

Cargo on Deck, MV Mitra Utama

Unloaded Fish Boxes

Figure 15.2 NCVs at Belawan Lama

From January to August 2012, 54 NCVs entered Belawan Lama from Penang and 65 NCVs departed from Belawan to Penang. Some of them dropped by Lumut. Among all such ship call records, the Team tabulated cargo flows on the triangle zone of the NCV trade (see Table 15.4).

Table 15.4 Cargo Flows of NCV Trade at Belawan

Export		Import	
Belawan to Penang	6,785	Penang to Belawan	20,768
Belawan to Lumut	15,822	Lumut to Belawan	8,219
Total	**22,607**	**Total**	**28,987**

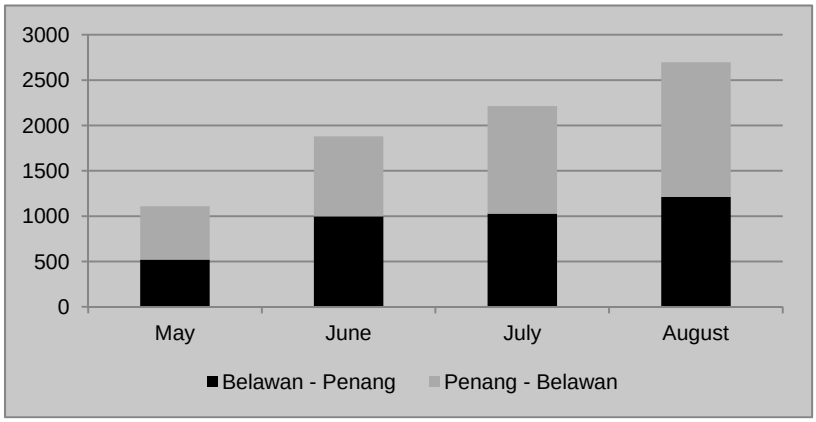
Note: Tons, January – August, 2012

Source: Belawan Port Authority

(2) Container Shipping

The Team observed considerable container shipping traffic between Belawan and Penang. However, the flow is directional since Penang Port attracted 21,078 TEUs or five (5) times more containers from Belawan during the period January to August 2012 compared with the volume from Penang to Belawan of 4,142 TEUs during the same period. It implies that Penang Port functions as a transshipment port while Belawan Port is a feeder port. It also implies that Belawan is a net exporter in this trade.

All the container volume of 4,142 TEUs from Penang to Belawan was transported by MV Uni Assent. Evergreen started to assign MV Uni Assent on this route in May 2012. Since then, MV Uni Assent operates 5 round trips per month on the route even as the vessel enjoys incremental growth in container volume handled.



Note: TEU, May to August 2012

Source: Belawan Port Authority

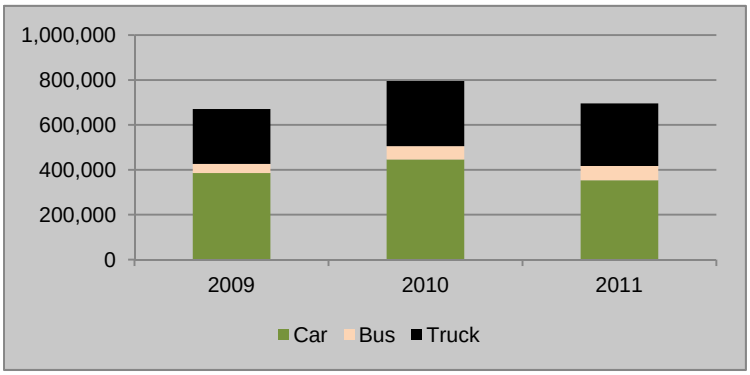
MV UNI ASSENT (15,517 DWT)

Figure 15.3 Monthly Volume of Container Shuttle Service by MV Uni Assent

(3) Cross-Border Road Traffic between Thailand and Malaysia

So far there is no liner shipping service between Penang and Phuket. If there would be break bulk cargo and passenger demand on the route, cross-border road transport could be an alternative.

In fact, the cross-border vehicle traffic between Thailand and Malaysia is huge, e.g., 696 thousand vehicles of cars, buses and trucks from Thailand to Malaysia in 2011 (see Figure 15.4). Historically, the cross-border traffic shows a growing trend, increasing from 181,799 cars in 2002 to 353,375 cars in 2011. Buses (63,581 in 2011) and trucks (279,103 in 2011), which are likely to be shifted to RO-RO shipping, are also increasing on the border in recent years.



Source: Regional Customs Bureau 4, Thailand

Figure 15.4 Cross-border Road Traffic from Thailand to Malaysia, 2009-2011

(4) Potential Cargo by Interviewed Stakeholders

The Team interviewed 25 freight and trade related stakeholders at Medan and Belawan who export a total of 294,000 tons monthly and import 18,000 tons monthly, and 24 freight and trade related stakeholders at Penang who export 780,000 tons monthly and import 320,000 tons monthly.

They disclosed potential cargoes for the new RO-RO shipping service, such as various manufacturing goods, cereal products, sugar, plastic products, frozen and fresh fish, vegetables, fruits, bulky materials and vehicles. Except for heavy and bulky materials and vehicles, however, these cargoes can be transported by presently available direct shipping services, consisting of container vessel and wooden-hulled NCVs. Even though only the RO-RO vessel is suitable to carry heavy and bulky materials and vehicles, the respondents did not disclose specific demand volume.

The Indonesian and Malaysian stakeholders on the corridor did not indicate any potential cargo trade with Phuket. The team interviewed six (6) shippers/traders/forwarders at Phuket. They disclosed two potential cargoes (see Table 15.5). One is latex gloves, a rubber product which currently uses container trailers by road to Penang. The other is lumber, which currently uses tramper cargo vessels from Belawan to Phuket. At the least, RO-RO shipping can compete with road container trailer.

Table 15.5 Potential Cargo for RO-RO Shipping among Phuket Stakeholders

	Commodity	Avg. Monthly Volume	Type of Packing	Port of Origin	Port of Destination	Consumption Region
Export	Latex glove	70 TEU	Containerized	Phuket Port	Penang Port	Penang
Import	Lumber	100 tons	Break bulk/ Loose	Belawan Port	Phuket Port	Phuket

Source: Phuket Stakeholder Survey, JICA Study Team, 2012

15.3 Infrastructure Preparation

1) Basic Direction of Infrastructure Preparation

(1) Terminals of the Route

This route covers Belawan, Penang and Phuket. The service would primarily use existing port facilities considering the limited land space of the port area and efficient use of limited funding resources. Berth assignment for this service at each calling port has to be discussed in depth among the parties involved as prioritized berth assignment is required due to the nature of this service.

When the terminal infrastructure is used for international RO-RO service, it is required to install facilities for CIQ procedures and fence the area to ensure the proper border control function.

The ship arrives at the port in the morning and departs at night. Discharging operation and passenger disembarkation is done on arrival in the morning. Loading operation and passenger embarkation is done before departure in the evening. During in-between hours, the ship basically stays at berth. However, if required to vacate the berth for another working ship, the ROPAX vessel moves to anchorage and re-berths at the time of loading.

Any disadvantage that is anticipated from the use of existing facilities or joint use by other users is intended to be overcome by operational skill to ensure the safety and usability of the service.

(2) Requirements of Terminal

The capacity of the navigation channel and anchoring area needs to be sufficient to accommodate the RO-RO vessel of 120 m long and 4.5 m draft at any time. The navigation channel should have a water depth of 5.5 m and minimum width of 180 m. Anchoring area should have a water depth of 5.5 m and minimum radius of 180 m.

It is required to have sufficient capacity of mooring facility to accommodate a ROPAX vessel of 120 m long in safe water area. It is also required to have sufficient berth window allowing the ROPAX vessel to stay all the daylight hours. It is required that Penang port provides such berth window three times a week. Belawan port should also provide such berth window two times a week. Phuket port will need to provide such berth window once a week. At all three ports, the ROPAX vessel berths on existing berth for general use. Cars and trucks uses the ship ramp to/from berth apron. Passengers embark and disembark using simple facilities. Therefore, it is not required to install any special equipment on the shore side at each port.

It is required to set up a passenger terminal building which has customs clearance and passport control booths for 400 passengers (maximum boarding capacity). It is also

required to have sufficient land space to set up a cars/trucks checking area for customs/immigration and ordinary parking area. The cars/trucks checking area should have segregated lanes for inbound and outbound vehicles, which enable drivers to go through customs/immigration formalities without leaving their vehicles. In addition to this, a parking space for the vehicles that wait for the formalities and another separate parking space for the vehicles waiting for loading onto the ship after completion of all formalities need to be prepared.

Strict control is required for the following areas: the area where the vehicles park and passengers stay after having landed from the ship but before inbound customs/immigration formalities are performed, and the area where the vehicles park and passengers stay before being loaded onto the ship but after outbound customs/immigration formalities have been completed.

2) Belawan Port

(1) Location of the Terminal

Belawan Port has a relocation plan for its passenger terminal. According to this plan, the existing terminal in Ujung Baru will be relocated to Belawan Lama area. The initial work has already started at Belawan Lama. PELINDO I will handle the international RO-RO service at this new site when it comes to actual implementation. It is observed that the Belawan Lama area has advantages as a site for an international RO-RO terminal. Traffic flow is separated from the main port cargo traffic and the area has easy access from Medan City by road and by rail as well.

Therefore, this study of the RO-RO terminal is carried out on the Belawan Lama premises.

It is understood that the Belawan Lama area needs redevelopment work for modernization of its port facilities. Once the international RO-RO service comes into full swing, a dedicated terminal for RO-RO service will be needed to cater to expanded demand of cars and passengers. The terminal area can be expanded by covering the trestle area behind the apron of the berth.

Figure 15.5 Location of the Planned International RO-RO Terminal at Belawan Port

(2) Main Facilities

The planned RO-RO service on this route is to be performed by a ROPAX vessel which is equipped with quarter ramp for vehicles. Therefore, there is no need to provide discharging and loading devices on the shore side. The following facilities are required at the port to receive international RO-RO service:

- Port water facilities: Channel, Basin, Mooring Facilities
- Passenger terminal: Passenger building, CIQ facilities (in the building), Car parking
- Vehicle terminal: Check-in post, security post, CIQ booth, Car waiting area for boarding, Inspection area

i) Channel and Basin

The navigation channel of Belawan Port is 12 miles long and the water depth is 8.7 m LSW. Water depth in front of berth of Belawan Lama is maintained between 6 to 7 m. The relocation plan of the passenger terminal includes refurbishment of wharf facilities to accommodate currently serving passenger ship of 14,665 GT (draft 5.9 m, LOA 146.5 m) and necessary dredging work as well.

Hence, there is no obstacle to handle the planned ROPAX vessel.

ii) Mooring Facilities

The mooring facilities of Belawan Lama is 689 m long and the water depth is maintained at 6 to 7 m. Refurbishment work of Belawan Lama includes dredging of berth front area and strengthening of the berth structure. The width of the apron is 15 m; little difficulty is foreseen in case of handling larger size of vehicles at the berth. It is anticipated, however, that this small problem could possibly be solved by proper conduct of vehicle handling operation on the berth. The new passenger terminal is planned on the basis of existing domestic passenger service by PELNI that makes four ship calls a month (weekly service). Hence, berth window adjustment would be relatively easy.

iii) Passenger Terminal

The planned passenger terminal has an area of 2,445 m^2 (163 m x 15 m) with capacity for about 500 passengers. When this new passenger terminal is utilized for the international RO-RO service, additional necessary facilities, such as CIQ booths and inspection area, shall be placed in an appropriate part of the terminal giving due consideration to the line of passenger flow. Car parking is provided adjacent to the passenger building. Ample time between the ship's arrival and departure allows the separate operation of loading and discharging of cars/passengers. Therefore, it is possible to utilize the same facilities/space for both incoming and outgoing traffic separately.

iv) Vehicle Terminal

It is necessary to reserve the space for vehicles in the terminal area. Space for 49 vehicles (maximum loadable capacity of the ROPAX vessel) is required for inbound and outbound formalities and waiting.

At the entrance of the vehicle terminal, a security post and a check-in post are placed. Along with the arranged lane (width 3 m), Customs inspection booth and Immigration inspection booth are installed in parallel.

The length of the lane shall be a minimum of 30 m enabling two large-sized vehicles

to park one after the other for Customs inspection and Immigration inspection, respectively, at the same time. The number of lanes shall be two lanes each for inbound and outbound. Customs and immigration officers are usually stationed at the offices in the terminal building.

Parking space to accommodate a maximum of 49 vehicles shall be provided for the vehicles waiting for boarding the ship after completion of authorities' inspection. As the break-down of vehicle type is uncertain at this moment, total required space of 2,500 m^2 is obtained using a standard space occupancy figure of 50 m^2/unit. CIQ inspection area shall be also provided. This space is utilized for other purposes when the ROPAX vessel is not in the port.

The vehicle terminal space is segregated from other areas basically by a fixed fence. Ample time between ship's arrival and departure allows the separate operation of loading and discharging of vehicles. Therefore, it is possible to utilize the same facilities/space for both incoming and outgoing traffic separately.

v) Controlled Area

The intended area for the RO-RO service at Belawan Lama is currently used for domestic trade only and is not fit for international trade. Hence, it is necessary to change the arrangement of the facility to be appropriate for international RO-RO service. The installation of a fixed fence surrounding the vehicle terminal as discussed above is one of the measures to be taken before the start of the RO-RO service.

The whole area of the new passenger terminal is used for international RO-RO service when the RO-RO vessel calls the port. Necessary arrangements should be provided to segregate the controlled area from the general area within the terminal building. The space for CIQ formalities for the passengers should be properly managed as a controlled area.

The terminal facilities at Belawan Port are summarized in Table 15.6. The layout of the terminal area is shown in Figure 15.6. The layout is drafted in order to show the required size and a possible location of facilities. The layout shall be decided based on the types and size of vehicles which will actually use the RO-RO service. Controlled entrance and exit security gates shall be provided. The shaded area indicates the area which should be controlled as an international RO-RO terminal.

Table 15.6 Facilities of International RO-RO Terminal at Belawan Port

Port Water Facilities	
Channel and basin	No special arrangement necessary General use with other vessels Maintenance dredging may be required
Mooring facilities	Refurbishment work is in progress General use with other vessels
Passenger Terminal	
Terminal building	Use the new terminal currently developing General use with domestic passengers
CIQ facilities	To be installed in the terminal building
Regular parking space	Use the new terminal facilities currently developing
Vehicle Terminal	
Check-in post	To be installed
Security post	To be installed
CIQ booth	To be installed
Vehicle waiting area (for boarding)	To be defined within the vehicle terminal
CIQ inspection area	To be defined within the vehicle terminal
Terminal Area	
Outer ward	To be installed
Site	Within the present port area General use with other activities

Source: JICA Study Team

(3) Improvement of Facilities

For the handling of international RO-RO service at Belawan Port, the basic facilities which should be installed are listed in Table 15.7. All others are mostly covered by the existing facilities and on-going passenger terminal development project.

Table 15.7 Required Facilities at Belawan Port

Facilities to be installed as passenger facilities	
CIQ facilities	CIQ facilities
Facilities installed at Vehicle Terminal	
Check-in post	1 unit
Security post	1 unit
CIQ booth	4 posts for Customs and 4 posts for Immigration
Vehicle waiting area	The area of 2,500 m^2
Outer ward	
Fence	Fixed Fence, Movable Fence

Source: JICA Study Team

The total cost involved for the above is roughly estimated at US$ 80,000. The estimate is based on the consultation with the concerned parties and information on similar type of project, therefore, the estimated amount is subject to further review depending upon the results of the detailed study of the project site.

Since only the installation work of booth and fence would be involved, the required time period for the work is rather short. It can be completed within one year following the final decision by the parties concerned.

(4) Terminal Use

Due to the size of the planned ROPAX vessel, pilot service is compulsory for entering and departing Belawan Port. The liner type service is usually given preferential treatment such as exemption of pilot arrangement after showing prudent performance of the services for a certain period of time. No other time-consuming formalities are expected for ships entering and departing the port.

Inbound passengers move to the passenger building for the formalities immediately after disembarking and leave the terminal after clearing. Inbound vehicles move to the vehicle terminal for formalities immediately after discharging and leave the port after clearing through the port gate of Belawan Lama.

Outbound passengers and vehicles have to arrive at the terminal building or the vehicle terminal well before the ship's sailing time or at least by the designated time given by the terminal. Passengers go through CIQ formalities at the passenger terminal and wait for boarding. Vehicles also go through CIQ formalities at the CIQ booth in the vehicle terminal and wait for boarding.

Once the boarding is announced, passengers move from the passenger terminal to the berth and board the ship. Vehicles move from vehicle terminal to the berth and board the ship through the ship’s ramp. Flow of passengers and vehicles on the berth is strictly separated from the view point of safety.

The flow of passengers and vehicles for loading and discharging is illustrated in Figure 15.6.

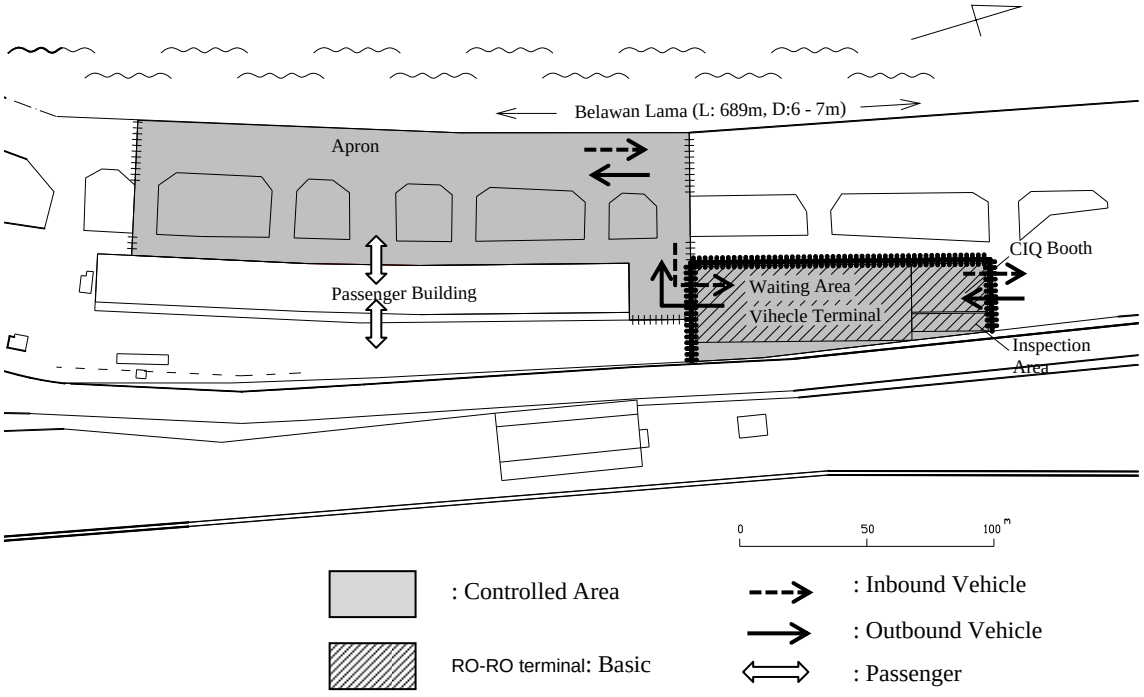
(5) Management and Operation

The facilities of the international RO-RO terminal, the passenger building and the vehicles terminal are owned and managed by PELINDO I and the RO-RO ship operator uses the terminal when the ship calls the port based on the contract between PELINDO I and the ship operator.

CIQ formalities are undertaken by the concerned authorities utilizing the facilities installed in the passenger terminal and vehicle terminal.

(6) Access Infrastructure Improvement

The proposed RO-RO terminal at Belawan Lama is convenient to use the toll road and the railway both stretched between Medan and Belawan. The Indonesian government prioritizes the Trans Sumatra Highway Project or ASEAN Highway No. 25. In the metropolis, some other toll road projects are in the pipeline or under construction such as the Medan – Binjai toll road and the Medan – Kuala Nam airport toll road. Those road projects contribute to improving the connection between the port and port hinterland.



The layout is only an appropriate representation.

Figure 15.6 Terminal Layout and Traffic Flow in the Terminal at Belawan Port

3) Penang Port

(1) Location of the Terminal

The container terminal function at Butterworth Wharf of Penang Port has been relocated to the North Butterworth Container Terminal. As a consequence, re-organization of the function of Butterworth Wharf is required. The No. 6 Berth of Butterworth Wharf was initially developed as a RO-RO terminal and actually used for that purpose for a certain period of time. Later on, the berth was converted to a regular container berth, removing the link-span. Currently, the berth is used for conventional type general cargo vessels. The inland area of the old container yard is now partly utilized as a stockyard of long-lengthy cargo. There is a railway station in the north-east corner of this area and the renovation of the facilities is currently being undertaken. There is also a plan to develop a transportation hub in the station area. The Penang Port Commission and Penang Port Sdn Bhd consider the No. 6 Berth as one of the candidate locations for international RO-RO service.

At Swettenham Pier Area of Penang Port, there is an international cruise terminal and all the necessary facilities are developed there. However, considering the current berth utilization situation, road traffic condition and future development plan of the area, the Swettenham area is not considered the most suitable location for the international RO-RO terminal.

Taking all these facts into consideration, the study of RO-RO terminal at Penang Port is carried out on No. 6 Berth of Butterworth Wharf and its hinterland.

The RO-RO terminal in this study is primarily designed to be a simple configuration because the international RO-RO service is a relatively newer transportation method and the number of expected calls to the terminal is fewer as a result of the demand forecast conducted by the study team. It is desirable to upgrade the terminal facility in the future when international RO-RO service becomes a more popular means of transportation. Depending on the growth of the demand, future development plan such as functional enhancement of terminal facilities and strengthening of connection with transportation hub would be required in the future.

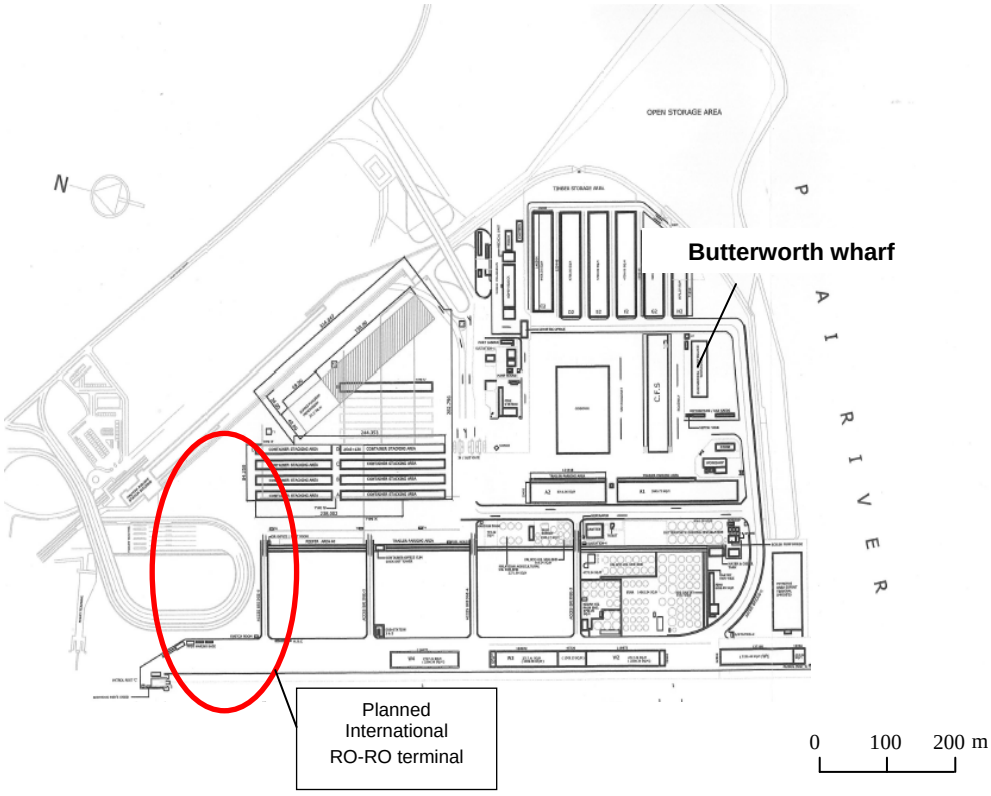


Figure 15.7 Location of the Planned International RO-RO Terminal at Penang Port

(2) Main Facilities

The following facilities are required at the port to handle international RO-RO services:

- Port water facilities: Channel, Basin, Mooring Facilities
- Passenger terminal: Passenger building, CIQ facilities (in the building), Car parking
- Vehicle terminal: Check-in post, Security Post, CIQ booth, Car waiting area for boarding, Inspection area.

i) Channel and Basin

There are two navigation channels in Penang Port. The North Channel is 10 miles long, 182 m wide and the water depth is 11 m. The South Channel is 8.5 miles long, 160 m wide and the water depth is 6.5 m. The Butterworth Wharf is situated between the North and South Channels. The water depth in front of Butterworth Wharf is 9 to 10 m. Hence, the planned ROPAX vessel (draft 4.5 m, LOA 120 m) can use both channels and there is no problem to enter/depart Penang Port.

ii) Mooring Facilities

The total berth length of Butterworth Wharf is 1,046 m. The length of the No. 6 berth is 156 m and water depth is 9 m. The detached pier style wharf apron is 58 m wide and connected to the land with a bridge (length 155 m). The wharf is designed to accommodate 40,000 DWT size vessels, thus there is no structural problem to receive the planned RO-RO vessel.

Since the berth is not used as a container terminal any longer, it is understood that the berth window for the RO-RO service is manageable.

Hence, the planned ROPAX vessel can utilize the existing No.6 Berth of Butterworth Wharf without any problem.

iii) Passenger Terminal

Passengers will enter the terminal through the gate. A new terminal gate will be built at the northern edge of Butterworth Wharf area. After the gate, the passenger terminal building would be built to accommodate about 400 passengers. The location of the passenger terminal is about 300 m away from the ship's berthing place. Passenger transportation by shuttle bus between terminal and berth is considered from the viewpoint of safety and security.

iv) Vehicle Terminal

It is necessary to reserve the space for vehicles in the terminal area. Space for 49 vehicles is required for inbound and outbound formalities and waiting. At the entrance of the vehicle terminal, a security post and a check-in post are installed. Along with the entrance lane (width 3 m), Customs inspection booth and Immigration inspection booth are installed in series. The length of the lane shall be a minimum 30 m enabling two large-sized vehicles to park one after the other for Customs inspection and Immigration inspection, respectively, at the same time. The number of lanes shall be two lanes each for inbound and outbound.

A parking space of approximately 2,500 m^2 shall be provided to accommodate the vehicles waiting for boarding the ship after completion of authorities' inspection. A CIQ inspection area shall be also provided.

Ample time between ship's arrival and departure allows the separate operation of loading and discharging of vehicles. Therefore, it is possible to utilize same facilities/space for both incoming and outgoing traffic separately.

v) Controlled Area

The entire area of Butterworth Wharf is a controlled area in compliance with the ISPS Code and managed by the Penang Port Sdn Bhd. All the vehicle traffic is checked at the gate. Although the planned area for RO-RO service is within the existing control area, it is necessary to identify the exact area that will be utilized for international RO-RO service and the area should be segregated by a fence.

The No.6 Berth and the passage connecting it to the terminal area are usually open for other port users. Therefore, when the international RO-RO vessel is in port and under operation, the control area should be separated from other traffic by a movable fence or an equivalent structure. All passengers are transported by bus between the terminal and berth and necessary measures are taken to minimize the staying time of passengers at the apron of the berth.

The terminal facilities at Penang Port are summarized in Table 15.8. The area and layout of the terminal area is shown in Figure 15.9. The layout is drafted in order to show the required size and a possible location of facilities. The layout shall be decided based on the types and size of vehicles which will actually use the RO-RO service. Controlled entrance and exit security gates shall be provided. The shaded area indicates the area which should be controlled as an international RO-RO terminal.

Table 15.8 Facilities of International RO-RO Terminal at Penang Port

Port Water Facilities	
Channel and basin	No special arrangement necessary General use with other vessels
Mooring facilities	Use the existing facilities General use with other vessels
Passenger Terminal	
Terminal building	Newly install
CIQ facilities	To be installed within the terminal building
Regular parking space	To be defined near the terminal building
Vehicle Terminal	
Check-in post	To be installed
Security post	To be installed
CIQ booth	To be installed
Vehicle waiting area (for boarding)	To be defined within the vehicle terminal
CIQ inspection area	To be defined within the vehicle terminal
Office rooms	To be installed as necessary
Terminal Area	
Outer ward	To be installed
Passenger Terminal Gate	To be installed
Site	Within the present port area

Source: JICA Study Team

(3) Improvement of Facilities

For the handling of international RO-RO service at Penang Port, basic facilities which should be newly required are shown in Table 15.9. All others are mostly covered by the existing facilities.

The total cost involved for the above is roughly estimated at US$ 630,000. The estimate is based on consultations with the concerned parties and information on similar types of project, therefore, the estimated amount is subject to further review depending upon the results of the detailed study of the project site.

The required time period for planning, coordination, detailed design and application formality is estimated at about 18 months. The following time schedule is tentatively programmed based on the start of construction in 2014 and the start operation in 2015.

Table 15.9 Required Facilities at Penang Port

Facilities newly installed as passenger facilities	
Passenger building	2,000 m^2 for CIQ facilities, waiting room, etc.
Car parking area	Define the area near passenger terminal
Facilities newly installed at Vehicle Terminal	
Check-in post	1 unit
Security Post	1 unit
CIQ booth	4 posts for Customs and 4 posts for Immigration
Vehicle waiting area	The area of 2,500 m^2
Outer ward	
Fence	Fixed fence, Movable fence

Source: JICA Study Team

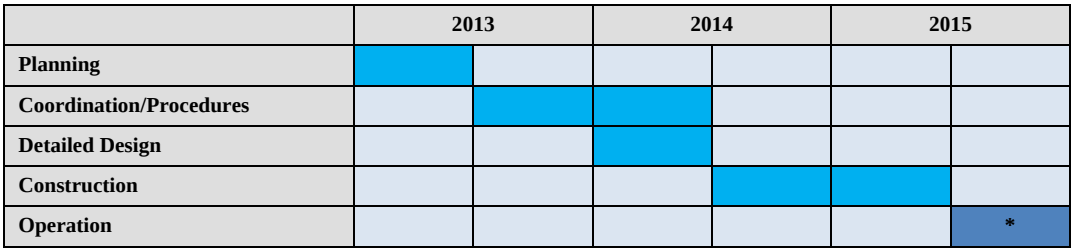


Figure 15.8 Schedule of Terminal Improvement at Penang Port

(4) Terminal Use

For entering and departing the port, pilot service is compulsory. No other time-consuming formalities are expected for ships entering and departing the port.

Outbound vehicles enter the port area through the Butterworth Wharf port gate. At the port gate, drivers of outbound vehicles should present to the gate officer the boarding ticket or other evidence to prove the status of the vehicle as a boarding vehicle, and proceed to vehicle terminal. Inbound vehicles move to the vehicle terminal immediately for the formalities, and leave the terminal after clearing. They should present to the gate officer some sort of evidence to prove that the vehicle has just arrived by the RO-RO vessel.

Inbound passengers disembark immediately after the ship's arrival, then move to the passenger terminal by shuttle bus for arrival formalities, and leave the terminal. Outbound vehicles and passengers follow almost the same steps for boarding as in the case of Belawan Port, except passengers are transported by shuttle bus between the terminal and the berth.

The flow of passengers and vehicles for loading and discharging is illustrated in Figure 15.9.

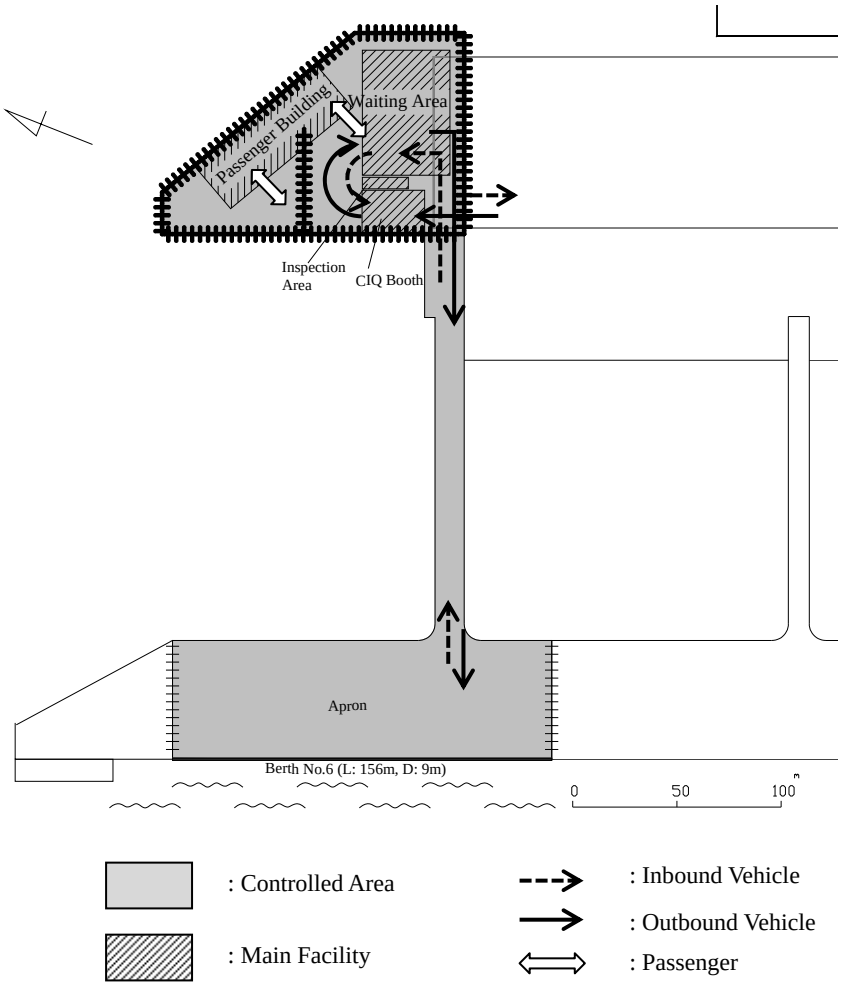


Figure 15.9 Terminal Layout and Traffic Flow in the Terminal at Penang Port

(5) Management and Operation

The Penang Port Commission is the sole owner of the mooring facilities, road and land for passenger facilities and the vehicle terminal. Penang Port Sdn Bhd undertakes the management and operation of these assets. There are two alternatives for investment scheme of RO-RO related facilities. The first case is the investment by the Penang Port Sdn Bhd and utilization by the RO-RO ship operator. The other case is the investment and utilization by the RO-RO ship operator based on the land use license given by the Penang Port Sdn Bhd. Considering the exclusive use of the facility by the RO-RO ship operator, the latter case is deemed to be practical and reasonable. Decision should be made by the time when the RO-RO project really takes off. In both cases, passenger and vehicle handling operation in the terminal is undertaken by the RO-RO ship operator when the ship is in port.

CIQ formalities are performed by the concerned authorities utilizing the facilities installed in the passenger terminal and vehicle terminal.

(6) Access Infrastructure Improvement

The Butterworth Area of Penang Port is located next to the Butterworth Rail Station, currently under improvement, and near the Penang Bridge. It has good access to the Malaysian North-South Expressway or ASEAN Highway No. 2. The Second Penang Bridge, located several km south from the Butterworth Port Area is scheduled to open in January 2014. The proposed RO-RO terminal enjoys convenient location and it will be further improved in the near future.

4) Phuket Port

(1) Location of the Terminal

Phuket Port is a regular calling port of international cruise ships. The port's function as a cruise port for international tourists is going to be strengthened through the port development plan including extension of existing mooring facility and new installation of passenger shed.

This study of RO-RO terminal is carried out based on the port development plan of Phuket Port.

Once the international RO-RO service comes into full swing, a dedicated terminal for RO-RO service will be needed to cater to the expanded demand of cars and passengers. Future expansion is possible at Phuket Port as there is ample space yet unused which could be developed into dedicated RO-RO terminal facilities in the future.

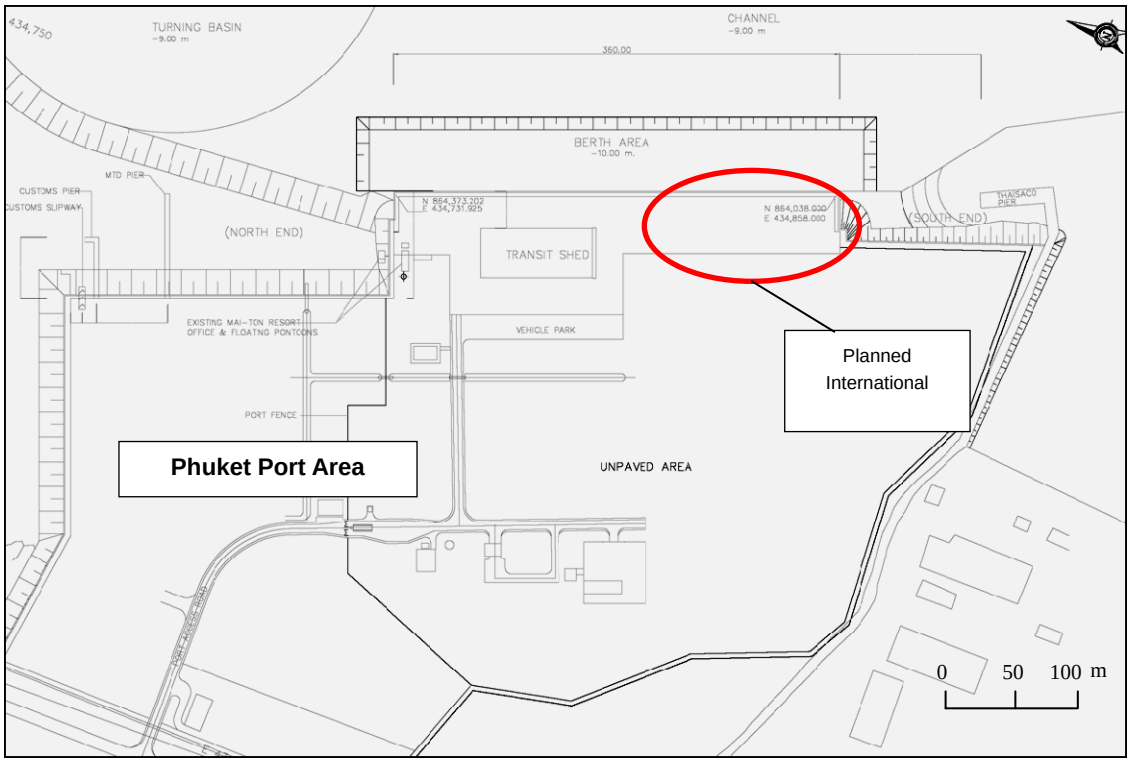


Figure 15.10 Location of the Planned International RO-RO Terminal at Phuket Port

(2) Main Facilities

The following facilities are required at the port to receive international RO-RO services:

- Port water facilities: Channel, Basin, Mooring Facilities
- Passenger terminal: Passenger building, CIQ facilities (in the building), Car parking
- Vehicle terminal: Check-in post, CIQ booth, Car waiting area for boarding, Inspection area.

i) Channel and Basin

The navigation channel of Phuket Port is 1.5 km long, 120 m wide and the water depth is 9 m. There is a turning basin of 180 m radius and water depth of 9 m at the bottom of the channel. It is reported that there is no problem regarding the channel and basin for the international cruise liner of 75,338 GT currently calling Phuket Port. Hence, no obstacle is recognized in handling the planned ROPAX vessel.

ii) Mooring Facilities

The mooring facility of Phuket Port is 360 m long and the water depth is 10 m. The width of the wharf apron is 30 m. The North part of the wharf is used by cargo ships and the South part of the wharf is used by the cruise ships. It currently serves 75,000 GT class cruise ships, thus no problem is envisaged regarding the structural outfit of the berth.

Due to the limitation of the overall length of the current wharf (360 m) and the larger size of cruise ships (LOA over 200 m), the terminal suffers from the lack of berth window. In order to solve this problem, it is planned to extend the berth length by adding 2 dolphins at the southern end of the berth. By this arrangement, the total length of the berth is extended by 60m. The plan is currently at the environmental impact assessment (EIA) stage. According to the terminal operator, it is possible to provide a berth window for the international RO-RO service after the planned berth extension is completed. From the foregoing, it is believed that the planned RO-RO service can utilize the extended mooring facility.

iii) Passenger Terminal

International cruise ships of 3,350 passenger capacity regularly call at Phuket Port. However, there is no passenger terminal building at the port. All the passenger-related activities such as parking for buses/taxis and souvenir shops are done at the empty land behind the port wharf. The development plan is in progress to strengthen the port's function as a cruise port for international tourists. According to the blueprint of the plan, a passenger shed of 915 m^2 and a parking area for 40 units of buses and 40 units of passenger cars are to be constructed.

As international cruise ships call at the port twice a week, the passenger shed can be utilized for the RO-RO service, taking advantage of the vacant periods of the week.

iv) Vehicle Terminal

It is necessary to reserve the space for vehicles in the terminal area. Space for 49 vehicles is required for inbound and outbound formalities and inspection/waiting.

It is necessary that the vehicles that have completed customs and immigration formalities be kept in a segregated area before boarding. The berth apron in front of the passenger shed is deemed to be a suitable place for temporary storage of boarding vehicles as the width of the apron is 30 m which is good enough to create a

space of 2,500 m^2. A movable fence is planned to be installed at the apron in this plan.

Ample time between ship's arrival and departure allows the separate operation of loading and discharging of vehicles. Therefore, it is possible to utilize the same facilities/space for both incoming and outgoing traffic, separately.

v) Controlled Area

The total area of Phuket Port is designated as a controlled area in compliance with the ISPS Code and managed by Chaophaya Terminal International Co. Ltd. (CTIC), who is the concessionaire of the port. All the vehicles are checked at the gate of the port. Although the passenger terminal area is primarily within the controlled area, another independent controlled area should be established for international RO-RO service.

The terminal facilities at Phuket Port are summarized in Table 15.10. The area and layout of the terminal to be used for international RO-RO terminal is shown in Figure 15.11. The layout is drafted in order to show the required size and the possible location of the facilities. The layout shall be decided based on the types and size of vehicles which actually use the RO-RO service. Controlled entrance and exit security gates shall be provided. The shaded area indicates the area which should be controlled as an international RO-RO terminal.

Table 15.10 Facilities of International RO-RO Terminal at Phuket Port

Port Water Facilities	
Channel and basin	No special arrangement necessary General use with other vessels
Mooring facilities	Use the berth to be extended according to another development plan General use with other vessels
Passenger Terminal	
Terminal building	Use the new terminal building to be installed according to another development plan General use with other passengers
CIQ facilities	Use the facilities to be installed according to another development plan General use with other passengers
Regular parking area	Use the area to be installed according to another development plan General use with other passengers
Vehicle Terminal	
Check-in post	To be installed
Security post	To be installed
CIQ booth	To be installed
Vehicle waiting area (for boarding)	Define at the existing apron
CIQ inspection area	Define at the existing apron
Terminal Area	
Outer ward	Use the fences according to another development plan
Site	Within the present port area General use with other activities

Source: JICA Study Team

(3) Improvement of Facilities

Almost all the terminal facilities for the handling of international RO-RO service at Phuket port are covered by the existing and planned facilities. Only the facilities shown in Table 15.11 should be newly added. The total cost involved for the above is roughly estimated at US$ 22,000.

Table 15.11 Required Facilities at Phuket Port

Facilities to be installed at the Vehicle Terminal	
Check-in post	1 unit
Security Post	1 unit
CIQ booth	2 posts for Customs and 2 posts for Immigration

Source: JICA Study Team

The required time period for the above installation is rather short. The work can be completed within one year following the final decision by the parties concerned. All plans for the improvement of facilities as described here are subject to the actual implementation of planned port development project of berth extension and passenger shed installation.

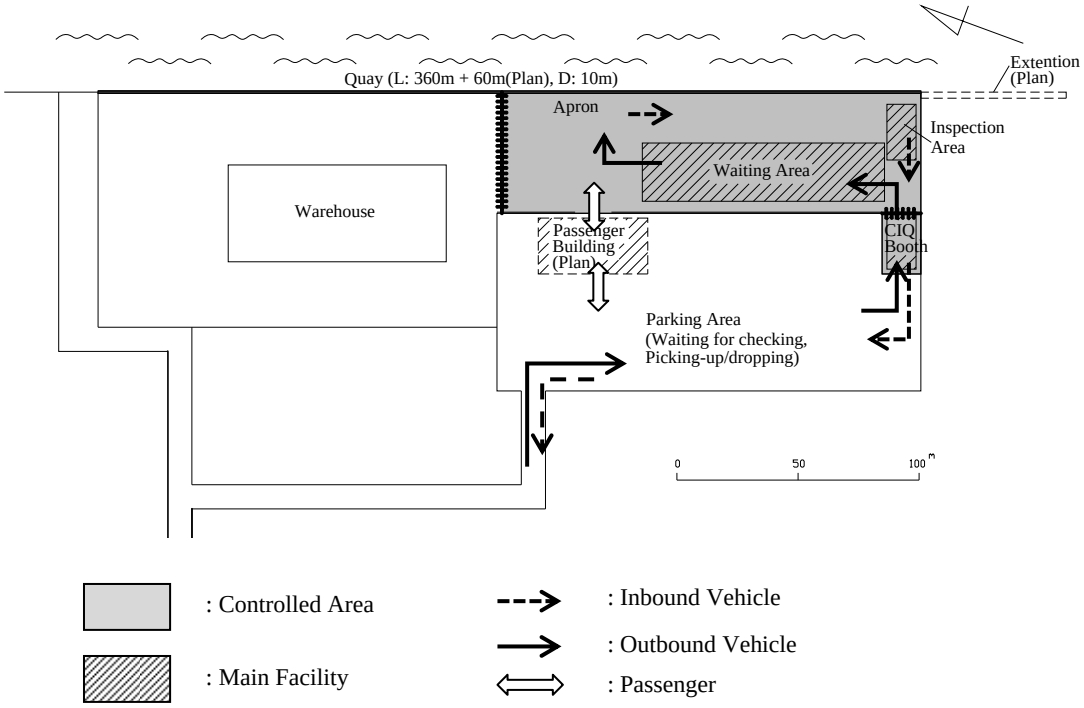
(4) Terminal Use

For entering and departing the port, pilot service is compulsory for vessels over 2,000 GT. No other time-consuming formalities are expected for ships entering and departing the port. Also no extra time is required for berthing and unberthing.

Outbound vehicles and other means of local transportation enter the port area through the port gate. At the port gate, drivers of outbound vehicles should present to the gate officer the boarding ticket or other evidence to prove the status of the vehicle as a boarding vehicle, and proceed to the vehicle terminal. Likewise, inbound vehicles should present to the gate officer some sort of evidence to prove that the vehicle has just arrived by the RO-RO vessel. Inbound vehicles immediately move to the vehicle terminal for the formalities, and leave the terminal after clearing. Inbound passengers immediately move to passenger terminal for arrival formalities, and leave the terminal by bus or taxi or other means of transportation.

Outbound vehicles and passengers follow almost the same steps for boarding as in the case of Belawan Port. Outbound vehicles firstly wait for customs and immigration inspection at the planned parking area of the terminal and then proceed to inspection when the booths are open. After completion of all the inspections, the vehicles move to the apron area and wait for boarding.

The flow of passengers and vehicles for loading and discharging is illustrated in Figure 15.11.



The layout is only an appropriate representation.

Figure 15.11 Terminal Layout and Traffic Flow in the Terminal at Phuket Port

(5) Management and Operation

Phuket Port has been developed by the Thai Ministry of Transport and managed/operated by CTIC under a concession agreement. The port development plan consisting of extension of wharf and installation of passenger shed is handled by CTIC upon getting approval of the MOT. The actual arrangement of terminal usage for the international RO-RO service, including the priority use of the berth, has to be discussed with CTIC.

CIQ formalities are performed by the concerned authorities utilizing the facilities installed in the passenger terminal and vehicle terminal.

(6) Connection with Hinterland

The ASEAN Highway Network Project does not cover Phuket Island. Access must be done via National Road No. 4 from ASEAN Highway No.2. National Road No. 402 serves Phuket Port. However, the existing road width (mostly 12 m wide) is not sufficient. To meet further traffic volume increase, the route should be widened in the near future.

15.4 Shipping Strategy and Ship Operation Plan

1) Marketing Strategy

(1) Cargo

i) Belawan - Penang

On the Belawan – Penang route, the new RO-RO shipping will provide distinguishable service in comparison with NCV and container vessel, as follows:

- The new RO-RO shipping will urge some NCV shippers to use the RO-RO service for carrying perishable goods and valuable goods. It will enable shippers to use their trucks and reefer vans on the whole stretch of their logistics chains.
- According to the case study on the international RO-RO shipping in Northeast Asia, 21 RO-RO shipping routes account for 12% in the seaborne container traffic among three countries: Japan, Korea and China (refer to Section 2.2). The new RO-RO shipping will promote service toward RO-RO suitable containers such as reefer containers and the containers to be delivered fast and seamlessly at port hinterland.

Table 15.12 Survey Summary for Potential RO-RO Cargo Demand between Belawan and Penang

	From Belawan to Penang	From Penang to Belawan
Convertible Break bulk Cargo Demand *	33,911 tons	43,481 tons
Convertible Container Cargo Demand **	11,274 TEU	12,436 TEU
Inducible Cargo Demand	(unspecified)	(unspecified)
Total (per year) * **	**146,651 tons**	**167,841 tons**

*) Estimated NCV trade between Belawan and the Malay Peninsula in 2012 based on the collected NCV records during the period January to August 2012.

**) Estimated container shuttle service between Belawan and Penang in 2012 based on the operation records of MV UNI ASSENT during the period May to August 2012.

***) Average cargo per container = 10 tons

Source: JICA Study Team

ii) Penang - Phuket

Currently, there is no liner shipping service between Penang and Phuket. However some general cargo vessels are observed on the route on a tramper basis in 2012 according to the Penang Port Commission. The cargoes are various manufactured products and therefore they are convertible to RO-RO shipping service. The recorded cargoes average 140 tons per week in 2012. Taking regional growth rate into account, this general cargo will increase to 7,852 tons per annum in 2015.

On the Penang – Phuket route, the Team has identified only one inducible cargo among the interviewed stakeholders. The cargo is now transported by container trailers through the roads of Thailand and Malaysia to Penang Port. It is deemed a good strategy that the new RO-RO service will help the modal shift from road freight transport to shipping due to less fuel consumption of shipping transport, as greatly emphasized in the EU.

If RO-RO shipping holds a stable container demand, the shipper may use the RO-RO service to bring back empty containers, too.

Since only one regular shipper is not sufficient, it is suggested to seek for similar freight demand through modal shift from road transport between Phuket and Penang among the huge cross-border truck traffic (279,103 units in 2011) reported earlier.

Table 15.13 Potential RO-RO Cargo Demand between Penang and Phuket

	From Penang to Phuket	From Phuket to Penang
Convertible Sea Cargo Demand in 2015 *	7,852	None
Inducible Cargo Demand **	(unspecified)	840 TEU
Total (per year) * **	**7,852 tons**	**8,400 tons**

*) Estimated general cargo ship trade in 2015 based on the Penang port data in 2012

**) Potential cargo volume in 2015 among interviewed stakeholders

***) Average cargo per container = 10 tons

Source: JICA Study Team

iii) Phuket - Belawan

On the Phuket – Belawan route, however, there is no regular shipping service and no convertible cargo demand. One Phuket trader mentioned lumber from Belawan as possible cargo. However, lumber is not a valuable product and thus RO-RO shipping may not compete with cargo shipping on a tramper basis. Phuket used to buy fruits and vegetables from North Sumatra. But Chinese agricultural products now overwhelm the market. Taking such local conditions into account, it is difficult to expect RO-RO shipping suited stable cargo demand at least until 2015.

Therefore, the best strategy is to postpone RO-RO shipping service on the Phuket – Belawan route for the time being until 2015 or until considerable and stable RO-RO cargo demand is found.

(2) Passenger

On the Belawan – Penang route, fast passenger boat service was suspended in 2010 due mainly to severe competition with emerging LCCs. Today, LCCs still prevail in the market, with 71 roundtrip flights by 5 airlines weekly in June 2012. Under such a situation, RO-RO passenger shipping service on the route has the following marketing strategies:

- Different clientele segment: LCCs have successfully exploited a new passenger type, i.e. individual travelers who book tickets through the internet. The new RO-RO shipping will focus on travel tours by buses. For convenience of tour operators in tour planning, the new RO-RO shipping will navigate during nighttime only. It will offer fares, inclusive of accommodation, that are competitive with LCCs. The new RO-RO shipping will provide strait-crossing bus tour opportunities to the emerging middle-income class.
- Walk-in passengers: There are some unserved demand for economic service among workers and students. The new RO-RO shipping may substitute for the suspended fast passenger boat service.

On the Penang – Phuket route, cross-border bus traffic is increasing, e.g., 63,581 buses from Thailand to Malaysia in 2011, and the number of Malaysian tourist buses in Phuket is increasing according to the Phuket Tourism Association. Like cargo demand, the route strategy is to promote passenger modal shift from road to seaway. It may give more options

for a tour planner such as dropping by many sites along the roads during an onward trip and enjoying nighttime relaxation in a spacious ship during the trip back home.

On the Phuket – Belawan route, the Team has not identified explicit shipping passenger demand. Recently Air Asia opened the Medan – Phuket route during weekends only and suspended it after three months. It is the same as cargo demand which the Study suggests that the route operation be delayed until considerable and stable RO-RO passenger demand is found.

2) Shipping Demand Forecast

(1) Cargo Analysis

The Belawan – Penang route is a historical trading route. Nowadays, the Port of Klang has successfully attracted increased container ship calls due to modern and larger port capacity and lower port tariff in comparison with the Port of Penang. As a consequence, container shuttle shipping service was once suspended on the Belawan – Penang route in 2008.

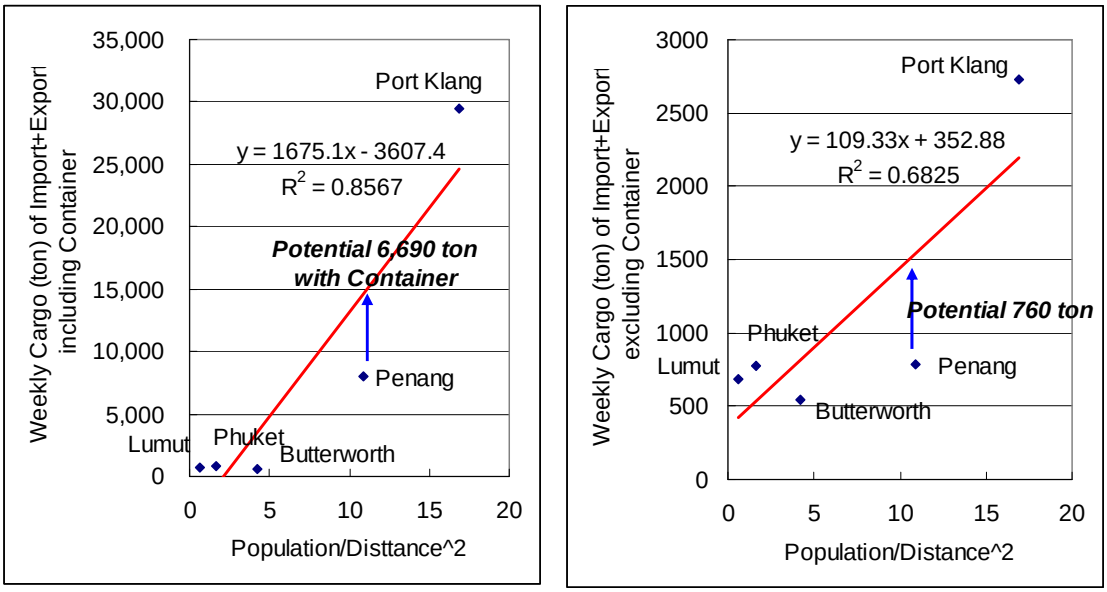
However, the Port of Penang has recently invested in the North Butterworth Container Terminal and laid stress on port sales to international container carriers. Evergreen decided to revive container shuttle shipping service on the Penang – Belawan route in May 2012.

There is a question in relation to transport planning – Is there still an opportunity to increase shipping service on the route? If yes, how large is such an opportunity?

To answer this question, the Study has developed an econometric gravity model which intends to correlate seaborne cargo to/from Belawan with trading ports' information such as hinterland population and route distance from Belawan. More precisely, as shown in Figure 15.12, the vertical axis means cargo volume (in the left figure shown including container and in the right figure shown excluding container) and the horizontal axis means the gravity of population in the city divided by square of port distance.

The model suggests that there would be large potential cargo on the route between Belawan and Penang if other conditions such as shipping and port services were the same as other port links. It means that Penang may not fully enjoy the advantages of its proximity to Belawan at present. The potential cargoes which are measured by the model are 6,690 tons per week including container cargo, and about 760 tons per week excluding container cargo.

The new RO-RO shipping service on the route will be able to take part of the potential cargo. Thus, they are considered inducible cargo when RO-RO service is provided.



Source: Estimated by JICA Study Team based on Monthly Report of Ship Records in Belawan

Figure 15.12 Estimated Weekly Potential Cargo on the Belawan – Penang Route

The survey summary for potential RO-RO cargo demand (Table 15.14) is revised to incorporate the above estimation results as inducible traffic and set the cargo demand at the target year of 2015 where a growth rate of 7.5% between 2012 and 2015 is applied.

Table 15.14 Potential RO-RO Cargo Demand between Belawan and Penang (revised)

	Between Belawan and Penang
Convertible Break bulk Cargo Demand in 2015 *	83,196 tons
Convertible Container Cargo Demand in 2015 **	25,488 TEU
Inducible Container Cargo Demand in 2015 ***	37,397 TEU
Inducible Non-container Cargo Demand in 2015 ***	42,484 tons
Total (per year) ****	**754,530 tons**

*) Estimated NCV trade between Belawan and the Malay Peninsula in 2015 based on the collected NCV records during the period January to August 2012.

**) Estimated container shuttle service between Belawan and Penang in 2015 based on the operation records of MV UNI ASSENT during the period May to August 2012.

***) Estimated inducible traffic in 2015 based on the calculation results of the gravity model developed by JICA Study Team (refer to Figure 15.12)

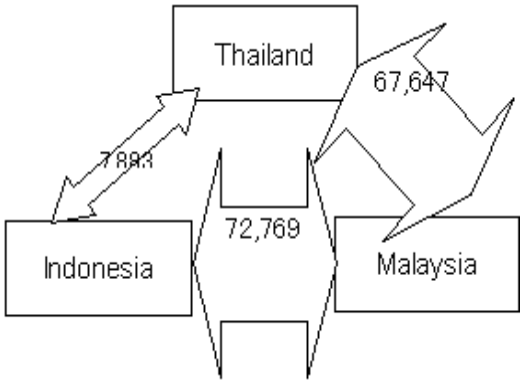
****) Average cargo per container = 10 tons

Source: JICA Study Team

(2) Tourism Analysis

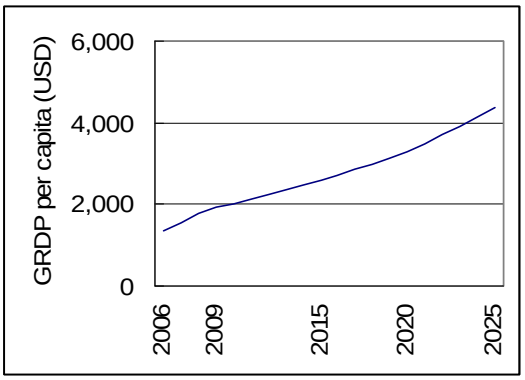
On the route between Belawan, Penang and Phuket, there are two regional tourism hubs, Penang and Phuket, as millions of foreign tourists' destinations. Synergy effect such as joint tourism promotion is expected. Penang and Medan/Belawan has kept a historical, social and cultural tie. But the remaining link between Medan/Belawan and Phuket is weak, resulting in the absence of a liner shipping route or scheduled air service. From a countrywide perspective, the Indonesia – Thailand link is also weak compared with other two links (refer to 15.13).

For tourism development, there is a strong relation between the number of tourist arrivals and GDP per capita in ASEAN (refer to Figure 11.8). The projection of GRDP per capita of North Sumatra suggests that the Phuket- Medan/Belawan tourism by RO-RO shipping should be promoted around the year 2025 when the GRDP per capita would exceed USD 4,000 (refer to Figure 15.14).



Source: Various tourism statistics

Figure 15.13 Weekly Tourists Movement among Thailand, Indonesia and Malaysia in 2010



Source: Estimated by JICA Study Team based on BPS Data

Figure 15.14 Projection of GRDP per Capita in North Sumatra

(3) RO-RO Shipping Traffic Plan

On the route, the Study designed the largest ROPAX vessel among the priority routes. All the existing ports of Belawan, Penang and Phuket can accommodate this vessel with minor improvement. At the opening of the route, one ROPAX vessel will make ports-of-call along with the proposed weekly schedule. All three (3) local governments, North Sumatra Province, Penang State and Phuket Province, accept this idea. Taking such on-going inter-related works into account, the Study has prepared a RO-RO shipping traffic plan on the route between 2015 and 2035.

In the plan, the vehicle floor occupancy rate which is an important RO-RO shipping operation indicator, is set around 70% in the opening year. More precisely, there are two vehicle floor occupancy rates of 69% on the Belawan – Penang route section and 73% on the Penang – Phuket route section. The opening of the Phuket - Belawan route section will be postponed to a later date, when a viable traffic is already ready. The vehicle floor occupancy rates are considered adequate since each port has some time to collect vehicles and passengers compared with frequent daily service.

The plan result includes passenger vehicles (cars and buses) and trucks. Provided that one bus and one truck are equivalent to 3 cars, respectively, trucks account for around 60% of the vehicle space in ship. It is positioned at the middle truck share among the 3 priority routes. It reflects the stakeholders' views at North Sumatra, Penang and Phuket, of promoting fast and seamless freight service and tourists with vehicles by RO-RO shipping .

Table 15.15 Projection of RO-RO Shipping Traffic on the Belawan, Penang and Phuket Triangle Route

Weekly Two-Way Traffic			2015	2020	2025	2030	2035
(A) Belawan & Medan (B) Penang	Passenger	Total person	990	1,120	1,260	1,410	1,560
		(non vehicle)	(80)	(90)	(110)	(130)	(150)
	Vehicle	Car	89	102	115	128	142
		Bus	21	24	27	30	33
		Truck	84	86	88	88	90
	Cargo	Tonnage	350	390	420	460	500
	Characteristics	(A) => (B)	- Medical tours with family, Sightseeing and amusement tours - Vegetables, fruits, fish				
		(B) => (A)	- Lake Toba and Aceh tours, shopping tour in Medan - Home electric appliances, manufacturing spare parts, accessories				
(B) Penang (C) Phuket	Passenger	Total person	490	560	620	670	720
		(non vehicle)	(50)	(40)	(50)	(60)	(70)
	Vehicle	Car	44	50	55	60	65
		Bus	10	12	13	14	15
		Truck	42	44	46	46	48
	Cargo	Tonnage	200	210	230	250	260
	Characteristics	(B) => (C)	- Thailand resort tour - Alternative cargo way for land transportation				
		(C) => (B)	- Malaysia and Singapore bus tours - Cargo stock and loading to export to other countries				
(C) Phuket (A) Belawan & Medan	Passenger	Total person	50	60	500	540	590
		(non vehicle)	(10)	(10)	(60)	(60)	(60)
	Vehicle	Car	5	5	45	49	53
		Bus	1	1	10	11	12
		Truck	4	4	34	36	40
	Cargo	Tonnage	20	20	190	200	220
	Characteristics	(C) => (A)	- The demand will increase after about 10 years as in Penang - Phuket				
		(A) => (C)	- The demand will increase after about 10 years as in Penang - Phuket				

Source: JICA Study Team

As a result, the year 2015 cargo demand gives some implications in comparison with the estimated convertible and inducible cargo demand in 2015, as follows:

- The year 2015 cargo demand on the Belawan – Penang route is equivalent to 5.4% of the estimated convertible cargo currently transported by NCVs and container vessels. It is essential for RO-RO shipping business to take RO-RO suitable cargo in the market. The proposed RO-RO shipping may take some part of the estimated inducible cargo as well.
- In contrast, the year 2015 cargo demand on the Penang – Phuket route accounts for 64% of the estimated convertible and inducible demand in 2015. It means that concerted marketing efforts are required to find cargo or to allocate more space for cars and buses inside the ship. The year 2015 demand assumes that the rate of passengers is 61% of its cabin capacity (400 passengers per trip) on the average. There is such a margin (39%) to increase passengers and passenger vehicles.

There is no convertible passenger traffic since no passenger shipping service is available on the triangle route except cruise ships and chartered ships. It means that the new RO-RO shipping will create a new market to connect with international tourism destinations such as Phuket and Penang. In 2011, Phuket Airport received 8.5 million passengers while Penang Airport reported 4.6 million. The new RO-RO shipping service plans to carry around 26,000 from Belawan to Penang and 13,000 from Penang to Phuket in 2015 and the same volumes in the opposite direction. The volume is quite marginal to the scale of both the tourism markets. However, it will be able to provide a new pattern that people from neighboring countries come from the sea with their vehicles.

3) Ship Operation Plan

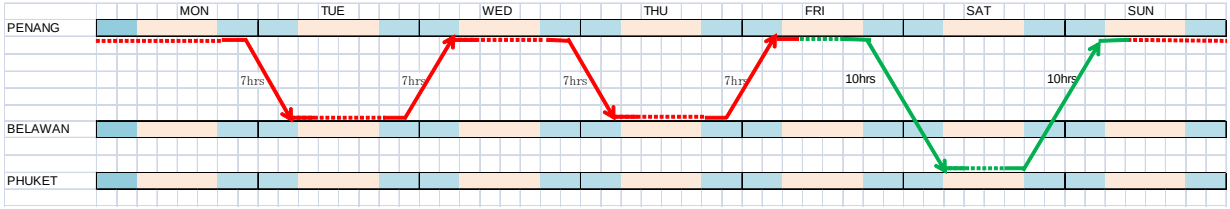
In Indonesia, some public and private operators have shown their interests in the route to the Study Team during the field survey. In Malaysia and Thailand, the Team has not met potential operators directly. One reason is attributable to different shipping industry characteristics of Malaysia and Thailand where there is no RO-RO operator to assign such several thousand tons' vessels. It does not deny a possibility of RO-RO shipping operator on the route from Malaysia and Thailand.

In the opening year of 2015, one proposed RO-RO vessel (see Section 15.5) will be assigned on the Belawan – Penang – Phuket route. The vessel will ply twice a week between Belawan and Penang on weekdays and once a week between Penang and Phuket to meet weekend tourism demand.

The RO-RO shipping service will start to be provided on the Belawan – Phuket route when the RO-RO shipping route demand is sufficient around 2025, according to the traffic demand forecast. Additional ship procurement will be required when extending the route.

The estimated navigation time is 7 hours between Belawan and Phuket and 10 hours between Penang and Phuket. For easy bus tour arrangement, the vessel will transfer from port to port during nighttime in principle.

To make such a vessel operation possible, the proposed RO-RO vessel will use Penang as a homeport.



Source: JICA Study Team

Figure 15.15 RO-RO Vessel Assignment Plan on the Belawan – Penang – Phuket Route

15.5 Preliminary Ship Design

1) Design Conditions

In addition to the requirement regarding cargo and passenger loading capacity indicated in the demand forecast and the ship operation plan (in Section 15.4), the preliminary ship design for the Belawan – Penang - Phuket route has been worked out taking the following facts and conditions into account:

i) Port to port distance

The port to port distance between Penang and Belawan is approximately 140 nm, the distance between Penang and Phuket is 198 nm, and the distance between Belawan and Phuket is 242 nm.

ii) Expected shipping service

One ship will be allocated on this route. Three roundtrips in a week will be intended on this route, that is, for example two roundtrips between Penang and Belawan, and one roundtrip between Penang and Phuket.

Overnight traveling is regarded as one of the attractive services for passengers in the circumstance that LCC becomes one of major transportation means in this region.

iii) Sea conditions

Sea conditions of this water are described as “sea state is invariably smooth or slight in Malacca strait”.[5] It was reported during the field survey that around 2 m high waves sometimes hit Phuket in the monsoon season. However, it can be regarded that the impact due to this wave condition is very little and no specific consideration is needed, considering the ship dimension is large enough.

iv) Docking conditions

An exclusive berth or docking facility for RO-RO vessels is not available in any port, but this RO-RO vessel will be docked at the wharf designed for a common cargo berth. The ship is equipped with bow and stern quarter ramps.

Belawan Lama Wharf cannot accommodate a 40-foot container trailer. Thus, the maximum truck size is 12 m long and 2.5 m wide.

[5] Malacca Strait and West Coast of Sumatera Pilot, NP44, The Hydrographer of the Navy.

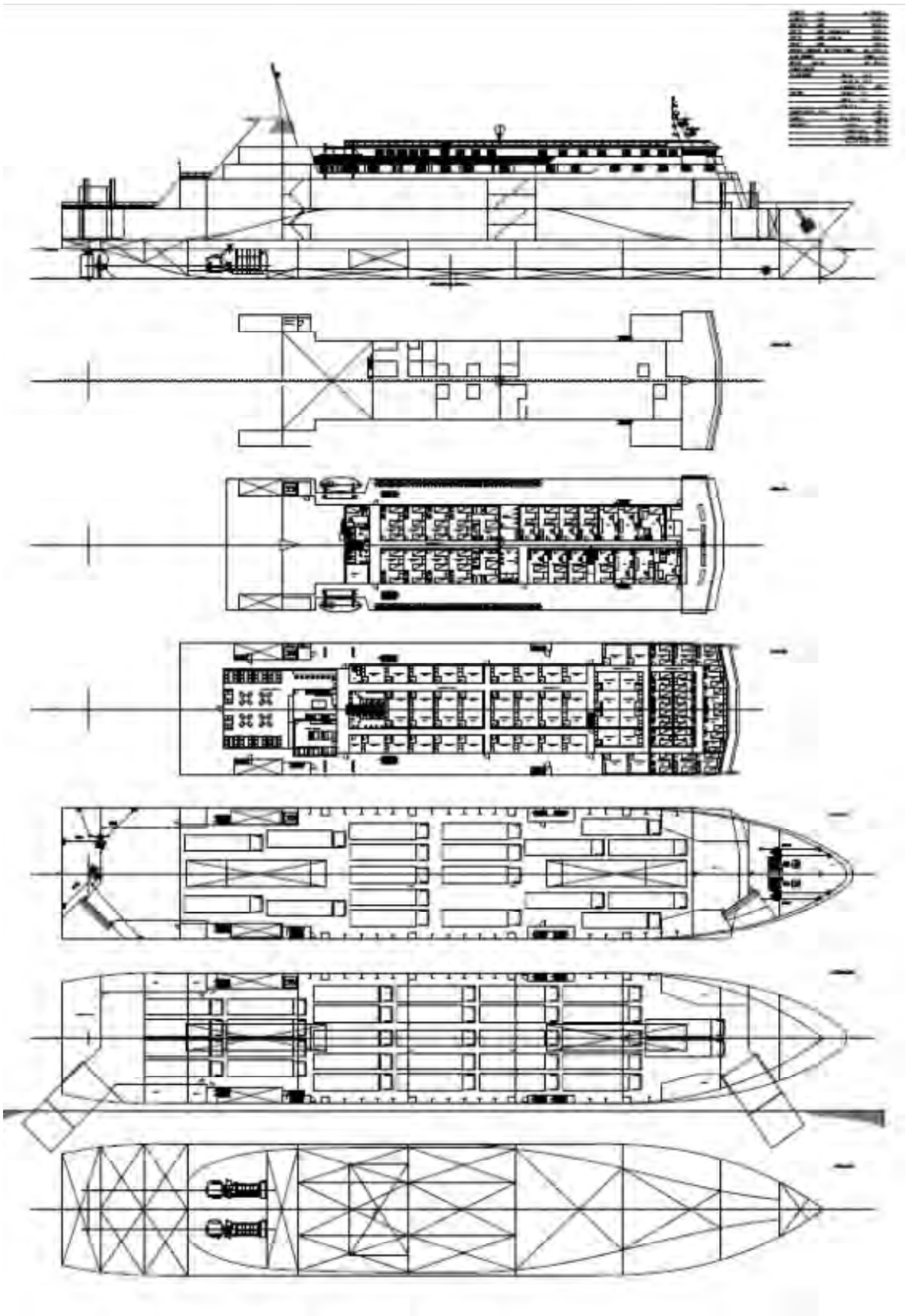
2) Outline of the Ship

Principal particulars of the proposed ROPAX for the Belawan – Penang - Phuket route are shown in Table 15.16, and its general arrangement plan is illustrated in Figure 15.16.

Table 15.16 Principal Particulars

Length over all	Approx. 120.0	m
Length between perpendiculars	111.0	m
Breadth	20.0	m
Depth	10.5	m
Draft (design)	4.5	m
Gross tonnage (international)	9,150	T
Main engine	5,884	kw
Service speed	Approx. 20.0	Kt
Loading capacity		
- Truck	49	Unit
- Passenger	400	Person
New shipbuilding cost	35	Mil $

Source: JICA Study Team



Source: JICA Study Team

Figure 15.16 General Arrangement Plan for Belawan-Penang-Phuket Route

15.6 Institutional Arrangement

1) Belawan Port

(1) Port Policy

The Port of Belawan is operated by PELINDO-I. According to the port classification system in Indonesia, the port is regarded as "international port." There is no policy conflict when the port will open an international RO-RO terminal to directly connect with Penang and Phuket.

The existing passenger terminal of Ujung Baru will be totally removed to Belawan Lama by 2013. An international RO-RO terminal is supposed to use Belawan Lama but PELINDO-I has not prepared it.

It is, therefore, advisable that PELINDO-I will prepare for international RO-RO terminal operation as the Study plans in the previous section.

(2) Customs Regulations

The Customs procedures at Belawan Port would be the same as in any other Indonesian port. Incoming vehicles would be treated as imported goods, and, therefore, are subject to import taxes and duties or bond guarantee.

The proposed solution is the same as in the Port of Dumai, i.e., the application of the SOSEK MALINDO Agreement to this RO-RO route. The RO-RO shipping service can be considered as a floating bridge connecting the roads of the two countries. Such an application would greatly alleviate problems encountered at border or port crossings.

The treatment of RO-RO cargo should also be such that it would be cleared with dispatch and minimum impedance of movement. In a coordination meeting with Customs officials in Belawan, it was suggested that a national policy on the special treatment of RO-RO vehicles should be issued from the Central Office in Jakarta (the Directorate General for Customs). The Study Team was assured that if such a policy directive is issued, it shall be applied at the Port of Belawan.

The development of a RO-RO service and the growth of trade that it will foster on this route would also exert pressure on Customs services to be on guard against contraband goods, especially illegal drugs. The necessary office and equipment should already be in place before the opening of the service. The port at Belawan Lama was proposed by local port officials to serve the RO-RO route. However, the passenger terminal building that is being renovated would seem to be insufficient to serve both as a holding area for passengers and CIQ clearing area. It would be best if a consolidated CIQS building or extension wing would be built to house the different agencies for better and more efficient services.

(3) Immigration Regulations

The immigration procedures should be straightforward, similar to immigration procedures in international airports. Since most of the passengers of the RO-RO service would be of ASEAN nationality and just for a short stay only, the visa requirement would not be a problem. If ever there is an additional requirement for an ASEAN citizen it should be just an exit ticket.

However, considering that the RO-RO service would also mean more movement of people, the immigration officials should also be on the lookout against human trafficking and cross-border movement of unwanted elements. This is very important considering that Belawan

could also be a staging point for workers bound for Penang, or other parts of Malaysia. Immigration and other databases must be updated to be aware of any imminent threats.

An appropriate office for the Immigration should also be provided in a consolidated CIQS building to provide better and more efficient services.

(4) Quarantine Regulations

The Port of Belawan is expected to handle a lot of agricultural and meat products to be exported to the Malaysian side. This highlights the need for quarantine procedures to safeguard against the spread of diseases, whether it be on persons, plants or animals. For the same reason that the RO-RO service would foster greater movement of people and goods, which would also include plant and animal products, quarantine services should also be strengthened.

An appropriate office for the Quarantine should also be provided in a consolidated CIQS building to provide better and more efficient services.

(5) Port Security

Security is a growing concern everywhere, especially in places where people congregate, like ports and airports. The IMO has formulated the ISPS Code to provide guidelines in ensuring safety and security of shipping services and port facilities. Even if the port is not ISPS Code rated, it would still be good policy to apply the ISPS provisions.

Belawan Lama, which is proposed to serve as the port for the RO-RO service, would need a lot of security improvements in its facilities. The proposed international passenger terminal is not fenced off from the rest of the port. The access to the international passenger terminal, the holding area for international RO-RO vehicles or container chassis and the port apron for international operations should be controlled. Only authorized personnel should be allowed in these areas.

An appropriate office for the Port Security should also be provided in a consolidated CIQS building to provide better and more efficient services and faster coordination among concerned agencies.

(6) Recognition of Driver's License and Vehicle Registration

The recognition of driver's license is not a contentious issue as it is a usual courtesy given in almost all countries to foreign visitors, as long as it is in a language recognized by the country. For drivers between Indonesia and Malaysia it is even easier as both the languages are closely related, and there is almost no need for translation. Drivers from Thailand would need to have a translation of their licenses.

The fact that all three countries involved in the route are right-hand-drive (RHD) countries adds an incentive for drivers that they could or would also drive in the other country.

The recognition of vehicle registration (and the related vehicle insurance) would not present a formidable issue as seen in the cross-border movement of vehicles in the island of Borneo. The same principles and guidelines can be applied to cross-border movement via the RO-RO service, and expanded to include Thailand. This would greatly contribute to the success of the service.

2) Penang Port

(1) Port Policy

The Port of Penang is the largest port on the proposed RO-RO shipping route. In line with the development of the North Butterworth Container Terminal, the Butterworth Terminal is now under reformation. Pier No.6 used to serve RO-RO vessels. Now it operates as a multipurpose pier but it is not busy.

The Penang Port Commission, Penang Port Sdn Bhd and JICA Study Team agreed to design an international RO-RO terminal at Pier No.6.

The area is now busy for transport development. Butterworth Rail Station located nearby is under improvement. The government has a concept to develop a transport hub near the Butterworth Terminal. It is important to incorporate the proposed international RO-RO terminal into such an area-wide transport development plan for the sake of RO-RO shipping users' convenience, particularly for passengers.

(2) Customs Regulations

The Port of Penang has had a long history of trading, so its Customs procedures can be said to be matured and up-to-date already. However, RO-RO shipping services would also require some more adjustments to the procedures, especially the need to facilitate the seamless movement, which is the hallmark of RO-RO transport service.

The development of a RO-RO service and the growth of trade that it will foster on this route would also exert pressure on Customs services to be on guard against contraband goods, especially illegal drugs. The necessary office and equipment should already be in place before the opening of the service. The old Butterworth Port is being proposed to serve as the terminal port of the RO-RO service in Penang. However, there would still be a need to construct a passenger terminal. It would be best if a consolidated CIQS building or extension wing to the passenger terminal would be built to house the different agencies for better and more efficient services.

A shuttle service for passengers would be a welcome additional service that would encourage the use of RO-RO service by barter traders who would be traveling without vehicles.

(3) Immigration Regulations

It has been reported that an Indonesian RO-RO passenger was denied entry because he was not carrying enough "personal expense money" or "allowance money" for his intended stay in Malaysia. When he returned the next time carrying the amount previously suggested, he was again denied entry because there is a new amount as a new minimum of threshold amount.

However, the truth is that the same immigration procedures similar to immigration procedures in international airports should also be applied at the port. Since most of the passengers of the RO-RO service would be of ASEAN nationality, and would be just for a short stay, the visa requirement would not be a problem. If ever there is an additional requirement for an ASEAN citizen it should be just an exit ticket, and not the "allowance money" of the guest.

However, considering that the RO-RO service would also mean more movement of people, the immigration officials should also be on the lookout against human trafficking and cross-

border movement of unwanted elements. Immigration and other databases must be updated to be aware of any imminent threats.

An appropriate office for the Immigration should also be provided in a consolidated CIQS building to provide better and more efficient services.

(4) Quarantine Regulations

The Port of Penang is expected to handle a lot of agricultural and meat products to be imported from the Indonesian side. This highlights the need for quarantine procedures to safeguard against the spread of diseases, whether it be on persons, plants or animals. For the same reason that the RO-RO service would foster greater movement of people and goods, which would also include plant and animal products, quarantine services should also be strengthened.

An appropriate office for the Quarantine should also be provided in a consolidated CIQS building to provide better and more efficient services.

(5) Port Security

Security is a growing concern everywhere, especially in places where people congregate, like ports and airports. The IMO has formulated the ISPS Code to provide guidelines in ensuring safety and security of shipping services and port facilities. Even if the port is not ISPS Code rated, it would still be good policy to apply the ISPS provisions. This is a primary concern since the port handles international vessels and cargo, as this would impact on their ISPS rating and their attractiveness to international trade.

The Old Butterworth Terminal, which is proposed to serve as the port for the RO-RO service, would need some security improvements in its facilities. The proposed international passenger terminal should be fenced off from the rest of the port. The access to the international passenger terminal, the holding area for international RO-RO vehicles or container chassis and the port apron for international operations should be controlled. Only authorized personnel should be allowed in these areas.

An appropriate office for the Port Security should also be provided in a consolidated CIQS building to provide better and more efficient services and faster coordination among concerned agencies.

(6) Recognition of Driver's License and Vehicle Registration

The recognition of driver's license is not a contentious issue as it is a usual courtesy given in almost all countries to foreign visitors, as long as it is in a language recognized by the country. For drivers between Indonesia and Malaysia it is even easier as both the languages are closely related, there is almost no need for translation. Drivers from Thailand would need to have a translation of their licenses.

The fact that all three countries involved in route are right-hand-drive (RHD) countries adds an incentive for drivers that they could or would also drive in the other country.

The recognition of vehicle registration (and the related vehicle insurance) would not present a formidable issue as seen in the cross-border movement of vehicles in the island of Borneo. The same principles and guidelines can be applied to cross-border movement via the RO-RO service, and expanded to include Thailand. This would greatly contribute to the success of the service.

3) Phuket Port

(1) Port Policy

The Port of Phuket intends to expand its service capacity by a new passenger terminal and the extension of berth length with dolphin piers. Since they are good for international RO-RO terminal operation, early implementation is appreciated.

(2) Customs Regulations

The Port of Phuket is a regular port of call of cruise liners and international cargo vessels. As such, the port is experienced in handling importations and international passenger movement, but not on RO-RO operations. RO-RO shipping services would require some more adjustments to the procedures, especially the need to facilitate the seamless movement of people and goods, which is the hallmark of RO-RO transport service.

The development of a RO-RO service and the growth of trade that it will foster on this route would also exert pressure on Customs services to be on guard against contraband goods, especially illegal drugs. The necessary office and equipment should already be in place before the opening of the service. The existing port is very limited in terms of its berthing capacity and holding area for RO-RO vehicles. There are expansion plans for the port that would see the extension of the berthing area and additional facilities. It would be best if a consolidated CIQS building or extension wing to the passenger terminal would be built to house the different agencies for better and more efficient services.

(3) Immigration Regulations

Considering that Phuket is tourism-oriented, its immigration procedures are straightforward and very efficient. They have a long experience in handling tourists coming through the port, because of the cruise liners frequenting the port.

Since most of the passengers of the RO-RO service would be of ASEAN nationality and just for a short stay only, the visa requirement would not be a problem. If ever there is an additional requirement for an ASEAN citizen it should be just an exit ticket.

However, considering that the RO-RO service would also mean more movement of people, the immigration officials should also be on the lookout against human trafficking and cross-border movement of unwanted elements. This is very important considering that Belawan could also be a staging point for workers bound for Penang, or other parts of Malaysia. Immigration and other databases must be updated to be aware of any imminent threats.

An appropriate office for the Immigration should also be provided in a consolidated CIQS building to provide better and more efficient services.

(4) Quarantine Regulations

The Port of Phuket serves a tourism-oriented market and is, therefore, a consumption center. It is expected to handle a lot of agricultural and meat products to be imported from either the Indonesian or Malaysian side. This highlights the need for quarantine procedures to safeguard against the spread of diseases, whether it be on persons, plants or animals. For the same reason that the RO-RO service would foster greater movement of people and goods, which would also include plant and animal products, quarantine services should also be strengthened.

An appropriate office for the Quarantine should also be provided in a consolidated CIQS building to provide better and more efficient services.

(5) Port Security

Although the Port of Phuket regularly handles international traffic in terms of cruise liners and international cargo vessels, security at the port needs a lot of improvement. It was noticed that the entry to the port is not controlled. This aspect needs to be given more priority. Security is a growing concern everywhere, especially in places where people congregate, like ports and airports. The IMO has formulated the ISPS Code to provide guidelines in ensuring safety and security of shipping services and port facilities. Even if the port is not ISPS Code rated, it would still be good policy to apply the ISPS provisions.

The proposed international passenger terminal should be fenced off from the rest of the port. The access to the international passenger terminal, the holding area for international RO-RO vehicles or container chassis and the port apron for international operations should be controlled. Only authorized personnel should be allowed in these areas.

An appropriate office for the Port Security should also be provided in a consolidated CIQS building to provide better and more efficient services and faster coordination among concerned agencies.

(6) Recognition of Driver's License and Vehicle Registration

The recognition of driver's license is not a contentious issue as it is a usual courtesy given in almost all countries to foreign visitors, as long as it is in a language recognized by the country. Drivers from Indonesia and Malaysia would need to have a translation of their licenses.

The fact that all three countries involved in route are right-hand-drive (RHD) countries adds an incentive for drivers that they could or would also drive in the other country.

The recognition of vehicle registration (and the related vehicle insurance) would not present a formidable issue as seen in the cross-border movement of vehicles in the mainland between Malaysia and Thailand. The same principles and guidelines can be applied to cross-border movement via the RO-RO service, and expanded to include Indonesia. This would greatly contribute to the success of the service.

16 THE DAVAO / GENERAL SANTOS – BITUNG ROUTE

On the route, the Sara Wharf of Davao Port needs sufficient rehabilitation for the time being. However no alternative port in Davao has been identified to receive international RO-RO ship calls during the Study. Under such situations, the Study conducted only stakeholder interviews in Davao while port and its institutional issues were not analyzed. It is advisable to the responsible Philippine authorities to the project that similar analytical works with other ports in the report be done at one of Davao ports where an international RO-RO terminal is developed immediately after the port is selected.

This chapter aims at forming a RO-RO shipping system on the General Santos – Bitung route. The same planning workflow and demand forecast assumptions are adopted as indicated in Section 14.1.

16.1 Stakeholders' Views

1) Stakeholder Interview Survey

A total of 101 companies responded to the stakeholder surveys for the General Santos-Bitung RO-RO route (see Table 16.1). The survey in Southern Mindanao covered 34 companies in General Santos and 22 companies in Davao, the latter being an integral part of the Southern Mindanao transport corridor wherein some of the products from the Davao region are shipped out through the General Santos Port and vice-versa. The North Sulawesi survey covered a total of 45 companies based in Bitung, the province's industrial and maritime transport hub, and Manado, the capital city and commercial/ services hub. The survey included 44 agricultural and fishery producers/ processors and non-agricultural/fishery manufacturers, 11 traders, 22 forwarders, and 24 travel and tour operators.

Table 16.1 Profile of Survey Respondents for General Santos-Bitung Route

Region	Shipper/ Manufacturer/ Processor	Trader/ Distributor/ Retailer	Forwarder	Travel and Tour Operator	Total
General Santos	21	6	2	5	34
Davao	13	2	3	4	22
Bitung/Manado	10	3	17	15	45
Total	**44**	**11**	**22**	**24**	**101**
% Share	**43.6**	**10.8**	**21.8**	**23.8**	**100.0**

Source: General Santos/ Davao and Bitung/ Manado Stakeholder Surveys, JICA Study Team, 2012

In terms of employment and capitalization size, most of the respondents are small and medium-sized companies. Almost one-fifth of the total are large companies, while about one-tenth are micro-enterprises. The cargo stakeholders deal with various agriculture, fishery and industrial products. The major ones are fresh and processed fish (especially tuna) and seafood products, fresh and processed fruits (pineapple, banana, mango), coconut and its byproducts (e.g., crude coconut oil, copra, copra expellers, activated carbon, charcoal briquettes, coco syrup and sugar, coconut flour), rubber, palm oil, coffee, cocoa, packaging materials, metallic and non-metallic minerals, cement, furniture and home decors, construction materials, tin and steel products, paper products, fertilizer, chemicals, petroleum products, industrial machines and equipment, and general cargoes.

The travel and tour operators are generally small companies providing ticketing and hotel reservation services, outbound and inbound tours, passport/ visa assistance, general sales agent services for airlines, transport services, and hotel operations. They handle far more domestic than international tourists.

2) General Santos/ Davao Stakeholders' Views to Use New RO-RO Shipping Service

(1) General Opinions

The local governments, national government agencies, and the private sector stakeholders in the influence area of the General Santos Port (including General Santos City, Sarangani Province, South Cotabato, Davao City, and other surrounding provinces) eagerly welcome and commit to support the development of an international RO-RO shipping service connecting the southern part of Mindanao with Eastern Indonesia. In fact, representatives from three different areas (i.e., Davao, Glan and General Santos) are claiming to be viable as connecting ports for the service.[1] As the ASEAN RO-RO study pinpoints the General Santos Port (Makar Wharf) as Bitung's partner port, the role of the other areas is now being examined within the context of a transport corridor which will use the General Santos Port as the hub port connecting them to Indonesia via Bitung.

The keen interest to develop the General Santos-Bitung RO-RO shipping route is deeply rooted in historical maritime trade and cultural ties across this region dating back to the pre-colonial period. These ancient ties are still evident in today's thriving traditional barter trading across the route and the intermingling of Filipino and Indonesian bloodlines and cultures especially near the border areas. For the Mindanao stakeholders, the establishment of the new shipping connection is just a re-establishment and formalization of these historical commercial and cultural ties.

In general, the Mindanao stakeholders expect the new RO-RO shipping service to contribute to increased trade, business, investment, tourism and economic growth in both the Philippine and Indonesian regions.

(2) Perceived Advantages and Disadvantages of the RO-RO Shipping Service

The Mindanao stakeholders see the following advantages of opening the General Santos-Bitung RO-RO shipping route:

i) The new route can potentially increase trade and business opportunities for Mindanao. The General Santos-Bitung route can be used to source out raw materials from Indonesia, if transport costs would be competitive. Potential imports via this route may include copra, coconuts, frozen fish, lumber, furniture, fertilizer, coal, paper products, tin plates/ends/lids, etc. New markets will also open up ushering in more business and investment opportunities for trade and commerce. Potential Mindanao exports to Indonesia include processed fruit products, beverages, fishing supplies, packaging materials, roofing materials, cannery equipment and spare parts, clothes, accessories, kitchenware, home decors, etc. The new shipping service stands to

[1] As of the writing of this report, there are at least two known initiatives to establish direct shipping routes between Mindanao and North Sulawesi. One is the planned operation by Ciptadua Sarana Company of Indonesia of "M/V Bawangung Nusa 1" (an old Navy vessel converted into a fast ferry vessel) to service the Bitung/ Manado-Glan/ General Santos/ Davao route within 2012. Another is the planned operation by Super Shuttle Company of the Philippines of a RO-RO shipping service between Davao and Bitung by the first quarter of 2013.

particularly benefit the Filipino (General Santos) companies currently operating in Bitung and/or having business relationships with Indonesia, including the fish canneries, fishing operators, suppliers of fishing supplies, importers of raw materials, etc. Other stakeholders are interested to explore trading and business opportunities with Indonesia and nearby countries that may arise from the opening of the General Santos-Bitung route. The forwarders say they can expand their clientele base when the route becomes available. The service will be faster and delivery time for cargoes will be shorter especially for door to door service of forwarders. While there is an upbeat interest in using the shipping route, there is a need to validate the suitability of the specific cargoes for RO-RO type of shipping.

ii) The new route can potentially increase tourism opportunities for Mindanao. Some tour operators see the RO-RO route as an opportunity to offer new tour packages, and a potentially much cheaper alternative to the expensive and longer air travel via Manila, and Jakarta or Singapore. General Santos can also become the gateway for Indonesians to go to other Philippine destinations like Cebu, Manila, Boracay, etc. as the General Santos route is substantially shorter than the Jakarta route. Some tour operators in Davao doubt if the RO-RO service would be attractive to leisure travelers who might find the land travel to General Santos and long RO-RO travel to Bitung too tiring. Passengers who may potentially use the service are traders, Indonesians studying in the Philippines and their relatives,[2] Indonesia-based Filipino workers and their families who are waiting for a more direct and cheaper way to travel between General Santos and Bitung, and travelers who are adventurous and not in a hurry. The RO-RO operation can also boost the education sector, as Indonesians can study English and other skilled courses in the Mindanao cities.

iii) The RO-RO shipping route can possibly reduce overall logistics costs. RO-RO is useful in moving heavy equipment vehicles, perishable items and break bulk cargoes. Because the planned shipping route is more direct, shorter, provides faster transit and vessel turnaround, and may entail less handling fees, the stakeholders who are interested to potentially use the new route think that this would contribute to lowering their overall logistics costs. They point out that it is important that prior to implementation, the shipping costs should go through careful deliberation among the authorized participating groups in the Philippines and Indonesia.

iv) The new shipping connection can potentially benefit the local economies of the Philippines and Indonesia. The increase in trade, business, investments and tourism in both countries that may be brought about by the opening of the direct shipping route can benefit the local economies and people of the two countries.

v) The RO-RO shipping service can also enhance bilateral relations between the Philippines and Indonesia. The Philippines-Indonesia relationship has been strengthened by the BIMP-EAGA cooperation. The introduction, and more importantly the sustainability, of the new RO-RO service will further deepen the ties between the two countries.

vi) Mindanao can prepare its infrastructure for the planned RO-RO operation by 2015. Both the General Santos and Davao Ports have had experience in servicing RO-RO

[2] There is a significant Indonesian community in General Santos, Sarangani Province and Davao. There is an estimated 5,000 Indonesians and Indonesian-Filipinos living in Glan.

shipping operations, albeit domestic. At present, three domestic RO-RO vessels (with quarter or side ramps) regularly call on the General Santos Port. Until a few years ago, another RO-RO ferry ship used to call on both the Davao and General Santos ports but this service has stopped due to competition from LCCs. There is an existing RO-RO ramp at the General Santos port, which is currently not being utilized. Only the berthing space is being used. If an international RO-RO service is realized, the passenger terminal with a 200-passenger capacity can be used. CIQS offices are located inside the port complex. Other RO-RO facilities can be improved/ expanded within the next three years. The General Santos and Davao ports are connected by a good land transport corridor (about 170 km) where many container trucks currently ply to bring across cargo.

On the other hand, the Mindanao stakeholders expressed their apprehension about the following possible disadvantages of the RO-RO shipping services:

i) The new route might foster backdoor smuggling, human trafficking, movement of illegal aliens, and terrorism.

ii) There is strong concern about security of the route and the sea worthiness of the vessel since it will ply quite a long route on open seas.

iii) The difference in vehicle configuration in both countries is a disadvantage. Vehicles in Indonesia are right-hand driven while those in the Philippines are left-hand driven so either type of vehicles may not be allowed at either side. There is also the issue of acceptance of vehicle registration plate and driver's license.

iv) There is a limitation on the availability of trailers for containers as well as limited vessel capacity. If goods are in containers on chassis, it will be costly when there is no backload or when turnaround time is long.

v) High tariffs at the ports will make shipping operation costs as well as shipping users' costs expensive.

vi) There may be a language barrier problem encountered in documentation, transactions, etc. across the border.

vii) The new shipping service may adversely affect the local industries of Mindanao, especially the small farmers, due to easier importation of agricultural products from Indonesia.

viii) A possible lack of support from both governments will jeopardize the success of the project.

(3) Stakeholders' Expectations from the RO-RO Shipping Service

To realize the abovementioned anticipated benefits of the General Santos-Bitung RO-RO service, the Mindanao stakeholders raised the following concerns and conditions that should be considered in developing the new route and service:

i) The shipping cost per nautical mile should be competitive vis-a-vis the current costs incurred by the shippers using alternative routes. Based on the sample survey of cargo stakeholders, the average shipping freight rate from General Santos or Davao to some usual destination/ transshipment ports in Asia (e.g., Singapore, China, Taiwan, Jakarta, Thailand, Korea, Vietnam) ranges from USD400-700 per TEU depending on type of product and destination. The bottom-line consideration of the shippers is cost. If they could bring/get their cargo requirements to/from their

destinations at a lower cost through the new RO-RO route, then the new shipping service would be attractive for them to use.

ii) The vessel schedule should maintain a regular and stable schedule. To sustain business between the two countries, the new shipping service should maintain a regular schedule of maybe twice a week at the start. The frequency could increase later. The schedule should also be reliable. The time of departure and arrival should not change frequently, unless due to uncontrollable factors such as bad weather, etc. Transshipment delays should be avoided, if not eliminated. There should be minimal interruptions on the way to destinations (e.g., unnecessary checkpoints/coast guards).

iii) The type and size of the vessel is envisioned to meet the requirements of the shippers. The vessel is expected to have adequate cargo capacity (at least 100 TEUs), safe and seaworthy (appropriate to the wind and wave attributes of the route). It should be capable of accommodating/ servicing reefer containers, and with refrigeration sockets/terminals on board. The shipping service should be operated by a reliable and reputable group. It should have proper insurance and adequate number of qualified personnel to provide quality service.

iv) The RO-RO port facilities should be adequate. The priority bay/berthing for the RO-RO service is necessary to facilitate faster loading and unloading of passengers, vehicles and cargoes. This could also ensure the timely departure and arrival of the RO-RO vessel. The current cargo handling facilities in the General Santos Port may be inadequate and may need to be expanded. The existing monopoly of the lone port handler should be addressed to improve port services.

v) The shipping service is expected to be well supported by all the concerned sectors. Both the government, private and non-government sectors in the Philippines and Indonesia should support and promote the new shipping service to help it realize its benefits. Both governments should facilitate easy documentation clearance/permits for the shipping operator, provide incentives, eradicate informal fees, ensure transparency and consistency in policies and regulations. All sectors should help promote the use of the new service in order to build demand and sustain its operation over the long-run.

vi) Containers on chassis are made available. Transporting goods in containers on chassis is costly because the chassis has to be delivered back to origin. Some shippers have problems with availability of containers; with the RO-RO service, there may also be a problem with availability of container chassis. As such, the RO-RO service is expected to identify providers for collaboration on supply of container chassis on both sides of the route.

vii) Regulate the entry of similar agricultural products. Unless regulated, the opening of this route may possibly be detrimental to the plight of local farmer producers in the region. Although there may be uncontrolled market forces for the trading between the Philippines and Indonesia, it is still hoped that the local players (especially farmers) will be sustained and benefited.

viii) Aside from cargo, the RO-RO service should also be suitable for travelers. The tour operators expect the RO-RO services to be affordable, safe, have frequent and convenient schedules (at least twice a week), enough capacity for passengers (at

least 200) and cargo, good accommodations, and managed efficiently by a reputable operator with good business savvy. A few said the service should have an ambiance of a leisure boat because tourists travel for leisure and fun. About USD125 per passenger would be acceptable fare rate on the RO-RO. Terminal fees should be less than the airport terminal fee of PhP200. The existing domestic shipping passenger terminal fee at the General Santos Port is only PhP11.20 per passenger.

3) Manado/Bitung Stakeholders' Views to Use New RO-RO Shipping Service

(1) General Opinions

Government and private sector stakeholders in North Sulawesi are committed to support the development of the General Santos – Bitung RO-RO shipping service as this project can promote trade, tourism and socio-economic relationships with Mindanao and the rest of the Philippines under the BIMP-EAGA cooperation. It can revive international trade between the two neighboring countries and encourage government to pursue open trade agreements.

In April 2012, a government-private sector delegation from Manado/ Bitung visited General Santos City to discuss continuing efforts to revive the North Sulawesi-General Santos bilateral relations. Aside from trade and business, among the priority areas discussed was the establishment of transport connectivity between Bitung and General Santos.

The Provincial Government of North Sulawesi is keen on the port status of Bitung in Indonesia. The Provincial Government of North Sulawesi as well as other government and private stakeholders are keen on the port status of Bitung in Indonesia. For years, local stakeholders have been lobbying for Bitung Port to be declared an international gateway port, which they believe will allow it to receive mother vessels and the bigger international liners directly, without using Jakarta or Surabaya as transshipment ports. They, therefore, welcome the designation of Bitung Port as one of two international gateway ports in Eastern Indonesia as contained in the national master plan on accelerating and expanding economic development in Indonesia (referred to in short as MP3EI) in 2010.

The General Santos – Bitung RO-RO shipping service stands to benefit local businesses, especially the small and medium enterprises. It can boost trade, tourism and investments which will contribute to more business activities, more employment, and greater incomes.

(2) Perceived Advantages and Disadvantages of the RO-RO Shipping Service

The following are the perceived advantages of the General Santos-Bitung RO-RO shipping service according to stakeholders in the Manado/ Bitung influence area:

i) Official statistics show that the current cargo trading volume between Bitung and General Santos is small (e.g., CPO directly shipped to the Philippines, copra directly shipped to General Santos, frozen fish shipped through Jakarta). One major reason is that there is no existing direct shipping service across the route. From Bitung, cargo to the Philippines (and to many other countries) usually follows the long and circuitous route of transshipping through Surabaya or Jakarta. The new General Santos – Bitung RO-RO shipping service has the potential to reduce shipping time and costs to/from the Philippines and other trading partners.

ii) Some of the commodities that may be good to trade with the Philippines are copra, coconut oil, fish, fishing supplies and equipment, furniture, instant noodles, ice cream, other food items, beverage, soap, kitchenware, dinnerware, home decors, other

consumer goods, etc. Many Filipinos especially from Glan and other towns of Sarangani Province sail to Bitung, through Tahuna, to buy barter trading goods via traditional wooden-hulled boats but this kind of informal trading is considered illegal. With the North Sulawesi government's stricter regulations against smuggling, the volume of such traditional barter trade has been declining. An estimated 1,000 Filipinos, most of them fisherfolks, live in Bitung and Tahuna and many of them sail across to the Philippines to trade, shop and/or visit their relatives. They may be able to use the RO-RO shipping service for these activities.

iii) The new shipping service is also seen to benefit local businesses in North Sulawesi. Some traders in Manado informed that imports from China (for example, from the Central Guangzhou area) are cheaper sourced from Davao than through the usual China-Jakarta-Bitung/Manado route. They regard Philippine customs procedures to be relatively simpler than Indonesia's. They think it would be cheaper for traders in Sulawesi to source their imported Chinese products from the Philippines, possibly from Mindanao.

iv) Shippers, traders and forwarders in Manado and Bitung are projecting to export coconut flour, palm derivative oil, charcoal and other products to North East Asia and European countries, such as China, Korea, Netherlands, and Belgium. In return, they would import electronics, vehicle spare parts, etc. from China, Malaysia, Taiwan and Europe. Many of them want to explore the possibility of using the planned General Santos – Bitung RO-RO shipping service for transshipment, not necessarily as the final destination for their cargoes.

v) Stakeholders appreciate the advantages that RO-RO shipping can give. RO-RO vessels can carry large trucks and passenger vehicles, with short time for the loading and unloading process. The new shipping route can connect Bitung to other hinterland islands such as Tahuna and Sangihe Regency and serve as a hub for collecting and distributing various products from/to Eastern Indonesia as far as Papua.

vi) The direct shipping connection can enhance business relationships between Indonesia and the Philippines. For example, there are now ongoing efforts to organize the North Sulawesi-Mindanao (NORSULMIN) Business Council, with assistance from the Philippine Consulate-General in Manado. Among other activities, the Council will support moves to promote direct transport connectivity including the RO-RO project.

vii) Similar to cargo, statistics on tourist traffic between North Sulawesi and Mindanao are limited due to the absence of any regular direct transport service on this route.[3] Nevertheless, tourism stakeholders in Manado and Bitung believe that the opening of the new RO-RO shipping service will encourage more tourist traffic across the route. With cheaper fare, it can be a good alternative to traveling abroad by airplane. It can carry coaches, buses and passenger vehicles, which can attract tourists to come by

[3] For comparative purposes, Indonesia's Bouraq Airlines operated a Manado-Davao-Manado service from 1992-2000. During this period, it carried a monthly average of 243 passengers from Manado-Davao and 227 passengers from Davao-Manado. It also carried a monthly average of 374 MT of cargo from Manado-Davao and 122 MT vice-versa. Over the last decade, a few airlines (e.g., Sriwijaya, Midsea Travel Express, Wings Air) have tried to revive the route but their operations were either short-lived or are on irregular charter basis. Passenger statistics on these few flights are not currently available.

their own vehicles (as it is less expensive this way). They think that people from Manado and Bitung will go to Mindanao for shopping, leisure and entertainment, casino, nightlife, business and education. Many people in Manado and Bitung who have relatives in General Santos, Sarangani and Davao may want to use the shipping service to visit their relatives. The new route may also attract backpackers and more adventurous tourists. However, there should be more aggressive tourism promotion activities to support this (like how Malaysia is promoting its tourism). Healthcare tourism may not be a big potential market for the new shipping service as Manado people would prefer to go to Singapore and Malaysia for this purpose.

Manado and Bitung stakeholders also expressed their concerns on possible disadvantages of the RO-RO shipping service, as follows:

i) Many businesses are doing their shipping by their own vessels and ports and may not need the new RO-RO service.

ii) The new service might increase the potential of smuggling, terrorism, and other illegal activities, if the operation is not supported by adequate regulation and control by the governments at both sides.

iii) It can increase imported products coming to North Sulawesi. This may result in trade imbalance, competition with local products, and loss of jobs and income.

iv) The RO-RO operation may require detailed suitability of port design and facilities as well as good accessibility from the city center. This will mean additional financial burden on the government to construct supporting infrastructure.

v) Some stakeholders think the RO-RO is an unstable vessel and they worry that sharing space with cargo and passenger vehicles is too risky for security and safety, more so for such a long-distance trip and especially during rough sea conditions.

vi) Different vehicle and traffic regulations between the two countries may cause some problems, if there is no adjustment in policies and regulations. For example, considering the left hand/ right hand drive issue and costs, it might be better for travel and tour operators to use local tourist buses at the other destination.

(3) Stakeholders' Expectations from the RO-RO Shipping Service

The Manado/ Bitung stakeholders expect the following to be considered in the operation of the General Santos-Bitung RO-RO shipping service:

i) It should be safe, secure, comfortable, and convenient. It should have a regular and frequent schedule, at least twice a week. It should provide cheaper cargo and passenger service fares than alternative transport modes. The current airfare on Wings Air from Manado-Davao is USD350 return and USD200 one-way. The tourism stakeholders think that a roundtrip passenger fare between USD100 and USD200 on the RO-RO shipping service would be attractive to travelers.

ii) The new shipping service should be supported by the government and the business sectors and should be aggressively promoted. There should be more exchanges between government and private sector representatives of the two countries to generate interest, cargo and passenger traffic, and resolution of issues to sustain the route.

iii) Legal and institutional issues, such as those on right-hand/ left-hand drive vehicles, should be addressed.

iv) The Bitung Port operator reiterated the need to separate the domestic and international passenger terminal operations for the RO-RO shipping operations, for better CIQS control.

4) Convergence of General Santos - Bitung Stakeholders' Views

The converging and diverging views of the stakeholders for the General Santos-Bitung RO-RO shipping service are summarized in Table 16.2.

Like in the other RO-RO shipping routes, the stakeholders in the General Santos-Bitung route are unified in viewing the new shipping service as a positive development and contributor to their businesses and local economies. At both sides, stakeholders see the project as part of their continuing efforts to revive and strengthen historical trading and cultural ties and bilateral relations. It is interesting to note that even if these traditional bilateral partners are eager to open up their respective economies to greater international trade, both sides are also cautious about protecting their homegrown industries.

Competitive costs, safety, comfort, convenience and reliability are the most important considerations the stakeholders expect from the RO-RO shipping operations. As in other locations, the stakeholders of the General Santos-Bitung route are also particularly concerned that trade and regulatory issues such as CIQS should be effectively addressed in order to realize the success of the RO-RO service. True to their cooperative ways of promoting inclusive development, the stakeholders also see the need for strong bilateral commitment to support and promote the new shipping service to make it viable and sustainable.

Table 16.2 Summary of Stakeholder Views on the General Santos-Bitung RO-RO Shipping Service

Aspect	Converging Views	Diverging and/or Singular Views
Overall Economic Benefits	- The RO-RO shipping service can reduce logistics costs and boost business, trade, tourism, investments, employment and incomes. Government and private sector stakeholders are committed to supporting the development of the route. - It can revive and strengthen bilateral socioeconomic relationships between Indonesia and the Philippines. - Caution should be taken that local industries and small producers are not adversely affected by competing imported products.	
Market	- Stakeholders badly need modern liner shipping service across the route but some do not specify RO-RO vessel. - There is limited cargo trading across the route since there is no existing liner shipping service. There is potential trade if the new shipping service is opened. - Tahuna/Sangihe Regency can be part of the shipping route as it plays a significant role in current trade in the area and is strategically located along the route. - The route can be used as a shorter and cheaper alternative route to transship products from/to China, Taiwan, etc to/from Bitung through General Santos. - The route can open up trading and business opportunities with hinterland areas. - The shipping service can increase travel to other destinations through the Bitung-General Santos connection, particularly for traders, overseas workers and their relatives, students, backpackers and adventure travelers. - Tour operators are not inclined to carry tour buses on the RO-RO vessel considering the left-hand vs. right-hand driving limitation. It would also be more practical and economical to rent tour vehicles with competent local drivers at the other side.	
Infrastructure	- The RO-RO port facilities should be adequate and should not cause any delay or inconvenience to cargo loading/ unloading and vehicle/ passenger movement.	- The General Santos Port has experience with RO-RO shipping operations (domestic). Existing and future facilities can be prepared for international RO-RO shipping operations. - The Davao and Glan ports should also be developed for the RO-RO shipping service.
Legal and Institutional Issues	- The new route might foster smuggling, human trafficking, terrorism, crime. - CIQS and other regulatory issues that may affect the RO-RO operation should be properly addressed. - The left-hand vs. right-hand drive orientation in the Philippines and Indonesia, respectively, will be a major issue hindering the movement of vehicles across the route. - The new service should be strongly supported and aggressively promoted by government and business sectors.	- Government and local stakeholders need to level off on the real status of Bitung Port as an international gateway port.
Costs	- Freight and passenger rates on the RO-RO should be competitive with current costs incurred by shippers and passengers using alternative transport routes and modes.	-

Aspect	Converging Views	Diverging and/or Singular Views
	Acceptable roundtrip passenger fare rate should be USD120-200. - Port tariffs should be more competitive and should not make overall logistics costs very expensive. - Initial operations of the RO-RO may need to be subsidized until it becomes sustainable.	
Ship Facilities	- The RO-RO vessel and operation should be safe, seaworthy, secure, comfortable and convenient both for cargo and passengers. - The RO-RO operation should observe a regular and stable frequency of service. - The vessel type and size should meet the requirements of the users.	- General Santos cargo stakeholders see the lack of container chassis as a potential problem for RO-RO operations. There should be a provision for this. - Some stakeholders think the RO-RO is an unstable vessel to carry cargo and passenger vehicles on a long-distance route especially during rough sea conditions.

Source: General Santos/ Davao and Manado/ Bitung Field Surveys, JICA Study Team, 2012

16.2 Detailed Traffic Demand Survey

1) NCV Traffic Survey at Tahuna and Marore

There are very few modern liner shipping services between North Sulawesi, Indonesia and South Mindanao, Philippines. It is said that most of bilateral direct trade is still done by traditional NCVs. However NCV trade-related data is limited. The traffic survey was conducted to know actual trade and shipping activities.

The survey results reveal actual conditions, as follows:

i) Manado Port used to work as a trading port by Philippine NCVs. Since the North Sulawesi Governor issued a strict regulation concerning smuggling, Philippine NCVs have disappeared at Manado Port.

ii) Sangir Besar Island has historically functioned as an intermediate trading area. Two ports, Tahuna Port and Petta Port, serve for such trade. According to port statistics, around 20 vessels used the two ports annually in recent years. Philippine vessels loaded mostly copra at the island. Currently one small bulk ship is assigned to this task. On the other hand, Indonesian vessels unloaded various general cargoes (see Table 16.3).

iii) In 2010, Sangihe Islands Regency subsidized a small cargo passenger vessel which plied between Tahuna and Glan, Sarangani Province, for 4 roundtrips. Due to insufficient demand, the service was suspended.

iv) The Study Team attended the customs clearance of a small Indonesian cargo vessel (254 GT). One customs officer stationed at Tahuna and one more officer from Manado undertook the customs clearance by both ocular survey and documentation check. The ship owner was a Tahuna trader who bought Philippine general cargoes of 500 tons in 2011. The ship owner may use the new RO-RO shipping service because he must own a vessel under the current situations - no modern shipping service on the route (see Figure 16.1).

v) Philippine NCV trade is still active at Marore Island located very near the Philippine territory. According to the immigration statistics in 2011, 70 Philippine vessels with 204 crew members called at Marore, and 44 Indonesian vessels departed from the island with 102 crew members. In the same year, regardless of vessel flag, 236 Indonesian passengers departed from the island to the Philippines while 66 Filipino passengers landed at the island (see Table 16.4).

vi) There is a border trade regime which entitles border people to import up to USD 250 worth of goods per month without import duty. Such border trade's customs clearance is done by documentation. The Survey Team observed 8 small NCVs which imported 1,490 kg in total or IDR 3.6 million only. The declared value was extraordinarily low to avoid tax payment.

vii) Marore Island is the front island to the Philippines and the center of island shipping by NCVs. However, NCVs observed in Marore Island are very small in capacity and probably one vessel hardly transports over one ton at a time. The NCV trade at Marore, therefore, seems marginal when introducing modern shipping service (see Figure 16.2).

Table 16.3 Shipping Traffic between Sangir Besar Island and South Mindanao

Year	Ship Call		Cargo (ton)		Passenger	
	Incoming	Outgoing	Unload	Load	Disembarkation	Embarkation
Foreign Ship						
2007	11	11	-	13,580	-	-
2008	8	8	-	9,000	-	-
2009	8	8	-	9,600	-	-
2010	7	7	-	-	-	-
2011	9	9	-	-	-	-
Indonesian Ship						
2007	-	8	-	-	-	-
2008	-	11	-	-	-	-
2009	-	7	-	-	-	-
2010	11	11	152	-	382	368
2011	4	6	500	-	-	-

Source: Tahuna Port Office

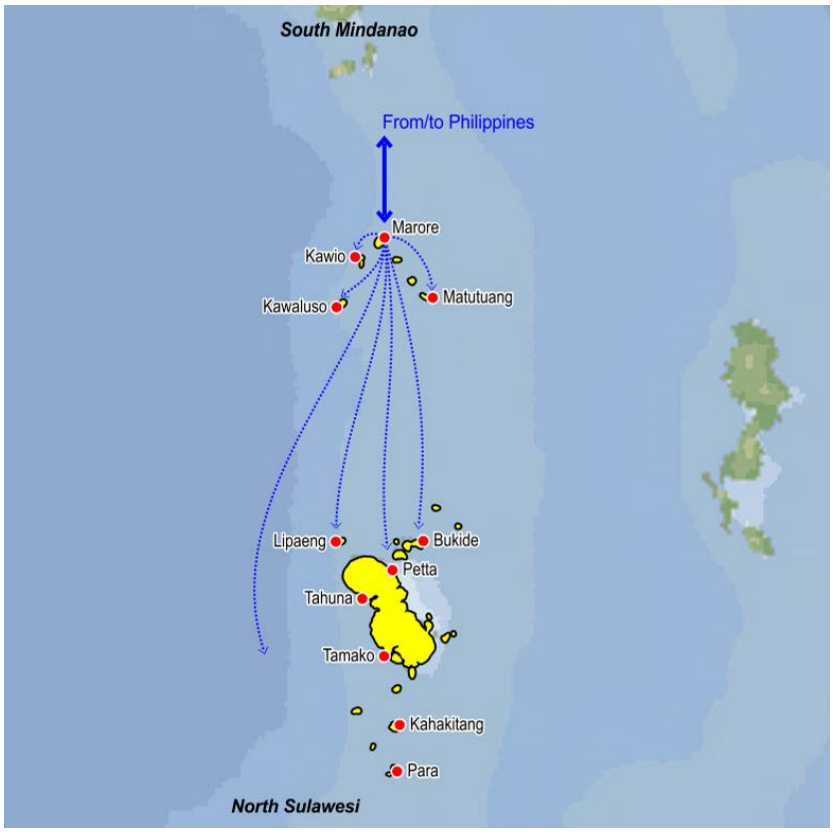
Table 16.4 Immigration Statistics at Marore Island

			Year		
			2010	2011	2012*
Ship	Indonesia	In	32	42	17
		Out	34	44	20
	Foreign	In	50	70	20
		Out	43	67	18
Crew	Indonesia	In	90	115	41
		Out	96	102	48
	Foreign	In	152	204	66
		Out	151	177	50
Passenger	Indonesia	In	259	202	114
		Out	269	236	129
	Foreign	In	129	66	24
		Out	131	73	23

Note: * from January to July 2012

Source: Marore Island Immigration Office

Figure 16.1 Customs Clearance at Petta Port



Source: JICA Study Team

Figure 16.2 Ports of Sangihe Islands Regency and NCV Routes

2) Potential Cargo by Interviewed Stakeholders

(i) General Santos/Davao

At General Santos/Davao, the Study Team interviewed 34 shippers, 8 traders and 5 forwarders. Most of them have not experienced RO-RO shipping service. But some are positive about trading with North Sulawesi and revealed their business plans with potential cargo.

The potential cargo includes existing cargo which is currently detoured via Jakarta/Surabaya since there is no direct shipping service. However, the North Sulawesi trade statistics and the Bitung port statistics do not record them as traded goods. Thus, it is difficult to identify exact trading volumes. The potential cargo also includes induced cargo by the new shipping service based on stakeholders' perceptions.

(ii) Bitung/Manado

At Bitung/Manado, the Study Team interviewed 10 shippers, 3 traders and 17 forwarders. They have more ideas about exported goods to many countries via Philippine ports. It means that the current shipping patterns--of shipping out via Jakarta/Surabaya for transshipment with international shipping vessels--are neither convenient nor attractive for the local stakeholders.

Table 16.5 Potential Cargo for RO-RO Shipping among General Santos/Davao Stakeholders

From Bitung/Manado/Tahuna to Gensan/Davao		From Gensan/Davao to Bitung/Manado/Tahuna	
Frozen Tuna and Other Fish Products	1,063	Cement	94
		White Sugar	52
Fresh Tuna	69	Com Seeds	8
Various Fertilizer Products	69	Cords, Fish Nets	7
Tin Plate Sheets, Tin Free Steel Strips, End Lids, Coated Plates	91	Cannery Equipment	12
Furniture, Home Decors	5	Packaging Materials (labels, hand tags, stickers, etc)	46
Lumber	13	Date Cola Beverage	37
Desiccated Coconut	1	Activated Carbon	17
Vegetables	1	Charcoal	17
Cosmetic Products	2	Fresh Mango	2
Charcoal Shell, Nutmeg, Coffee, Seaweeds, Noodles, Soap, Cigarette, etc.	Not Specified	Clothes, Shoes, Accessories, Dishware, Cosmetic Products, Ice Cream, Fish Meal, etc.	Not Specified
TOTAL (tons/week)	**1,314**	**TOTAL (tons/week)**	**292**

Source: General Santos/Davao Stakeholder Survey, JICA Study Team, 2012

Table 16.6 Potential Cargo for RO-RO Shipping among Bitung/Manado Stakeholders

Commodity	Avg. Weekly Tonnage (Ton)	Type of Packing	Port of Origin	Transshipment Port	Port of Destination	Consumption Region
Export						
Frozen flying fish (*cakalang*), tuna, and other	19	Boxes, in container	Bitung	Philippines	Japan, China, Korea, Netherlands, Belgium	Japan, China, Korea, Netherlands, Belgium
Cloves	5	Bags	Bitung	Philippines	Singapore, Thailand	Singapore, Thailand
Charcoal	102	Bags, in container	Bitung	Philippines	Vietnam, China	Eastern Asia countries
Palm derivative oil	231	*Not specified*	Bitung	Philippines	China, USA	China, USA
Vanilla	1	Bags	Bitung	Philippines		European countries
Coconut wood	1	*Not specified*	Bitung	Philippines	China	China
Activated carbon	12	Container	Bitung	Philippines	China	China
Export Total	371					
Import						
Electronics, spare parts	62	Boxes	Europe, China, Taiwan, Malaysia	Gensan	Bitung, Manado	North Sulawesi

Source: Bitung/Manado Stakeholder Interview, JICA Survey Team, 2012

16.3 Infrastructure Preparation

1) Basic Direction of Infrastructure Preparation

(1) Terminals of the Route

This route connects General Santos Port and Bitung Port by ROPAX vessel with LOA of 80 m and draft of 3.8 m (refer to Section 16.5). The service would primarily use existing port facilities, considering the limited land space of the port area and efficient use of limited funding resources. Berth assignment for this service at each calling port has to be discussed in depth among the parties involved as prioritized berth assignment is required due to the nature of this service.

When the terminal infrastructure is used for international RO-RO service, it is required to install facilities for CIQ procedures and to fence the area to ensure the proper border control function.

The ship arrives at the port in the morning and departs at night. Discharging operation and passenger disembarkation is done on arrival in the morning. Loading operation and passenger embarkation is done before departure in the evening. During in-between hours, the ship basically stays at berth. However, if required to vacate the berth for another working ship, the RO-RO vessel moves to anchorage and re-berths at the time of loading.

Any disadvantage that is anticipated from the use of existing facilities or joint use by other users is intended to be overcome by operational skill to ensure the safety and usability of the service.

The appropriate location of an international RO-RO terminal in the port area of General Santos Port is selected considering the abovementioned situations.

(2) Requirements of Terminal

It is required to have sufficient capacity of navigation channel and anchoring area to accommodate the ROPAX vessel of 80 m long and 3.8 m draft at any time. Navigation channel should have a water depth of 4.8 m and minimum width of 120 m. Anchoring area should have a water depth of 4.8 m and minimum radius of 120 m.

The capacity of mooring facilities must be sufficient to accommodate a ROPAX vessel of 120 m long in safe water area. It is also required to have sufficient berth window allowing the ROPAX vessel to stay all the daylight hours in the day when the vessel calls each port twice a week. At each port, the ROPAX vessel berths on existing berth for general use. Cars and trucks uses the ship's ramp to move to/from the berth apron. Therefore, it is not required to install any special equipment on the shore side at each port.

At the RO-RO terminal of General Santos Port and Bitung Port, it is required to prepare a passenger building which has customs clearance and passport control booths and a room for passengers to wait for boarding after completion of the border formalities in the passenger terminal.

It is also required to have sufficient land space to set up a cars/trucks checking area for customs/immigration and ordinary parking area in the vehicle terminal. The cars/trucks checking area should have segregated lanes for inbound and outbound vehicles which enable drivers to go through customs/immigration formalities without leaving their vehicles. In addition to this, a parking space for outbound vehicles that wait for the formalities and

another separate parking space for 15 vehicles waiting for loading onto the ship after completion of all formalities.

Strict control is required for the following areas: the area where the vehicles park and passengers stay after landing from the ship but before conducting inbound customs/immigration formalities, and the area where the vehicles park and passengers stay before being loaded onto the ship but after outbound customs/immigration formalities have been completed.

2) General Santos Port

(1) Location of the Terminal

The Eastern Wharf of General Santos Port (known as Makar Wharf) has been used for domestic ferry services and the transit shed No. 1 which is located behind the eastern part of the wharf will be converted to a passenger terminal building. In addition to this, RO-RO vessels also use this berth. Considering the positional relations among the port gate, the berth and road network in the port, it seems that the intersection of traffic lines of passengers and vehicles as they approach the wharf and other vehicles which move in the port will not be a big problem. The General Santos Office of the Philippine Ports Authority (PPA) believes that the eastern part of Eastern Wharf is an appropriate location for the international RO-RO terminal.

Accordingly, the plan of the international RO-RO Terminal is drafted at the eastern part of the Eastern Wharf.

Once the international RO-RO service between General Santos Port and Bitung Port comes into full swing, a dedicated terminal for RO-RO service will be needed to cater to expanded demand of cars and passengers. The area next to the eastern part of Eastern Wharf is a good candidate location for an international RO-RO terminal because the area is not used fully and the development of the gateway complex is planned there.

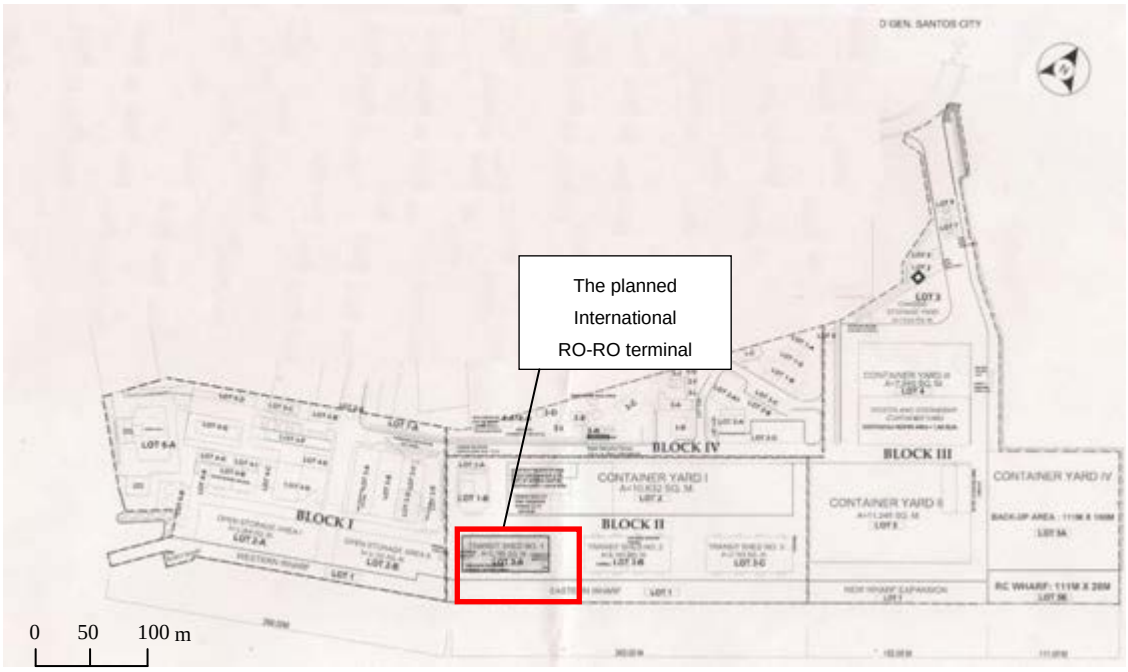


Figure 16.3 Location of the Planned International RO-RO Terminal at General Santos Port

(2) Main Facilities

The planned RO-RO service on this route is performed by a ROPAX vessel which is equipped with quarter ramp for vehicles. The following facilities are required at the port to receive international RO-RO services:

- Port water facilities: Channel, Basin, Mooring facilities
- Passenger terminal: Passenger building, CIQ facilities (in the building), Car parking
- Vehicle Terminal: Check-in post, Security post, CIQ booth, Car waiting area for boarding, Inspection area.

i) Channel and Basin

General Santos Port provides sufficient port waters for 30,000 DWT class vessels. No problem on navigation is reported from the domestic ferry vessels which use the Eastern Wharf.

Hence, there is no obstacle to handle the planned ROPAX vessel.

ii) Mooring Facilities

The length and depth of Eastern Wharf is 300 m and 8.5 m. The width of its apron is 19 m and a little difficulty is foreseen in case of handling larger size of vehicles at the apron. However, this small problem could possibly be solved by proper operation of the vehicle. The wharf has been used by regular service vessels but service is suspended at present. In addition, the planned ROPAX vessel calls only twice a week.

Hence, Eastern Wharf can provide necessary berth window to the planned ROPAX service.

iii) Passenger Terminal

Conversion work of transit shed No. 1 to a passenger terminal building is on-going. The building is planned to be a domestic passenger terminal building only. Therefore, it is necessary that additional facilities, such as CIQ booths and inspection area, are placed in a proper position of the building giving due consideration to the line of passenger flow when it is used by international passengers. A security check deck is planned at the entrance and it can be also used for international passengers. The area of the building is 2100 m^2 (70 m wide and 30 m deep) and has enough space for 100 international passengers to go through the border formalities and wait for boarding. Hence, for the international RO-RO service, this passenger terminal building will also be utilized. The block in front of the building was used by cars which carry ferry passengers and it can be used as the car parking area for international RO-RO service.

Ample time between the ship's arrival and departure allows the separate operation of loading and discharging of cars/passengers. Therefore, it is possible to utilize the same facilities/space for both incoming and outgoing traffic separately.

iv) Vehicle Terminal

An approximately 30 m x 30 m area between shed No. 1 and shed No. 2 and a certain area of the apron are reserved for a vehicle terminal. The General Santos Office of PPA thinks that the area may be used by vehicles of the international RO-RO service.

At the entrance of the vehicle terminal, a security post and a check-in post are placed. One lane each for inbound and outbound is arranged. Along with the arranged lane

(width 3 m), a customs inspection booth and an immigration inspection booth are installed in series. The length of lane shall be a minimum of 30 m enabling two large-sized vehicles to park one after the other for customs inspection and immigration inspection, respectively, at the same time. Customs and immigration officers are usually stationed at the offices in the terminal building.

Parking spaces of 300 m^2 and 300 m^2 to accommodate 6 trucks and 6 cars shall be designated at the apron and the abovementioned area, respectively. The trucks and cars wait for boarding the vessel after completion of the border inspection there. The parking space for inbound vehicles is not necessary because they go to CIQ booths immediately for going through the border formalities and the number of vehicles is small. In addition to such parking areas, the space for CIQ inspection is reserved in the terminal area.

This terminal area is segregated from other areas by a fence while carrying out operation for international RO-RO service.

Ample time between the ship's arrival and departure allows the separate operation of loading and discharging of vehicles. Therefore, it is possible to utilize the same facilities/space for both incoming and outgoing traffic separately.

v) Controlled Area

The area between shed No. 1 and shed No. 2 and the apron are open to other use when the operation of international RO-RO service is carried out. However, these areas have to be controlled as the border area during such operations. It is preferable for the area to be segregated from other areas by fences.

Facilities in the international RO-RO terminal at General Santos Port are summarized in Table 16.7. The layout of the terminal area is shown in Figure 16.4. The layout is drafted in order to show the required size and a possible location of facilities. The layout shall be decided based on the types and size of vehicles which will actually use the RO-RO service. Controlled entrance and exit security gates shall be provided. The shaded area indicates the area which should be controlled as an international RO-RO terminal.

Table 16.7 Facilities of International RO-RO Terminal at General Santos Port

Port Water Facilities	
Channel and basin	No special arrangement necessary General use with other vessels
Mooring facilities	Use the existing facilities General use with other vessels
Passenger Terminal	
Terminal building	Use the passenger building currently being improved General use with domestic passengers
CIQ facilities	To be set up in the terminal building
Regular parking area	Use the existing parking area
Vehicle Terminal	
Check-in post	To be installed
Security post	To be installed
CIQ booth	To be installed
Vehicle waiting area (for boarding)	To be defined within the vehicle terminal and at the apron
CIQ inspection area	To be defined within the vehicle terminal
Terminal Area	
Outer ward	To be installed
Site	Within the present port area General use with other activities

Source: JICA Study Team

(3) Improvement of Facilities

For the handling of international RO-RO service at General Santos Port, basic facilities which should be installed are shown in the table below. All others are mostly covered by the existing facilities and on-going project.

Table 16.8 Required Facilities at General Santos Port

Facilities newly installed as passenger facilities	
CIQ facilities	Set up in the passenger building
Facilities newly installed at vehicle terminal	
Check-in post	1 unit
Security post	1 unit
CIQ booth	2 posts for Customs and 2 posts for Immigration
Vehicle waiting area	The areas of 300 m^2 at the apron and 450 m^2 within the vehicle terminal
Outer ward	
Fence	Movable fence

Source: JICA Study Team

The total cost involved for the above is roughly estimated at US$ 40,000. The estimate is based on the consultation with the concerned parties and information on similar types of project, therefore the estimated amount is subject to further review depending upon the results of the detailed study of the project site.

Since only the installation work of booths and fence are involved, the required time period for the work is rather short. It can be completed within one year following the final decision by the parties concerned.

(4) Terminal Use

Due to the size of the planned ROPAX vessel (LOA over 60 m), pilot service is compulsory for entering and departing General Santos Port. The liner type service is usually given preferential treatment such as exemption of pilot arrangement after showing prudent performance of the services for a certain period of time. No other time-consuming formalities are expected for ships entering and departing the port.

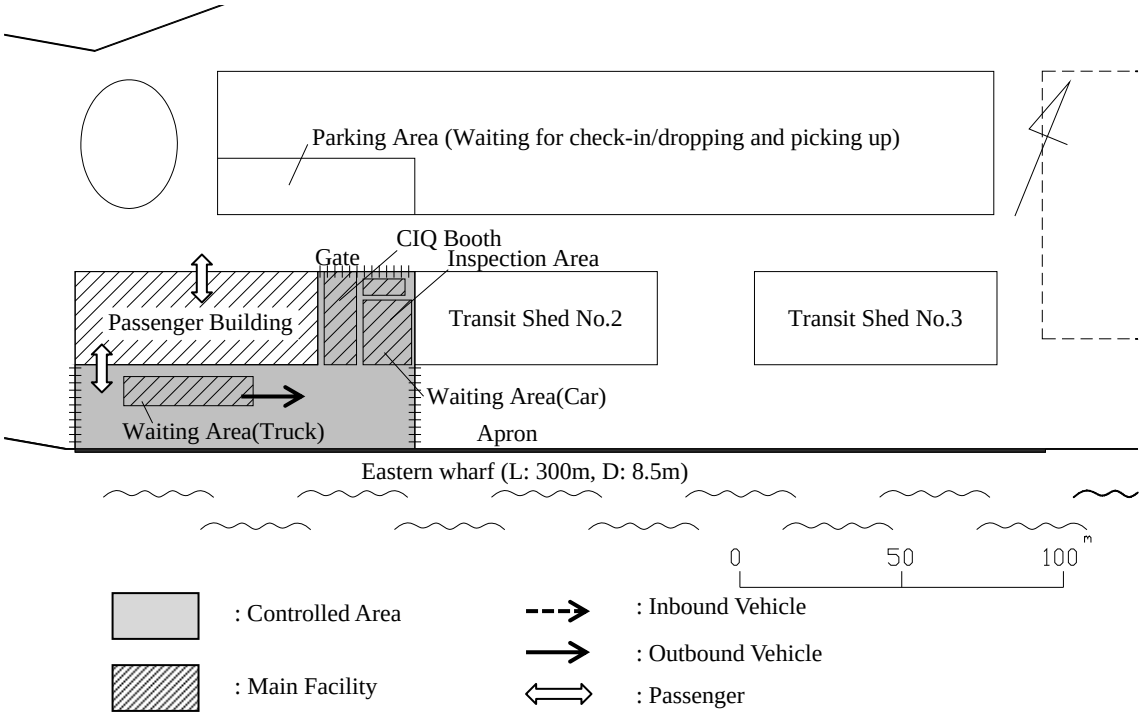
Outbound vehicles and other local transportation means enter the port area through the west port gate. At the port gate, drivers of outbound vehicles should present to the gate officer the boarding ticket or other evidence to prove the status of the vehicle and proceed to vehicle terminal. Likewise, inbound vehicle should present to the gate officer some sort of evidence to prove that the vehicle has just arrived by the ROPAX vessel.

Inbound vehicles immediately move to the vehicle terminal for the border formalities, and leave the terminal after clearing. Inbound passengers immediately move to the passenger terminal for arrival formalities, and leave the terminal by bus or taxi or other means of transportation.

Outbound passengers and vehicles have to arrive at the terminal building or the vehicle terminal well before the ship's sailing time or at least by the designated time given by the terminal. Passengers go through CIQ formalities at the passenger terminal and wait for boarding. Vehicles also go through CIQ formalities at the CIQ booth of the vehicle terminal and wait for boarding.

Once the boarding is announced, passengers move from the passenger terminal to the berth by foot and board the ship. Vehicles move from the parking area to the ship side. The flow of passengers and vehicles on the berth is separated from the viewpoint of safety.

The flow of passengers and vehicles for loading and discharging is illustrated in Figure 16.4.



The layout is only an appropriate representation.

Source: JICA Study Team

Figure 16.4 Terminal Layout and Traffic Flow in the Terminal at General Santos Port

(5) Management and Operation

The facilities of the international RO-RO terminal are basically owned and managed by the General Santos Office of PPA, and the RO-RO ship operator uses the terminal when the ship calls the port based on the contract between General Santos Office of PPA and the ship operator.

CIQ formalities are undertaken by the concerned authorities utilizing the facilities installed in the passenger terminal and vehicle terminal.

(6) Connection with Hinterland

The Davao – General Santos road section (161 km) is part of ASEAN Highway No. 26 as well as TTR. The BIMP-EAGA Implementation Blueprint 2012 – 2016 prioritizes to rehabilitate this section with a project budget of USD 21.3 million. The scheduled implementation is anticipated for better port hinterland connection.

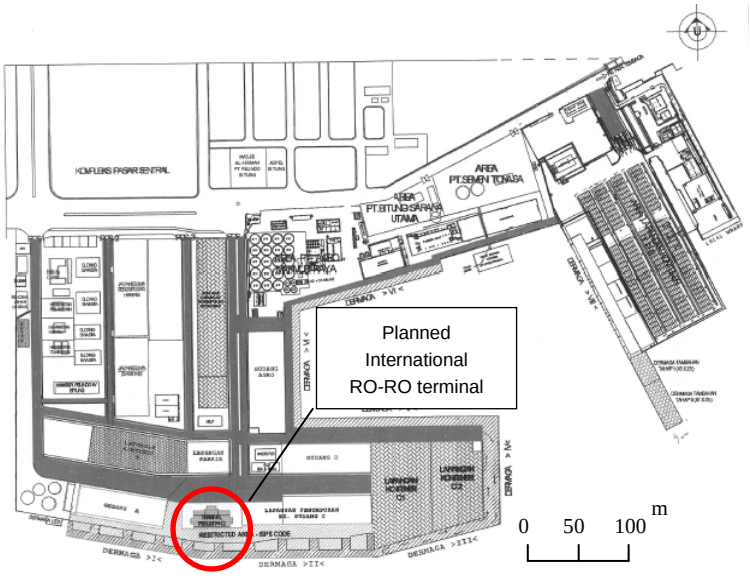
3) Bitung Port

(1) Location of the Terminal

Pier II of the multipurpose terminal of Bitung Port is used by domestic passenger vessels which are operated by PELNI and a passenger terminal located behind Pier II. In addition to this, RO-RO vessels also use this berth twice or three times a month. Considering positional relations among the entrance gate, exit gate, road network in the port and Pier II, it seems that the intersection of traffic lines of passengers and vehicles as they approach the wharf and other vehicles which move in the port will not be a big problem. The Bitung

Office of PELINDO 4 thinks that the Pier II is the proper location of the international RO-RO terminal at present. Accordingly, the plan of the international RO-RO Terminal is drafted at Pier II.

Once the international RO-RO service between General Santos Port and Bitung Port comes into full swing, a dedicated terminal for RO-RO service will be needed to cater to the expanded demand of cars and passengers. The development of a new passenger terminal is discussed in the Master Plan of Bitung Port, which the Bitung Office of PELINDO 4 is drafting now. It is necessary to discuss the location of an international RO-RO terminal in the Master Plan.



Source: JICA Study Team

Figure 16.5 Location of the Planned International RO-RO Terminal at Bitung Port

(2) Main Facilities

The planned RO-RO service on this route is performed by a ROPAX vessel which is equipped with quarter ramp. The following facilities are required at the port to receive international RO-RO services:

- Port water facilities: Channel, Basin, Mooring facilities
- Passenger Terminal: Passenger building, CIQ facilities (in the building), Car parking
- Vehicle Terminal: Check-in post, Security post, CIQ booth, Car waiting area for boarding, Inspection area.

i) Channel and Basin

The depth of the approach channel of Bitung Port is 16 m and the depth of the port waters in front of Pier II is 10.2-10.5 m. Any problem on navigation is not reported from the users of the pier.

Hence, there is no obstacle to handle the planned ROPAX type vessel (LOA 80 m, Draft 3.8 m).

ii) Mooring Facilities

The length and depth of Pier II are 242 m and 10.5 m, respectively. The pier is a detached pier type structure and the apron of 19 m in width is connected with the back

yard by about a 15 m long concrete slab structure. A little difficulty is foreseen in case of handling larger size of vehicles at the apron. However, this small problem could possibly be solved by proper positioning of the ship ramp. Passenger vessels use this pier under prioritized berth assignment by the port. The planned ROPAX vessel calls only twice a week. There is a possibility that the planned ROPAX vessel receives such a benefit. Hence, Pier II can provide necessary berth window to the planned RO-RO service.

iii) Passenger Terminal

A two-storey passenger building is located behind Pier II which passengers from overseas sometimes use. The ground area of the building is about 1,000 m^2 (52 m wide by 21 m deep) and a waiting room for boarding is located at the first floor and the second floor is prepared for persons who have come to see someone off. The building is designed as a domestic passenger building only. Therefore, it is necessary that additional facilities, such as CIQ booths and inspection area, are placed in an appropriate parts of the building giving due consideration to the line of passenger flow when it is used by international passengers. Security check is carried out at the entrance by personnel but security checking equipment will be installed with the assistance of the United States. It can also be used for international passengers. The area of the building has enough space for 100 international passengers to go through the border formalities and wait for boarding. Hence, this passenger building can be utilized for the international RO-RO service. The parking area of cars which pick up or drop off passengers is placed in front of the building.

Ample time between the ship's arrival and departure allows the separate operation of loading and discharging of cars/passengers. Therefore, it is possible to utilize the same facilities/space for both incoming and outgoing traffic separately.

iv) Vehicle Terminal

A 70 m x 40 m area neighboring the passenger building is reserved for a vehicle terminal. The area is reserved for customs inspection at present and the Bitung Office of PELINDO 4 thinks that the area may be used by vehicles of the international RO-RO service.

At the entrance of the vehicle terminal, security post and check-in post are placed. One lane each for inbound and outbound is arranged. Along with the arranged lane (width 3 m), customs inspection booth and immigration inspection booth are installed in series. The length of the lane shall be a minimum of 30 m, enabling two large-sized vehicles to park one after the other for customs inspection and immigration inspection, respectively, at the same time. Customs and immigration officers are usually stationed at the offices in the terminal building.

A parking space of 600 m^2 to accommodate 12 vehicles shall be designated in the area. The trucks and cars wait for boarding the vessel after completion of the border inspection there. The parking space for inbound vehicles is not necessary because they go to the CIQ booth immediately for going through the border formalities and the number of vehicles is small. In addition to the parking area, the space for CIQ inspection is reserved in the terminal area.

This terminal area is segregated from other areas by a fence while carrying out operation for international RO-RO service.

Ample time between the ship's arrival and departure allows the separate operation of loading and discharging of vehicles. Therefore, it is possible to utilize the same facilities/space for both incoming and outgoing traffic separately.

v) Controlled Area

The area of the vehicle terminal is basically used for the planned international RO-RO service and is basically segregated by fences. It is preferable for the area to be segregated from other areas by fences. However, it could be open to other use when operation of the international RO-RO service is not carried out but the purpose of use should be limited to activities in the restricted area.

The facilities in the international RO-RO terminal at Bitung Port are summarized in Table 16.9. The layout of terminal area is shown in Figure 16.6. The layout is drafted in order to show the required size and a possible location of facilities and shall be decided based on the types and size of vehicles which will actually use the RO-RO service. Controlled entrance and exit security gates shall be provided. The shaded area indicates the area which should be controlled as an international RO-RO terminal.

Table 16.9 Facilities of International RO-RO Terminal at Bitung Port

Port Water Facilities	
Channel and basin	No special arrangement necessary General use with other vessels
Mooring facilities	Use the existing facilities General use with other vessels
Passenger Terminal	
Terminal building	Use the existing passenger building General use with domestic passengers
CIQ facilities	To be set up in the terminal building
Regular parking area	Use the existing parking area
Vehicle Terminal	
Check-in post	To be installed
Security post	To be installed
CIQ booth	To be installed
Vehicle waiting area (for boarding)	To be defined within the vehicle terminal
CIQ inspection area	To be defined within the vehicle terminal
Terminal Area	
Outer ward	To be installed
Site	Within the present port area

Source: JICA Study Team

(3) Improvement of Facilities

For the handling of international RO-RO service at Bitung Port, basic facilities which should be newly installed are shown below. All others are mostly covered by the existing facilities.

Table 16.10 Required Facilities at Bitung Port

Facilities newly installed as passenger facilities	
CIQ facilities	Set up in the passenger building
Facilities newly installed at Vehicle Terminal	
Check-in Post	1 unit
Security Post	1 unit
CIQ booth	2 posts for Customs and 2 posts for Immigration
Vehicle waiting area	The area of 750 m^2 within the vehicle terminal
Outer ward	
Fence	Fixed fence, Movable fence

Source: JICA Study Team

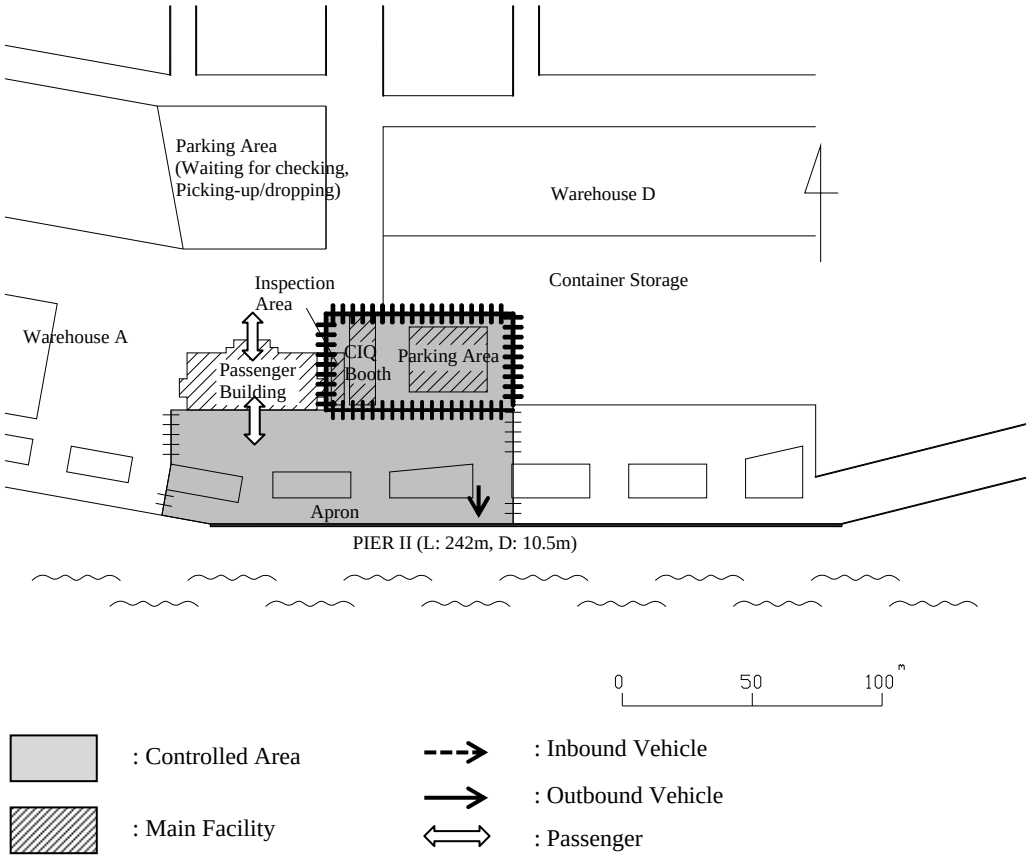
The total cost involved for the above is roughly estimated at US$ 60,000. The estimate is based on the consultation with the concerned parties and information on similar types of project, therefore, the estimated amount is subject to further review depending upon the results of the detailed study of the project site.

Since only the installation work of the booths and fences is involved, the required time period for the work is rather short. It can be completed within one year following the final decision by the parties concerned.

(4) Terminal Use

Due to the size of the planned ROPAX type vessel, pilot service is compulsory for entering and departing Bitung Port. The liner type service is usually given preferential treatment such as exemption from pilot arrangement after showing prudent performance of the services for a certain period of time. No other time-consuming formalities are expected for ships entering and departing the port.

The flows of outbound and inbound passengers and vehicles are basically the same as those of General Santos port and are illustrated in Figure 16.6.



Source: JICA Study Team

Figure 16.6 Terminal Layout and Traffic Flow in the Terminal at Bitung Port

(5) Management and Operation

The facilities of the international RO-RO terminal are basically owned and managed by the Bitung Office of PELINDO 4 and the RO-RO ship operator uses the terminal when the ship calls the port based on the contract between the Bitung Office of PELINDO 4 and the ship operator.

CIQ formalities are undertaken by the concerned authorities utilizing the facilities installed in the passenger terminal and vehicle terminal.

(6) Connection with Hinterland

The Manado – Bitung road section has been gradually congested. The Manado – Bitung toll road project (49 km, USD 400 million) was planned to be a bypass to the existing road when the Japanese Yen loan project for Bitung Port was agreed in 1996. The project has not been completed yet and, thus, the BIMP-EAGA Implementation Blueprint 2012 – 2016 prioritizes it. Project completion is urgently required. It is noted that Sulawesi Island is not included in the ASEAN Highway Network Project.

16.4 Shipping Strategy and Ship Operation Plan

1) Market Analysis

(1) Cargo

i) Convertible and inducible cargo

Since there is no regular shipping service for break bulk cargo on the General Santos – Bitung route, the Study Team observed small cargo volume. Through the stakeholder interviews, on the other hand, various potential cargoes have been identified. They are physically divided into two, namely: (i) potential cargo along the route; and (ii) potential cargo beyond the route. Those cargo volumes are tabulated below. It shows a larger traffic demand from North Sulawesi to South Mindanao by over four times than the other direction.

Table 16.11 Convertible and Inducible RO-RO Cargo Demand

	From Gensan/Davao to Bitung/Manado/Tahuna	From Bitung/Manado/Tahuna to Gensan/Davao
Convertible Cargo Demand *	600 tons	100 tons
Inducible Cargo Demand (i) **	15,184 tons	68,328 tons
Inducible Cargo Demand (ii) ***	3,240 tons	19,128 tons
Total (tons/year)	**19,024 tons**	**87,556 tons**

*) Estimated general cargo ship and NCV trade in 2012 based on the collected ship records at the Sangihe Islands

**) Potential cargo volume along the General Santos-Bitung route in 2015 among interviewed stakeholders

***) Potential cargo volume beyond the General Santos-Bitung route in 2015 among interviewed stakeholders

Source: JICA Study Team

ii) Fishery products

The study has identified the biggest demand segment on the General Santos – Bitung route as frozen tuna and other fishery products. General Santos has the largest tuna and fishery processing complex in Asia with an annual capacity of 2.3 million tons. Indonesia regulates that fish catch within the territorial water must be processed at domestic plants. General Santos' cannery industry has invested in fish processing plants around Bitung. Currently, such products transfer seems to be done via Jakarta/Surabaya. For example, Bitung Port shipped out 360 container units including processed fishery products of 5,500 tons to Jakarta/Surabaya as of July 2012. What can be explored by the fact is to look at the General Santos – Bitung RO-RO route as a possibly shorter transshipment route of processed fish to the Japan, USA, EU and other export markets.

The fishermen at the Sangihe Islands can sell their tuna at Tahuna (IDR 35,000/kg), Bitung (IDR 45,000-60,000/kg) and General Santos (IDR 95,000-100,000/kg). General Santos offers the highest price but the fishermen must go there by their small boats without other choice although the domestic laws prohibit it. The low price offered at Tahuna could probably be due to the lack of cold storage facilities and the need to transport it farther to either Bitung or General Santos. These factors affect the quality and freshness of the fish, and finally the price of the fish.

If the new RO-RO service is introduced, fish traders in Tahuna would have the

opportunity to use reefer containers to transport the fish product in a more sanitary manner and a mode that would also translate into lower spoilage. In this scenario, the fish trader would be able to offer a better price for the fish catch from Tahuna. Or alternatively, the fisherfolks of Tahuna can use the new regular RO-RO service to transport their catch to General Santos using reefer containers. Either way, the new RO-RO service would redound to better economic opportunities for Tahuna and the Sangihe Islands. This presumes that the Indonesian government would allow the landing of fish from Tahuna to General Santos, which is presently not allowed by national law.

(2) Passenger

Similar to cargo, direct passenger traffic between North Sulawesi and South Mindanao is limited due to the absence of any regular direct transport service on this route. The tourism agents/tour operators interviewed doubt a possibility of mass tourism by RO-RO shipping service. Due to the long sailing time and different road transport systems such as right-hand drive and left-hand drive, they are reluctant to bring their tourism buses across the route. Therefore a modest marketing strategy is adopted to focus on:

- Vehicle drivers, overseas workers and their families, students, backpackers and other cost-sensitive passengers provided that the proposed RO-RO shipping service would offer the least tariff in comparison with other services such as chartered flights (USD 350 per round trip between Davao and Manado) and the planned fast craft service (USD 200 per round trip between South Mindanao and North Sulawesi).

2) Demand Forecast

(1) Regional Shipping View for Potential Cargo beyond the Route

Some Bitung/Manado stakeholders pointed to the opportunity to use General Santos Port as a transshipment point to connect the areas/countries beyond the route.

From the viewpoint of regional shipping, the proposed General Santos – Bitung route may work as an alternative route or actualize one regional missing link.

Currently, due to some regulations, cargo, containerized or otherwise, would have to pass through Jakarta (Tanjung Priok) and/or Surabaya (Tanjung Perak) before it is finally unloaded at Bitung. For instance, port data show that an average of 38 ship calls connect Bitung with Jakarta and/or Surabaya, with a total monthly throughput of a little over 36,000 tons. But no ship call comes from Davao and General Santos.

This is a long and circuitous route that adds up to the high cost of goods in the area. This would not be much of a problem if the goods come from or are bound for countries west of Indonesia, as these are naturally transshipped at Singapore. But for goods from northeast of Indonesia would have to go the extra voyage to transship via Singapore, whereas it can be transshipped at Hong Kong, Kaohsiung, or other major transshipment ports, and on to General Santos (or even via the Port of Manila or Port of Cebu) for onward shipping to Bitung via the ASEAN RO-RO route.

Figure 16.7 gives a graphic comparison of the relative distances between the two options while Table 16.12 compares some representative figures.

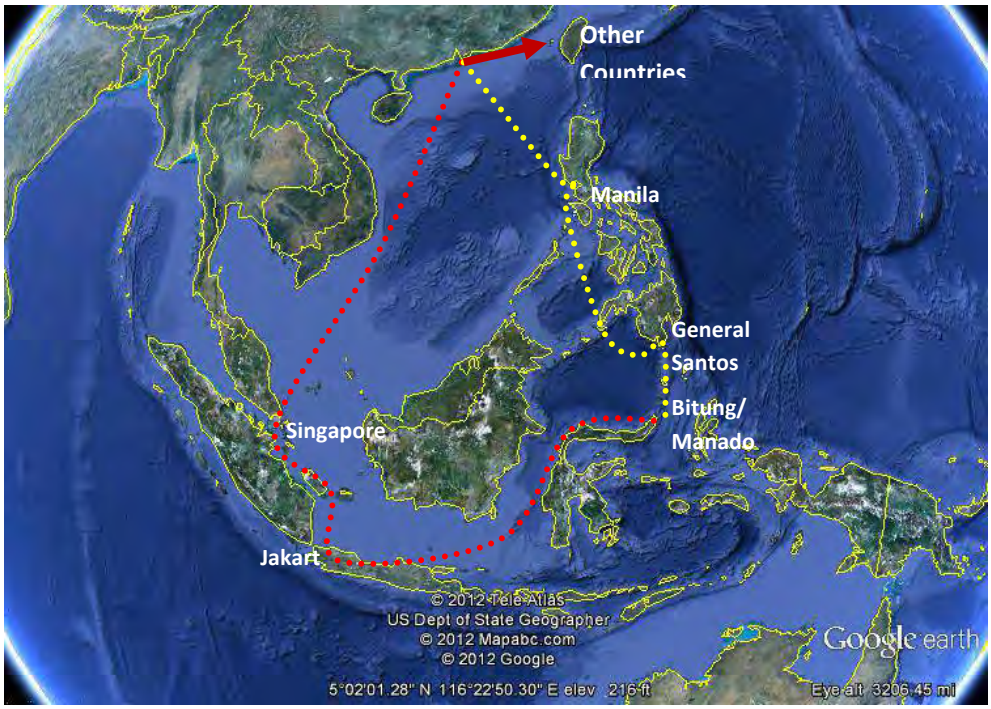


Figure 16.7 Comparative Distances of Shipping Routes between Hong Kong and Bitung

Table 16.12 Comparison of Two Shipping Routes between Hong Kong and Bitung

Shipping Route	Distance	Time *
Bitung – Hong Kong via Jakarta and Singapore	3,300 n.m.	13 days
Bitung – Hong Kong via General Santos and Manila	1,750 n.m.	9 days

*) Inclusive of sailing and port stay

Source: JICA Study Team

If the new RO-RO service between General Santos and Bitung is opened, the service would capitalize on its advantage of shorter sailing distance and time, and lower total shipping cost.

The Study has developed a traffic model with trade statistics and compared the two shipping routes. The results obtained from the traffic model indicate some considerable potential cargo demand on the alternative route (refer to Annex 16.1).

This exercise can confirm the possibility of the alternative cargo flow via General Santos and Manila to be shifted from the existing flow via Jakarta and Surabaya as the stakeholders at Bitung and Manado pointed out.

(2) RO-RO Shipping Traffic Plan

On the route, the Study designed a medium-size ROPAX vessel which has enough seaworthiness on the peculiar oceanic conditions and enables entering the designated berths at the ports of General Santos and Bitung. Since ample passenger demand is not expected, the vessel has a moderate passenger cabin for 98 persons. In the opening year of 2015, one vessel will serve on the route although an operator has not been determined yet.

Taking such on-going inter-related works into account, the Study has prepared RO-RO shipping traffic plan on the route between 2015 and 2035.

In the plan, vehicle floor occupancy rate which is an important RO-RO shipping operation indicator, is set at 71% in the opening year. It is considered adequate due to semi-weekly operation.

The plan includes passenger cars and trucks. No tourism bus is planned as the result of the stakeholders' interview. The vehicle floor can be used for container without chassis due to long navigation time of around 20 hours and no container shipping service available on the route. It is the largest truck/cargo share in ship space utilization among the 3 priority routes. It reflects the stakeholders views at North Sulawesi and South Mindanao, so as to provide modern freight liner shipping service.

Table 16.13 Weekly RO-RO Shipping Traffic on General Santos – Bitung, 2015 – 2035

Weekly Two-Way Traffic		2015	2020	2025	2030	2035
Passenger	Total person *1	280	330	380	450	520
	(non vehicle)	(218)	(264)	(310)	(376)	(440)
Vehicle	Car	10	12	14	16	19
	Bus	0	0	0	0	0
	Truck	28	28	28	28	28
	Container (without chassis)	24	30	35	43	50
Cargo	Tonnage	320	360	400	450	510
Character	Bitung => General Santos	- New tourist markets should be developed in both countries. - Fish related products, Tuna products, Coco fiber				
	General Santos => Bitung	- Daily commodities from east Asian countries and North America.				

Main Assumptions: The same as the previous chapters of 14 and 15.

Note 1: In this route it is assumed that about 10% of passengers use passenger cars and there is no bus because stakeholders do not wish bus usage for long sea trips.

Source: JICA Study Team

The cargo demand forecast result is assessed in comparison with the convertible and inducible RO-RO cargo demand (Table 16.11 in 'Market Analysis' Section, page 16-28) as follows:

- Existing direct shipping volume is scarce. The cargo to be converted from the direct shipping volume is far from the sufficient level to meet the projected RO-RO shipping demand.
- Due to imbalanced cargo demand flows, the proposed RO-RO shipping will transport an Indonesian cargo of 192 tons/week or 9,982 tons/year in 2015. The amount is equivalent to 11.4% of the convertible and inducible cargo from Bitung/ Manado/ Tahuna to General Santos/ Davao.
- The proposed RO-RO shipping will transport a Philippine cargo of 128 tons/week or 6,656 tons/year in 2015. The cargo volume accounts for 35.0% of the convertible and inducible cargo from General Santos/ Davao to Bitung/ Manado/ Tahuna. It means that the marketing for sufficient Philippine cargo reservation may be more difficult than that of Indonesian cargo despite the smaller Philippine cargo projected.

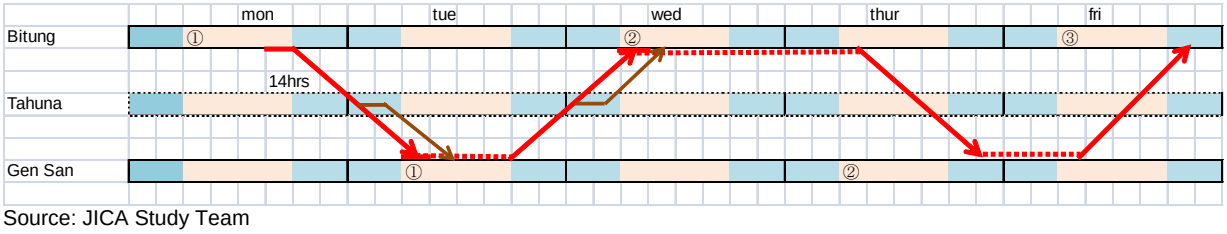
The result of passenger demand forecast anticipates many walk-in passengers (78% of all RO-RO shipping passengers in 2015). It also anticipates only cars to be transported. Since there is no passenger movement on the route except for ad hoc chartered flights and chartered ships, the demand is considered newly induced traffic.

3) Ship Operation Plan

Both Indonesian and Philippine RO-RO shipping operators have shown their interests in the route to the Study Team during the field surveys. However many of them considered operational subsidy and other financial supports necessary when providing services. It is noted that the Memorandum of Cooperation was made among local chambers of commerce and industry and other entities for the Bitung – General Santos – Davao RO-RO shipping link in November 2012. One participating signatory is Asian Marine Transport Corp. which provides 'Super Shuttle' RO-RO/ROPAX services in the Philippines.

One RO-RO vessel will ply twice a week between General Santos and Bitung. When there is substantial demand at Sangir Besar Island, the vessel will drop by Tahuna Port as an optional arrangement. When vessel space tightens due to increased demand, one more round trip will be added in the operation plan.

One weekly ship operation plan is depicted below. It is a combination of one nighttime sailing round trip and one daytime sailing round trip. It allows a short visit to Tahuna Port within minor adjustment. In the plan, the RO-RO vessel homeports at Bitung.



Source: JICA Study Team

Figure 16.8 Ship Operation Plan on the General Santos – Bitung Route

16.5 Preliminary Ship Design

1) Design Conditions

In addition to the requirement regarding cargo and passenger loading capacity indicated in the previous demand forecast related sections, the following facts and conditions are considered in a comprehensive manner in the preliminary ship design for the General Santos - Bitung route.

i) Port to port distance

- The port to port distance between General Santos and Bitung is approximately 302 nm.
- It will be preferable that sailing time is around 20 hours or less, to allow one trip per day.

ii) Sea conditions

Sea conditions of this water can be generally regarded as a calm area all year round, where typhoon never hits. Any specific provisions are not needed in terms of sea condition.

iii) Expected shipping service

One ship will be allocated in this route.

iv) Docking conditions

No special boarding facility in the port for RO-RO vessels will be provided. The ship will dock at the general cargo berth, and cars, trucks, and cargoes will be loaded and off loaded through the stern quarter ramp of the ship.

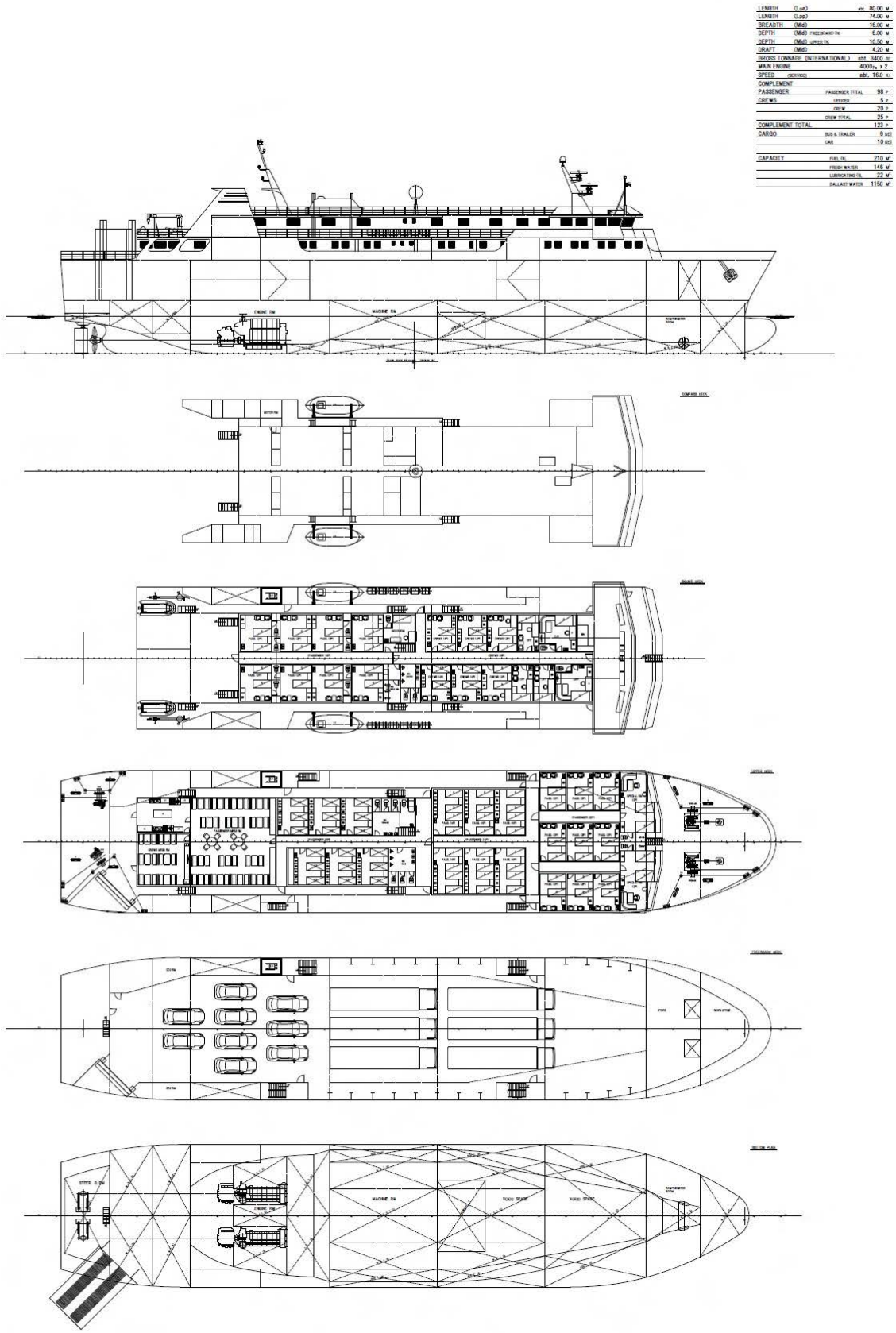
2) Outline of the Ship

Principal particulars of the proposed ROPAX for the General Santos - Bitung route is shown in the Table 16.16, and its general arrangement plan is illustrated in Figure 16.9.

Table 16.14 Principal Particulars

Length over all	Approx. 80.0	m
Length between perpendiculars	74.0	m
Breadth	16.0	m
Depth	10.5	m
Draft (design)	3.8	m
Gross tonnage (international)	3,400	T
Main engine	5,001	kw
Service speed	Approx. 16.0	Kt
Loading capacity		
- Truck/cargo	Approx 300	Ton
- Passenger car	6	Unit
- Passenger	98	Person
New shipbuilding cost	18.75	Mil $

Source: JICA Study Team



Source: JICA Study Team

Figure 16.9 General Arrangement Plan

16.6 Institutional Arrangement

1) General Santos Port

(1) Port Policy

The Port of General Santos or Makar Wharf is an international port to directly connect with foreign ports. However, Davao Port (Sasa Wharf) has a wider and denser shipping network than General Santos. For example, local shippers ship out their container cargo to USA from Davao Port. There is no policy restriction to connect with Indonesian ports.

The port has enough experience to accommodate domestic RO-RO vessels, from small to large ships. For international RO-RO terminal operation, the same wharf will be shared with the domestic fleet. The existing passenger terminal will be used for international shipping passengers and a limited area for vehicle inspections will be allocated.

(2) Customs Regulations

The Philippines does not have much experience in handling vehicles in transit. Very few vehicles, such as racing cars, cars for exhibits, etc. are usually given exemptions from import taxes and duties. During a meeting where a Customs official was present, it was informed that the usual treatment for vehicles entering a Philippine port would be as imported goods subject to import taxes and duties. However, if a national directive is issued by the Commissioner of the Bureau of Customs for special treatment of RO-RO vehicles or even RO-RO chassis, it shall be uniformly applied nationwide, including at the General Santos Port. RO-RO shipping services would require some more adjustments to the procedures, especially the need to facilitate the seamless movement of people and goods, which is the hallmark of RO-RO transport service.

The proposed solution would be drafting of an MOU between the Philippine and Indonesian governments, along the line of the SOSEK MALINDO agreement, for this RO-RO route. The RO-RO shipping service can be considered as a floating bridge connecting the roads of the two countries. Such an application would greatly alleviate problems encountered at border or port crossings. The development of a RO-RO service and the growth of trade that it will foster on this route would also exert pressure on Customs services to be on guard against contraband goods, especially illegal drugs. The necessary office and equipment should already be in place before the opening of the service. The existing port is very limited in terms of its berthing capacity and holding area for RO-RO vehicles. There are expansion plans for the port that would see the extension of the berthing area and additional facilities. It was suggested to the Port Manager to also consider the development of a passenger terminal and CIQS building. It would be best if a consolidated CIQS building or extension wing to the passenger terminal would be built to house the different agencies for better and more efficient services, since some of these offices are currently located inside the port but a bit far from the terminal building.

(3) Immigration Regulations

The immigration experience at the General Santos Port is just on the crew of foreign vessels, since it has not been handling international passengers. With the introduction of an international RO-RO service, the port would be needing a more comprehensive immigration services. This will not be a formidable task since most of the passengers of the RO-RO service would be of ASEAN nationality, mostly Indonesians, and just for a short stay only, the visa requirement would not be a problem. If ever there is an additional requirement for an ASEAN citizen it should be just an exit ticket.

However, considering that the RO-RO service would also mean more movement of people, the immigration officials should also be on the lookout against human trafficking and cross-border movement of unwanted elements. Immigration and other databases must be updated to be aware of any imminent threats.

An appropriate office for the Immigration should also be provided in a consolidated CIQS building to provide better and more efficient services.

(4) Quarantine Regulations

The trade between General Santos and Bitung is expected to handle a lot of agricultural and fishery products to be traded between the Indonesian and Philippine sides. This highlights the need for quarantine procedures to safeguard against the spread of diseases, whether it be on persons, plants or animals. For the same reason that the RO-RO service would foster greater movement of people and goods, which would also include plant and animal products, quarantine services should also be strengthened.

An appropriate office for the Quarantine should also be provided in a consolidated CIQS building to provide better and more efficient services.

(5) Port Security

The General Santos Port handles international vessels and cargo, and is ISPS Code compliant. When the RO-RO service is inaugurated, the requirements of the ISPS Code must also be complied with in the new service.

The proposed international passenger terminal and vehicle holding area should be located within the foreign service area of the port and fenced off from the domestic service area of the port. The access to the international passenger terminal, the holding area for international RO-RO vehicles or container chassis and the port apron for international operations should be controlled. Only authorized personnel should be allowed in these areas.

An appropriate office for the Port Security should also be provided in a consolidated CIQS building to provide better and more efficient services and faster coordination among concerned agencies.

(6) Recognition of Driver's License and Vehicle Registration

The recognition of driver's license is not a contentious issue as it is a usual courtesy given in almost all countries to foreign visitors, as long as it is in a language recognized by the country. Drivers from Indonesia and Malaysia would need to have a translation of their licenses.

However, the fact that the Philippines is a left-hand-drive (LHD) country, while Indonesia is a right-hand-drive (RHD) country, provides a hindrance for drivers for them to drive in the other country. The driver would be driving on the "wrong side of the road" once he is at the other country.

The main stumbling block is that the Philippines has a law (Republic Act No. 8506) banning the registration and operation of RHD vehicles in the country, except for some special cases, wherein the Department of Transportation and Communications (DOTC) would issue an exemption.

The provisions of the law, however, would not be applicable to a container chassis. One solution would be to use the container on chassis or what is also called CHARO (chassis RO-RO), and the prime movers from either side of the route would be used on their side.

Even this mode would still need clarification on the need for insurance of the chassis on the other side of the route. One solution would be to treat the chassis as an extension of the vessel in the same manner that a container is treated as an extension of the vessel, and the insurance of the prime mover would cover not only the prime mover but also what is being towed.

2) Bitung Port

(1) Port Policy

The provincial government of North Sulawesi and local business groups such as KADIN (chamber of commerce) are keen on the internationalization of Bitung Port. The port may accommodate foreign ship calls. But the number is limited so far, such as only Singapore connected container service in liner shipping. Several relevant government regulations do not encourage Bitung Port as an international port, such as:

a) Ministry of Transportation Regulation No. 62/2010 regarding Working System of Port Organization (and enhanced by Ministry of Transportation Regulation No. 36/2012 regarding Working System of Port Master and Authority) stipulates that all ports in Indonesia should be operated under hierarchy-port authority and *syahbandar* (port master) relating to the port classification by function. There are five classes, as follows:

Table 16.15 Port Classification in Indonesia

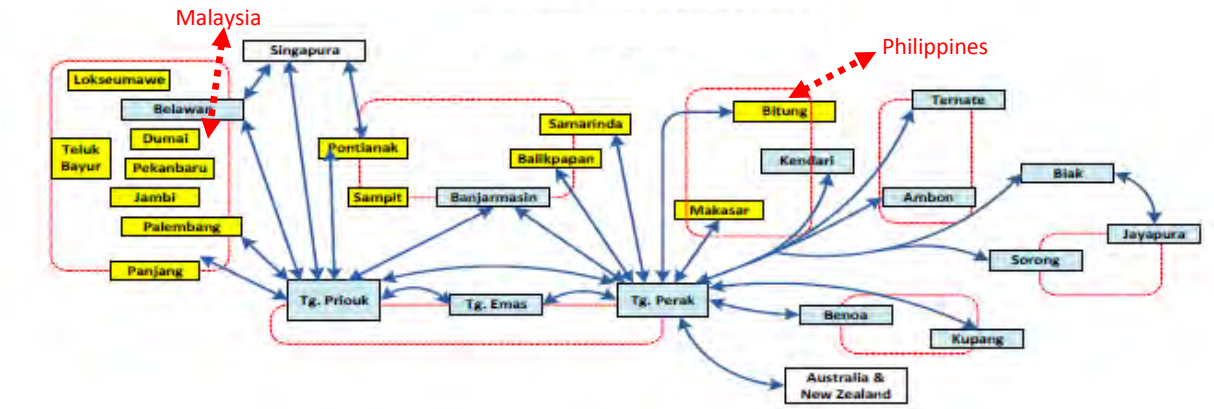
Port Classification	Port Authority	Class by Functions
Main	Port Authority	International Port (5 ports – Tanjung Priok, Tanjung Perak, Tanjung Emas, Belawan, Makassar)
Class I	Port Administrator Level I	National Port (including Dumai and Bitung)
Class II	Port Administrator Level II	Regional Port
Class III	Unit Level III under PA I	Local Port
Class IV	Unit Level IV under PA II	Local Port
Class V	Supporting Section under PA I and PA II	Supporting Port

Source: MOT Regulation No. 62/2010

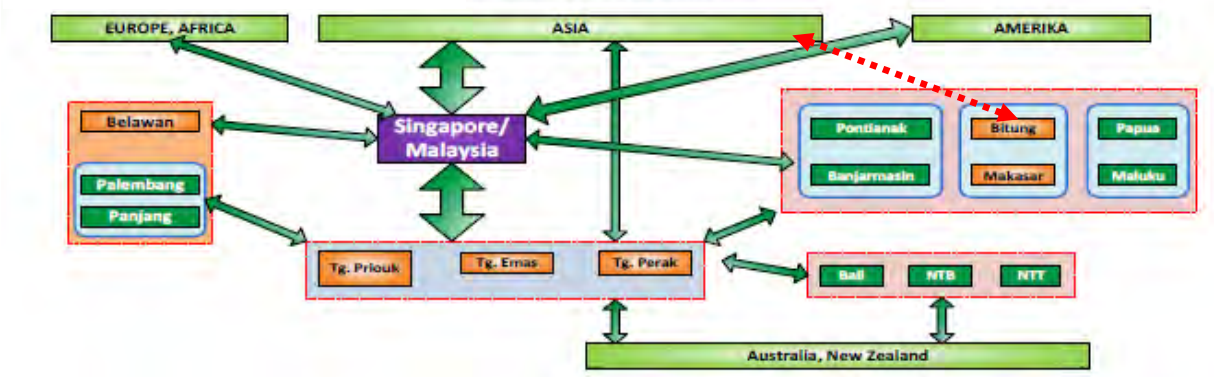
b) Presidential Regulation No. 26/2012 regarding Blueprint of National Logistic System illustrates the pattern of conventional cargoes and container cargoes in Indonesia as shown in Figure 16.10. It is noted that there is no international connection between Bitung and Philippine ports, and between Dumai and Malaysian ports in the conventional shipping, and that there is no international connection between Bitung and Asian ports except Singapore/Malaysia in container shipping.

   For the RO-RO routes to be successfully implemented, the Port of Dumai and the Port of Bitung must be re-classified so as to give it the freedom, at the very least, to have direct trade with Malaysia and the Philippines, respectively.

1. Conventional Cargo Flow



2. Container Cargo Flow



Note: ◄·····► Identified Missing Links by JICA Study Team

Source: Presidential Regulation No. 26/2012, Indonesia

Figure 16.10 Blueprint of National Logistics System

c) Additionally, the Ministry of Marine Affairs and Fisheries Decree No. 32/2010 and Ministry of Marine Affairs and Fishery Regulation No. 16/2006 regarding Fishery Port, designated a total of six ports, including Bitung Port and Belawan Port, as Ocean Fishery Port, where the ports are allowed to do international shipping activities for fishery commodities.

(2) Customs Regulations

Bitung Port is the main port for the region of North Sulawesi and has been handling a growing volume of foreign cargo. As such, the port is well-experienced in handling importations. However, there has not been much vehicles-in-transit using the port. The treatment of vehicles coming to a port would be the same as in all other Indonesian ports, they will be treated as imported goods and subject to import taxes and duties or bond guarantee.

The proposed solution would be drafting of an MOU between the Philippine and Indonesian governments, along the line of the SOSEK MALINDO agreement, for this RO-RO route. The RO-RO shipping service can be considered as a floating bridge connecting the roads of the two countries. Such an application would greatly alleviate problems encountered at border or port crossings.

The treatment of RO-RO cargo should also be such that it would be cleared with dispatch and minimum impedance of movement. The development of a RO-RO service and the growth of trade that it will foster on this route would also exert pressure on Customs services to be on guard against contraband goods, especially illegal drugs. The necessary office and equipment should already be in place before the opening of the service. The port at Bitung that is presently handling domestic passengers was proposed to serve the RO-RO route. However, the international passenger terminal and the CIQ clearing area must be separate from the domestic passenger terminal. It would be best if a consolidated CIQS building or extension wing would be built to house the different agencies for better and more efficient services.

(3) Immigration Regulations

The immigration procedures should be straightforward, similar to immigration procedures in international airports. Since most of the passengers of the RO-RO service would be mostly Filipinos and just for a short stay only, the visa requirement would not be a problem. If ever there is an additional requirement, it should be just an exit ticket.

However, considering that the RO-RO service would also mean more movement of people, the immigration officials should also be on the lookout against human trafficking and cross-border movement of unwanted elements. Immigration and other databases must be updated to be aware of any imminent threats.

An appropriate office for the Immigration should also be provided in a consolidated CIQS building to provide better and more efficient services.

(4) Quarantine Regulations

Bitung Port is expected to handle a lot of agricultural and fishery products to be exported to or imported from the Philippine side. This highlights the need for quarantine procedures to safeguard against the spread of diseases, whether it be on persons, plants or animals. For the same reason that the RO-RO service would foster greater movement of people and goods, which would also include plant and animal products, quarantine services should also be strengthened.

An appropriate office for the Quarantine should also be provided in a consolidated CIQS building to provide better and more efficient services.

(5) Port Security

The proposed international passenger terminal is in the existing domestic passenger terminal building. There is a need for the international service area to be separate or fenced off from the rest of the port. The access to the international passenger terminal, the holding area for international RO-RO vehicles or container chassis and the port apron for international operations should be controlled. Only authorized personnel should be allowed in these areas.

An appropriate office for the Port Security should also be provided in a consolidated CIQS building to provide better and more efficient services and faster coordination among concerned agencies.

(6) Recognition of Driver's License and Vehicle Registration

The recognition of driver's license is not a contentious issue as it is a usual courtesy given in almost all countries to foreign visitors, as long as it is in a language recognized by the country. For drivers from the Philippines their licenses are in the English language.

However, the fact that the Philippines is a LHD country, while Indonesia is a RHD country, provides a hindrance for drivers for them to drive in the other country. The driver would be driving on the "wrong side of the road" once he is at the other country. One solution would be to use the container on chassis or what is also called CHARO (chassis RO-RO), and the prime movers from either side of the route would be used on their side.

Even this mode would still need clarification on the need for insurance of the chassis on the other side of the route. One solution would be to treat the chassis as an extension of the vessel in the same manner that a container is treated as an extension of the vessel, and the insurance of the prime mover would cover not only the prime mover but also what is being towed.

17 ROUTE EVALUATION AND IMPLEMENTATION PLAN

17.1 Financial Analysis

1) Assumptions for Cost Estimation

According to the “Shipping Strategy and Ship Operation Plan” in Sections 14.5, 15.4 and 16.4 the profitability projections for each route are calculated with new ships designed according to the “Preliminary ship design” in Sections 14.6, 15.5 and 16.5. The projections are planned during 20 years from 2015 to 2034.

The number of voyages takes into consideration a non-service period during docking survey of two weeks. Cancellation of service due to rough sea conditions is not considered because the sailing routes of the three routes are relatively calm. Although the freight and passenger fares and all expenses and charges should be paid in the local currency in each country (partly in US$), all amounts are converted into US$.

Major items of the operating expenses and ship costs are described as follows:

(1) Bunker cost:

Marine fuel oil and marine diesel oil should be purchased with a current international market price (marine fuel oil, US$ 700/ton; marine diesel oil, US$ 900).

(2) Charges in port:

To be applied based on tariffs of each port. Cargo handling charge of stevedores in each port are not incurred because the loading/unloading are carried basically by self- driving vehicles (car, bus, truck) on RO-RO ship. The detailed tariffs of each port are shown in Table 17.1.

(3) Crew expense:

To be estimated to meet the crew’s wage scale (for coastwise sailing) of International Transport Workers' Federation (ITF). An actual wage in the current market may be higher than ITF wage scale on coastwise sailing. However, since the subject routes are very short voyages within one day and night even on the longest route, the crew members can be employed with wages on the level of the ITF wage scale for coastwise sailing.

(4) Docking repair and maintenance:

The ships take the docking survey annually in a shipyard near the area of the port of call. The expense amount is estimated based on information from the ferry operators in Indonesia. The expense amount is assumed to increase at the ratio of 10% in each survey (annual - intermediate - annual - renewal) every cycle of four years due to the ordinary wear and tear.

Table 17.1 Port Charge Tariff at Seven Ports

		Dumai - Malacca (Tj. Buruas (SPPG))						Belawan - Penang - Phuket								General Santos - Bitung			
	item	DUMAI		MALACCA				BELAWAN		PHUKET		PENANG		GENERAL SANTOS		BITUNG	
	currency	US$		MR					us$	Baht		RM			US$/Peso		Rp
PORT CHARGE	Port Due	int'l, commercial		per100GT	7.00			Harbor due		no charge		per m		under BIMP-EAGA pgm(*)		201-500 GT	
		per GT,call	0.118					per GT,10day	0.080			61-90m	3.90	per GT	$0.04	per call	250,000
								Light due				91-120m	8.45	over 100GT		501--1000GT	
								per GT	0.034			121-150	18.85	perGT,day	0.80	pe rcall	300,000
	pilotage	fixed tariff		per move.	at P. limit	berth		fix tarrif				enter/leave >600GT		less 500GT	$30.00	fix tarrif	
		per vsl, move.	152.543	61m below	56.00	105.00		per move	179.00	(Loa-5)*d in feet		berth/unberth >200GT		500-2500GT	$43.33	per move	$82.00
		variable tariff		61-76m	70.00	119.00		variable tarrif		holidy/overtime +50%		first 1hr	286.00	2500-5000GT	$71.33	variable tarrif	
		per GT,move.	0.071	76-91m	83.00	132.00		perGT,move	0.062	allowance	5,000	sbsq. half hr	143.00			perGT,move	$0.033
				surcharge under 91m		49.00											
	towage (tug)	fixed tariff	under 3500GT	per half hr	500			up to 3500GT		up to 5000GT		up to100m				up to 8000GT	
		per vsl, hr	339.730					per Hr	279.00	first 1hr	4,000	first 1hr	364.00	per tug ,move	25,500	per Hr	$618.75
		variable tariff						perGT, Hr	0.01	sbsq. half hr	2,000	sbsq. half hr	182.00	at DAVAO port		perGT, Hr	$0.01
		per GT,hr	0.0054					3501up to 8000GT		above 5000GT		exceeding 100m					
		fixed tariff	3501-8000GT					per Hr	597.00	first 1hr	5,000	first 1hr	598.00				
		per vsl, hr	527.83					perGT, Hr	0.01	sbsq. half hr	2,500	sbsq. half hr	299.00				
		variable tariff															
		per GT,hr	0.0054														
	line handling (mooring)	wharf		per move.	30.00			wharf		berthing/unberthing		inclued in whafage		less than 10,000GT			
		per GT,day	0.120					per GT,day	0.120	per sevice	700				585.00	per GT,day	$0.0168
		assumed same as Belawan															
	wharfage (berth hire)	at berth			at berth			concreat wharf		convt. vsl		per m per hr		under BIMP-EAGA pgm(*)			
		per GT,24hrsl	0.116	per GT	1.50			per GT,day	0.152	per100GT,hr	4.00	cargo vsl	1.00	per GT,day	$0.02	per GT,day	$0.0140
										other vsl							
										per call, day	1,000						
CARGO HANDLING	passenger charge	per passenger	Rp	per passenger				international	Rp	per head		per person		(domestic)		international	
			10,000.00	adult	3.00			per person	8,000		20	adult	6.50	per person	11.20	per person	10,000
				child<12yr	1.50			(in 2000)				child<12yr	3.20				
	cargo handling	for vehilce	per each					for vehilce	per each	admission fee		per ton or each		(domestic)		passing fee	per each
		sedan	0.21	car,trailer	6.00			sedan	0.21	van	50	breakbulk	1.40	ro-ro on chasis or trailer		sedan	3,000
		bus,truck	0.26	bus,van	12.00			bus,truck	0.26	coach	100	car,trailer	6.00	35-40ft		truck	4,000
		assumed same as Belawan		assumed same as Penang						truck	20	bus,van	12.00	per box	862.00	(Manado area↑)	20'↓
														empty	346.00	wharf sercice	60,600
														10-20ft	431.00	passeing fee	7,500
OTHERS	fresh water supply			per 1000litres	5.50			per ton		per tonne				per MT	80.00		
								throgh pipe	7.00	water	40						
										min.charge	600						
	garbage charge			per day	20.00					per truck	1,000						
										min.charge	200						

(*) from PPA paper

(5) Subject ships:

New ships are provided. Ships' prices are estimated on the base of shipyards in Japan with the delivery at late of 2015. As an alternative case, the used ships around 20 years old are procured and runs during 10 years up to 30 years old when she is scraped. After 10 years another used ships around 20 years old are procured again. In this case, an initial investment amounts are reduced greatly, but on the other hand the repair costs are more than a new built ships. The detail in case of the used ship is stated later. Capital cost is calculated on the method of straight line depreciation in 20 years. The capital is injected for 15% of initial total investment and 85% of it is borrowed from policy-based finance which may offer an attractive interest rate for buyer's credit loan, with a condition of level payment in the term of 20 years. The initial investment amount is a purchase price of new ships plus 10% as initial preparatory expenses. No investment for the facilities related to the port terminals is considered.

An income tax is applied for "assessment by estimation on the basis of business size" which is allowed for a shipping company by tax authorities in Indonesia, Malaysia, Thailand and Philippines. Under this method, a certain percent of the gross income is always imposed as the income tax; for example, a domestic shipping company in Indonesia is imposed 1.2% of gross income. Our profitability projection is applied for 1.2% in Indonesia.

Even after 2035 at the end of this projection period, this project will continue in due course. However, for the purpose of calculating investment return ratio of this profitability projection, at the end of 2035 the owning ship will be sold out as a scrap ship in the scrap market and get the capital gain of sales proceeds. The price of scrap ship is conservatively estimated at US$300/LDT (light displacement tonnage) with consideration of current market (about US$400/LDT) and past records.

The freight tariffs for each route are fixed as per Table17.2 with consideration of following.

Table 17.2 Freight Tariff

(Unit: US$)

	per	Dumai – Malacca	Belawan – Penang – Phuket			General Santos – Bitung
			Belawan – Penang	Penang – Phuket	Phuket – Belawan	
(Distance)	n.m	(58)	(140)	(198)	(242)	(302)
Passenger	head	25	40	45	50	100
Car	no.	200	200	220	240	600
Bus	no.	540	540	560	580	1,400
Truck	no.	640	640	660	680	1,500
Cargo in container	ton	-	-	-	-	150

Source: JICA Study Team

(1) Dumai – Malacca:

The passenger fare is fixed on US$ 25 per head, which is less than the fare of the speed boat (IDR 260,000=US$ 28) running between Dumai and Malacca. This speed boat is a direct competitor on this route. Freight for vehicles is determined on the base of a length of the vehicles, not related to their weight, following the practice of

RO-RO ship and ferry business. Freight of car is fixed at US$ 200, which may be allowable for rich people or business people to move across the Strait with their cars. There is no competitor in this car carry service on this route. Freight of bus is fixed at US$ 540. A bus occupies a floor area 2.5 times as large as a car. A bus is utilized for group travel tours which are arranged by travel agents. This freight may be affordable for travel agents, because the amount per head is less than US$ 20 when this freight is divided by the number of travelers in a bus (average 30 travelers on board). Freight for truck (as 12m length, 10t load) is fixed on US$ 640. A truck occupies a floor area almost as large as a bus. Since the cargo on truck can afford to bear more freight cost, the freight is determined at US$ 100 higher than a bus.

(2) Belawan – Penang – Phuket:

Passenger transportation service has no competitor on this sea lane route, but competes with air transportation. This ship can provide some advantageous services for the passengers, who can sleep in bed during night sailing and can bring much more luggage than air transportation. The passenger fare is fixed at the level of no more than US$ 50, that is, US$ 40, US$ 45 and US$ 50 on each service route with some difference in proportion to its sailing distance. In the same manner as in the Dumai – Malacca route, the freight for car is fixed at US$ 200, 220, 240 and the freight for bus is fixed at US$ 540, 560, 580 on each service route with some difference in proportion to its sailing distance. The freight for truck is fixed at US$ 640, 660, 680 on each service route with consideration of the freight for container ship service between Belawan and Penang commencing on May 2012 by Evergreen Shipping. The container freight is US$ 275/20ft, US$ 425/40ft for export and US$ 250/20ft, US$ 400/40ft for import. The loading capacity of truck (12m in length, 10t load) is almost equal to a mean of 20ft and 40ft container box. US$ 640 for truck is higher than the container freight, however, may be on reasonable level with consideration of the merit for the swift transportation by RO-RO ship.

(3) General Santos – Bitung:

This route is connecting the missing link where there is no liner shipping service; therefore, relatively high freight may be accepted by shippers. The freight is determined in respect to its potential value and its long sailing distance (278 nautical miles) which is twice as long as the distance between Belawan and Penang (140 nautical miles). Passenger fare is fixed at US$ 100, which is 2.5 times as much as US$ 40 between Belawan and Penang. Freight for car is fixed at US$ 600, which is 3 times as much as US$ 200 between them. Freight for bus is fixed at US$ 1,400, which is 2.5 times as much as US$ 540 between them, even though bus is not expected in this route. Freight for truck is fixed at US$ 1,500, which is 2.3 times as much as US$ 640 between them. Major cargo in this route is expected to be fresh fish and processed marine products. These cargoes may be suitable for container box because of relatively low stowage factor (=heavy weight goods). Therefore, most of cargoes (around 70% of all) are planned to be contained in 20-foot container boxes (including reefer containers) for more effective transportation. Freight for container cargo is determined on the base of weight and fixed at US$ 150 per ton. If the average cargo weight in 20ft container is supposed to be 8ton same as cargo weight on truck, freight amount counts for US$ 1,200 (=150x8) per 20feet container. This freight level is cheaper than those of cargo on the truck (US$ 1,500) and so affordable for the shippers. Although US$ 1,200/20ft is expensive if comparing to

container freight, shippers will allow them in respect of the quick transportation by RO-RO ship. The 20 feet containers are loaded into the ship by a trailer and stowed in the hold by a forklift.

Other detailed assumptions are shown in the following table.

Table 17.3 Detailed Assumptions on Profitability Projection

	Item	Assumption for Estimation
	Total no. of round trips	Annual working weeks is estimated as below. No. of weeks in a year : 52 (minus) docking repair : 2 Working weeks : 50
Revenue	Cargo freight	Cargo on truck is included in the freight for truck. Other cargo is charged for cargo freight (General Santos-Bitung route only)
Operating Expense	Fuel cost	Marine fuel oil price for main engine: US$700/ton Marine diesel oil price for elec. generator: US$900/ton on current market. Fuel consumption rate: Main diesel engine: 200g/KW-Hr Aux. diesel engine for electric generator: 210g /KW-Hr
	Port charges, etc.	By each port tariff
Ship's Exp.	Crew's expense	Follow the ITF minimum wage scale for coastwise voyage
	Docking repair and maintenance	In every year, dry dock survey is undergone as a passenger ship by IMO regulation.
	General & administrative expenses	About 20% of ships' expenditures in 1st year, and thereafter, increasing in proportion to gross income
	Capital gain on end of last year(2034)	Subject ship will be sold in the scrap market, of which price is assumed to be US$300/LDT
Capital Cost	Investment Total	Price of new building ship plus 10% initial expenditures Equity is 15% of total investment, and 85% is bank loan
	Interest payment	Level payment in 20 years Loan to be provided by policy-based finance with buyer's credit or by commercial bank
	Depreciation	Straight line depreciation in 20 years (=5%per year)
	Income tax	Tax rate is 1.2% of gross income, which is applied to domestic shipping company in Indonesia. *Indonesia: 1.2% (domestic co.) or 2.64% (foreign co.) of gross income *Malaysia : 5% of gross income from Malaysia *Thailand: 3% of freight *Philippines: 2.5% on gross revenue

Source: JICA Study Team

2) Profitability Analysis

The calculation results for all the three (3) routes are shown in Table 17.4. For FIRR calculation, there are two types of financial sources:

(Type 1) A financer is supposed to be an international financial institution, e.g. offering an attractive interest rate for buyer's credit yen loan with a condition of level payments with a term of 20 years.

(Type 2) A financer is supposed to be a commercial bank, e.g. offering a prime lending rate of US dollar loan with a condition of level payments with a term of 20 years.

For each route, profit & loss and cash flow projections under Type 1 finance during the project period are indicated in Tables 17.5, 17.6 and 17.7).

Table 17.4 Summary of Freight and Profitability

		Dumai - Malacca		Belawan - Penang - Phuket						Bitung - Gen San	
				Belawan - Penang		Penang - Phuket		Phuket - Belawan from 2025			
distance	n.mile	58		140		198		242		302	
ship speed	kt	14		20						16	
sailing hour	hours	4		7		9.9		12.1		18.9	
no.of round trip /week	no.	14		2		1		1		2	
		by 2 ships									
pax & cargo movement	weekly	2015	2035	2015	2035	2015	2035	2015	2035	2015	2035
passenger	no.	2,000	3,180	990	1,560	490	720	50	590	280	520
car	no.	189	301	89	142	44	65	5	53	10	19
bus	no.	44	70	21	33	10	15	1	12	0	0
truck	no.	78	112	84	90	42	48	4	40	28	28
cargo	MT	430	610	350	500	200	260	20	220	320	510
freight tariff	one way										
passenger	us$	$25		$40		$45		$50		$100	
car	us$	$200		$200		$220		$240		$600	
bus	us$	$540		$540		$560		$580		$1,400	
truck	us$	$640		$640		$660		$680		$1,500	
cargo	us$/MT	$0		$0		$0		$0		$150	
		included to truck								cont'r cargo	
particular of ship											
L oa/Lpp	m	61.0/56.6		120.0/110.0						80.0/74.0	
BxD -dft	m	14.2 x 9.5		20.0 x10..5 -4.5						16.0x10.5 -3.8	
internatinal GT	GT	1,920		9,150						3,400	
Passenger	no.	250		400						98	
car/truck	no.	7/10		-/49						6/6	
engine power	PS	4,000		15,000						6,800	
generator power	KW	300		800						600	
bunker price	us$/ton	700		700						700	
ship finance											
ship price(new build)	000us$	25,000		35,000						18,750	
total investment	000us$	27,500		38,500						20,625	
capital amount(15%)	000us$	4,125		5,775						3,094	
loan interest (Type 1)	%p.a.	1.40%		1.40%						1.40%	
loan interest (Type 2)	%p.a.	4.00%		4.00%						4.00%	
FIRR (Type 1)	**%**	**13.29%**		**18.40%**						**5.58%**	
FIRR (Type 2)	**%**	**8.91%**		**10.70%**						**1.19%**	

Source: JICA Study Team

Table 17.5 Profitability Projection for the Dumai – Malacca Route

Unit: ´000US$				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
PROFIT/ LOSS			year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	Total No. of Round Trip		2 ships	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	14,000
	Total No. of Passenger			100,000	102,800	105,600	108,400	111,200	114,000	116,800	119,600	122,400	125,200	128,000	131,000	134,000	137,000	140,000	143,000	146,200	149,400	152,600	155,800	2,543,000
	Total No. of Vehicle	Car		9,450	9,710	9,970	10,230	10,490	10,750	11,020	11,290	11,560	11,830	12,100	12,390	12,680	12,970	13,260	13,550	13,850	14,150	14,450	14,750	240,450
		Bus		2,200	2,260	2,320	2,380	2,440	2,500	2,570	2,640	2,710	2,780	2,850	2,910	2,970	3,030	3,090	3,150	3,220	3,290	3,360	3,430	56,100
		Truck		3,900	3,980	4,060	4,140	4,220	4,300	4,380	4,460	4,540	4,620	4,700	4,780	4,860	4,940	5,020	5,100	5,200	5,300	5,400	5,500	93,400
	Cargo Tonnage on Truck			21,500	21,900	22,300	22,700	23,100	23,500	23,900	24,300	24,700	25,100	25,500	26,000	26,500	27,000	27,500	28,000	28,500	29,000	29,500	30,000	510,500
Freight Revenue	Passenger Fare			2,500	2,570	2,640	2,710	2,780	2,850	2,920	2,990	3,060	3,130	3,200	3,275	3,350	3,425	3,500	3,575	3,655	3,735	3,815	3,895	63,575
	Car Freifht			1,890	1,942	1,994	2,046	2,098	2,150	2,204	2,258	2,312	2,366	2,420	2,478	2,536	2,594	2,652	2,710	2,770	2,830	2,890	2,950	48,090
	Bus Freight			1,188	1,220	1,253	1,285	1,318	1,350	1,388	1,426	1,463	1,501	1,539	1,571	1,604	1,636	1,669	1,701	1,739	1,777	1,814	1,852	30,294
	Truck Freight			2,496	2,547	2,598	2,650	2,701	2,752	2,803	2,854	2,906	2,957	3,008	3,059	3,110	3,162	3,213	3,264	3,328	3,392	3,456	3,520	59,776
	Cargo Freight	incl.truck freight		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GROSS INCOME			8,074	8,280	8,485	8,691	8,896	9,102	9,315	9,528	9,741	9,954	10,167	10,384	10,600	10,817	11,033	11,250	11,492	11,734	11,975	12,217	201,735
Running Costs	Operating exp Fuel Cost			2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	2,843	56,850
	Port Charges			1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	1,849	36,990
	Cargo handling charge			192	198	203	208	214	219	224	230	235	241	246	252	258	263	269	275	281	287	293	299	4,887
	Others			711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	14,217
	Operating Expenditures			5,595	5,600	5,606	5,611	5,617	5,622	5,627	5,633	5,638	5,643	5,649	5,655	5,660	5,666	5,672	5,678	5,684	5,690	5,696	5,702	112,944
	Ship's exp Crew's exp.			560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	11,200
	Docking Repair & Maintenance			200	260	220	300	220	286	242	330	242	315	266	363	266	346	293	399	293	381	322	439	5,983
	Lubricant Oil			69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	1,381
	Ship's stores			60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	1,200
	Insurance: Hull & Machnery			303	289	275	261	247	232	218	203	189	174	159	144	128	113	97	81	65	49	33	17	3,276
	Insurance: P& I			120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	2,400
	Ship's Expenditures			1,312	1,358	1,304	1,370	1,276	1,327	1,269	1,342	1,240	1,297	1,234	1,316	1,204	1,268	1,199	1,290	1,167	1,239	1,164	1,265	25,441
	Gen. & admi. Expenses	abt.20%	~ G.income	262	269	275	282	289	295	302	309	316	323	330	337	344	351	358	365	373	381	389	396	6,546
	GROSS COST			7,169	7,227	7,185	7,263	7,181	7,245	7,199	7,284	7,194	7,264	7,213	7,307	7,208	7,285	7,229	7,332	7,224	7,310	7,249	7,364	144,931
NET INCOME				905	1,053	1,300	1,428	1,715	1,857	2,116	2,244	2,547	2,690	2,954	3,076	3,392	3,532	3,804	3,918	4,268	4,424	4,727	4,854	56,804
capital gain on last year		300	US$/LDT																			scrap ships→	582	582
Capital Cost	INVESTMENT TOTAL	2 ships	27,500																					
	Equity	15%	4,125																					
	Loan	85%	23,375																					
	Interest paym't (int.rate p.a.)	1.40%		327	313	298	284	269	254	238	223	207	191	175	159	142	125	108	91	73	55	37	19	3,587
	Depreciation (period:yrs)	20		1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	27,500
PROFIT				-797	-635	-373	-231	72	228	503	646	965	1,124	1,404	1,543	1,875	2,032	2,322	2,452	2,820	2,994	3,315	4,042	26,299
Income Tax		1.20%	of G. income	97	99	102	104	107	109	112	114	117	119	122	125	127	130	132	135	138	141	144	147	2,421
NET PROFIT after tax				-894	-735	-475	-335	-35	119	391	531	848	1,004	1,282	1,418	1,748	1,902	2,189	2,317	2,682	2,853	3,171	3,895	23,878
Accumulated profit				-894	-1,628	-2,103	-2,439	-2,474	-2,355	-1,964	-1,432	-584	420	1,703	3,121	4,869	6,771	8,960	11,277	13,959	16,812	19,983	23,878	
CASH FLOW																								
	Net Profit before Depreciation			481	640	900	1,040	1,340	1,494	1,766	1,906	2,223	2,379	2,657	2,793	3,123	3,277	3,564	3,692	4,057	4,228	4,546	5,270	51,378
	Principal Payment			1,021	1,035	1,050	1,064	1,079	1,094	1,110	1,125	1,141	1,157	1,173	1,190	1,206	1,223	1,240	1,258	1,275	1,293	1,311	1,329	23,375
	NET CASH		-4,125	-540	-395	-150	-25	261	400	656	781	1,082	1,223	1,484	1,604	1,917	2,054	2,324	2,434	2,782	2,935	3,235	3,941	28,003
	Cash Outstanding			-540	-934	-1,084	-1,109	-848	-448	208	989	2,071	3,294	4,778	6,382	8,299	10,353	12,677	15,111	17,893	20,828	24,063	28,003	

Table 17.6 Profitability Projection for the Belawan – Penang – Phuket Route

round trips
Belawan—penang: 100 | Belawan - Phuket: 50
Penang—Phuket: 50

Unit: '000US$				2016	2017	2018	2019	2020	2021	2022	2023	2024	In service of Phuket - Belawan route				2029	2030	2031	2032	2033	2034	
PROFIT/ LOSS			year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	Total No. of Round Trip			150	150	150	150	150	150	150	150	150	150	200	200	200	200	200	200	200	200	200	200	3,500
	Total No. of Passenger			74,000	76,000	78,000	80,000	82,000	84,000	86,000	88,000	90,000	92,000	119,000	121,400	123,800	126,200	128,600	131,000	133,500	136,000	138,500	141,000	2,129,000
	Total No. of Vehicle	Car		6,650	6,840	7,030	7,220	7,410	7,600	7,780	7,960	8,140	8,320	10,750	10,970	11,190	11,410	11,630	11,850	12,080	12,310	12,540	12,770	192,450
		Bus		1,550	1,600	1,650	1,700	1,750	1,800	1,840	1,880	1,920	1,960	2,500	2,550	2,600	2,650	2,700	2,750	2,800	2,850	2,900	2,950	44,900
		Truck		6,300	6,340	6,380	6,420	6,460	6,500	6,560	6,620	6,680	6,740	8,500	8,500	8,500	8,500	8,500	8,500	8,580	8,660	8,740	8,820	150,800
	Cargo Tonnage on Truck			27,500	28,000	28,500	29,000	29,500	30,000	30,500	31,000	31,500	32,000	42,000	42,700	43,400	44,100	44,800	45,500	46,200	46,900	47,600	48,300	749,000
Freight Revenue	Passenger Fare			3,083	3,166	3,250	3,333	3,417	3,500	3,583	3,666	3,749	3,832	5,165	5,268	5,370	5,473	5,575	5,678	5,785	5,893	6,000	6,108	90,890
	Car Freifht			1,374	1,413	1,452	1,492	1,531	1,570	1,607	1,644	1,681	1,718	2,295	2,342	2,388	2,435	2,481	2,528	2,577	2,625	2,674	2,722	40,549
	Bus Freight			847	874	902	929	957	984	1,006	1,028	1,049	1,071	1,383	1,411	1,438	1,466	1,493	1,521	1,549	1,576	1,604	1,631	24,719
	Truck Freight			4,074	4,100	4,126	4,152	4,178	4,204	4,243	4,282	4,322	4,361	5,556	5,556	5,557	5,557	5,558	5,558	5,611	5,664	5,718	5,771	98,148
	Cargo Freight	incl.truck freight		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GROSS INCOME			9,378	9,554	9,730	9,906	10,082	10,258	10,439	10,620	10,801	10,982	14,399	14,576	14,753	14,930	15,107	15,285	15,521	15,758	15,995	16,232	254,306
Running Costs	Operating exp. Fuel Cost			4,089	4,089	4,089	4,089	4,089	4,089	4,089	4,089	4,089	4,089	6,141	6,141	6,141	6,141	6,141	6,141	6,141	6,141	6,141	6,141	102,304
	Port Charges			994	994	994	994	994	994	994	994	994	994	1,349	1,349	1,349	1,349	1,349	1,349	1,349	1,349	1,349	1,349	23,430
	Cargo handling charge			245	251	257	264	270	276	282	288	295	301	351	357	364	371	377	384	391	398	405	412	6,537
	Others			159	159	159	159	159	159	159	159	159	159	214	214	214	214	214	214	214	214	214	214	3,733
	Operating Expenditures			5,487	5,493	5,499	5,506	5,512	5,518	5,524	5,531	5,537	5,543	8,055	8,062	8,068	8,075	8,082	8,088	8,095	8,102	8,109	8,116	136,004
	Ship's exp. Crew's exp.			400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	8,000
	Docking Repair & Maintenance			300	390	330	450	330	429	363	495	363	472	399	545	399	519	439	599	439	571	483	659	8,974
	Lubricant Oil			101	101	101	101	101	101	101	101	101	101	152	152	152	152	152	152	152	152	152	152	2,529
	Ship's stores			50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	1,000
	Insurance: Hull & Machnery			424	404	385	365	345	325	305	285	264	243	222	201	180	158	136	114	92	69	46	23	4,587
	Insurance: P& I			110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	2,200
	Ship's Expenditures			1,385	1,455	1,376	1,476	1,336	1,415	1,329	1,441	1,288	1,376	1,333	1,457	1,291	1,389	1,287	1,425	1,243	1,352	1,241	1,394	27,290
	Gen. & admi. Expenses	abt.20%	~ G.income	276	281	286	292	297	302	307	313	318	323	424	429	434	439	445	450	457	464	471	478	7,485
	GROSS COST			7,147	7,230	7,162	7,274	7,145	7,236	7,161	7,284	7,143	7,242	9,812	9,948	9,793	9,903	9,813	9,963	9,795	9,918	9,821	9,988	170,778
	NET INCOME			2,230	2,324	2,568	2,632	2,937	3,022	3,278	3,336	3,658	3,740	4,587	4,628	4,960	5,027	5,294	5,322	5,727	5,840	6,174	6,244	83,528
	capital gain on last year	300	US$/LDT																			scrap ship→	546	546
Capital Cost	INVESTMENT TOTAL		38,500																					
	Equity	15%	5,775																					
	Loan	85%	32,725																					
	Interest paym't (int.rate p.a.)	1.40%		458	438	418	397	376	355	334	312	290	268	245	222	199	175	151	127	102	77	52	26	5,022
	Depreciation (period:yrs)	20		1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1,925	38,500
	PROFIT			-153	-39	225	310	635	742	1,019	1,099	1,443	1,547	2,417	2,481	2,836	2,927	3,218	3,270	3,700	3,838	4,197	4,839	40,552
	Income Tax	1.20%	of G. income	113	115	117	119	121	123	125	127	130	132	173	175	177	179	181	183	186	189	192	195	3,052
	NET PROFIT after tax			-266	-154	108	191	514	619	894	972	1,314	1,415	2,244	2,306	2,659	2,748	3,037	3,087	3,513	3,649	4,005	4,644	37,500
	Accumulated profit			-266	-420	-311	-120	394	1,013	1,907	2,879	4,192	5,608	7,851	10,157	12,817	15,564	18,601	21,688	25,201	28,850	32,855	37,500	
CASH FLOW																								
	Net Profit before Depreciation			1,659	1,771	2,033	2,116	2,439	2,544	2,819	2,897	3,239	3,340	4,169	4,231	4,584	4,673	4,962	5,012	5,438	5,574	5,930	6,569	76,000
	Principal Payment			1,429	1,449	1,470	1,490	1,511	1,532	1,554	1,575	1,597	1,620	1,642	1,665	1,689	1,712	1,736	1,761	1,785	1,810	1,836	1,861	32,725
	NET CASH		-5,775	230	322	564	626	928	1,012	1,265	1,321	1,641	1,721	2,526	2,566	2,895	2,960	3,225	3,251	3,653	3,764	4,095	4,708	43,275
	Cash Outstanding			230	552	1,116	1,742	2,670	3,682	4,948	6,269	7,910	9,631	12,157	14,723	17,618	20,579	23,804	27,055	30,708	34,472	38,567	43,275	

Table 17.7 Profitability Projection for the General Santos – Bitung Route

US$				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
PROFIT/ LOSS			year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	Total No. of Round Trip			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	2,000
	Total No. of Passenger			14,000	14,500	15,000	15,500	16,000	16,500	17,000	17,500	18,000	18,500	19,000	19,700	20,400	21,100	21,800	22,500	23,200	23,900	24,600	25,300	384,000
	Total No. of Vehicle	Car		500	520	540	560	580	600	620	640	660	680	700	720	740	760	780	800	830	860	890	920	13,900
		Bus		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Truck		1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	28,000
	Cargo Tonnage on Truck			16,000	16,400	16,800	17,200	17,600	18,000	18,400	18,800	19,200	19,600	20,000	20,500	21,000	21,500	22,000	22,500	23,100	23,700	24,300	24,900	401,500
Freight Revenue	Passenger Fare			1,400	1,450	1,500	1,550	1,600	1,650	1,700	1,750	1,800	1,850	1,900	1,970	2,040	2,110	2,180	2,250	2,320	2,390	2,460	2,530	38,400
	Car Freifht			300	312	324	336	348	360	372	384	396	408	420	432	444	456	468	480	498	516	534	552	8,340
	Bus Freight			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Truck Freight			2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	42,000
	Cargo Freight	in cont'r		1,224	1,284	1,344	1,404	1,464	1,524	1,584	1,644	1,704	1,764	1,824	1,899	1,974	2,049	2,124	2,199	2,289	2,379	2,469	2,559	36,705
	GROSS INCOME			5,024	5,146	5,268	5,390	5,512	5,634	5,756	5,878	6,000	6,122	6,244	6,401	6,558	6,715	6,872	7,029	7,207	7,385	7,563	7,741	125,445
Running Costs	Operating exp	Fuel Cost		3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	3,040	60,803
		Port Charges		259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	5,184
		Cargo handling charge		37	38	39	41	42	43	44	46	47	48	49	51	53	54	56	57	59	61	63	65	992
		Others		102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	2,038
		Operating Expenditures		3,438	3,439	3,441	3,442	3,443	3,444	3,446	3,447	3,448	3,449	3,451	3,452	3,454	3,455	3,457	3,459	3,460	3,462	3,464	3,466	69,017
	Ship's exp	Crew's exp.		400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	8,000
		Docking Repair & Maintenance		200	260	220	300	220	286	242	330	242	315	266	363	266	346	293	399	293	381	322	439	5,983
		Lubricant Oil		74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	1,489
		Ship's stores		40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	000
		Insurance: Hull & Machnery		227	217	206	196	185	174	163	153	142	130	119	108	96	85	73	61	49	37	25	12	2,457
		Insurance: P& I		65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	1,300
		Ship's Expenditures		1,006	1,056	1,006	1,075	984	1,040	985	1,062	963	1,024	965	1,050	942	1,010	945	1,040	921	997	926	1,031	20,029
	Gen. & admi. Expenses	abt.20%	~ G.income	201	206	211	216	221	225	230	235	240	245	250	256	262	269	275	281	288	295	303	310	5,019
	GROSS COST			4,645	4,701	4,657	4,733	4,648	4,709	4,661	4,744	4,651	4,719	4,665	4,758	4,658	4,734	4,677	4,780	4,670	4,755	4,693	4,807	94,065
NET INCOME				379	445	611	657	864	925	1,095	1,134	1,349	1,403	1,579	1,643	1,900	1,981	2,195	2,249	2,537	2,630	2,870	2,934	31,380
capital gain on last year		300	US$/LDT																			scrap ship →	546	546
Capital Cost	INVESTMENT TOTAL		20,625																					
	Equity	15%	3,094																					
	Loan	85%	17,531																					
	Interest paym't (int.rate p.a.)	1.40%		245	235	224	213	202	190	179	167	155	143	131	119	106	94	81	68	55	41	28	14	2,690
	Depreciation (period:yrs)	20		1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	1,031	20,625
PROFIT				-898	-821	-644	-587	-369	-297	-115	-64	162	229	416	492	762	856	1,083	1,150	1,451	1,558	1,811	2,435	8,611
Income Tax		1.20%	of G. income	60	62	63	65	66	68	69	71	72	73	75	77	79	81	82	84	86	89	91	93	1,505
NET PROFIT after tax				-958	-883	-707	-651	-435	-365	-184	-135	90	155	341	416	684	775	1,000	1,066	1,365	1,469	1,720	2,342	7,106
Accumulated profit				-958	-1,841	-2,548	-3,200	-3,635	-3,999	-4,183	-4,318	-4,228	-4,073	-3,732	-3,316	-2,632	-1,857	-857	209	1,574	3,043	4,763	7,106	
CASH FLOW																								
	Net Profit before Depreciation			73	148	324	380	596	667	847	896	1,122	1,186	1,373	1,447	1,715	1,807	2,032	2,097	2,396	2,500	2,752	3,373	27,731
	Principal Payment			766	776	787	798	809	821	832	844	856	868	880	892	905	917	930	943	956	970	983	997	17,531
	NET CASH		-3,094	-693	-628	-463	-418	-213	-154	15	52	266	319	493	555	810	889	1,101	1,154	1,439	1,531	1,768	2,376	10,199
	Cash Outstanding			-693	-1,321	-1,784	-2,202	-2,415	-2,570	-2,555	-2,502	-2,236	-1,918	-1,425	-870	-60	829	1,931	3,085	4,524	6,055	7,823	10,199	

(1) Features of each route in terms of profitability

(1) Dumai – Malacca:

Under the freight tariff fixed as above, a deficit of net income counts in starting 5 years and a profit appears in the 6th fiscal year in the case of the Type 1 loan. Thereafter, the profit is increasing year by year according to cargo volume increase. In the case of Type 2 loan, a deficit of net income counts in starting 7 years and a profit appears in the 8th fiscal year. The total profit in 20 years amounts to US$ 23.9 million and the internal rate of return (IRR) for capital injection of US$ 4.125 million reaches 13.29% under Type 1 finance. The profitability of this route is relatively good.

Two small-sized ships are provided on this route to offer the high frequency service to carry many passengers effectively on calm sea conditions in this area. Capital cost is relatively high due to procurement of two ships, crew's expense is heavy to hire the two shipping crews, and port charge expense is big due to frequent port calls. On the other hand, bunker expense is small because of very short voyage. If the two ships are replaced with one large-sized ship to reduce the expense of crew wage and port charges by half, the profitability can be improved or the freight tariff can be discounted. But the size of ship cannot be enlarged considering the limits of the existing berth facility in Dumai port. The two ships service is the best solution for this route.

(2) Belawan – Penang – Phuket:

A deficit of net income counts in starting two years and a profit appears from the third fiscal year in the case of the Type 1 loan. Thereafter, the profit is increasing year by year according to cargo volume increase. In the case of Type 2 loan, a deficit of net income counts in starting 6 years and a profit appears in the 7th fiscal year. The total profit in 20 years amounts to US$ 37.5million and the IRR for capital injection of US$ 5.8 million reaches 18.40% under Type 1 finance. The profitability of this route is the best among the three routes in this study.

The ship in this route is the largest among the three types of ship since the berth facility of each port of call is enough for large-sized ships.

The ship is designed to run at high speed of 20 kt to travel the distance between ports. At this speed, the ship can set the operating schedule of "day time at berth" and "sailing at night" which is convenient for passengers and shippers. In the next 10 years from 2025, the service between Belawan and Phuket will be planned to make a triangle route service which makes port calls on fixed days during the week. This full operation in a week contributes to improved profitability. The fuel consumption is biggest among the three routes due to its high speed. The share of bunker expense in the operating expenses is relatively high that negative impact to profitability is most severe if the price of bunker soars.

(3) General Santos – Bitung:

Under the freight tariff fixed as above with Type 1 finance, a deficit of net income counts during 8 years long and first profit appears in the ninth fiscal year. Thereafter, profit is increasing year by year according to cargo volume increase. In the case of Type 2 loan, a deficit of net income counts in starting 8 years and a profit appears in the 9th fiscal year. The total profit in 20 years amounts to only

US$ 6.5 million and the IRR for capital injection of US$ 3.1 million is 5.58% only under Type 1 finance. The profitability of this route is not attractive to business investment.

An increase of the estimated freight tariff may be not welcomed because the tariff is already so high.

Since the cargo volume is relatively small on this route, only two round trips a week are arranged (even if three round trips are available in the time schedule).

Two days' rest of operation is one of the reasons for weak profitability. Three round trip operations weekly with a smaller ship might be considered to increase the full days operation, but a small ship is not safe for sailing the long distance in consideration of seaworthiness. According to the current forecast of cargo movement, service frequency is set at two round trips weekly, but there is a possibility to improve the profitability by adding another round trip if cargo movement increases in the future.

While calling at Tahuna Port is not considered in the profitability projection, the ship can call at Tahuna Port without a deviation and additional bunker expense if the cargo movement occurs in future. Calling at Tahuna Port will contribute effectively in improving this route's profitability.

For reference, the cost components of each route are illustrated in Figure 17.1.

(2) Other modes of ship deployment

In addition to new shipbuilding, there are several more modes of ship deployment, namely, secondhand ship procurement, ship chartering and ship lease.

Secondhand ship is a popular procurement method and it is separately analyzed in the following section.

Ship chartering is also popular in tanker shipping and dry bulk shipping. Ship chartering contracts are also varied from voyage-charter, time-charter and bareboat-charter, depending on chartering condition and period. However RO-RO ship is a minor liner fleet type. Chartering is not popular to liner business and RO-RO shipping has small fleets in the world. As a result, there is no charter rate published for RO-RO ships in the related ship market reports. Although few transactions may happen to charter RO-RO ships, they are rare and individual contracts without published guiding rates. Therefore the Study did not do an in-depth analysis of chartered ships, in terms of financial analysis. It is noted that ship chartering is popular in some ASEAN Member States such as the Philippines.

Ship lease, particularly finance lease, is considered a suitable method for long-term ship usage, like liner shipping business. It allows the lessee to enter into shipping business with a small investment while the lessor supervises the lease asset during the lease contract and sometimes provides professional advice on ship construction/secondhand ship procurement, ship operation and ship maintenance to the lessee. In ASEAN, a couple of dedicated ship leasing companies do such business, e.g. PT. PANN, an Indonesian state-owned ship leasing company, and Maritime Lease Corporation under the Development Bank of the Philippines. They borrow money from affiliated commercial banks and lease out ships. Even though ship leasing companies can provide such value-added financial services particularly to new comers and small-to-medium enterprises, they must charge commercial lending rate plus their management fee (2-3%) on ship lease amount. As a result, the FIRR must be reduced by ship leasing management fee accordingly.

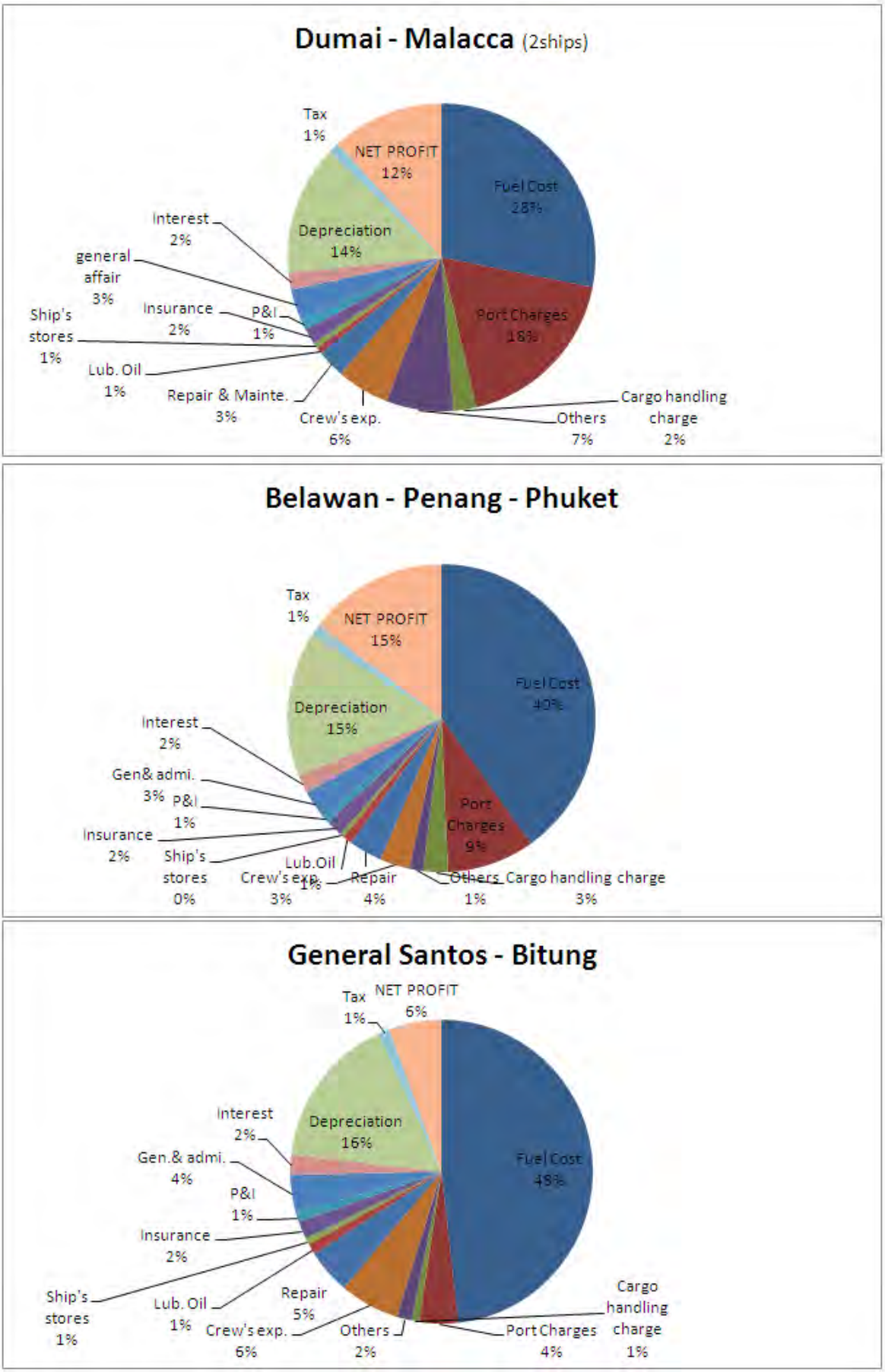


Figure 17.1 Cost Distribution in Total (20 years)

(3) Trial calculation for profitability projection in case of a used ship

Continuous and stable services are very important in this long-term project, and safe sailing is first priority for passenger transportation service. For this purpose, reliable new ships designed for each service route are most preferable.

In case of used ships, it is uncertain whether a suitable ship matching for each route can be procured in a timely manner. Most of the used RO-RO ships and ferry ships appearing in the resale market are nearly 20 years old, so their remaining lifetime is about 10 years.

By half way of project implementation (20 years), the ship should be replaced with another used ship. A concern is that this replacement might interrupt the continuous service.

However, the used ships are very advantageous in respect to the initial investment cost. Considering this, a trial estimation for profitability projection is done with the following assumptions.

(1) Most of the ships similar to the ones planned in this project have been built in Japanese shipyards. Those ships are being operated by many ferry shipping companies for the coastal services and transportation services to isolated islands in Japan. From Japan, many used ferry boats have been exported to ASEAN countries. With this situation, the used ships may be procured from Japan. There are many used ships in Japan which are potential candidates for this project. The distribution by age of all exiting ferry boats in Japan is shown in Figure 17.2. According to this data, the ships from 11 to 20 years old are nearly half of all existing ships in Japan.

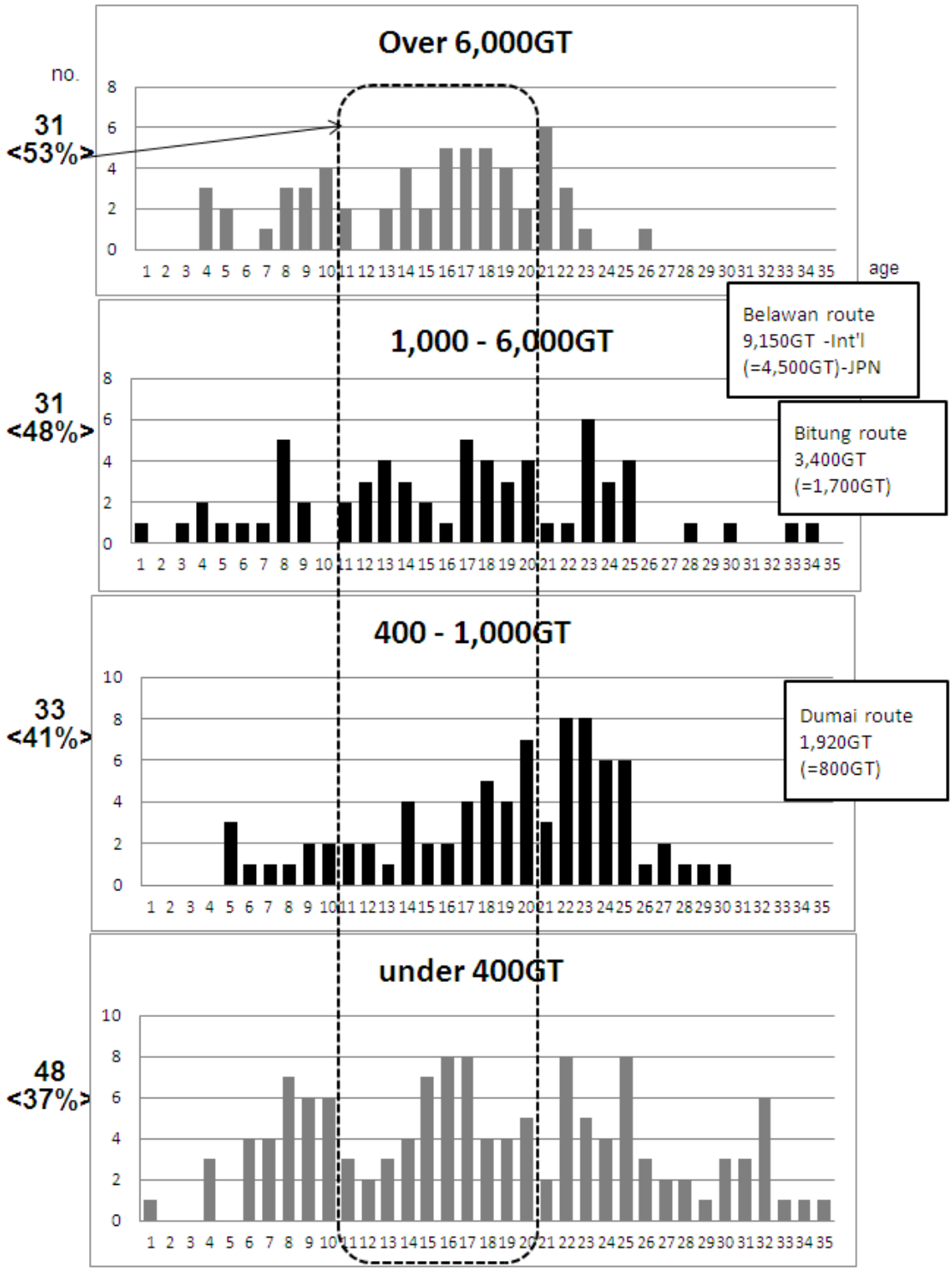


Figure 17.2 Number of Existing ROPAX Ships in Japan by Age

(2) Ships 20 years old are procured, operated for 10 years, after which they are sold as scrap ships. Other 20-year old used ships are procured again.

(3) The price of used ship is estimated at about one fourth of a new ship.

(4) 70% of procurement cost is financed by bank loan for used ships, and 10 years later financed again by a bank (interest rate is the same as new ship).

(5) 30% of procurement cost for the first ship is appropriated by own fund (= capital cash), and that for second one is appropriated by internal accumulated cash.

(6) Depreciation period is 10 years to consider the economical life of the used ship.

(7) Docking repair and maintenance expense is applied for 10% increasing ratio by four years cycle, which is extended to the 30th year from 21st year in a new ship.

(8) Insurance expense is estimated at 110% of the amount of the debt outstanding balance.

(9) P&I insurance are also amended for used ships.

In the resulting trial estimation, the capital cost (=depreciation + interest payment) is reduced nearly by half for each route. The net profit increases greatly if the freight tariff is not adjusted. If the profitability is maintained at the same level as a new ship, the freight tariff is discounted by approximately 20%.

Particularly for the General Santos-Bitung route, the choice of a used ship contributes to pushing up its poor profitability. The detailed results are shown in Table 17.8.

Table 17.8 Profitability in Case of Procuring Used Ships

1. In case of freight tariff unchanged on base of new ship

US$	Dumai – Malacca	Belawan – Penang	Penang – Phuket	Belawan – Phuket	General Santos – Bitung
Passenger	25	40	45	50	100
Car	200	200	220	240	600
Bus	540	540	560	580	1,400
Truck	640	640	660	680	1,500
Cargo					150
Price of used ship	3,000,000	9,000,000			5,000,000
Capital invested	1,980,000	2,970,000			1,650,000
IRR	42.44%	60.29%			26.78%

2. In case of freight tariff discounted to keep IRR level on base of new ship

US$	Dumai – Malacca	Belawan – Penang	Penang – Phuket	Belawan – Phuket	General Santos – Bitung
Passenger	20	30	35	40	90
Car	160	140	160	180	500
Bus	520	490	510	530	1,300
Truck	620	490	610	630	1,400
Cargo					140
Price of used ship	3,000,000	9,000,000			5,000,000
Capital invested	1,980,000	2,970,000			1,650,000
IRR	13.41%	18.50%			12.78%

Source: JICA Study Team

(4) Sensitivity analysis of profitability

The shipping operation profit is most sensitive to the cargo volume variation, of course. The next major factor is the bunker fuel price which is a large portion of operating expense. In case of an increase of US$ 100/ton on bunker price, the net profit in total (20 years) is reduced as follows:

- Dumai – Malacca route: US$ 7.8 million down, IRR 4.6% down
- Belawan – Penang – Phuket: US$ 14.3 million down, IRR 6.8% down
- General Santos – Bitung: US$ 7.8 million down, IRR 5.7% down

Bunker fuel is a highly volatile commodity, so its price changes sharply. In the last 5 years (2007-2012), the price fluctuated between US$ 400 and US$ 1,150/ton. This movement is not avoidable in the future. The bunker surcharge mechanism should be applied for the freight tariff, which is a common practice in the shipping business all over the world. This bunker price risk should be transferred to the shippers through a Bunker Surcharge clause, which should be stated in the shipping contract with shippers. The crew's wages are rising due to the expanding fleet size world-wide. Crews from ASEAN countries are now in a seller's market, crew's wage will rise in future. Other factors influencing profit are currency exchange, and repair expense (to be affected by technical skill of maintenance). Therefore, the four major factors affecting profit are freight revenue, bunker fuel price, crew's expense, and price of the ship. New ship prices are gathered and calculated, as in the following table.

Additionally, in case of financing from commercial banks which may offer higher interest rate than policy-based finance, or for fluctuation of the interest rate in financial markets in future, the sensitivity of FIRR is shown as follows.

Table 17.9 Sensitivity Analysis to Profitability

Route Factor		Dumai – Malacca		Belawan – Penang –Phuket		General Santos – Bitung	
IRR (original)		**13.29%**		**18.40%**		**5.58%**	
Freight revenue	+5%	19.15%	(+5.86%)	24.46%	(+6.06%)	10.39%	(+4.81%)
	-5%	7.71%	(-5.58%)	12.48%	(-5.92%)	0.68%	(-4.90%)
Bunker	+US$ 100/ton	8.69%(*)	(-4.60%)	11.64% (*)	(-6.67%)	-1.04% (*)	(-6.62%)
	-US$ 100/ton	18.33%	(+5.14%)	25.44%	(+7.04%)	12.68%	(+7.10%)
Crew's expense	+10%	12.45%	(-0.84%)	17.86%	(-0.54%)	4.79%	(-0.79%)
	-10%	14.13%	(-0.84%)	18.95%	(+0.54%)	6.38%	(+0.80%)
New ship price	+10%	10.73%	(-2.56%)	14.92%	(-3.48%)	3.35%	(-2.23%)
	-10%	16.25%	(+2.96%)	22.59%	(+4.19%)	8.07%	(+2.49%)
Interest rate	3.00%	10.62%	(-2.67%)	15.03%	(-3.37%)	2.94%	(-2.64%)
from	4.00%	8.91%	(-4.38%)	12.87%	(-5.53%)	1.19%	(-4.39%)
commercial BK	5.00%	7.17%	(-6.12%)	10.70%	(-7.70%)	-0.63%	(-6.21%)

Note: (*) to be hedged by Bunker Surcharge

Source: JICA Study Team

17.2 Economic Analysis

1) Benefits

The following benefits by introducing a RO-RO shipping service can be evaluated quantitatively. Those items are consistent with advantages of a RO-RO shipping service and also are important aspects for marketing of the new service.

(1) Decrease of transit time:

The waiting time at the origin port will be greatly reduced by a RO-RO service and also cargo unloading time at the destination port will be reduced to 3 hours or less. In case of the existing services, the container yard (CY) cut-off time for most container services is set to one day before the departure and a NCV does not sail out before its deck is filled with cargo.

Since a RO-RO service features a shorter lead time, a quick customs check at the destination port is also essential. Waiting time for customs clearance will be reduced to about 3 hours due to quick checks for cargoes carried with a RO-RO service.

A faster shipping service will make more profit. The cargo's value of time arises from the extended reproduction which is enabled by faster shipping and earlier collection of sales proceeds. Considering 20% of an annual average gross margin rate, a daily gross margin rate is 0.050%. Therefore, carrying cargo one day faster will make a benefit of 0.050% of its value.

As noted in Chapter 16, the General Santos – Bitung route can be a part of shortcut to import cargoes from the third countries to North Sulawesi. The priority routes will also take a role of a shortcut for some logistics routes which will result in the reduction of transit time.

(2) Decrease of cargo damage:

Cargo shipped by a RO-RO vessel will avoid damages thanks to the direct loading/unloading with trucks while cargo shipped in a container suffers unnecessary damages in vanning/devanning and container loading/unloading processes. Quality of goods sensitive to shock such as vegetables, fruits, precision equipments and other fragile items, will be improved.

In addition, cargo owners' sales may increase because of better quality of their export commodities after a modern reefer transport service using the RO-RO route is introduced in a corridor where the NCV trade is dominant. Shipment of fresh foods or food products requires power supplies on a RO-RO vessel for reefer containers and reefer vans.

(3) Shipment of heavy/long products:

A RO-RO service can also carry heavy products and long products such as transport equipments and construction materials which cannot be shipped by NCVs nor container vessels. This will allow such industries locate at the hinterland of the route-connecting ports. Additionally, from a viewpoint of the demand side, procurement and repair of those products will be easier.

(4) Shipment of private cars and buses:

A RO-RO shipping service allows passengers to make personal tours with their own cars, which creates a new style of travel in ASEAN. Group tourists can enjoy inexpensive and comfortable tours with a bus prepared by a travel agent or by the group.

(5) Decrease of shipping/transportation cost:

Since cargo is directly loaded to and unloaded from a RO-RO vessel with trucks, vanning/devanning charges and cargo handling charges are not necessary.

Shipping tariff may increase if the new RO-RO route is not so different from that of existing container ship or wooden boat services. However, the tariff will decrease if the new RO-RO route makes a shortcut in long-distance routes such as China – Bitung as shown in Chapter 16.

Shipping cost cannot be lower in all cases but if the sales increase due to decrease of transit time and decrease of cargo damage as mentioned above are larger than the cost increase, cargo owners and forwarders will choose the new route based on the economic rationality.

With regard to passenger transport, the proposed RO-RO services for Dumai – Malacca and General Santos – Bitung offer passenger fares cheaper than existing passenger boat and air services. Thu they will provide alternative choices to cost-sensitive passengers (i.e. middle- and low-income class people).

As well as those benefits, passengers' benefit also can be evaluated for the decrease of travel time and cost but no benefit is considered for the priority routes because there is no diverted passenger demand.

As described in Chapters 14 to 16, the present level of service varies among the priority routes and different roles of the planned RO-RO service are expected for each route. For example, comparing the introduction of a RO-RO service as a modern shipping service in the Dumai – Malacca route where trade by non-conventional vessels is dominant, and introducing a RO-RO service for responding to a niche demand in the Belawan – Penang corridor where a container vessel is being operated, the meaning of the projects are obviously different.

Among the aforementioned benefits, measurable items are transit time, cargo damage and shipping cost. The following tables and figures show those benefits per transporting 1 TEU or 10 tons of cargo if a container service between Belawan and Penang and NCV service between Dumai and Malacca are diverted to a new RO-RO service.

Table 17.10 Cost and Time of the Container and RO-RO Shipping between Belawan and Penang

Direction: From Belawan to Penang Assumed Commodity: Fresh and chilled vegetables in a reefer van/container (10 tons or 1 TEU)			
Item	**Cost/Time**		
	Container (A)	**RO-RO (B)**	**Benefit (A-B)**
Belawan Port			
Vanning Charge	$250.00	N/A	$250.00
Cargo Handling Time	24 hours	3 hours	21 hours
Cargo Handling Charge	$175.00	N/A	$175.00
Shipping from Belawan to Penang			
Shipping Time	8 hours	7.5 hours	0.5 hours
Shipping Cost	$600.00	$690.00	-$90.00
Penang Port			
Cargo Handling Time	15 hours	3 hours	12 hours
Cargo Handling Charge	$161.20	N/A	$161.20
Customs Clearance	6 hours	3 hours	3 hours
Devanning Charge	$250.00	N/A	$250.00
Total Time:	53 hours	16.5 hours	36.5 hours
Cargo Damage:	5%	1%	4%
Total Cost:	$1,436.20	$690.00	$746.20

Direction: From Penang to Belawan Assumed Commodity: Machinery (10 tons or 1 TEU)			
Item	**Cost/Time**		
	Container (A)	**RO-RO (B)**	**Benefit (A-B)**
Penang Port			
Vanning Charge	$250.00	N/A	$250.00
Cargo Handling Time	24 hours	3 hours	21 hours
Cargo Handling Charge	$161.20	N/A	$161.20
Shipping from Penang to Belawan			
Shipping Time	8 hours	7.5 hours	0.5 hours
Shipping Cost	$250.00	$640.00	-$390.00
Belawan Port			
Cargo Handling Time	15 hours	3 hours	12 hours
Cargo Handling Charge	$175.00	N/A	$175.00
Customs Clearance	48 hours	3 hours	45 hours
Devanning Charge	$250.00	N/A	$250.00
Total Time:	95 hours	16.5 hors	78.5 hours
Cargo Damage:	3%	1%	2%
Total Cost:	$1,086.20	$640.00	$446.20

Note: Cargo handling charges and vanning/devanning charges are determined based on current market price. Shipping cost by a container ship from Belawan to Penang is assumed based on the current tariff offered by Evergreen ($1,200 per 40' reefer container). Shipping cost by a container ship from Penang to Belawan is the same as the current tariff offered by Evergreen ($255 per 20' dry container). For the power supply service on board the RO-RO vessel, $50 per trip is assumed. Customs clearance time at both ports is in accordance with the report of "Logistics Development Study of the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT)." The percentage of cargo damage is assumed based on the Study Team's interview survey of cargo owners.

Source: JICA Study Team

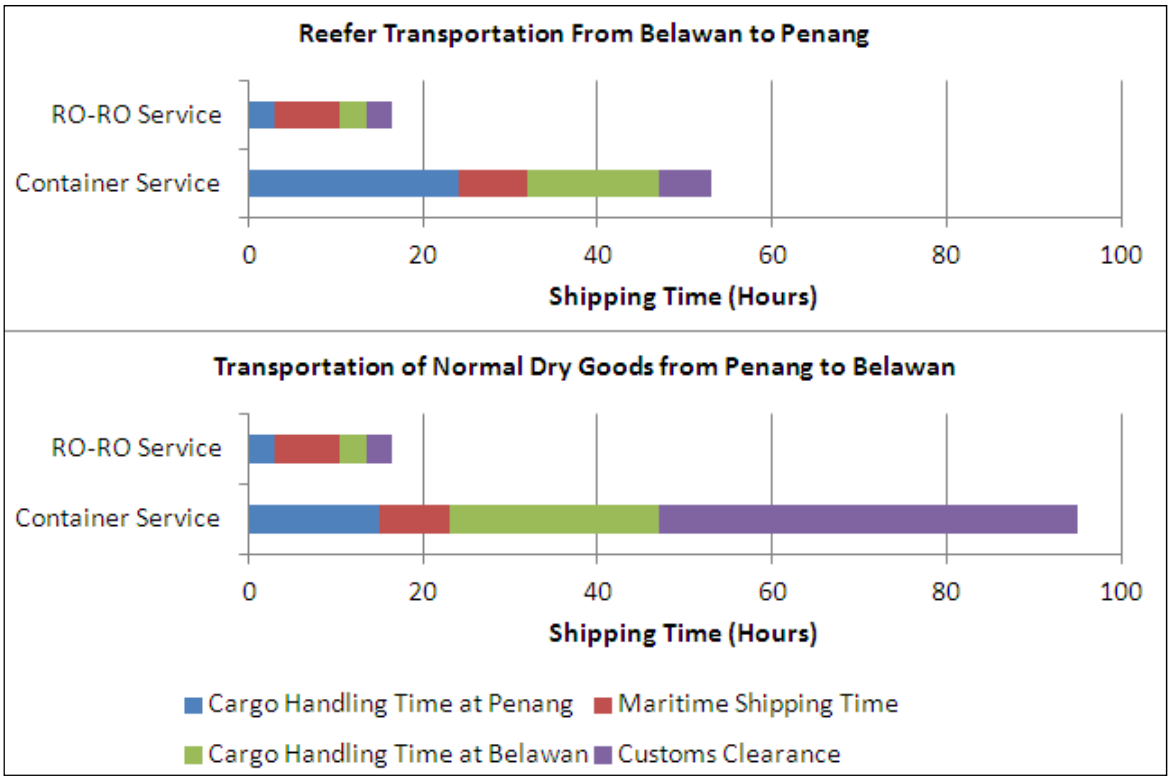
Table 17.11 Cost and Time of the NCV and RO-RO Shipping between Dumai and Malacca

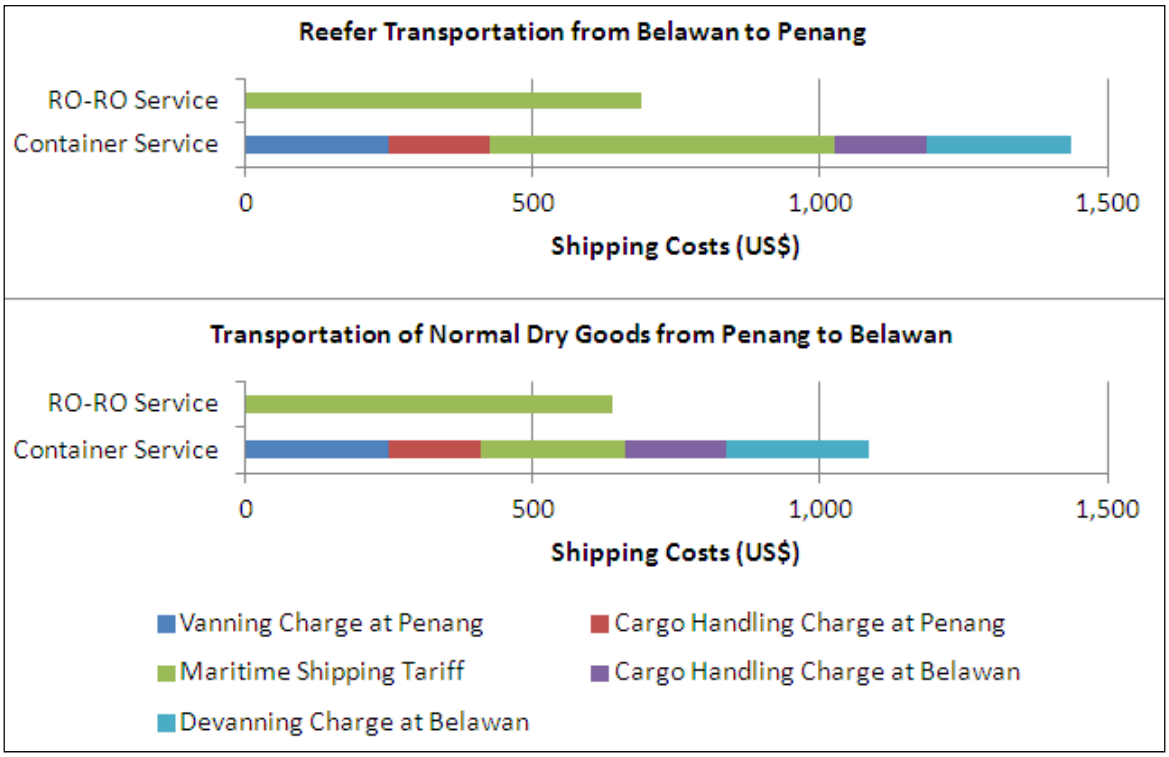
Direction: From Dumai to Malacca Assumed Commodity: Fresh and chilled fish (10 tons or 1 TEU)			
Item	**Cost/Time**		
	NCV (A)	**RO-RO (B)**	**Benefit (A-B)**
Dumai Port			
Cargo Handling Time	+/- 24 hours	3 hours	+/- 21 hours
Cargo Handling Charge	(Unknown)	N/A	(Unknown)
Shipping from Dumai to Malacca			
Shipping Time	12 hours	4.5 hours	7.5 hours
Shipping Cost	$170.00	$350.00	-$180.00
Malacca Port			
Cargo Handling Time	+/- 6 hours	3 hours	+/- 3 hours
Cargo Handling Charge	(Unknown)	N/A	(Unknown)
Customs Clearance	6 hours	3 hours	3 hours
Total Time:	+/- 48 hours	13.5 hours	+/- 34.5 hours
Cargo Damage:	10%	1%	9%
Total Cost:	> $170.00	$350.00	> -$180.00

Direction: From Malacca to Dumai Assumed Commodity: Processed food products (10 tons or 1 TEU)			
Item	**Cost/Time**		
	NCV (A)	**RO-RO (B)**	**Benefit (A-B)**
Malacca Port			
Cargo Handling Time	+/- 24 hours	3 hours	+/- 21 hours
Cargo Handling Charge	(Unknown)	N/A	(Unknown)
Shipping from Malacca to Dumai			
Shipping Time	12 hours	4.5 hours	7.5 hours
Shipping Cost	$170.00	$320.00	-$150.00
Dumai Port			
Cargo Handling Time	+/- 6 hours	3 hours	+/- 3 hours
Cargo Handling Charge	(Unknown)	N/A	(Unknown)
Customs Clearance	48 hours	3 hours	45 hours
Total Time:	+/- 90 hours	13.5 hours	+/- 76.5 hours
Cargo Damage:	5%	1%	4%
Total Cost:	> $170.00	$320.00	> -$150.00

Note: Shipping cost by a NCV is the same as the current average tariff (Source: interview of shipping companies). Customs clearance time at both ports is in accordance with the report of "Logistics Development Study of the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT)." The percentage of cargo damage is assumed based on the Study Team's interview survey of cargo owners.

Source: JICA Study Team





Source: JICA Study Team

Figure 17.3 Reduction of Shipping Cost and Time by a RO-RO Service in Belawan – Penang Route

Source: JICA Study Team

Figure 17.4 Reduction of Shipping Time and Increase of Shipping Cost by RO-RO Service in Dumai - Malacca Route

2) Possible Value Creation with RO-RO Shipping and Its Bottlenecks

This section presents possibilities of brand-new value creation with the proposed RO-RO shipping and bottlenecks against that with an example of the Dumai – Malacca route. Currently NCVs carry various kinds of cargo between Dumai and Port Klang and among many other ports facing Malacca Strait. Market analysis of the Study also identified potential commodities to be carried by RO-RO such as palm-related goods and food products (see Table 14.5) but they are not novelty. In regard to passengers, however, the following ideas have been found to create new markets.

(1) Import of Indonesian Clothes from Riau Province with Buyers' Vehicles:

In the stakeholder interview in Malacca, it was said that inexpensive clothes made in Indonesia are popular in Malaysia and Malaysian buyers with a good judge often go to Jakarta or Bandung by air to directly get fashionable or well-designed clothes by themselves. Estimated sales record to Malaysian buyers is several trillion Rupiah in Jakarta every year. However such buyers can bring very small amount of cargo with their carry-in and check-in baggage. Therefore the new RO-RO service is expected to create a new business which is an agile import business of fashionable Indonesian clothes purchased in larger quantities in Riau Province and carried by buyers' own vehicles. Indonesia can supply sufficient amount of clothes since Indonesia's export of clothes recorded US$ 7,690 million in 2011[1] and the annual total expenditure for clothes in Malacca is RM 175 million (US$ 57 million) in 2009/10[2].

The biggest obstacle to this business is temporary admission of private cars in Indonesia. This business could not be developed if the route connecting countries excludes private cars from the types of road vehicles on-board the RO-RO vessel.

Because most of buyers are considered to go to Pekanbaru, the State capital, the travel time between Dumai and Pekanbaru is another major bottleneck and thus early open of the Pekanbaru – Dumai toll road is expected. However, since the new import business features purchasing in larger volume at once, a difference of the travel time by only several hours per round trip might not matter to some buyers. In addition, clothes will not be damaged by bad pavement conditions in some sections of the existing Pekanbaru – Dumai road.

(2) Walking Disabled and Critically-ill Patients' Medical Tourism in Malacca:

Malaysia has been promoting its medical tourism industries to foreign countries and Malacca, one of the most historical cities in Malaysia, is one of major destinations of medical tourists. In 2012, more than 7,000 patients a month are coming to Malacca from Riau Province to receive medical services[3]. Currently medical tourists intend to take airplanes between Pekanbaru and Kuala Lumpur or Malacca or to take a fast passenger boat between Dumai and Malacca. However, patients with walking difficulty and patients requiring travel lying down cannot go to Malacca because currently there is no travel mode crossing Malacca Strait which is able to accommodate such patients. In this respect, the Dumai – Malacca RO-RO service will enable to take a walking disabled and critically-ill patient lying down on a stretcher

[1] Aggregated by the Study Team based on Indonesia's foreign trade statistics.

[2] Department of Statistics, Malaysia

[3] Malaysian National News Agency, Sep 2012

by land and sea. This travel mode will create a new market in the Malaysia's medical tourism but it may not attract any patients who can easily travel by air or fast boat because of the longer travel time.

The biggest concern for this transport service is a long travel time and bad road conditions between Dumai Port and the patient's home. Especially, the latter might be fatal to some patients. Maintenance and improvement of major roads are necessary.

After opening the RO-RO route, travel between Pekanbaru and Malacca will be as follows:

Pekanbaru	
|	5 – 6 hours by car (2 hours after open of the planned toll road)
Dumai Port	1 – 2 hours to wait for departure
|	4 hours by RO-RO (Car tariff: US$ 200, passenger tariff: US$ 25)
Malacca Port	10 minutes for immigration and customs
|	20 minutes by car
Malacca	
Malacca	
|	20 minutes by car
Malacca Port	1 – 2 hours to wait for departure
|	4 hours by RO-RO (Car tariff: US$ 200, passenger tariff: US$ 25)
Dumai Port	10 minutes for immigration and customs
|	5 – 6 hours by car (2 hours after open of the planned toll road)
Pekanbaru	

3) Economic Effects Analysis

Cost-benefit analysis, which is based on improvements from existing conditions, cannot include economic effects derived from additional passengers and cargo induced by RO-RO shipping. Since most of projected traffic volume in this Study is induced demand, every public body is recommended to make investment decisions on RO-RO terminal and other relevant developments according to economic effects analysis, not cost-benefit analysis.

There are several methodologies to estimate economic effects but only the increase of tourists' expenditure and sales of commodities are considered in this section because there are few statistics which enable more detailed analysis. The following statistics are basis to estimate expenditures by passengers:

- Average expenditure by a Malaysian tourist visiting Indonesia in 2010: US$ 134 /pax/day;
- Average expenditure by a foreign tourist visiting Thailand in 2010: US$ 126 /pax/day; and
- Average length of stay at Phuket: 4 days.

In accordance with those figures, a passenger using a RO-RO service is assumed to stay at the destination for 4 days and spend US$ 130 a day. Therefore US$ 520 /pax/round trip is assumed to be spent. It is also said that a medical tourist coming to Malaysia spends more than US$ 4,000 per stay on average but their economic effects are not included in this analysis because it is difficult to project the number of medical tourists.

Since international logistics costs including feeder transport costs usually account for 10 – 15% of the sales price of the commodity[4], cargo value is estimated assuming the RO-RO tariff is equivalent to 5% of the cargo value and the economic effect is considered to be the same as cargo value.

The following table shows estimated route-wide economic effects for every 5-year period. It would be worth for governments to invest developments relevant to RO-RO shipping.

Table 17.12 Route-wide Economic Effects

(Unit: Million US$)

Route	2015 - 2020	2020 - 2025	2025 - 2030	2030 - 2035	Total
Dumai - Malacca	261	327	362	399	1,348
Belawan - Penang	193	213	235	260	901
Penang - Phuket	105	115	124	134	478
Phuket - Belawan	0	0	104	112	217
Total	298	327	463	507	1,595
General Santos - Bitung	286	321	362	409	1,378

Source: JICA Study Team

4) Negative Impacts Caused by RO-RO Shipping

Negative impacts to each stakeholder which will be caused by the priority RO-RO routes and measures to the possible impacts are discussed below.

(1) Existing Shipping Operators:

Existing shipping operators will compete with RO-RO but impacts to their business will be limited and no operators are expected to go out of business because an increase of trade in the region will be more than the predicted cargo volume which will divert to RO-RO. According to stakeholder interview survey, a trader handling almost all cargo on the General Santos/Davao – Bitung/Manado/Tahuna corridor with their own NCV welcomes the RO-RO shipping since the trader will get relief from the maintenance cost of the NCV. However, anyways, it cannot be helped to reduce the number of NCV operators under the modernization of maritime transportation. Regardless of RO-RO, every government is being encouraged to find alternate jobs for workers in the NCV shipping sector.

(2) Port Workers:

Because a RO-RO requires fewer workers for loading and unloading, job opportunities at ports will decrease. On the other hand, RO-RO will create new jobs such as guiding passengers and vehicles in RO-RO terminals, terminal maintenance etc. which will absorb redundant workers.

[4] http://www.logistics-alliance.eu/about-logistics/increasing-competitiveness

(3) Cargo Owners:

As mentioned above, logistics using RO-RO sometimes costs higher because of higher ship price and fuel oil cost. The additional logistics cost might be reflected to the sales price of commodities. However cargo owners will also be able to choose existing shipping services after opening the RO-RO route and all of cargo will not be diverted to RO-RO shipping. Every cargo owner can decide if they accept the increase of the logistics cost with better quality. This will lead to distribution of better commodities with higher prices in the market but commodities with the same quality and value as they are now will still remain. Thus introduction of RO-RO shipping will not result in the increase of consumer prices but it will provide more options to consumers.

(4) Environment:

RO-RO vessel operation needs more fuel oil per cargo weight due to their relatively larger dead spaces. If citizens consider that the increase of fuel oil consumption is an external diseconomy caused by shipping operators and cargo owners, governments would have to control that with appropriate taxation. Additionally, shipping operators are suggested to procure energy-saving vessels and/or to consider energy-saving vessel operation.

5) Project Costs

As discussed in Chapters 14 to 16, initial costs for infrastructure development and vessel procurement are necessary to open the new routes. Annual costs for ship maintenance are also required.

Table 17.13 Estimated Initial Costs for Each Priority Route

Route	Cost for Port Infrastructure Development	Cost for Vessel Procurement
Dumai – Malacca	Dumai : US$ 1,300,000 Malacca : US$ 2,300,000	US$ 25,000,000 for two vessels
Belawan – Penang – Phuket	Belawan : US$ 80,000 Penang : US$ 630,000 Phuket : US$ 22,000	US$ 35,000,000
General Santos – Bitung	General Santos : US$ 40,000 Bitung : US$ 60,000	US$ 18,750,000

Note: See Chapters 14, 15 and 16 for more details.

Source: JICA Study Team

17.3 Possible Effects on Regional Development

This section qualitatively evaluates potential cargoes and passengers for a RO-RO shipping service and possible effects by the RO-RO service onto the regional economy and society for each priority route.

As a result of the benefits of the RO-RO shipping services, positive economic and social effects are also expected, as described below. Although those are important evaluation items in regional development, a quantitative analysis in relation with new RO-RO shipping services is difficult. Therefore, the Study notes them as qualitative ones.

(1) Active foreign trade:

Trading activities between the hinterlands will be more active. The price of imported goods will be lower because of reduced shipping costs and decrease in damages, which will provide people cheaper and better goods. Furthermore, it will become convenient to do import by individuals using their own cars.

(2) Promotion of industry:

More convenient access by the new RO-RO service will attract industries to the hinterlands for exporting their products and procuring raw materials more easily. A RO-RO shipping service may also attract machinery and transport equipment industries since a RO-RO vessel can carry heavy or long products that NCVs, container vessels or aircrafts cannot. Such promotion will also be helpful to maintain the RO-RO route and to improve its level of service.

(3) Active tourism:

The number of tourists around hinterlands of ports connected by a RO-RO route will increase due to a brand-new service and cheaper travel expenses. Since a RO-RO service allows tourists and tourism companies to bring their vehicles to the destination, a RO-RO service will encourage travel of tourists in groups using a bus and persons who want to enjoy driving in the wide area of the hinterlands.

(4) Closer social interaction:

Frequent passenger movements with the proposed RO-RO services will lead to deeper mutual understandings and cultural exchanges among route-connecting areas. This is a key factor at the grass-root level to build subregional partnerships.

From above points of view, each priority route is evaluated as follows:

(1) The Dumai – Malacca Route:

The proposed RO-RO service will enable more frequent movements of people and commodities for further activation of the economic zone. The new RO-RO service is expected to modernize logistics, which currently rely on NCVs, and to provide quality logistics services especially for perishable goods. People will have a new style of tourism with their own vehicles. Comparing to existing passenger boat and air routes, economical and frequent (i.e. two round trips daily) service will give more opportunities of transport especially for middle- and low-income class citizens, which will contribute to more social interactions.

(2) The Belawan – Penang – Phuket Route:

The proposed RO-RO service will strengthen linkages among the world-famous tourist destinations to attract more tourists from home and abroad. The RO-RO service will add value to tourism in this area by enabling a new style of tourism with tourists' own vehicles and the new RO-RO shipping service itself will be another key attraction to appeal even to foreign tourists. With regard to industry and trade, easier and better shipment of perishable goods and heavy or long products will attract more industries to this area.

(3) The General Santos – Bitung Route:

The proposed RO-RO service will provide economical sea linkage for citizens and fast sea connection to shippers and consignees, contributing to forming a subregion. The most significant point is that the RO-RO service will promote social interactions between the route-connecting areas by activating movements of people and general cargoes. Industrial integration and tourism promotion are considered second to that. However, according to the scale of economy and past trials for introduction of shipping services, marketing for this route will require a huge effort.

Tables 17.14 to 17.16 show the expected effects by priority route together with commodities and passengers RO-RO services which indicate service advantages and thus enable competing to other modes for capturing markets. Those tables will give some viewpoints to shipping companies and related local stakeholders including governments for marketing.

Table 17.14 Effects on Regional Development for the Dumai – Malacca Route

Market		Benefits of a RO-RO Shipping Service						Effects		
		Transit Time	Cargo Damage	Heavy/ Long Products	Private Car	Bus	Cost	Trade & Industry	Tourism	Interaction
Demand from Dumai										
Divertible Cargo	Fresh/Chilled fish and fishery products	✓	✓					✓		
Inducible Cargo	Fresh/Chilled vegetables, fruits and agricultural products	✓	✓					✓		
	Machineries and heavy equipments for repair in Malaysia	✓	✓	✓				✓		
Passengers	Shoppers/Traders with private car to Malacca				✓			✓	✓	✓
	Tourists with private car to Malacca				✓				✓	
	Group tourists to Malacca					✓			✓	
	Medical tourists to Malacca				✓				✓	
	Passengers for family visit to Malacca						✓		✓	✓
Demand from Malacca										
Inducible Cargo	Perishable processed foods	✓	✓					✓		
	Machineries, heavy equipments, transport equipments and construction materials	✓	✓	✓				✓		
Passengers	Shoppers/traders with private car to Dumai/Pekanbaru				✓			✓	✓	✓
	Passengers for family visit to Dumai/Pekanbaru						✓		✓	

Source: JICA Study Team

Table 17.15 Effects on Regional Development for the Belawan – Penang – Phuket Route

Market		Benefits of a RO-RO Shipping Service						Effects		
		Transit Time	Cargo Damage	Heavy/ Long Products	Private Car	Bus	Cost	Trade & Industry	Tourism	Interaction
Demand from Belawan										
Divertible Cargo	Fresh/Chilled/Frozen fish and fishery products	✓	✓					✓		
	Fresh/Chilled vegetables, fruits and agricultural products	✓	✓					✓		
Inducible Cargo	Machineries and heavy equipments for repair in Malaysia	✓	✓	✓				✓		
Passengers	Shoppers/Traders with private car to Penang and Phuket				✓			✓	✓	✓
	Tourists with private car to Penang and Phuket				✓				✓	
	Group tourists to Penang and Phuket					✓			✓	
	Medical tourists to Penang				✓				✓	
	Tourists from other countries								✓	
Demand from Penang										
Divertible Cargo	Machineries, heavy equipments, transport equipments and construction materials	✓	✓	✓				✓		
Passengers	Shoppers/Traders with private car to Belawan/Medan				✓			✓	✓	✓
	Tourists with private car to Belawan/Medan				✓				✓	
	Group tourists to Belawan/Medan					✓			✓	
	Tourists from other countries								✓	
Demand from Phuket										
Divertible Cargo	Manufactured goods		✓	✓				✓		
Passengers	Shoppers/Traders with private car to Belawan/Medan				✓			✓	✓	✓
	Tourists with private car to Belawan/Medan				✓				✓	
	Group tourists to Belawan/Medan					✓			✓	
	Tourists from other countries								✓	

Source: JICA Study Team

Table 17.16 Effects on Regional Development for the General Santos – Bitung Route

Market		Benefits of a RO-RO Shipping Service						Effects		
		Transit Time	Cargo Damage	Heavy/ Long Products	Private Car	Bus	Cost	Trade & Industry	Tourism	Interaction
Demand from General Santos										
Divertible Cargo	General cargo including processed foods, home appliances etc.	✓	✓					✓		
Inducible Cargo	Industrial products from other countries	✓	✓	✓			✓	✓		
Passengers	Shoppers/Traders to Bitung/Manado						✓	✓	✓	✓
	Passengers for family visit to Bitung/Manado						✓		✓	✓
Demand from Bitung										
Divertible Cargo	General cargo including raw materials, furniture, fertilizer etc.	✓	✓					✓		
Inducible Cargo	Fresh/Frozen fish	✓	✓					✓		
Passengers	Shoppers/Traders to General Santos/Davao						✓	✓	✓	✓
	Tourists to General Santos/Davao						✓		✓	
	Passengers for family visit to General Santos/Davao						✓		✓	✓
	Students						✓			✓

Source: JICA Study Team

17.4 Implementation Plan

1) Schedule

The implementation plan or milestones until the opening of new RO-RO shipping services on the priority routes are proposed in Table 17.17. All the relevant government agencies have to be involved in the implementation plan.

The most significant point is the engagement of a route-wide MOU among the central governments of the connected countries. Before this MOU, all institutional arrangements and necessary coordination among the connecting countries will have to be done to ensure smooth seaway and highway connection, including temporary admission of foreign road transport vehicles without security deposit and import duty.

The schedule is strict as proposed in Table 17.13 if it is set out to open the route by the middle of 2015. Since new shipbuilding and RO-RO terminal preparation need considerable investment just for the ASEAN RO-RO shipping project alone, and their works take one and half years at least, it is desirable that the route-wide MOU will be engaged by the end of 2013. This is considered a project deadline, in other words, international commitments among the route connecting countries in order to meet the target opening of the new routes in 2015. If minor modifications could be enough at ports and a second-hand ship could be prepared shortly including necessary modifications for international operation, a deadline of a route-wide MOU might be delayed by one year at maximum or by the end of 2014.

The tight schedule compels the concerned national focal persons to discuss the draft MOU within their national bureaucracy to set into motion the activities needed to bring the project into fruition.

Some of the items must be tackled with the cooperation of the concerned government entities and investors. Central ministries will have important roles to resolve institutional issues and instruct their local agencies. Local governments may be expected to develop port and road infrastructures but it might be necessary to seek financial and technical support from the central ministries depending on the project scale. As to port infrastructures, coordination between the local government and port authority will also be required. In addition, the lessons learned in the past experiences of the international RO-RO shipping in ASEAN tell that shipping operators should promote their new services to potential users in the hinterlands in cooperation with the local governments. The marketing efforts have to be done, even months in advance of the initial operations, to gather enough interest in the service and to assure the prospective clients that the operation would be sustained, thus the shippers would be willing to divert their shipment to the new RO-RO service.

Once the RO-RO service is initiated, the advantages of the RO-RO service would become very eminent among users, and the service would be able to attract more clients. It is, thus, imperative that the initial operation should be well-planned and well-coordinated to attract customers to the service.

Table 17.17 Proposed Schedule for Opening Priority RO-RO Routes

Work Item and Entities in Charge	2013		2014		2015
	First Half	Second Half	First Half	Second Half	First Half
General					
Institutional set-up for international RO-RO shipping service (Sea and Road Transport Administrations, CIQ authorities)	←	→		At appropriate time taking institutional, infrastructure and ship preparation into account	
Engagement of route-wide MOU (Related Central Governments)		← → ▲	▲		
Detailed Operational Arrangement (Local Governments, Port Operators and RO-RO Shipping Operators)		← →	←	- - -	- - - →
Procurement of RO-RO Ship(s) (RO-RO Shipping Operators)			←	New Shipbuilding →	
				Procurement & Modification of Secondhand Ship	← →
RO-RO terminal development and operation arrangement (Port Authority & Local Government)	←	→			
Development of port infrastructures (Local Government)	(See below)				
Rehabilitation/improvement/construction of port access roads (Local Government & Road Administration)	←	- - - →	- - -	- - -	- - - →
Promotion of RO-RO shipping among potential local users (RO-RO Shipping Operators, Local Government)			←	→	
Detailed preparation of CIQS operations at passenger/vehicle terminals (Port Operators, CIQ Authorities)					← →
Port-Specific					
Development of Dumai Port					
Development of Malacca Port					
Development of Belawan Port					
Development of Penang Port					
Development of Phuket Port					
Development of Bitung Port					
Development of General Santos Port					

Source: JICA Study Team

2) Desirable Actions by Priority Route

In order to operationalize the selected priority routes, desirable actions by route are specified in parallel with Table 17.17.

(1) The Dumai – Malacca Route

Policy and institutional set-up: The RO-RO route was initially identified at the IMT-GT meeting in 2002. It is one of the priority activities under the Memorandum of Understanding between Riau and Malacca in 2009. Therefore the project deserves priority at both central and local government levels. However, there are institutional coordination issues prior to the engagement of the route-wide MOU. They are customs for transit vehicles particularly in Indonesia and vehicle insurance as shown in Table 17. 18 and Table 17.19.

Engagement of route-wide MOU: The appointed RO-RO operator in Malacca intends to order a newly built ship. One year is required to build such a small RO-RO ship. The Malacca State Government intends to construct the proposed cruise terminal jetty in 2013. An international RO-RO terminal will be installed later on. At the Dumai side, the existing RO-RO terminal will be improved to meet international RO-RO terminal standards. Taking such after-MOU activities into account, the desirable time to engage a route-wide MOU will be no later than the middle of 2014.

Detailed operational arrangement: Important matters to be spelled out in a route-wide MOU will be discussed earlier such as preferential port and marine charges and other financial arrangement to RO-RO operators. Other detailed matters, if any, will be continuously discussed after the MOU's engagement.

Procurement of RO-RO ship(s): Based on the Study's output, a suitable RO-RO ship will be newly built and/or an available secondhand ship will be modified by the RO-RO operator participating in the route.

RO-RO terminal development and operation arrangement: Based on the Study's output, international RO-RO terminals with terminal operators will be finally designed by both the Malacca Port Authority and the Provincial Government of Riau. After the MOU's engagement, the terminal plans will be realized.

Port access road: The route expects to carry the largest passenger vehicles among the priority routes. The on-going Pekanbaru – Dumai toll road (ASEAN Highway No.25) will be completed by 2015. In Malacca, not only a connection road to the North-South Expressway (ASEAN Highway No.2) but also other roads to serve tourism areas will be open to international traffic.

Promotion of RO-RO shipping service: Local economies will have to undertake the promotion many new activities, including various passenger-vehicle tourism products such as heritage tourism, medical tourism and sports and recreation, and new trade such as modern break-bulk cargo trade and heavy and bulky cargo trade. Local governments and participating RO-RO operators will take leading roles to explore such opportunities.

CIQS operation: New CIQS operation at international RO-RO terminals will be prepared within a couple of months before the terminals start.

(2) The Belawan – Penang - Phuket Route

Policy and institutional set-up: The pilot RO-RO operation was done in 2005 as one of the IMT-GT activities. Since then, the project has deserved priority at both central and local government levels. However, there are institutional coordination issues prior to the engagement of route-wide MOU. They are customs for transit vehicles particularly in Indonesia, vehicle insurance and different language characters as shown in Table 17. 18, Table 17.19 and Table 17.20.

Engagement of route-wide MOU: Based on the Study's output, one and half years is required to build such a middle to large RO-RO ship. An international RO-RO terminal will be installed at Butterworth Wharf with a passenger terminal building. Minor works will be required at the ports of Belawan and Phuket. Taking such after-MOU activities into account, the desirable time to engage a route-wide MOU will be no later than the end of 2013. It is noted that this type of MOU is subject to cabinet approval in Thailand.

Detailed operational arrangement: Important matters to be spelled out in a route-wide MOU will be discussed earlier such as preferential port and marine charges and other financial arrangement to RO-RO operators. Other detailed matters, if any, will be continuously discussed after the MOU's engagement.

Procurement of RO-RO ship(s): Based on the Study's output, a suitable RO-RO ship will be newly built or an available second-hand ship will be modified by the RO-RO operator participating in the route.

RO-RO terminal development and operation arrangement: Based on the Study's output, international RO-RO terminals with terminal operators will be finally designed by PELINDO I, Penang Port Commission and the Marine Department of Thailand. After the MOU's engagement, the terminal plans will be realized.

Port access road: Beside the ASEAN Highway Network, other roads to serve tourism areas will be open to international traffic.

Promotion of RO-RO shipping service: Local governments, local economies and participating RO-RO operator will promote many new activities suitable to use RO-RO shipping, including reefer freight service, fast multimodal transport service, various passenger-vehicle tourism products such as heritage tourism and resort tourism.

CIQS operation: New CIQS operation at international RO-RO terminals will be prepared within a couple of months before the terminals start.

(3) The Davao/General Santos – Bitung Route

Policy and institutional set-up: The Davao/General Santos – North Sulawesi Sub Corridor is listed in the BIMP-EAGA Implementation Blueprint Project List (2012 – 2016). It is important for Indonesia to operate Bitung Port as an international port to South Mindanao in its port hierarchy. There are many institutional coordination issues between Indonesia and the Philippines (refer to Table 17.18 and Table 17.21). In the Philippines, new legislation will be necessary to allow foreign vehicles in transit regardless of RHD vehicle.

Engagement of route-wide MOU: The Study's financial analysis identifies project viability only for the case that second-hand ship would be assigned on the route. The two ports of General Santos and Bitung are ready to accept international RO-RO ship calls with minor modification. There may be no time-consuming preparation work after MOU and therefore the desirable time to engage a route-wide MOU will be no later than the end of 2014.

Detailed operational arrangement: Important matters to be spelled out in a route-wide MOU will be discussed earlier such as preferential port and marine charges and other financial arrangement to RO-RO operators. Other detailed matters, if any, will be continuously discussed after the MOU's engagement.

Procurement of RO-RO ship: Based on the Study's output, an available second-hand ship will be modified by the RO-RO operator participating in the route.

RO-RO terminal development and operation arrangement: Based on the Study's output, international RO-RO terminals with terminal operators will be finally designed by both PPA and PELINDO IV. After the MOU's engagement, the terminal plans will be realized.

Port access road: In order to enjoy fast and seamless shipping services, the Davao – General Santos road will be urgently rehabilitated and a new parallel toll road will be developed as the BIMP-EAGA Implementation Blueprint Project List (2012 – 2016) envisages. The long-awaited Manado-Bitung toll road will be completed by 2015.

Promotion of RO-RO shipping service: Local governments and participating RO-RO operator will take leading roles to explore direct international shipping opportunities. Since the route seems to have limited passenger demand, stable and suitable cargo demand to RO-RO service is essential for it to materialize.

CIQS operation: New CIQS operation at international RO-RO terminals will be prepared within a couple of months before the terminals start.

Table 17.18 Monitoring Matrix for Indonesia (Ports of Belawan, Bitung and Dumai)

Institutional Aspect	Conditions if the RO-RO Service Were Opened Today	Interim Goal
Customs for vehicles	Vehicle considered an import, to be levied taxes and duties. Alternatively, a guarantee bond would be made, vehicle is bonded material	Tax-Free and bond-free entry of vehicles Same treatment as in Brunei Darussalam and East Malaysia highway borders
Vehicle Insurance	Liability coverage only in Indonesia Might need to procure insurance at the border port	Optional expansion of coverage of insurance liability including another country or countries
LHD vs RHD	Not an issue with Malaysia and Thailand Special exemption for LHD vehicles from the Philippines	Not an issue with Malaysia and Thailand Exemption for LHD vehicles in North Sulawesi
Driver's License	Information in Bahasa Indonesia, using Roman characters Might not need translation in Malaysia Would need English translation in the Philippines and Thailand	Information in Bahasa Indonesia, using Roman characters Might not need translation in Malaysia A template license with English translation of information

Note: 'Interim Goal' for a more efficient and effective RO-RO service required when the international RO-RO service commences.

Source: JICA Study Team

Table 17.19 Monitoring Matrix for Malaysia (Ports of Malacca and Penang)

Institutional Aspect	Conditions if the RO-RO Service Were Opened Today	Interim Goal
Customs for vehicles	A relaxed policy on entry of vehicles coming from Indonesia as per experience	Same treatment as vehicles crossing Thai and Kalimantan highway borders
Vehicle Insurance	Liability coverage only in Malaysia Might need to procure insurance at the border port	Optional expansion of coverage of insurance liability including another country or countries
Driver's License	Information in Bahasa Malaysia, using Roman characters Might not need translation in Indonesia	Information in Bahasa Malaysia, using Roman characters Might not need translation in Indonesia

Note: 'Interim Goal' for a more efficient and effective RO-RO service required when the international RO-RO service commences.

Source: JICA Study Team

Table 17.20 Monitoring Matrix for Thailand (Port of Phuket)

Institutional Aspect	Conditions if the RO-RO Service Were Opened Today	Interim Goal
Customs for vehicles	Vehicle considered an import, to be levied taxes and duties. Alternatively, a guarantee bond would be made.	Tax-Free and bond-free entry of vehicles Same treatment as vehicles crossing Malaysian highway border
Vehicle Insurance	Liability coverage only in Thailand Might need to procure insurance at the border port	Optional expansion of coverage of insurance liability including another country or countries
Driver's License	Information in Thai, using Thai characters Would need English translation in Indonesia and Malaysia	Information in Thai, using Thai characters A template license with English translation of information Personal information in Roman characters

Note: 'Interim Goal' for a more efficient and effective RO-RO service required when the international RO-RO service commences.

Source: JICA Study Team

Table 17.21 Monitoring Matrix for The Philippines (Port of General Santos City)

Institutional Aspect	Conditions if the RO-RO Service Were Opened Today	Interim Goal
Customs for vehicles	Vehicle considered an import, to be levied taxes and duties. Alternatively, a guarantee bond would be made.	Tax-Free and bond-free entry of vehicles
Vehicle Insurance	Liability coverage only in the Philippines Might need to procure insurance at the border port	Optional expansion of coverage of insurance liability including another country or countries
LHD vs RHD	Special exemption for RHD vehicles using ASEAN RO-RO Network	Exemption for RHD vehicles in Southern Mindanao

Note: 'Interim Goal' for a more efficient and effective RO-RO service required when the international RO-RO service commences.

Source: JICA Study Team

18 A POLICY AND INSTITUTIONAL FRAMEWORK FOR ASEAN RO-RO SHIPPING

The infrastructure and port facilities for RO-RO operations are fairly simple and straightforward. The smaller RO-RO vessels with forward and/or aft ramps, require port ramps, which could either be fixed ramps or adjustable ramps, depending on the tidal variation at the port. The bigger RO-RO vessels equipped with side ramps do not require port ramps, as they dock alongside the quay and the vessel's ramp sits directly on the apron for loading and unloading.

Another facet of RO-RO shipping, especially for international RO-RO services, that is very critical for its success, apart from the transport side, is the institutional aspect, more specifically, with regard to Customs, Immigration, and Quarantine formalities and regulations.

The success of domestic RO-RO operations in Indonesia and the Philippines is mostly due to the ease of operations of RO-RO vehicles. The RO-RO vehicles just line up prior to boarding, pay the fees, and roll on to the vessel during boarding time. It is even easier at the destination port, as the vessels simply roll off the vessels, there are no more payment of fees, no more delays in getting back on the road.

The same is also true in the European and Baltic countries where the environment of RO-RO operations is almost domestic or "quasi-domestic." The CIQS systems are quite well-developed, with modern monitoring methods and equipment, and the operators involved are mature and responsible enough to make the system work efficiently and effectively, with minimum losses.

The "2010 MASTER PLAN ON ASEAN CONNECTIVITY: ONE VISION, ONE IDENTITY, ONE COMMUNITY" adopted in Ha Noi, Viet Nam on 28 October 2010 correctly noted that:

> "Physical connectivity per se cannot guarantee seamless movement of goods and people across countries. Inefficient and lengthy cross-border procedures, which add unnecessary friction and costs to transport, are serious challenges that need to be addressed. At the same time, enhanced connectivity, without appropriate safeguards from abuse, could lead to transnational crimes and other cross-border challenges such as pollution and pandemics."

The proposed ASEAN RO-RO Network does not, as of yet, possess the maturity and experience so as to be at par with the successful international RO-RO services in different parts of the globe. Presently, only one international RO-RO service is in operation in ASEAN, the Muara – Labuan route. Nonetheless, this route offers some insight on what would be necessary for a successful and sustainable international RO-RO operation in ASEAN, namely; policy coordination and institutional harmonization within ASEAN; and, perhaps more importantly, route-wide coordination among the route-connecting countries.

18.1 Policy Coordination and Institutional Harmonization within ASEAN

Over the years, ASEAN formulated a number of transport facilitation initiatives to foster the right environment to create an efficient logistics and multimodal transport system for seamless movement of goods, connecting land, maritime, and air transport. Notable among these are: (a) ASEAN Framework Agreement on the Facilitation of Goods in Transit (AFAFGIT); (b) ASEAN Framework Agreement on Multimodal Transport (AFAMT), (c) ASEAN Framework Agreement on the Facilitation of Inter State Transport (AFAFIST), and (d) Roadmap Towards an Integrated and Competitive Maritime Transport in ASEAN (RICMT). Although these agreements have been signed by Member States, still many protocols of these agreements, especially Protocols 2, 6 and 7 of the AFAFGIT, have yet to be concluded or ratified In view whereof, the operationalization of these agreements may still be years down the road.

The ratification and implementation of these agreements are crucial in fostering effective cross-border facilitation. At the core to these efforts is the ASEAN Single Window, which is an environment where ten National Single Windows operate and integrate, enabling a single submission of data and information, a single synchronized processing of data and information, and a single decision-making system for customs clearance of cargo.

The RICMT is a time-bound action plan for concrete actions that ASEAN Member States need to take in order to achieve a more open, efficient, and competitive ASEAN maritime transport system. The Roadmap also deals with port and related services necessary for an efficient, secure, and reliable operation of maritime transport services. There are a number of issues that need to be addressed prior to the implementation stage, the most crucial of which is the definition of a single shipping market, and the formulation of a strategy to realize such a market, bearing in mind the issue of cabotage principle. The cabotage principle is very critical to Indonesia and the Philippines, which are two archipelagic countries, and, to some extent, Malaysia.

Cross-border facilitation and management is an essential component of enhanced ASEAN connectivity. It, however, has its own challenges in terms of cross-border procedures, owing to negative externalities (e.g., smuggling of contrabands, transnational crime and terrorism) of substantially borderless countries. The right balance must therefore be struck between encouraging and facilitating more efficient movement of goods and people on the one hand, and protecting the region and its peoples from transnational crimes and cross-border challenges and having secure supply chains throughout the region, on the other. The most critical challenge is in consolidating different policies, regulations, as well as institutions within a country, and across the Member States. ASEAN addresses this issue through an initiative to improve the cooperation between CIQ institutions in the Member States, as well as through building and modernizing the capability of the CIQ institutions. The development of an efficient and effective CIQ mechanism requires not only investment in the necessary infrastructure and technology at border checkpoints, but also the harmonization of relevant rules and regulations, procedures and standards.

18.2 Recommendations for Policy and Institutional Development

In view of the foregoing issues and concerns, and taking into account the combined results of the field surveys and the country surveys, the Study has identified common legal and institutional issues for ASEAN RO-RO shipping development. The issues are reported with recommended solutions as follows:

(1) Designation of ASEAN RO-RO shipping route as an adjunct to the ASEAN Highway Network

(Issue)

There is no document of regional agreement and consensus building about the designation of ASEAN RO-RO shipping route. Without such an official document, the general public is not aware of the development perspective of ASEAN RO-RO shipping routes/network.

However, one ASEAN agreement mentions about RO-RO vessels, albeit by reference only. It is the ASEAN Framework Agreement on the Facilitation of Inter-State Transport (AFAFIST) where 'means of transport' is defined as road vehicles, including those on-board roll-on/roll-off vessels (Article3, (f)). The AFAFIST also indicates the list of transit transport routes as specified in the Annex of Protocol 1: Designation of Transit Transport Routes and Facilities, under the ASEAN Framework Agreement on Facilitation of Goods in Transit (AFAFGIT), which shall be the designated inter-state transport routes and facilities (Article 6 1.).

(Recommendation)

If there are RO-RO shipping routes which this Study would find highly feasible and the connecting countries could decide on their early implementation, it is recommended to designate those routes and their ports as transit transport routes and facilities under relevant ASEAN agreements such as AFAFGIT, AFAFIST and the Ministerial Understanding on the Development of the ASEAN Highway Network Project. The ASEAN Highway Network, ASEAN Railway Network, ASEAN Air Linkages and the ASEAN RO-RO Shipping Network would provide a full and inter-modal connectivity, which is also the objective of the Master Plan for ASEAN Connectivity.

(2) Acceptance of transit vehicles

(Issue)

This is the most critical institutional issue that the JICA Team encountered during the field survey. The Customs authorities of Indonesia and Philippines do not accept transit vehicles and impose import duties or deposit Customs' guarantee bonds. Without acceptance or admission of transit vehicles, international RO-RO shipping cannot carry vehicles in their operation.

(Recommendation)

Article 16 of the AFAFIST requires the member states to temporarily admit road vehicles as follows:

For the purpose of this Agreement, the Contracting Parties shall grant temporary admission to road vehicles (and the fuel contained in its supply

tanks, its lubricants, maintenance supplies, and spare parts in reasonable quantities) registered in the territory of another Contracting Party, without payment of import duties and import taxes, without depositing a Customs' guarantee bond and free of import prohibitions and restrictions, subject to re-exportation and other related conditions.

It is suggested to solve this transit vehicle issue when a RO-RO route is designated as a transit transport route between connecting countries. Although AFAFIST has been signed by the Member States, however, for some countries, like the Philippines, the entry into force of the agreement would only come after its ratification by the legislative branch. It suggested that the Government Ministry or Department that signed the agreement would champion its ratification in their own legislature.

(3) Mutual recognition of driving license, vehicle inspection certificate and vehicle insurance

(Issue)

They are all important to accept transit vehicles' driving capability, roadworthiness and liability. During the field survey, Malaysia and Thailand lay stress on vehicle insurance as one of obligations of transit vehicles.

(Recommendation)

ASEAN has already harnessed several agreements and protocol for regional transport facilitation. These are:

- Agreement on the Recognition of Domestic Driving Licenses Issued by ASEAN Countries (1985);
- Agreement on the Commercial Vehicle Inspection Certificates for Goods Vehicles and Public Service Vehicles Issued by ASEAN Member Countries (1998)
- Protocol 3: ASEAN Scheme of Compulsory Motor Vehicle Third-Party Liability Insurance under the AFAFGIT

It is suggested to fully implement the afore-mentioned agreements when an international RO-RO shipping route starts to operate between the connecting countries. A more immediate remedy would be the provision of a TPL, even at a monthly or quarterly basis only, which would be reasonably cheaper, at the port of entry.

(4) PPP scheme and incentive package

(Issue)

Although there are potential RO-RO operators, the business environment is not yet mature in terms of RO-RO terminal availability and use conditions, and CIQS services.

(Recommendation)

It is suggested to work out an attractive PPP scheme and incentive package where public and private sectors' demarcation is explicitly described with a set of incentives in relation to RO-RO terminal usage, RO-RO ship investment and

operation. It is noteworthy to mention that the Port of Penang has already scheduled the implementation of its privatization program, and there is an on-going feasibility study for the privatization of the Port of Davao, which would serve as a template for privatization of other ports.

When working out the priority routes' planning reported in Chapters 14, 15 and 16, there is one precondition that international RO-RO terminals would be provided by the relevant port authorities and participating RO-RO operators should bear all costs incurred from the service provided. It is considered a starting point of the PPP scheme for ASEAN RO-RO shipping development. To make it more attractive to the private sector, the following options are worth considering in the light of sustainable service provision:

(i) Adoption of concessionary rates on marine charges and terminal tariff or exemption of those expenses;
(ii) Financial support to RO-RO fleet including fleet procurement and lease out by governmental financial institutions to RO-RO operators [1] and other financial arrangement; and
(iii) Governmental support to RO-RO ship operation in the forms of granting of temporary exclusive right to pioneering RO-RO shipping service, e.g. 5 years, offsetting operation deficit (operation subsidy) and others.

(5) Tentative route-wide arrangement

(Issue)

The AFAFIST adopts the ASEAN - X Formula where two or more member states that are ready, may negotiate, conclude and sign implementation arrangements. However, it may take more time for countrywide preparation rather than early implementation of international RO-RO shipping service.

(Recommendation)

It is suggested to make a tentative route-wide arrangement among connecting countries or work out a specific sub-regional MOU. Indonesia's experience to admit transit vehicles as in the Entikong (West Kalimantan) – Tebedu (Sarawak) cross-border traffic operation, institutionally supported by the SOSEK MALINDO framework and related BIMP-EAGA MOUs, is essential and may be relevant in the ASEAN RO-RO shipping development. The same can also be said with the Muara – Labuan RO-RO route, which is showing signs of successful operation and further expansion of services.

In order to introduce international RO-RO shipping among the ASEAN member states, an institutional framework monitoring matrix is prepared for all the member states. It includes customs treatment of RO-RO vehicles, vehicle insurance, LHD vs RHD, other vehicle issues and driver's license. It is subdivided into three (3) parts in the report: the priority routes' connecting countries (Table 18.1), other international RO-RO shipping experienced countries (Table 18.2) and CLMV countries (Table 18.3).

[1] In ASEAN, there are policy-initiated ship leasing companies such as PT. PANN, a state-own ship leasing company in Indonesia and Maritime Leasing Corporation under the Development Bank of the Philippines.

Table 18.1 Institutional Framework Monitoring Matrix for the Priority Routes' Connecting Countries

Country	Indonesia		Malaysia		Philippines		Thailand	
Institutional Framework	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**
Customs treatment of RO-RO vehicles	Vehicle considered an import, to be levied taxes and duties. Alternatively, a guarantee bond would be made, vehicle is bonded material.	Tax-Free and bond-free entry of vehicles. Same treatment as in Brunei Darussalam and East Malaysia highway borders.	A relaxed policy on entry of vehicles coming from Indonesia and Thailand as per experience.	Same treatment as vehicles crossing Thai and Kalimantan highway borders.	Vehicle considered an import, to be levied taxes and duties. Alternatively, a guarantee bond would be made.	Tax-Free and bond-free entry of ASEAN RO-RO vehicles.	Vehicle considered an import, to be levied taxes and duties. Alternatively, a guarantee bond would be made.	Tax-Free and bond-free entry of ASEAN RO-RO vehicles. Same treatment as vehicles crossing Malaysian highway border.
Vehicle Insurance	Liability coverage only in Indonesia. Might need to procure insurance at the border port.	Optional expansion of coverage of insurance liability including another country or countries.	Liability coverage only in Malaysia. Might need to procure insurance at the border port.	Optional expansion of coverage of insurance liability including another country or countries.	Liability coverage only in the Philippines. Might need to procure insurance at the border port.	Optional expansion of coverage of insurance liability including another country or countries.	Liability coverage only in Thailand. Might need to procure insurance at the border port.	Optional expansion of coverage of insurance liability including another country or countries.
LHD vs RHD	Not an issue with Malaysia and Thailand. Special exemption for LHD vehicles from the Philippines.	Not an issue with Malaysia and Thailand. Could start with containers or containers on chassis only. Exemption for LHD vehicles within North Sulawesi.	Not an issue with Indonesia and Thailand. No RO-RO link with the Philippines.	Not an issue with Indonesia and Thailand.	Would need special exemption for RHD vehicles using ASEAN RO-RO Network.	Could start with containers or containers on chassis only. Exemption for RHD vehicles within Southern Mindanao.	Not an issue with Indonesia and Malaysia. No RO-RO link with the Philippines.	Not an issue with Indonesia and Malaysia.
Other Vehicle Issues			West Malaysia has strict policy on vehicle age and vehicle's window tint.	Same treatment as vehicles crossing Kalimantan highway border. Apply mutual recognition of vehicle inspection and registration.				

Country	Indonesia		Malaysia		Philippines		Thailand	
Institutional Framework	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**
Driver's License	Information in Bahasa Indonesia, using Roman characters. Might not need translation in Malaysia. Would need English translation in the Philippines and Thailand.	Information in Bahasa Indonesia, using Roman characters. Might not need translation in Malaysia. A template license with English translation of information for the Philippines and Thailand.	Information in Bahasa Malaysia, using Roman characters. Might not need translation in Indonesia. Would need English translation in Thailand.	Information in Bahasa Malaysia, using Roman characters. Might not need translation in Indonesia. A template license with English translation of information for Thailand.	Information in English, using Roman characters, already compliant with mutual recognition of driver's license.	Information in English, using Roman characters.	Information in Thai, using Thai characters. Would need English translation in Indonesia and Malaysia.	Information in Thai, using Thai characters. A template license with English translation of information. Personal information in Roman characters.

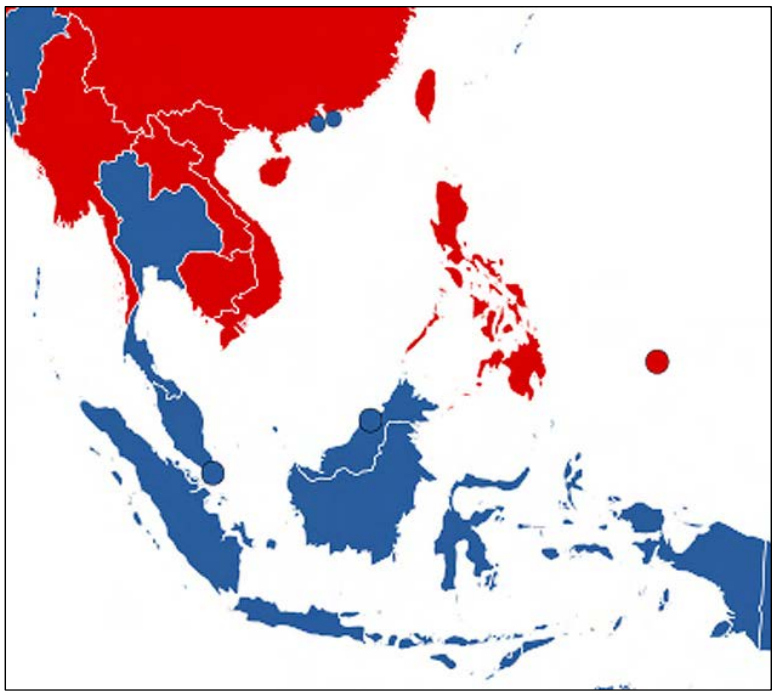
Table 18.2 Institutional Framework Monitoring Matrix for Other International RO-RO Shipping Experienced Countries

Country	Brunei Darussalam		Singapore	
Institutional Framework	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**
Customs treatment of RO-RO vehicles	Temporary admission of foreign road vehicles for an initial period of three months is allowed. However, security, in the form of bank guarantee, general bond or cash, is required. Road vehicles from Sabah and Sarawak are exempted from many customs requirements, including import duty payment and customs guarantee. A limited number of buses and coaches from Malaysia and Indonesia are allowed to enter Brunei Darussalam on a daily basis without the need to pay any import duty or security.	Tax-Free and bond-free entry of vehicles. Road vehicles from other ASEAN countries to be accorded the same treatment as to vehicles from Sabah and Sarawak.	Singapore allows temporary admission road vehicles to its territory. No customs duty is imposed on the vehicle and no customs guarantee is required. Tax is payable only if the vehicle is sold, disposed of or transferred locally.	This is already the ideal situation.
Vehicle Insurance	Malaysia's third party car insurance is recognized. Others are required to purchase Brunei Darussalam's third party car insurance before entering the country.	Optional expansion of coverage of insurance liability including another country or countries.	All foreign-registered vehicles (except Malaysia-registered) must buy mandatory insurance coverage at the immigration checkpoint in Singapore.	Optional expansion of coverage of insurance liability including another country or countries.
LHD vs RHD	LHD vehicles are not allowed in Brunei, except for diplomats' vehicles.	Temporary usage by tourist of LHD vehicles.	LHD vehicles cannot be imported for personal local registration, but temporary usage by tourists of LHD vehicles is allowed.	Temporary usage by tourist of LHD vehicles.
Driver's License	Information in English, using Roman characters, already compliant with mutual recognition of driver's license.	Information in English, using Roman characters.	Information in English, using Roman characters, already compliant with mutual recognition of driver's license.	Information in English, using Roman characters.

Table 18.3 Institutional Framework Monitoring Matrix for CLMV Countries

Country	Cambodia		Lao PDR*		Myanmar		Vietnam	
Institutional Framework	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**	**Current Situation**	**Interim Goal**
Customs treatment of RO-RO vehicles	Cambodia allows temporary admission of road vehicles free of import duty or tax up to 12 months but subject to re-exportation.	This is already the ideal situation.	Lao PDR allows temporary admission of road vehicles for a period of two years, upon payment of a security of 120% of customs duty and other fee payable, in the form of cash or bank guarantee.	Tax-Free and bond-free entry of ASEAN RO-RO vehicles.	Myanmar allows for temporary admission of foreign road vehicles. No customs bond or security is imposed on the vehicles.	This is already the ideal situation.	Vietnam has very strict rules on entry of foreign vehicles.	Tax-Free and bond-free entry of ASEAN RO-RO vehicles.
Vehicle Insurance	Insurance required to operate a motor vehicle. TPL insurance may be purchased at the designated border check points.	Optional expansion of coverage of insurance liability including another country or countries.	TPL insurance may be purchased at the designated border check points in Lao PDR.	Optional expansion of coverage of insurance liability including another country or countries.	Foreign vehicles must purchase third party liability insurance upon arriving at Myanmar's border crossings.	Optional expansion of coverage of insurance liability including another country or countries.	Insurance required to operate a motor vehicle. TPL insurance may be purchased at the designated border check points.	Optional expansion of coverage of insurance liability including another country or countries.
LHD vs RHD	RHD/LHD vehicles are allowed in the designated routes (ASEAN and GMS).	No problem.	Has a cross border arrangement with Thailand. RHD vehicles allowed in some roads.	Expand coverage to other ASEAN RHD countries.	Both LHD and RHD vehicles are allowed in Myanmar roads, but must drive on the right.	No problem.	RHD vehicles are not allowed in Vietnam, except for diplomats' vehicles.	Temporary usage by tourist of RHD vehicles.
Driver's License	Cambodian driver's license is written in both Khmer and English.	No problem.	Lao driver's license is in Lao script. Would need English translation for other ASEAN countries.	Info on Lao driver's license in both English and Lao script.	Myanmar recognizes the domestic driving license of other ASEAN Member States. Myanmar driver's license is in Myanmar script.	Info on Myanmar driver's license in both English and Myanmar script.	Vietnamese driver's license has information in both English and Vietnamese. ASEAN licenses are recognized.	No problem.

*) Lao PDR is a land-locked country, therefore there are no concerns on RO-RO shipping service. There are various agreements with neighboring countries re border crossings.



Note: Left-Hand-Drive countries in Red
Right-Hand-Drive countries in Blue

Figure 18.1 LHD vs RHD

18.3 Route-wide Coordination among Route Connecting Countries

The successful implementation and operationalization of the Muara – Labuan route underscores the fact that, notwithstanding the presence of a number of ASEAN Framework Agreements, the development of a RO-RO shipping route can be hastened through a bilateral agreement between participating countries. This is also in line with the ASEAN – X principle, wherein a number of ASEAN Member States may enter into an agreement following or adopting a general ASEAN Agreement.

Following the principles already agreed upon in the Agreement on the Recognition of Domestic Driving Licenses (1985), ASEAN Framework Agreement on the Facilitation of Goods in Transit (AFAFGIT, 1998), the ASEAN Framework Agreement on Multimodal Transport (AFAMT, 2005), and the ASEAN Framework Agreement on the Facilitation of Inter-State Transport (AFAFIST, 2009), the Consultant has drafted a template Memorandum of Understanding (MOU) between countries involved in the ASEAN RO-RO Shipping Network. The template MOU is attached as Annex 18.1. The salient features of the MOU are:

1. Priority is given to shipping companies or ship operators registered in either of the Participating Parties.
2. It is the responsibility of the ship operator to plan for an efficient and profitable frequency of service and ship schedule, in consultation and coordination with the concerned maritime and port authorities of the Participating Parties.
3. Compliance with operational, technical, safety and security standards regulated in the Participating Parties is compulsory.

The ultimate goal would be a true ASEAN Free Trade Area, where there is free movement of people and goods, very much like the European Union or Schengen States. One practical measure to facilitate cross-border traffic is through phased-in and limited entry of vehicles, e.g., allowing commercial vehicles such as trucks and buses first and expanding the vehicle coverage to private vehicles later on. Such a step-by-step implementation method has been done, and proven practicable on some road cross-border routes under the relevant bilateral, tripartite and sub-regional MOUs within ASEAN. It would also be applicable to ASEAN RO-RO shipping routes when responsible customs authorities have sufficiently addressed risk management issues, such as smuggling, etc., at the beginning of the shipping service.

19 CONCLUSIONS AND RECOMMENDATIONS

1) Conclusions

International RO-RO shipping in ASEAN has a great development potential. There is a growing concern to connect seaways with highways at the regional level. This is why the Master Plan on ASEAN Connectivity in 2010 includes the Study project as one of the priority projects. The Study has assessed some explicit users' benefits from ASEAN RO-RO shipping, including reduced logistics time, decreased cargo damage and new tourism opportunities when travelling with vehicles without interruption on seaways. In conclusion, it is convinced that stronger RO-RO shipping connectivity will offer greater economic and social interchange.

ASEAN, however, has only one international RO-RO shipping experience, i.e., Muara (Brunei Darussalam) – Labuan (Malaysia). In this sense, other regions' experiences are noteworthy:

- Northeast Asia: It plays an alternative means to container shipping within Japan, Korea and China.
- Europe: It is a dominant short sea shipping means within a quasi-domestic market. Recently EU promotes the modal shift from road transport to RO-RO shipping due to environmental protection.

While the development potential of ASEAN RO-RO shipping is significant, there are a number of conditions to be met to realize the expected effects. The development conditions are broadly divided into three, as follows:

1) Specific demand which can afford RO-RO service: In general, RO-RO shipping tariff is not cheap compared with other cargo shipping service due to peculiar ship space utilization such as the dead space between vehicle roof and hull ceiling. The Study has identified RO-RO shipping preferred cargoes such as perishable and valuable break-bulk goods. For passengers, the Study has suggested new tourism opportunities which are complementary to prevailing LCC service and existing passenger shipping service, e.g. bus tours and nighttime sailing, medical tourism by car. A RO-RO shipping business plan could capture those demand segments from convertible demand of other existing service and inducible demand among local stakeholders. However ASEAN is not accustomed to international RO-RO shipping due to limited practices. In order to enable new RO-RO shipping service to capture sufficient demand, not only RO-RO shipping operators but also governments and local economies should collaborate.

2) Vessel and Terminal: Even though RO-RO shipping does not require considerable port investment, it needs a terminal where a RO-RO vessel can be berthed safely and vehicle and passenger flows are separately arranged. As case studies, some combinations of vessels and terminals have been designed on the priority routes. Since the proposed vessel and port systems on the priority routes vary from each other, there is no universal design for ASEAN RO-RO shipping. An appropriate vessel and terminal system should be designed according to a RO-RO shipping route development plan.

3) Legal and Institutional Framework: The Study has confirmed that this is the most critical aspect for ASEAN to develop its RO-RO shipping system. For the seaways and highways connection as envisaged by ASEAN RO-RO shipping, road transport has many institutional issues to be coordinated. The biggest issue is temporary admission of foreign road transport vehicles without security deposit and import duty by customs authorities. The Study has raised and discussed those issues intensively. Regardless of the efforts, the Study has not paved the way to smooth vehicle flows on the seaway and highway connected routes particularly in Indonesia and the Philippines. The continuous discussions should be a must to forge out practical solutions among land and sea transport administrations and CIQ authorities.

2) Recommendations

The Study confirms that ASEAN RO-RO shipping is a significant regional endeavor to develop an alternative liner shipping system and to strengthen the connectivity between seaways and highways in a seamless manner. It is firstly recommended that all Member States participate in the development of ASEAN RO-RO shipping.

ASEAN transport facilitation agreements covering goods in transit (AFAFGIT), inter-state transport (AFAFIST) and multimodal transport (AFAMT) provides the relevant guiding and implementing principles to address among others the key institutional bottlenecks and constraints of ASEAN RO-RO shipping. It is therefore recommended that those regional agreements be fully ratified and effectively implemented at the possible early stage when ASEAN RO-RO shipping develops its network.

The Study has elaborated the institutional framework monitoring matrix among the Member States. The matrix shows current situation and interim goal which enables to participate in ASEAN RO-RO shipping network by country. It is recommended that the Member States facilitate their legal and institutional development in line with the matrix, as a guideline.

The Study has produced the early implementation plans of the three priority routes. It is recommended that the priority routes be implemented by 2015 as long as ASEAN sets this timeline. They are:

(1) The Dumai – Malacca Route;

(2) The Belawan – Penang – Phuket Triangle Route; and

(3) The General Santos – Bitung Route.

Due to different and inherent conditions of ports, seaways and local demands among the priority routes, the Study has worked out development plans for individual priority routes including international RO-RO terminals, preliminary ship designs, ship operation plans, etc. and evaluated them. As a result, (1) the Dumai – Malacca route and (2) the Belawan – Penang – Phuket route are rated to be financially affordable to assign adequately designed brand-new ships. On the other hand, (3) the Davao/Gensan – Bitung route needs intensive demand finding and boosting measures due to scare existing traffic on the route. A second-hand ship is imperative to make the route financially operational. Prior to the development of the priority routes, it is recommended to carefully review the planning contents in the report:

- For priority routes connecting countries:
  a) To arrange smooth vehicle/passenger flow and take necessary risk management of RO-RO shipping among related sea and road transport administrations and CIQ authorities including temporary admission of foreign road transport vehicles.
  b) To engage a route-wide MOU which indicates RO-RO shipping business environment such as the demarcation of government and RO-RO operator's roles.
  c) To report the progress and status of the priority route projects to the ASEAN Maritime Transport Working Group (MTWG).
- For responsible port authorities, to develop and operate international RO-RO terminals.
- For responsible road administrations, to improve hinterland connection with the RO-RO terminals.
- For local governments and local business associations, to promote new business opportunities when using RO-RO shipping service.
- For competent RO-RO shipping operators, to prepare RO-RO shipping operation based on their own marketing surveys and viable business plans including vessel procurement.

Finally, it is recommended that the ASEAN Connectivity Coordination Committee (ACCC), the Senior Transport Officials Meeting (STOM) and the ASEAN MTWG take on the important task of periodic monitoring of the ASEAN RO-RO shipping project at their respective levels in order that the envisaged RO-RO routes and services are operationalized, at least by 2015.

Annexes

ANNEX TO CHAPTER 16

Annex 16.1 Comparison of Alternative Shipping Routes

(1) Point of view

Presently, there are no cargo traffic data on this part of potential cargo since there is no service as of yet. So, the usual econometric methods of estimating or projecting future cargo traffic are not applicable since there is no base data to analyze or to make a regression analysis.

A different approach would have to be made to make an estimate on what the probable volume would be on the route once it is operated. This would be based on the objective of the service and what traffic, and how much of it, would be attracted by the service. This is based on the concept that plausible objective for the service would be to serve as the gateway for the North Sulawesi area.

(2) Use of Traffic Model

The usual traffic model being used for transport planning is the Gravity Model, which works on the principle that the force of attraction between two masses is equal to a constant multiplied by the two masses and divided by the square of the distance between the two masses. In other words, the force of attraction is directly proportional to the masses involve and inversely proportional to square of the distance between the two masses, or what keeps the two masses separate. It is usually shown as:

$$F = G\frac{m_1 \times m_2}{d^2}$$

Applying this model to the present issue on the choice of route, one of the masses involved would be the volume of cargo (in terms of TEUs or tons) exported or imported in the Bitung/Manado area. The other mass would be the number of container slots available in the vessels going through a particular route. The denominator would be the impedance that restricts the movement of goods. This is usually the generalized cost or the total cost of transport, including the money value and the time value of the transport cost.

The first information that would be required is the cargo traffic volume.

(3) Cargo Traffic Data for Bitung Port

The table below shows the volume of cargoes of the Port of Bitung in 2011 coming from or bound for the northeastern markets, e.g., Taiwan, Hong Kong, China, Japan, Korea, and the United States of America, which could be transshipped at General Santos for their onward voyages via the northeastern hub ports.

The tables show that the Bitung/Manado area is a net exporter with respect to northeastern countries, including China. The export to these countries are almost 37 times more than imports, in terms of tonnage, but a little more than six times more in terms of value. This means that the exports are mostly heavy but low-value goods, while the imports are of higher value goods.

Additionally, we also have to focus only on goods that are RO-RO suitable. Some of the export goods are best handled in bulk, like crude palm oil, which could understandably be a chunk of the total exports of the region. The imports, on the other hand are mostly items that can be suitable for RO-RO shipping. For this exercise, we could assume that only

30%, or 2,179 tons of the export goods and 90% or 177 tons of imports are RO-RO suitable. Expressing these in TEUs, then we would have 121 TEUs for export and 10 TEUs for import per month.

The external trade showed a very big jump in 2011 compared with 2010, with the imports more than double that of 2010, and the exports growing by 15%. For projections, it would be better to be prudent in making growth assumptions.

Table A 16.1 Potential Cargo Flow beyond the Corridor (from Bitung to General Santos)

No	Destination Country	Volume		Value		Commodities
		2009	2010	2009	2010	
1	Japan	4,604,050	5,024,878	18,395,317	16,944,690	Bluefin tuna, livestock, live milkfish for breeding, salmonidae fish, liver and roes, other flat fish, other tuna, yellow fin tuna, skipjack, kerapu, other marine fish, fish fillet, other frozen fish, smoked fish, nutmeg in shell, fish liver oil and their fractions, flour, meal and pellets of fish
2	South Korea	95,685,751	109,687,355	31,465,891	55,395,827	Other tuna, other fresh water fish, livers and roes, other smoked fish, Fraction of unrefined coconut (copra oil), Oil cake and other solid residues of coconut (copra manual/mechanic process), Oil cake and other solid residues of palm nuts or kernels
3	Hongkong	52,482	11,212	164,230	25,887	Other fish fillets, Ornamental marine fish, kerapu, other tunas, Milkfish breeder
4	Taiwan	524,246	4,649,768	565,216	1,017,966	Dogfish and other sharks, other salmonidae, other flat fish, yellow fin tuna, bluefin tuna, eels, sea bass, kerapu, other marine fish, other fish fillets, sharks fins, cuttlefish and squid, oil cake and other solid residues of coconut/copra/mechanic process, activated carbon, wood charcoal
5	China	148,927,175	167,643,453	80,802,335	104,277,867	Other wooden furniture, raw coir coconut fibers, wood charcoal, other industrial monocarboxylic fatty acid, activated carbon, iron ores and concentrates, oil cake and other solid residues of palm nuts or kernels, oil cake and other solid residues of coconut/copra manual/mechanical process, crude oil of palm kernel, fraction of unrefined coconut, crude oil of coconut, stearin refined bleached deodorized, palm oil, other seaweeds and other algae, other smoked fish, other tuna
6	Philippines	423,136	179,384	65,279	469,000	Yellow fin tuna
7	United States	78,003,717	90,467,467	62,846,221	94,612,665	Other flat fish, yellow fin tuna, other fish fillets, crude palm oil, palm oil refined, stearin refined bleached and deodorized, crude oil of coconut (copra), fraction of unrefined coconut, tunas, skipjack, bonito, activated carbon, acids oil from refining, wood charcoal
Total		328,220,557	377,663,517	194,304,489	272,743,902	
Tons/week		6,312	7,263			
RO-RO Suitable		1,894	2,179			

Source: Statistics Bureau, 2011

Table A 16.2 Potential Cargo Flow beyond the Corridor (from General Santos to Bitung)

No	Country of Origin	Volume (KG)		Value (USD)		Commodity
		2009	2010	2009	2010	
1	Japan	4,353	7,898	6,632,890	4,446,253	Flat crc
2	South Korea	62,667	102,446	359,514	657,603	Other boiler tube, weld, other thin high pressure conduit, other alloy steel
3	Taiwan	0	2,041,815	0	1,595,454	Flat crc
4	China	3,930,004	7,152,492	12,577,339	33,460,034	Petroleum bitumen, other safety fuses, detonated fuses, percussion detonating caps, igniters, electric detonator, prep and charge for fire extinguisher, refractory cements, mortars, concretes, other caps for cans of base metal, watertube boiler electric, parts of steam turbines and parts, other bridge cranes and gantry cranes, part of other lift handle load machine, conveyor, generating sets, other electronic app for switch circuits, other regulating instrument
5	Philippines	444,539	912,961	1,250,409	2,527,711	Ammonium nitrate, prepared explosive, other than propellant powders, other safety fuses, detonating fuses, percussion detonating caps, igniters, electric detonator, fishing vessels, printed other labels that form of packing for jewelry, small objects and the like
6	United States	137,660	27,074	384,672	187,023	Compress ignition pistons, flour, meal and powder of the dried leguminous vegetables
Total		4,579,223	10,244,686	21,204,824	42,874,078	
Tons/week		88	197			
ROR-able		79	177			

Source: Statistics Bureau, 2011

(4) Present Level of Service at Bitung

For the current route via Jakarta, port data show that an average of 38 ship calls connect Bitung with Jakarta and/or Surabaya, with a total monthly throughput of a little over 36,000 tons. This would translate into about 1,000 tons per ship call or 500 tons each of inbound and outbound cargo. If we assume 60% load factor, then the available cargo space for Bitung – Jakarta would be about 800 tons per day. We could safely assume that there are daily shipping services between Bitung and Jakarta, so the average waiting time is just half a day, or assumed nil.

(5) Envisaged Level of Service at General Santos

For the new General Santos – Bitung RO-RO service, we would assume that the RO-RO vessel can carry 10 TEUs, per direction per trip and there will be two round trips per week, or 20 TEUs per direction per week. Since this would be semi-weekly service, the average waiting time at Bitung Port would be 1.75 days or, say, two days.

(6) Application of the Gravity Model

For impedance the usual transport costs are the money value of the freight and the equivalent value of time spent in transporting the goods.

Freight costs are complicated because they are dependent on many things, not only sailing distance. The sailing distance from Hong Kong to Bitung via Singapore and

Jakarta is about 3,300 nautical miles, while that via Manila and General Santos is around 1,750 nautical miles. By sailing distance alone, the freight for the Bitung – Hong Kong via General Santos route would be about 60% of the Bitung – Hong Kong via Jakarta route. However, it could be argued that the Singapore – Hong Kong leg would be relatively cheaper because it would be using bigger mother vessels, with lower cost per nautical mile. Just for calculation purposes, we assume that the total shipping cost for Bitung – Hong Kong via General Santos is US$900 per TEU, while that for Bitung – Hong Kong via Jakarta is US$1,200.

The sailing time from Bitung to Jakarta would be four days and an average of one day port stay, then Jakarta to Singapore would be two days, and another one day at the port and loaded to a ship going to Hong Kong with sailing time of five days. It would take an average of 13 days from Bitung to Hong Kong via the present route.

For the new General Santos – Bitung RO-RO service, we would assume that the sailing time from Bitung to General Santos would be one day, and there will be an average of three days stay at the port before it is loaded on to the vessel that will take it to Hong Kong (or Kaohsiung) with sailing time of five days. Thus, it would take an average of nine days to move the cargo from Bitung to Hong Kong via General Santos.

If we assume further that the time cost is US$ 50 per day and that the constant is unity (1), then the forces of attraction, for exports, for each route would be:

$$F(gs) = \frac{121 \times 30 \times 2}{(900 + 11 \times 50)^2}$$

Or F(gs) = 0.003453

$$F(jak) = \frac{121 \times 44 \times 7}{(1{,}200 + 14 \times 50)^2}$$

Or F(jak) = 0.010324

This means that the total force acting on the volume of export cargo is 0.013777, and that F(gs) exerts 25% of the total force and F(jak) exerts 75%. So, based on the foregoing assumptions, the new route would be able to attract about 540 tons per week, or a load factor of about 50% for outbound trade. Using the same formula, we would get only 54 tons for inbound cargo.

For sensitivity analysis, we looked at the effect of price and time cost. The following figure shows that the percent share of the new RO-RO route would dramatically increase if its total freight cost would approximate about half of the present service.

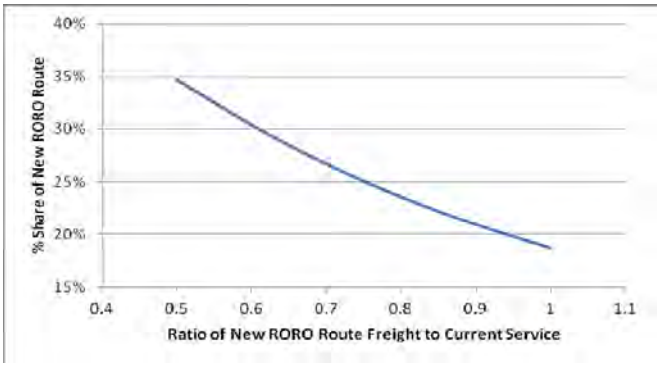


Figure A 16.1 Share of New RO-RO Route

ANNEX TO CHAPTER 18

Annex 18.1

A Template for

MEMORANDUM OF UNDERSTANDING BETWEEN [AND AMONG] THE GOVERNMENTS OF [COUNTRY A], AND [COUNTRY B], [AND COUNTRY C] ON THE ROLL-ON/ROLL-OFF SHIPPING SERVICE BETWEEN [AREA A] AND [AREA B] [AND AREA C]

The Governments of [COUNTRY A] and [COUNTRY B], [and COUNTRY C], hereinafter referred to individually as the Participating Party, and collectively as the Participating Parties, being members of the Association of Southeast Asian Nations (ASEAN);

RECALLING the goal of the Master Plan on ASEAN Connectivity, adopted at the 17th ASEAN Summit on 28 October 2010, is to connect ASEAN through enhanced physical infrastructure development (physical connectivity), effective institutional arrangements (institutional connectivity) and empowered people (people-to-people connectivity);

RECALLING also the strategy of the Master Plan on ASEAN Connectivity is to establish efficient and reliable shipping routes connecting mainland and archipelagic Southeast Asia through, among others, the development of roll-on/roll-off (RO-RO) shipping services;

ADHERING to the [Indonesia-Malaysia-Thailand – Growth Triangle (IMT-GT) / Brunei Darussalam – Indonesia – Malaysia – The Philippines - East Asia Growth Area (BIMP - EAGA)] Implementation Blueprint 2012-2016 adopted at the [Sixth IMT-GT Summit on 04 April 2012 / Eighth BIMP-EAGA Summit on 04 April 2012], which gives priority to development of RORO shipping services in the [Dumai (Indonesia) – Malacca (Malaysia) Economic / Greater Sulu Sulawesi] Corridor;

RECOGNIZING that the establishment of RORO shipping services will greatly enhance trade and people movement between [AREA A] and [AREA B] [and AREA C];

HAVE AGREED AS FOLLOWS:

1. Objective

The objective of this Memorandum of Understanding is to facilitate the establishment and sustainable operation of RO-RO shipping between [PORT A] in [AREA A], [COUNTRY A] and [PORT B] in [AREA B], [COUNTRY B], [and PORT C in AREA C, COUNTRY C] (hereinafter referred to as the Designated Ports).

2. Licensed Operator and Vessel

Any vessel operator duly registered in [COUNTRY A] or in [COUNTRY B] [or in COUNTRY C] (hereinafter referred to as the RORO Operator) may provide the RORO service using any number of vessels.

3. Obligation of RORO Ferry Operator

3.1 Compliance with Operational, Technical, Safety and Security Standards

The RORO Ferry Operator shall take all measures to ensure that the RORO shipping services provided are regular and in compliance with the operational, technical, safety and security standards in force in the Participating Parties.

3.2 Frequency of Service and Sailing Schedule

3.2.1 The RORO Ferry Operator shall plan for the appropriate level of service, in terms of service frequency and sailing schedules, to encourage movement of goods and persons, and shall duly notify the relevant authorities in the Participating Parties before the start of the service.

3.2.2 Should there be changes to the sailing schedule, the RORO Ferry Operator shall notify the relevant authorities in the Participating Parties of such a change at least one week in advance.

3.3 Operation Cost

As far as practicable, the RORO Ferry Operator shall bear all costs incurred from its RORO ferry operation.

3.4 Insurance

The RORO Ferry Operator shall provide sufficient insurance coverage for the passengers on board its vessel for the purpose of meeting any compensation or claims that may arise from its ferry service.

3.5 Representative Offices

The RORO Ferry Operator shall establish a representative office or appoint an agent in the other Participating Party for the purpose of facilitating its business and traffic operations. The number of expatriates of the total staff force of the representative office shall be in accordance with the national laws of the said Participating Party.

4. Port Facilities and Services

The Participating Parties shall, from time to time, upgrade port facilities and services especially passenger, vehicle and cargo handling capability and capacity at their respective Designated Port, as well as other ancillary port services.

5. Marine Charges and Terminal Tariff

To promote sustainability of the RORO shipping operation, the Participating Parties shall provide concessionary rates (e.g., BIMP-EAGA rates) on marine charges and terminal tariff to the RORO ferry operator.

6. Custom, Immigration and Quarantine (CIQ) Formalities

6.1 The Participating Parties shall simplify, streamline and harmonize customs procedures, as well as sanitary and phytosanitary measures, at their respective Designated Port.

6.2 The Participating Parties shall coordinate the hours of operation of the CIQ authorities at the Designated Ports to ensure smooth operation of the RORO ferry service.

6.3 Passengers and transport crew on-board the RORO ferry vessel shall possess a valid passport or international travel document in lieu of the passport.

6.4 The Participating Parties shall exempt each other's citizens holding valid national passports from visa requirement in accordance with the ASEAN Framework Agreement on Visa Exemption signed on 25 July 2006.

7. Safety, Security and Environmental Protection Standards

The Participating Parties shall jointly undertake measures to ensure the RORO ferry operation meets the safety, security and environmental protection standards set by the International Maritime Organization, and relevant regional agreements.

8. Transport Pricing

The transport price shall be best determined by market forces**.** The Participating Parties shall ensure that the RORO Ferry Operator refrains from any measure or practice that tends to distort free and fair competition.

9. Temporary Admission of Road Vehicles

The Participating Parties shall grant temporary admission to road vehicles (and the fuel contained in its supply tanks, its lubricants, maintenance supplies, and spare parts in reasonable quantities) registered in the territory of the other Participating Party, without payment of import duties and import taxes, without depositing a Customs' guarantee bond and free of import prohibitions and restrictions, subject to re-exportation and other related conditions in accordance with the ASEAN Framework Agreement on the Facilitation of Inter-State Transport (AFAFIST) signed on 10 December 2009.

10. Types of Road Vehicle

Road vehicles on-board the RORO ferry may include:

- Bicycles
- Motor-cycles
- Private and government cars, multi-purpose vehicles (MPVs), vans;
- Commercial tourist buses; and
- Commercial freight vehicles as specified in Protocol 3 of the ASEAN Framework Agreement on the Facilitation of the Goods in Transit (AFAGIT), which entered into force on 19 April 2010.

11. Entry Permit for Commercial Tourist Buses and Freight Vehicles

11.1 Commercial tourist buses and commercial freight vehicles from a Participating Party travelling to the territory of the other Participating Party shall be required to secure a vehicle permit from the Government of the other Participating Party.

11.2 Such permit should be valid for 12 months.

11.3 The number of permits issued shall be determined by market forces for transport services.

11.4 Private and government vehicles are exempted from such permit requirement.

12. Identification Marks, Certificate of Registration and Registration Plate

12.1 Road vehicles in cross-border traffic shall be registered in their home country (i.e., the country of registration). They shall bear identification marks (trademark of manufacturer, chassis and engine serial number), carry a valid certificate of registration issued by the government agency responsible for regulating transport-related activities of their home country and display their registration number on a plate in the rear and the front.

12.2 The Participating Parties shall mutually recognize the vehicle registration certificate and registration plate.

13. Technical Conditions of Road Vehicles

Road vehicles from a Participating Party must comply with the technical standards on weights, axle loads and dimensions in force in the other Participating Party.

14. Technical Inspection Certificates

14.1 Road vehicles travelling to the territory of the other Participating Party shall be road worthy. The Participating Parties shall be responsible for the supervision of the roadworthiness of their respective road vehicles.

14.2 The Participating Parties shall mutually recognize each other's technical inspection certificate of goods vehicles and public services vehicles in accordance with the Agreement on the Recognition of Commercial Vehicle Inspection Certificates for Goods Vehicles and Public Services Vehicles Issued by ASEAN Member Countries signed at Singapore on 10 September 1998.

15. Driving Licenses

The Participating Parties shall mutually recognize each other's driving licenses in accordance with the Agreement on the Recognition of Domestic Driving Licenses issued by ASEAN Countries signed at Kuala Lumpur in Malaysia on 9 July 1985.

16. Road Safety Standards

Road vehicles from a Participating Party must comply with the road safety standards in force under the laws of the other Participating Party.

17. Compulsory Third-Party Motor Vehicle Liability Insurance

To be adequately insured against death or bodily injuries and/or property damages arising from road traffic accidents in the territories of the other Participating Party, road vehicles from a Participating Party travelling to the territory of the other Participating Party shall comply with the compulsory third-party motor vehicle liability insurance required thereat.

18. Safety and Security

The Participating Parties shall ensure the safety and security of travellers, goods and vehicles through coordination and cooperation among the authorities concerned and to render all necessary assistance in the event of accidents, casualties or deaths.

19. Access Roads to the Designated Ports

To allow for freer movement of road vehicles, the Participating Parties shall designate the access road to their respective Designated Port as part of the ASEAN Transit Transport Routes under Protocol 1 of the ASEAN Framework Agreement on the Facilitation of Goods in Transit (AFAFGIT) signed on 16 December 1998.

20. Consultations

In the ASEAN spirit of solidarity and cooperation, the Participating Parties shall consult each other from time to time in ensuring the full implementation of this Memorandum of Understanding.

21. Review and Amendment

21.1 This Memorandum of Understanding may be revised, modified or amended by the Participating Parties as and when needed to ensure its effective implementation.

21.2 A Participating Party may request in writing any revision, modification or amendment of all or any part of this Memorandum of Understanding. Such revision, modification or amendment shall be mutually agreed upon in written form by the other Participating Party, and shall form an integral part of this Memorandum of Understanding. Such revision, modification or amendment shall enter into force on such date as may be agreed upon in writing by all the Participating Parties. Any revision, modification or amendment shall not prejudice the rights and obligations arising from or based on this Memorandum of Understanding before or up to the date of such revision, modification or amendment.

22. Settlement of Disputes

Any disputes or differences arising out of the interpretation or implementation or application of the provisions of this Memorandum of Understanding shall be settled amicably through consultation or negotiation between the Participating Parties.

23. Entry into Force and Duration

This Memorandum of Understanding shall enter into force on the date of its (signing) ratification and shall remain in force until terminated.

24. Termination

Any Participating Party may terminate this Memorandum of Understanding by written notification to the other Participating Party at least six (6) months prior to such termination.

IN WITNESS WHEREOF, the undersigned, being duly authorized to sign by their respective Government, have signed this Memorandum of Understanding.

Done at [XXXX] in [XXXXX] on [XX in 201X].

For the Government of [COUNTRY A]

.....
Minister [or Senior Officials] for Transportation

For the Government of [COUNTRY B]

.....
Minister [or Senior Officials] of Transport

For the Government of [COUNTRY C]

.....
Minister [or Senior Officials] of Transport