

Chapter 9 Issues of Maritime and Port Sectors

9.1 Issues of Maritime Sector

Referring to Chapter 4, present status of maritime sector, and Chapter 7, present status of shipping industry in neighboring countries, the issues and possible counter measures for the maritime sector are summarized in the following tables. Related subsection can be referred to [] in each subsection.

9.1.1 Water-borne transport, shipping companies, operating route and inland water transport [Refer sub-chapter 4.1]

According to the benchmarking that was done by the study team, container transportation cost from Sihanoukville to the west coast of the US is about 20% higher than that of neighboring large ports. Higher cost simply means that Sihanoukville is not yet a gateway in the global container network. Throughput is too small and the number of loops is limited. Other related transportation costs are also higher so that extensive measures should be elaborated to acquire international competitiveness.

<i>Issues</i>	<i>Measures</i>
Upgrading the Sihanoukville port to gateway status	Integrated development of Sihanoukville SEZ and port. Development of Phnom Penh Sihanoukville Growth Corridor is also expected. Intensive effort for port sales. Joint venture with international terminal operators.
Enhancement of Phnom Penh to allow HCMC container transport.	Day of the week service. Night navigation. Employing larger size vessels in Mekong River transport by dredging.
No Cambodian enterprise for container transport. Dependence on the foreign logistics enterprises. Enterprises are deeply related to huge buyers. Foreign companies manage most cargo transport. No Cambodian sales agents. Individual factory (shipper / consignee) has no direct access to shipping companies.	Enhancement of private companies for logistics and forwarder business. Encouragement of private shipping and sales agents. Reconsideration of the role of KAMSAB. Reduction of empty container ratio.
Water-borne transport by Cambodian vessels is rare. Establishment of reliable transport of oil product and bulk cargo. CIF contract with foreign enterprise in tanker transport.	Consideration of own fleet transport for oil and bulk cargo. Effective national incentives for Cambodian operated vessels..
Opening of cement factory.	Observation.
Trend of passenger transport.	Observation.

9.1.2 Customs, CAMCONTROL and Immigration [Refer sub-chapter 4.8]

CAMCONTROL is a unique Cambodian institution that is responsible for quality control at the border. Although quality control is important, checking of all items is not necessary or desirable from the standpoint of efficiency.

On the other hand, Cambodia initiated the national risk management system in 2006. This system is based on the electronic recording and risk assessment functions. It is widely recognized that enhancement of trace-ability is useful for supply chain management as well as risk management. As CAMCONTROL plays an important role in IIFG, it is expected to enhance the security and efficiency of ports at the same time

<i>Issues</i>	<i>Measures</i>
Double check at border by Customs and CAMCONTROL.	More efficient quality control system should be employed.
Implementation of new Cambodian risk management system by IIFG into port security system.	Strengthen the connection between port security system and IIFG. Consciousness of Supply Chain Management in port operation.

9.1.3 Maritime administration, structure and legislation [Refer sub-chapter 4.2]

Many issues exist concerning legislation and the ratification of international conventions. Although national legislation should be devised by individual nations in principle, many issues are common to all as far as technical matters are concerned. Accordingly, practical procedures should also be considered in the process.

<i>Issues</i>	<i>Measures</i>
Legislation of maritime code. Legislation of Ship Safety Regulation. Ratification of International Conventions (listed below). Reviewing the relationship between national regulation and international conventions.	Introduction of experts. Application of internationally accepted code like Safety Regulation for Non-conventional Sized Ships (UNDP/IMO) ASEAN or Regional Cooperation for common rules.

Conventions to ratify:

UNCLOS, HNS(Hazardous and Noxious Substance) 1996, OPRC/HNS (Hazardous and Noxious Substance) 2000, LC72 (Dumping of Wastes), SAR, SUA 88(Suppression of Unlawful Act against safety of maritime navigation), STCW95, ILO convention No. 147, FAL 65, 2005 amendments, CSC (Safe Containers), LLMC (Limitation of Liability)

9.1.4 Ship registration and inspection [Refer sub-chapter 4.5]

After the ship safety regulation is established, significant manpower will be necessary. It is important to plan what institution will be responsible for implementing registration and inspection. Open registry of Cambodia resulted in an embarrassing situation and created confusion in the maritime sector. Strong political decision-making is urgently required.

<i>Issues</i>	<i>Measures</i>
Ship registration is not executed.	Capacity building of ship inspector.
Ship inspection is not executed.	Use of classification society.
Open registry.	Strong political decision-making.
Lack of implementation body.	Establishing a body for CSC.

9.1.5 Cooperation with neighboring countries

[Refer sub-chapter 4.3]

Implementation of PSC, SAR and oil pollution prevention measures are strong and common issues for ASEAN countries. Cambodia, Thailand and Vietnam are preparing cooperative implementation. This sort of effort should be encouraged and effective support should be prepared.

<i>Issues</i>	<i>Measures</i>
Port State Control	Join Tokyo MOU.
Search and rescue Lack of facilities.	Regional Coordination Center Donation of GMDSS
Oil pollution prevention	Framework program of Cambodia, Thailand and Vietnam. Sharing the cleaning material, information and human resources. Establishment of National Oil Spill Response Center.
Lack of implementation body.	Establishing a body for CSC.

9.1.6 Seafarers

[Refer sub-chapter 4.6]

Qualification and registration of seafarers remain outstanding issues. It should be reminded that seafarers are necessary not only in ship handling but also in shipping management. Maritime Training Center was opened in 2006 in cooperation with Belgium. This is a very small start and continuous support will be necessary.

Cambodia also has expectation in increasing the employment possibility for younger generation. Rating crew supply for global seafarers' market can be an opportunity.

<i>Issues</i>	<i>Measures</i>
No record of number of Cambodian seafarers. No effective registration and certification system exists for Cambodian seafarers. Endorsement system for foreign certificate.	Introduction of experts. Common understanding of required skill in inland water navigation.
Lack of implementation body.	Establishing a body for CSC.
Seafarers training institution.	Maritime training center was opened in 2006.
Lack of STCW compatible practice training facilities.	Donation of practical training facilities.
Rating crew training	Establishment of training center

9.1.7 Other maritime related issues

[Refer sub-chapter 4.7]

<i>Issues</i>	<i>Measures</i>
No ship-repairing yard.	New shipyard.
Dry port development.	Working well. Larger scale and rail linked operation is expected.
Van pool and container repairing.	Larger scale is expected (van pool/container repairing.)

9.1.8 Trends in neighboring countries

[Refer sub-chapter 7.1, 7.2]

Policy trends of neighboring countries should be carefully observed to achieve competitiveness in the maritime sector.

<i>Issues</i>	<i>Measures</i>
National fleet expansion.	Own fleet for oil and bulk transport.
Increase supply of seafarers.	Expansion of Training center.
Adaptation to globalization.	Expanding the scope for logistics

Note:

CSC stands for "Coastal State Control" proposed by MPWT

The measure corresponds to the issue "Lack of implementation body"

Implementation body may be Cambodian Coast Guard

9.2 Issues of Port Sector**9.2.1 General**

Sihanoukville Port and Phnom Penh Port play important roles as international logistics infrastructure in Cambodia. Many cargoes necessary for people's daily life and industrial activities are exported and imported through these two ports.

Management bodies of both ports were designated as autonomous ports by the sub-decree No 50 "The Establishment of the Sihanoukville Autonomous Port" and No. 51 "The Establishment of the Phnom Penh Port Autonomous Port" in 1998. At present, both ports are managed as state enterprises under MPWT.

Sihanoukville Port is an international sea port which represents Cambodia. Maximum depth of the wharf is 9m. At present, a new container terminal with 400m-long quay, two quay cranes and a container yard of approximately 350 m in width is under construction through the cooperation of Japan.

Main facility of Phnom Penh Port is a wharf of 300m in length with apron of 20m in width which was constructed through the cooperation of Japan. Despite navigation restrictions on the Mekong River, cargo through the port is increasing due to its advantageous location in Phnom Penh City. The increase of container cargo is particularly remarkable and container volume is forecasted to exceed the present capacity in a few years.

There are oil terminals owned and operated by private companies on the coast of Kompong Som Bay/Gulf of Thailand and in the Mekong River. In addition, small ports owned and operated by private companies or provincial bodies are located on the coast and on the Mekong and other rivers. Cargo volume through these small ports is small but in line with the progress of privatization in

Cambodia, some ports are planning to expand their activities. Furthermore, new private port development has been proposed to the Government.

As a result of economic growth and increase of industrial activities in Cambodia, import and export cargo from/to Cambodia will increase more and more. Coping with this situation, the port sector in Cambodia is expected to play a major role and to be a driving force of the Cambodian economy.

Important movements in the Cambodian port sector include the autonomy being given to two large ports, progress in increasing the capacity of ports, and greater private sector participation. On the other hand, international situation surrounding ports in Cambodia is also changing; for example, deep seaports are going to be developed in Vietnam.

Therefore, the port sector in Cambodia is at a point where it must decide the basic direction of port development and management.

Current issues facing the Cambodian port sector are examined below.

9.2.2 Efficiency of International Maritime Transport Service

One of the most important issues from the viewpoint of efficient international maritime transport service is that a port shall not become a bottleneck in the logistic network. To avoid this, sufficient capacity and appropriate layout of port facilities, satisfactory port service and efficient cargo handling and smooth procedures in the port are required. In addition, good cost performance is also an important factor.

Based on these factors, current issues facing Sihanoukville Port and Phnom Penh Port are examined (see Table 9.2.1 and Table 9.2.2).

Table 9.2.1 Current Issues from the Viewpoint of Efficiency of International Maritime Transport on Sihanoukville Port

<i>Issues</i>	<i>Measures</i>
Decrease of Cargo through Port	Enhancement of Cost and Service, Implementation of Port Promotion
Concentration of Container Vessel Calls	Increase in Number of Calling Vessels, and Rearrangement of Calling Day
Trunk Lines do not call	Enhancement of Connection with Trunk Line
Lower Efficiency in Container Terminal Operation	Introduction of Efficient Container Terminal Operation with Modern System
Complex Port Procedures	Introduction of Unified Port Procedures
Long Waiting Time of Trucks in or near Port	Efficient Use of Port Area and Procedural Enhancement in Port
Inadequate Security Check of Export Containers	Installation of New Container Scanner
Shortage of Facility/Area for Coping with New Cargo Handling and Storage Requests	Improvement of Necessary Port Facilities
Lack of Passenger Terminal and Inconvenience of Passengers	Improvement of Passenger Terminal
Restriction on Efficient Use and Future Development of Port Area	Effective Use of Port Area
Importance of Communication among Public and Private Sectors related to Ports	Establishment of Permanent Organization for Port Promotion
Competitiveness with Phnom Penh Port	Port Management and Operation Strategy that Maximizes Advantage of Sea Port

Table 9.2.2 Current Issues from the Viewpoint of Efficiency of International Maritime Transport on Phnom Penh Port

<i>Issues</i>	<i>Measures</i>
Rapid Increase of Container Cargo	Increasing Capacity of Container Handling
Transshipment at Deep Sea Ports in Vietnam	Enhancement of Connection with Trunk Lines
Necessity for Regular Maintenance Channel Dredging	Implementation of Maintenance Dredging
Lower Efficiency in Container Handling	Installation of Container Handling Equipment
Complex Port Procedures	Introduction of Unified Port Procedures
Inadequate Security Check for Export and Import Containers	Installation of Container Scanner
Congestion of Wharf and Shortage of Port Area	Improvement of Container Yard
Congestion of Road near Port	Improvement of Road in Phnom Penh City
Importance of Communication among Public and Private Sectors related to Ports	Establishment of Permanent Organization for Port Promotion
Competitiveness with Phnom Penh Port	Port Management and Operation Strategy that Maximizes Port's Advantageous Location

9.2.3 Promotion of Industrial Growth

In this age of the global economy, industries in almost all countries procure raw materials and sell their products on the world market. Accordingly, international logistics is a key factor for industrial activities. Logistics service that can transport the necessary volume of goods at the required time and at a low cost makes industries competitive.

Logistics services satisfying these requirements will be an important factor in promoting the location of industries. Ports are expected to play main roles for providing such services. In addition, it is important for ports to have potential for future development so as to cope with the expansion of industrial activities.

Current issues from the viewpoint of enhancement of international competitiveness for promoting industrial activities are listed in Table 9.2.3 for Sihanoukville Port and Table 9.2.4 for Phnom Penh Port.

Table 9.2.3 Current Issues from the Viewpoint of Industrial Activity Promotion on Sihanoukville Port

<i>Issues</i>	<i>Measures</i>
Trunk Lines do not call	Enhancement of Connection to Trunk Lines
Concentration of Container Vessel Calls	Increase in Number of Calling Vessels, and Rearrangement of Calling Day
Various Kinds of Costs levied on Exports and Imports through Port	Establishment of Competitive Charge
Time/Cost Disadvantage due to Remote Location of Industries	Improvement of Conditions on Road Transportation
Shortage of Port Facility/Area for Coping with Request from Industries in the Hinterland	Improvement of Port Facilities
Shortage of Facility/Area to Accommodate New Industry with Direct Connection to the Port	Port Development for Port-related Industry
Low-level of Industrialization in Area near Port	Promotion for Location of Industry near Port
No Industries with Direct Connection to Port	Creation of Industrial Core in Port SEZ

Table 9.2.4 Current Issues from the Viewpoint of Industrial Activity Promotion on Phnom Penh Port

<i>Issues</i>	<i>Measures</i>
Transshipment at Deep Sea Port	Enhancement of Connection with Trunk Line
Capacity Restriction for Navigation in Mekong River	Improvement of Navigational Conditions
Various Kinds of Costs Levied on Exports and Imports through Port	Establishment of Competitive Charge
Shortage of Port Facilities for Bulk Cargo	Improvement of Bulk Cargo Handling Facility
Shortage of Container Storage Area	Improvement of Container Yard
Lack of Port Expansion Area Adjoining Present Location	Port Development at New Site

9.2.4 Rational Role-Sharing of International Cargo Transport

Due to improvements of the international road network and simplification of procedures at borders, cross border transportation will be much more active and the structure of international logistics in Cambodia will likely change. Competitiveness of road transportation will increase and thus a higher level of service will be required for the port sector.

International logistics structure in this region under a rational functional allotment of both transport means will promote prosperous industrial activities and benefit the lives of citizens.

In formulating such a structure, ports have to share an important role. Current issues from the viewpoint of role-sharing between road and sea transportation are listed in Table 9.2.5.

Table 9.2.5 Current Issues from the Viewpoint of Role-sharing between Road and Sea Transportation

<i>Issues</i>	<i>Measures</i>
Necessity to Enhance Competitiveness with Road Transportation	Mechanism to Cope with Customer's Request
Necessity to Enhance Port Function in order to Maximize Advantage of Sea Transportation	Research and Port Promotion
Shortage of Port Facility for Cargo with Advantage in Sea Transportation	Expansion of Port Facilities to Cope with Increasing Cargo

9.2.5 Classification of Public and Private Roles in the Port Sector

Ports greatly influence the national economy and society and the effects of various kinds of port activities extend across a wide area. The distribution of cargo through ports is also vital to everyday life. In this sense, ports are public infrastructure. International gateway ports are even more important as they are representative of a nation. On the other hand, greater private sector participation is also a significant trend. But there is a concern that several problems such as inefficient investment in port sector, disorder development and utilization of land and sea, imperfection in requirement to international ports and system for safe navigation of vessels from/to the port, inappropriate port service and bad influence to environment etc. may occur if private ports expand their activities without appropriate port administration.

It is important that the public sector and private sector make use of their respective characteristics to maximize efficiency in the port sector and to benefit the Cambodian State as a whole.

Current issues from this viewpoint are listed in Table 9.2.6.

Table 9.2.6 Current Issues from the Viewpoint of Roles of Public and Private Sector

<i>Issues</i>	<i>Measures</i>
Private Port Development and Operation not Satisfying Global Standards	Rational Supervision of Private Sector under Present Institution
Necessity of Consensus on Role Sharing between Autonomous Port and Private Port	Establishment of National Port Policy
Lack of Port Administration System Supervising Private Sea Ports	Establishment of Port Administration System for Private Ports
Inadequate Coordination Scheme between Projects by Private Sectors and National Port Policy	Establishment of Comprehensive Port Administrative System

9.2.6 Compliance with International Conventions

Ports are international infrastructure and thus required to comply with international conventions. This may involve improving or establishing the required domestic legal frameworks and the required port facilities.

Regarding International conventions, current issues are listed in Table 9.2.7.

Table 9.2.7 Current Issues from the Viewpoint of International Conventions

<i>Issues</i>	<i>Measures</i>
Lack of Measures against Oil Spill Contingency	Establishment of System for Oil Spill Contingency
Delay in Preparing Domestic Law on Port Security	Enhancement of Administration on Port Security
Lack of Framework for Simplifying Port Procedures	Ratification of Treaty and Establishment of Domestic Law

9.2.7 Development of Law, Regulation and Institution

Various kinds of administrative actions such as controlling calling vessels and supervising trade and port related businesses as well as customs, immigrations and quarantines etc. are executed in international ports. In addition, port development also impacts regional development and thus also has ramifications on land administration, regional administration and the environment. And in Cambodia, the administration of foreign capital investment is also often an issue.

In the age of the global economy, volume and commodities of export and import cargo through ports is increasing and the role of international ports is becoming much more important. These tendencies apply to Cambodia as well, and expectations and demands on the port sector in Cambodia will increase. To cope with this situation, it is necessary to establish a rational and appropriate port administration system and formulate the necessary legal framework for ports.

Current issues on port administration and legal framework are listed in Table 9.2.8.

Table 9.2.8 Current Issues on Port Administration and Legal Frame

<i>Issues</i>	<i>Measures</i>
Complicated Port Administration System	Establishment of Proper System on Port Administration
Lack of National Port Policy	Formulation of National Port Policy
Difficulty of Reflecting Port Sector's Viewpoint into Port Development	Establishment of Institution on Port Development
Necessity for Port Policy Consistent with National Land Development and Economic Policy	Establishment of Coordinating System among relevant Plans/Policies
Lack of Nationwide Information/Data on Port Activities	Establishment of Port Statistics System

9.2.8 Capacity Development

The port sector must continually respond to the rapid changes in the international economy. Fostering human resources related to ports is a basic issue in every country. In Cambodia where its economy is growing largely, capacity development in this field is especially required.

Current issues on human development are listed in Table 9.2.9.

Table 9.2.9 Current Issues on Human Development

<i>Issues</i>	<i>Measures</i>
Mismatch between existing Administrative Organizations and Recent Requirements	Establishment of Administrative Organization to Cope with Latest Demands
Shortage of Human Resources with Experience and Expertise in Port Development and Planning	Capacity Development in the Field of Port Development
Shortage of Human Resources with Experience and Expertise in Port management and Operation	Capacity Development in the Field of Port Management
Shortage of Human Resources with Experience and Expertise in Port Administration	Capacity Development in the Field of Port Administration
Shortage of Skilled Persons in Container Terminal Management and Operation	Training of Port Terminal Manager and Operator

Chapter 10 Demand Forecast and Long Term Issues

10.1 Economic and Social Framework (Target Year 2020)

Population and GDP are adopted as indices for the macroscopic transportation demand forecast. These indices are quoted from the report of the JICA study “The Study on the Road Network Development in the Kingdom of Cambodia” (2006) (hereinafter referred as “the Road Network Study.”)

10.1.1 Growth Rate of Population and GDP

(1) Population

The population forecast is based on the report “First Revision Population for Cambodia 1998-2020” (National Institute of Statistics, 2005) and calculated in the Road Network Study as below.

Table 10.1.1 Population Forecast

Year	2005	2010	2015	2020
Population (thousand)	13,350	14,732	16,261	17,945
Annual average growth ratio		2.1%	2.1%	1.9%

Source: The Study on the Road Network Development in the Kingdom of Cambodia (2006)

(2) GDP

In the Road Network Study, “6%” is adopted for the growth rate until 2010 as the MEF Scenario. For the period from 2015 to 2020, the value “6.9%” and “7.8%,” which is a little higher than the MEF Scenario, is adopted because the MEF Scenario is a little lower than the Trend Scenario.

Table 10.1.2 GDP Growth Rate (3 cases)

Sector	GDP growth rate			
	2004-05 (Actual)	2009-10	2014-15	2019-20
Trend Scenario	7.7%	8.2%	9.4%	10.6%
MEF Scenario	7.7%	6.0%	6.4%	6.4%
Proposed Scenario	7.7%	6.0%	6.9%	7.8%
Primary Sector	-2.0%	3.8%	3.8%	3.8%
Secondary Sector	16.1%	7.2%	8.0%	10.0%
Tertiary Sector	9.2%	7.1%	8.0%	8.0%

Source: The Study on the Road Network Development in the Kingdom of Cambodia (2006)

10.1.2 Future Framework of Population and GDP

The growth rate of population and GDP for the macroscopic transportation demand forecast is set as below. The GDP value of year 2005 in the Road Network Study is replaced by the newer data cited from “Cambodian Statistical Year Book 2006” (National Institute of Statistics, 2007.)

Table 10.1.3 Social and Economic Future Framework

Year	2005 (Base Year)	2010	2020
Population (Thousand)	13,350	1.00	1.34
GDP (billion Riel)	25,350	1.00	2.73
GDP (million USD)	6,195	8,425	17,037

Source: The Study on the Road Network development in the Kingdom of Cambodia (2006)
Cambodian Statistical Year Book 2006

10.1.3 Foreign Trade

According to the foreign trade statistics (value basis) for recent several years, on export, value and growth rate of products exported under General System of Preferences, which include garment, are high. Growth rate of some agricultural products, such as rice and rubber, are also high, although the value is still small. Amount of logs and sawn timber is decreasing.

Table 10.1.4 Export Statistics (*1)

(Unit: million USD)

	2000	2001	2002	2003	2004	2005
Total exports	1,397	1,571	1,770	2,087	2,589	2,910
Domestic exports	1,279	1,462	1,659	1,970	2,454	2,773
GSP (incl. Garment)	1,013	1,188	1,392	1,628	2,079	2,261
Logs and sawn timber	100	68	38	20	16	16
Fish	44	42	73	76	69	76
Rubber	60	52	63	98	115	119
Rice	15	57	28	94	114	177
Others	47	54	66	54	62	124
Re-exports	118	109	111	117	134	137

Source: Cambodia: Selected Issues and Statistical Appendix (IMF, 2006)

Note: *1 Includes estimates for unrecorded exports.

On import, the value of vehicles is increasing. Considering the Cambodia's strong economic growth, the decrease or low growth of some products such as sugar and cement is hard to understand. It is assumed that such products may be imported with "under declaration," which is a notorious bad habit at private ports in Cambodia.

Table 10.1.5 Import Statistics (*1)

(Unit: million USD)

	2000	2001	2002	2003	2004	2005
Total imports (FOB) (*2)	1,936	2,094	2,361	2,668	3,269	3,928
Total imports (CIF)	2,096	2,270	2,554	2,888	3,538	4,254
Freights & insurance on imports	165	181	204	230	281	340
Taxable imports	741	711	729	751	856	994
Cigarettes	70	70	68	69	81	80
Motorcycles	31	21	28	30	45	55
Beer	3	2	2	1	1	6
VCRs	2	2	1	1	1	1
TV sets	6	5	5	4	4	4
Audio cassettes	3	3	2	1	1	0
Gold	35	12	10	13	25	5
Vehicles	23	26	38	36	65	90
Construction materials	13	14	13	12	12	28
Clothing	46	36	39	37	38	45
Cloth	3	3	5	6	6	9
Petroleum products	156	175	150	180	172	164
Sugar	10	25	26	4	6	8
Cement	27	31	37	37	40	44
Steel	21	18	23	16	19	21
Other	294	268	282	304	341	433

Source: Cambodia: Selected Issues and Statistical Appendix (IMF, 2006)

Note: *1 Includes imports for re-exports.

*2 Includes goods procured by resident carriers.

Main trade partners are USA, Hong Kong, EU, China, Thailand, Vietnam, Japan and Korea.

Table 10.1.6 Main Trade Partners (2005)

Import from		Export to		Import+Export	
Partners	Share (%)	Partners	Share (%)	Partners	Share (%)
1 Hong Kong	18.0	1 USA	48.7	1 USA	27.3
2 EU	15.8	2 Hong Kong	24.4	2 Hong Kong	21.5
3 China	15.2	3 EU	14.3	3 EU	15.0
4 Thailand	12.4	4 Canada	4.6	4 China	7.2
5 Korea	8.4	5 Japan	3.5	5 Thailand	6.0
6 Vietnam	7.9	6 Vietnam	1.3	6 Vietnam	4.3
7 Singapore	5.5	7 Thailand	0.6	7 Japan	4.0
8 Japan	4.6	8 China	0.6	8 Korea	3.8
9 Malaysia	3.7	9 Singapore	0.5	9 Singapore	2.8
10 Indonesia	3.6	10 Malaysia	0.3	10 Canada	2.6
11 USA	1.5	11 Switzerland	0.2	11 Malaysia	1.8
12 Australia	0.8	12 Australia	0.2	12 Indonesia	1.7
13 India	0.7	13 Norway	0.1	13 Australia	0.5
14 Pakistan	0.4	14 Russia	0.1	14 India	0.3
15 Switzerland	0.3	15 Turkey	0.1	15 Switzerland	0.3
16 Philippines	0.2	16 Mexico	0.1	16 Pakistan	0.2
17 N. Korea	0.2	17 Indonesia	0.1	17 Philippines	0.1
18 Macao	0.1	18 Philippines	0.1	18 N. Korea	0.1
19 Canada	0.1	19 Korea	0.1	19 Norway	0.1
20 Egypt	0.1	20 Pakistan	0.0	20 Russia	0.1

Source: DG TRADE (2006)

Based on IMF (DOTS)

Promotion of export of Cambodian products is one of the highest priority issues of the National Strategic Development Plan (NSDP, 2006-2010.) The plan recommends the promotion of export of agricultural and fishing products in addition to garment, which is practically the sole export product at present.

10.1.4 Visitors from Foreign Countries

The number of visitors, which includes tourists, from foreign countries has been increasing at a high growth rate in recent years and this trend is expected to continue in future. Visitors mainly travel by air, but the number of tourists by cruise ships is also increasing, although the share is still small.

Table 10.1.7 Visitor Arrivals, Passengers and Ship Call

Year	2001	2002	2003	2004	2005
Visitor Arrivals to Cambodia	604,919	786,524	701,014	1,055,202	1,421,615
Sihanoukville	NA	NA	1,330	466	NA
Kaam Samnor	NA	NA	17,238	24,916	NA
Passenger of Phnom Penh Port	NA	3,789	4,313	7,928	8,985
Phnom Penh - Chau Doc (VN)	NA	3,789	3,847	5,943	6,173
Tour Boat (Vietnam)	NA	NA	466	1,985	2,812
Ship Call					
Sihanoukville (Passenger Ship)	3	3	3	1	5
Phnom Penh (Tour Boat VN)	NA	NA	5	32	43

Source: Ministry of Tourism, PPAP, SAP

Kaam Samnor: Vietnamese border on the Mekong River (Vietnam side is Chau Doc)

10.1.5 Framework of Cargo Transport Demand Forecast

The base year for the forecast is 2005. Containerized cargo and non-containerized cargo are separately forecasted. Basically, cargo of Sihanoukville port and Phnom Penh port at base year is set to be base cargo. Cargo statistics of private ports around Sihanoukville port are not available. Meanwhile approximate cargo volumes of Oknha Mong port have been obtained by interview. They are used for the forecast accessorially because accuracy and veracity of the information can not be guaranteed.

Table 10.1.8 Port Cargo on Base Year (2005)

Exp/Imp	Cargo Type	Sihanoukville	Phnom Penh	Total
Export	Containerized (TEU)	105,286	15,337	120,623
	Non-Containerized (ton)	232	225	457
Import	Containerized (TEU)	105,855	14,944	120,799
	Non-Containerized (ton) Sub-Total	357,076	505,397	862,473
	Fuel	249,148	464,366	713,514
	Cement	65,849	0	65,849
	Others	42,079	41,031	83,110
Total	Containerized (TEU)	211,141	30,281	241,422
Throughput	Non-Containerized (ton) Sub-Total	357,308	505,622	862,930
	Fuel	249,148	464,366	713,514
	Cement	65,849	0	65,849
	Others	42,311	41,256	83,567

Source: SAP, PPAP

Table 10.1.9 Cargo of Oknha Mong Port on Base Year (2005)

Imp/Exp	Cargo Type	Weight (ton)
Import		480,000
	Containerized	-
	Non-Containerized	480,000
	Cement	360,000
	Others	120,000
Export		-
Total		480,000

Source: Oknha Mong Port

(1) Containerized Cargo

The total number of containers (TEU basis) handled by Sihanoukville port and Phnom Penh port is set to be the base cargo.

Statistics on the number of containers crossing land border are not available. According to interviews with authorities and organizations concerned, few containers are crossing the Poipet checkpoint on the Thai border. For the Bavet checkpoint on the Vietnamese border, approximately 150 TEU loaded containers are transported from Ho Chi Minh to Phnom Penh per month, and the same number of empty containers is assumed to be transported vice versa. On top of that, approximately 100 loaded containers per month are imported to the Manhattan Special Economic Zone in Bavet, and approximately 30 TEU loaded containers are exported from the SEZ. In total, approximately 7,000 TEU containers per annum are assumed to be transported through the Bavet checkpoint. This number does not include base cargo because the number is relatively small and the exact number is not available.

At Sihanoukville port, share of loaded containers and empty containers is fifty-fifty on export while loaded containers outnumber empty containers on import. At Phnom Penh port, share of loaded containers is very large on import and the share of empty containers is very large on export.

Table 10.1.10 Container Handling Volumes

(Unit: TEU)

Year			2001	2002	2003	2004	2005	2006
Sihanoukville	Export	Loaded	33,391	37,343	42,324	51,101	52,814	62,340
		Empty	39,160	45,299	48,208	55,250	52,472	51,610
		Total	72,551	82,642	90,532	106,351	105,286	113,950
	Import	Loaded	60,181	72,630	74,700	87,281	86,034	93,155
		Empty	12,560	11,366	16,054	20,284	19,821	23,931
		Total	72,741	83,996	90,754	107,565	105,855	117,086
	Total	Loaded	93,572	109,973	117,024	138,382	138,848	155,495
		Empty	51,720	56,665	64,262	75,534	72,293	75,541
		Total	145,292	166,638	181,286	213,916	211,141	231,036
Phnom Penh	Export	Loaded	NA	237	2,072	3,237	3,767	5,341
		Empty	NA	167	1,118	4,250	11,570	14,316
		Total	NA	404	3,190	7,487	15,337	19,657
	Import	Loaded	NA	242	4,134	7,054	14,077	18,099
		Empty	NA	100	306	985	867	477
		Total	NA	342	4,440	8,039	14,944	18,576
	Total	Loaded	NA	479	6,206	10,291	17,844	23,440
		Empty	NA	267	1,424	5,235	12,437	14,793
		Total	NA	746	7,630	15,526	30,281	38,233
Total	Export	Loaded	NA	37,580	44,396	54,338	56,581	67,681
		Empty	NA	45,466	49,326	59,500	64,042	65,926
		Total	NA	83,046	93,722	113,838	120,623	133,607
	Import	Loaded	NA	72,872	78,834	94,335	100,111	111,254
		Empty	NA	11,466	16,360	21,269	20,688	24,408
		Total	NA	84,338	95,194	115,604	120,799	135,662
	Total	Loaded	NA	110,452	123,230	148,673	156,692	178,935
		Empty	NA	56,932	65,686	80,769	84,730	90,334
		Total	NA	167,384	188,916	229,442	241,422	269,269

Source: SAP, PPAP

At Phnom Penh port, main origin and destination of containerized cargo are China and Vietnam.

Table 10.1.11 Origin of Import Container of Phnom Penh Port (Jan, Apr and Nov, 2004)

Country	TEU	Share (%)
China	1,385	59.9%
Korea	71	3.1%
Malaysia	9	0.4%
Taiwan	337	14.6%
Thailand	3	0.1%
Vietnam	508	22.0%
Total	2,313	

Source: Design and Masterplan for Walerborne
Transport on the Mekong River System
in Cambodia

Table 10.1.12 Destination of Export Container of Phnom Penh Port (Jan, Apr and Nov, 2004)

Country	TEU	Share (%)
China	120	16.3%
Japan	58	7.9%
Philippines	2	0.3%
Thailand	2	0.3%
USA	20	2.7%
Vietnam	534	72.6%
Total	736	

Source: Design and Masterplan for Walerborne
Transport on the Mekong River System
in Cambodia

Table 10.1.13 Origin of Import Container of Phnom Penh Port (Jan-Jun, 2005)

Country	TEU	Share (%)
China	3,703	56.1%
France	2	0.0%
India	1	0.0%
Indonesia	7	0.1%
Japan	2	0.0%
Korea	105	1.6%
Malaysia	21	0.3%
Myanmar	15	0.2%
Philippines	9	0.1%
Singapore	45	0.7%
Taiwan	119	1.8%
Thailand	36	0.5%
Usbekistan	2	0.0%
USA	6	0.1%
Vietnam	2,525	38.3%
Total	6,598	

Source: Design and Masterplan for Walerborne
Transport on the Mekong River System
in Cambodia

Table 10.1.14 Destination of Export Container of Phnom Penh Port (Jan-Jun, 2005)

Country	TEU	Share (%)
China	603	44.5%
France	8	0.6%
India	4	0.3%
Indonesia	3	0.2%
Japan	118	8.7%
Korea	1	0.1%
Philippines	1	0.1%
Taiwan	70	5.2%
Thailand	3	0.2%
USA	48	3.5%
Vietnam	497	36.7%
Total	1,356	

Source: Design and Masterplan for Walerborne
Transport on the Mekong River System
in Cambodia

At Sihanoukville port, only destination of all export cargo is available. The share of USA is very large followed by the UK.

Table 10.1.15 Destination of Export Cargo of Sihanoukville Port

Country	2004	2005
Australia	0.4%	0.4%
China	1.5%	0.7%
UK	7.3%	5.5%
USA	63.0%	71.5%
Malaysia	1.1%	1.6%
Others	26.7%	20.3%

Source: SAP

At Phnom Penh port, main commodities for import are general cargo, fabric, tiles and ceramics and main commodities for export are processed rubber tree, plywood and garment.

**Table 10.1.16 Commodities of Import Container of Phnom Penh Port
(Jan, Apr and Nov, 2004)**

Commodity	TEU	Share (%)
Air Conditioners	2	0.1%
Aluminum Cans	69	3.0%
Beer	51	2.2%
Ceramic	215	9.3%
Construction Equipment	51	2.2%
Fabric	426	18.4%
Food	28	1.2%
General Cargo	442	19.1%
Knitted Fabric	260	11.2%
Lubricant	2	0.1%
Medicine	10	0.4%
Paint	5	0.2%
Powder	12	0.5%
Raw Material	2	0.1%
Spare Part	7	0.3%
Stationary	225	9.7%
Steel	92	4.0%
Syringe with Needle	2	0.1%
Tiles	394	17.0%
TV	10	0.4%
Wheat Flour	8	0.3%
Total	2,313	

Source: Design and Masterplan for Waterborne
Transport on the Mekong River System
in Cambodia

**Table 10.1.17 Commodities of Export Container of Phnom Penh Port
(Jan, Apr and Nov, 2004)**

Commodity	TEU	Share (%)
Coconut Fiber	12	1.6%
Exhibition	4	0.5%
Garment	143	19.4%
General Cargo	31	4.2%
Modern Art	4	0.5%
Processed Rubber Tree	540	73.4%
Soft Drink	1	0.1%
Wheat Flour	1	0.1%
Total	736	

Source: Design and Masterplan for Waterborne
Transport on the Mekong River System
in Cambodia

Table 10.1.18 Commodities of Import Container of Phnom Penh Port (Jan-Jun, 2005)

Commodity	TEU	Share (%)
Air Conditioners	14	0.2%
Aluminum Cans	441	6.7%
Agriculture hoes	2	0.0%
Battery	6	0.1%
Beer	154	2.3%
Car	2	0.0%
Ceramic	1,231	18.7%
Construction Equipment	297	4.5%
Cosmetic	9	0.1%
Elastic Band	4	0.1%
Fabric	990	15.0%
Food	87	1.3%
Furniture	56	0.8%
General Cargo	1,427	21.6%
Glue	6	0.1%
Green Beans	15	0.2%
Knitted Fabric	424	6.4%
Lubricant	86	1.3%
Machine	114	1.7%
Medicine	52	0.8%
Monosodium glutamate	35	0.5%
Paint	13	0.2%
Plastic Product	66	1.0%
Powder	12	0.2%
Pure Drinking Water	5	0.1%
Raw Material	97	1.5%
Sanitary	88	1.3%
Stationary	85	1.3%
Steel	141	2.1%
Syringe with Needle	8	0.1%
Tiles	491	7.4%
TV	54	0.8%
Tire	42	0.6%
VCD Player	3	0.0%
Water Pump	12	0.2%
Wheat Flour	29	0.4%
Total	6,598	

Source: Design and Masterplan for Waterborne
Transport on the Mekong River System
in Cambodia

Table 10.1.19 Commodities of Export Container of Phnom Penh Port (Jan-Jun, 2005)

Commodity	TEU	Share (%)
Accessory	6	0.4%
Agriculture	30	2.2%
Cotton Rag	3	0.2%
Garment	271	20.0%
Personal Effect	9	0.7%
Plywood	252	18.6%
Processed Rubber Tree	769	56.7%
Scrap Steel	13	1.0%
Used Car	3	0.2%
Total	1,356	

Source: Design and Masterplan for Walerborne
Transport on the Mekong River System
in Cambodia

At Sihanoukville port, statistics for commodities of containerized cargo are not available. According to interviews with authorities and organizations concerned, the main import commodity is fabric, which is raw material for the garment industry, and the main export commodity is garment. Lumbers and plywood are also included in export cargo and passenger car is also included in import cargo.

(2) Non-Containerized Cargo

(a) Sihanoukville port

Non-containerized cargo handled at Sihanoukville port is shown in Table 10.1.20. Concerning commodities of import cargo, it is expected that consumption of rice, general cargo, machinery, cement, fertilizer, sugar, bitumen, steel and fuel will increase during the planning period, considering the improving economic situation.

It is difficult to find out the base cargo amount for those kinds of commodities because they are also handled at private ports since 2001 (except for fuel, which is handled out of SAP facilities,) and there are no statistics available at private ports. Therefore base cargo amount is set to be maximum handled amount of each commodity at Sihanoukville port during the period from 1995 to 2005. The maximum value is indicated with shadowing in Table 10.1.20.

Demarcation between Sihanoukville port and Oknha Mong port is assumed based on the cargo amount handled in Sihanoukville in recent years (mostly year 2005 or year 2006.)

It is assumed that the growth of rice, general cargo and sugar is proportional to the population growth and the growth in volumes of machinery, cement, fertilizer, bitumen, steel and fuel is proportional to the GDP growth.

Concerning commodities of export cargo, all commodities seem to be almost containerized, according to information obtained by interviews. Therefore they are out of the scope of consideration.

On top of those commodities, some new commodities, such as coal, are added to the scope of consideration, considering the economic situation.

(b) Phnom Penh port

Non-containerized cargo handled at Phnom Penh port is shown in Table 5.3.4.1 in Section 5.3.4. Amount of non-containerized cargo is very small except fuel, which is handled out of PPAP facilities. It is expected that PPAP facilities will be dedicated to handling the increasing containerized cargo during the planning period. Therefore non-containerized at Phnom Penh port is out of scope of consideration except fuel.

Table 10.1.20 Commodity-wise Maximum Throughput at Sihanoukville Port in the Past (tons)

Item	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Cargoes Throughput														
Gross Throughput	474,386	547,312	707,705	741,003	794,276	884,950	1,140,942	1,641,765	1,763,593	1,674,707	1,772,361	1,503,050	1,380,847	1,586,791
Not Include Fuel	451,267	506,216	635,463	650,487	648,022	661,176	884,007	1,340,163	1,401,071	1,352,155	1,454,856	1,242,011	1,131,699	1,320,102
Not Include Fuel&Cont.	325,570	367,219	406,826	340,496	290,399	243,533	365,884	683,999	709,825	550,409	650,329	308,153	107,929	197,573
Cargoes Containerize	125,697	138,997	228,637	309,991	357,623	417,643	518,123	656,165	691,247	801,746	804,527	933,858	1,023,770	1,122,529
Cargo Imported:														
Rice	10,449	18,867	36,685	23,540	6,952	16,615	10,889	18,783	21,118	44,769	8,697	23,238	7,557	
General Cargo	28,763	34,230	48,972	39,392	34,079	37,635	20,354	15,428	4,294	13,459	4,112	11,286	7,607	4,600
Machinery	2,261	2,588	6,527	7,854	17,133	12,489	9,765	7,834	5,027	12,381	8,741	8,823	9,771	16,562
Cement	137,295	153,679	93,387	115,440	81,017	16,689	217,636	553,250	554,754	411,472	564,906	218,618	65,849	144,462
Fertilizer	23,898	28,438	29,809	8,839		24,043								
Sugar	4,294	17,410	19,897	18,763	33,372		1,301		7,966	4,559				6,813
Bitumen			19,988	7,331	2,922	1,053	4,757	1,844	1,023	2,987	5,146	1,649		
Steel	2,570	16,207	17,939	43,393	57,352	67,236	82,387	75,734	70,646	52,996	58,727	44,306	17,144	18,408
Clinker				2,200	2,750	24,700								
Com						3,035								
Containerized Cargo	89,546	126,659	208,833	273,623	270,960	318,239	403,962	512,413	525,888	629,988	621,646	715,829	771,947	798,375
Flour				4,369										
Zinc		564		1,320										
Salt									41,922					
Fuel	23,119	41,096	72,242	90,516	146,254	223,774	256,935	301,602	362,522	322,553	317,505	261,039	249,148	266,689
Total Imported:														
Not Include Fuel	299,076	398,642	482,036	546,066	506,538	521,735	751,051	1,185,286	1,232,639	1,172,612	1,271,974	1,023,749	879,875	989,220
Include Fuel	322,195	439,738	554,278	636,582	652,792	745,509	1,007,986	1,486,888	1,595,161	1,495,165	1,589,480	1,284,788	1,129,023	1,255,910
Cargo Exported:														
Sawn Timber	96,020	62,369	88,156	52,191	44,730	21,346	7,877	2,640	1,900			230		
Log Wood	7,177	21,773	28,615	5,419										
Plywood		6,630	16,460	5,530	10,092	18,691	10,879	3,568						
Rice				2,611			39	4,453		95		2		238
General Cargo	4,680	1,378	164	294										
Scrap Metal	7,671			2,007										
Containerized Cargo	36,151	12,338	19,804	36,368	86,663	99,405	114,161	143,752	165,358	171,759	182,882	218,030	251,824	324,153
Rubber	492	3,086	228											
Wood Processing														
Total Imported:	152,191	107,574	153,427	104,421	141,485	139,442	132,956	154,877	168,433	179,543	182,882	218,262	251,824	330,882
Container Throughput:	23,986	21,186	39,942	55,734	60,990	71,589	94,860	130,435	145,292	166,638	181,286	213,916	211,141	231,036
Import Cont. (TUE)	9,417	10,620	20,429	28,929	30,732	37,250	50,289	65,811	72,741	83,996	90,754	107,565	105,855	117,086
Full (TEU)	9,417	10,620	20,429	28,929	30,732	37,250	44,163	57,303	60,181	72,630	74,700	87,281	86,034	93,155
Empty (TEU)							6,126	8,508	12,560	11,366	16,054	20,284	19,821	23,931
Export Cont. (TEU)	14,569	10,566	19,513	26,805	30,258	34,339	44,571	64,624	72,551	82,642	90,532	106,351	105,286	113,950
Full (TEU)	9,350	1,341	2,425	4,544	9,007	13,118	17,454	26,187	33,391	37,343	42,324	51,101	52,814	62,340
Empty (TEU)	5,219	9,225	17,088	22,261	21,251	21,221	27,117	38,337	39,160	45,299	48,208	55,250	52,472	51,610

Source: SAP

Remarks: Shadowing shows the maximum throughput in the past.

10.1.6 International Transportation by Routes and Modes

(1) Cargo Transportation

Considering the economic situation, main issue is transportation between the central plain of the land, the center of which is Phnom Penh, and foreign countries. There are four main alternatives for routing of the transportation as below;

Route 1: Sihanoukville port (via National Road No. 4, including neighbor private ports)

Route 2: Ho Chi Minh ports (via Phnom Penh port and the Mekong River)

Route 3: Ho Chi Minh ports (via National Road No. 1 and Bavet checkpoint)

Route 4: Poipet checkpoint (via National Road No. 5)

Laotian border route is out of the scope of consideration because the cargo volume is small at present and significant growth is not expected in the planning period.

In the present situation, Route 4 is used for import of non-containerized cargo, such as cement, from Thailand, and this situation is considered to be unchanged in the planning period. Therefore Route 4 is out of the scope of consideration for containerized cargo.

Cambodian railway rehabilitation project supported by ADB is under implementation and Poipet-Aranyaprathet international railway is planned to be re-connected in 2009. After the re-connection, some part of cargo of Route 4 may select railway (North Line.) Commodities are considered to be unchanged after the modal shift.

It will be possible that some part of containerized cargo of Route 1 will be carried by railway between Phnom Penh and Sihanoukville (South Line) in addition to conventional cargo, such as petroleum product if competitiveness of the South Line is improved by the rehabilitation project. This modal shift is considered to be one of the cost reduction factors in Route 1.

Air cargo transportation is out of the scope because volumes are small at present and there is low possibility for significant growth of cargo which can afford the relatively high air transportation cost.

There are two reasons why inland water transportation has a large share in container transportation between Phnom Penh and Ho Chi Minh. One is an institutional problem. The bilateral road transportation agreement between Cambodia and Vietnam has come into effect, but direct cargo trucking across the border has not yet started due to some practical problems (see Section 8.1.1.) The other is heavy container weight. According to container cargo statistics of Phnom Penh port (see Section 10.1.5,) dominant cargo is general cargo, fabric, tiles and ceramics imported from China and Vietnam. A 40 footer container fully loaded with ceramics and tiles is very heavy and sometimes exceeds the temporary weight limit of National Road No. 1, which is undergoing improvement works.

Negotiations to solve these problems are underway and it is expected that an agreement will be reached in the near future.

It is expected that the number of USA-bound containers will increase after the opening of Cai Mep-Thi Vai container terminals; the share of road transportation will also increase.

**Table 10.1.21 Container Average Weight by Commodity Imported at Phnom Penh Port
(Jan, Apr and Nov, 2004)**

Commodity	TEU	Gross Weight (kg)	ton/FEU
Creamic	215	3,790,014	35.3
Fabric	426	4,125,490	19.4
Knitted Fabric	260	1,540,163	11.8
Tiles	394	5,951,749	30.2
Others	1,018	11,111,093	21.8
Total	2,313	26,518,509	22.9

Source: Design and Masterplan for Walerborne
Transport on the Mekong River System
in Cambodia

**Table 10.1.22 Container Average Weight by Commodity Imported at Phnom Penh Port
(Jan-Jun, 2005)**

Commodity	TEU	Gross Weight (kg)	ton/FEU
Creamic	1,231	24,608,228	40.0
Fabric	990	8,002,571	16.2
Knitted Fabric	424	2,008,311	9.5
Tiles	491	9,339,622	38.0
Others	3,462	38,136,671	22.0
Total	6,598	82,095,403	24.9

Source: Design and Masterplan for Walerborne
Transport on the Mekong River System
in Cambodia

(2) Passenger Transportation

Air passenger transportation is the dominant mode for international passenger transportation, but demand forecast of air transportation is beyond the scope of the Study. Meanwhile tourists by international cruise ships and boats are in the scope of consideration because the number of such kind of tourists has been increasing recently.

10.2 Transportation Demand Forecast

10.2.1 Containerized Cargo Forecast

For the containerized cargo, the cargo growth rate is found to be higher than the GDP growth in the neighbor countries recently. A multiplier is set as 1.80 for the high case and 1.20 for the low case considering the situation in the neighbor countries, and 1.50, which is average of the high case and low case, for the middle case.

Table 10.2.1 Relation between GDP Growth Rate and Containerized Cargo Growth Rate

Country	Port cargo, GDP	2001	2005	Growth rate (%)	Multiplier
Thailand	Leam Chabang (TEU)	2,312,438	3,765,967	13.0	1.16
	GDP (million USD)	115,536	176,222	11.2	-
Vietnam	Ho Chi Minh (TEU)	774,010	1,911,016	25.4	2.00
	GDP (million USD)	32,685	52,832	12.7	-

Source: Containerisation International Web Site, JETRO Web Site

Table 10.2.2 Containerized Cargo Growth Rate

Cargo Type	Multiplier	2005	2010	2020
GDP	-	1.00	1.35	2.73
Containerized Cargo	High	1.80	1.00	1.70
	Middle	1.50	1.00	1.56
	Low	1.20	1.00	1.43

Source: JICA Study Team

Table 10.2.3 Containerized Cargo Forecast

Cargo Type	Case	2005	2010	2020
Containerized (TEU)	High	241,422	1.00	410,417
	Middle	241,422	1.00	376,618
	Low	241,422	1.00	345,233

Source: JICA Study Team

10.2.2 Demarcation of Containerized Cargo

(1) Route for Consideration

As mentioned in section 10.1.6, three alternatives are considered as below;

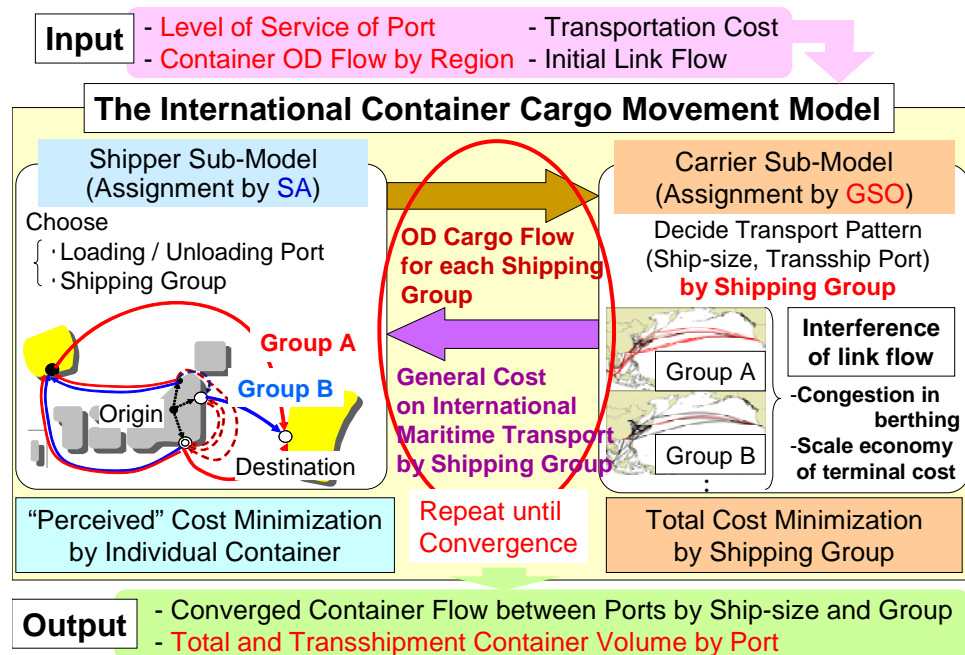
Route 1: Sihanoukville port (via National Road No. 4, including neighbor private ports)

Route 2: Ho Chi Minh ports (via Phnom Penh port and the Mekong River)

Route 3: Ho Chi Minh ports (via National Road No. 1 and Bavet checkpoint)

(2) Demarcation by Numeric Model

Demarcation of containerized cargo is considered by using a numeric model developed by researchers' group (see footnote) in Japan, the Model for International Container Cargo Simulation (MICCS). The input of the model is origin and destination (OD) data of containerized cargo and the output is the result of demarcation to the transportation routes. MICCS simulates the decision of carriers and shippers, both sides reiterate decision making for optimal cargo and ship allocation, and outputs solution when decision making reaches balance point.

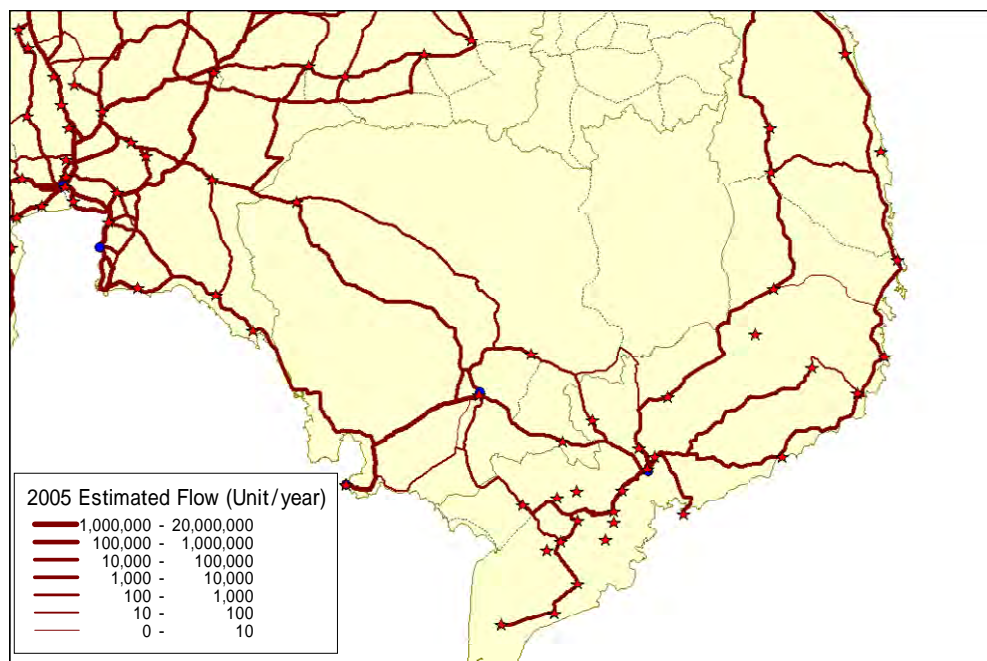


Source: Shibasaki et al.

Figure 10.2.1 Conceptual Diagram of MICCS

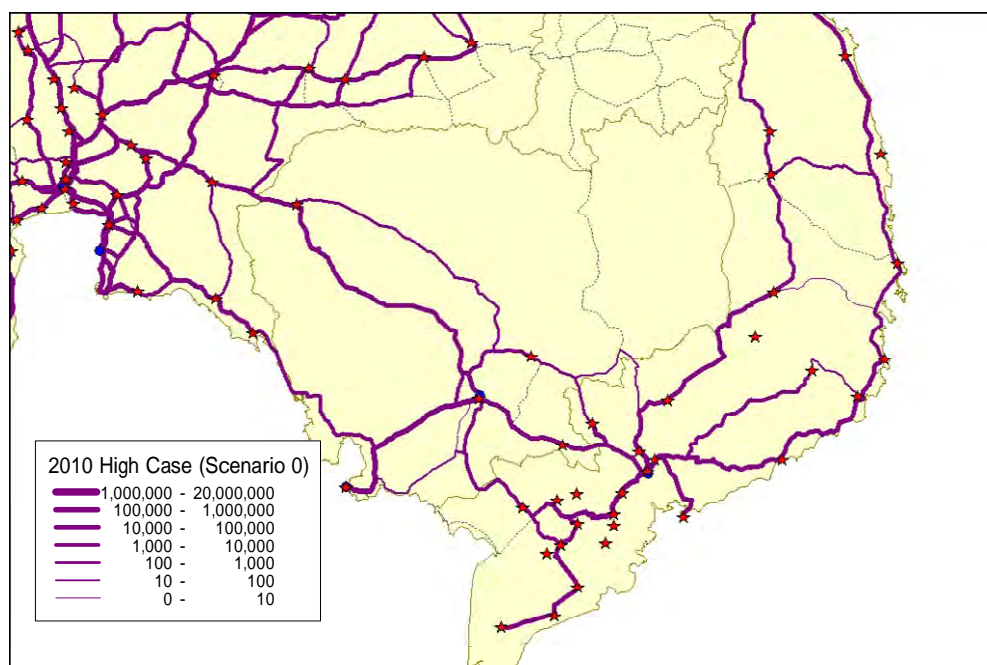
Researchers' Group for MICCS: Prof. T. Yoshida, Prof. H. Ieda, University of Tokyo, Dr. R. Shibasaki, National Institute for Land and Infrastructure Management, Ministry of Land, Infrastructure and Transport, Japan, etc.,...

MICCS has been used for the demand forecast of containerized cargo for port planning in Japan. Recently it is expanded so as to cover Southeast Asia and so as to consider cross-border land transportation. Some samples of results of the expanded MICCS are shown as below;



Source: Shibasaki et al.

Figure 10.2.2 Sample of Simulation Result by Expanded MICCS (1)



Source: Shibasaki et al.

Figure 10.2.3 Sample of Simulation Result by Expanded MICCS (2)

To operate the expanded MICCS fully, cargo OD data of the whole of Southeast Asia is required, which is beyond the scope of the Study. Therefore cargo demarcation between Route 1, Route 2 and Route 3 is considered by using route selection algorithm which is built in MICCS.

MICCS allocates cargo to each route according to logit-type selection probability. Selection probability p_k^{rs} for route k of OD pair (r, s) is shown as the formula below;

$$p_k^{rs} = \frac{\exp(-\theta \cdot C_k^{rs})}{\sum_{k' \in K_{rs}} \exp(-\theta \cdot C_{k'}^{rs})}$$

K_{rs} is set of routes for r - s transportation and C_k^{rs} is generalized cost (unit: 1,000 JPY) for route k of r - s transportation. Generalized cost includes time cost corresponding to transportation time and barrier cost corresponding to barriers for transportation. For parameter θ and time value vt , $\theta=0.0141$ and $vt=1.44$ (unit: 1,000JPY per TEU per hour) are adopted, which are assumed by Shibasaki et al. as a result of simulation. Barrier cost is set so as to reproduce real demarcation situation at the base year.

At first, demarcation between Sihanoukville port (Route 1) and Ho Chi Minh ports (Route 2 & 3) is considered. And then, for Ho Chi Minh ports, demarcation between inland waterway transportation (Route 2) and road transportation (Route 3) is considered.

(a) Demarcation between Sihanoukville port (Route 1) and Ho Chi Minh ports (Route 2 & 3)
Phnom Penh and west coast of USA (USWC) is adopted as a typical sample of OD pair. The reasons why the pair is adopted are that USA is a dominant trade partner as mentioned in section 10.1 and that the pair is typically effected by operation of Cai Mep—Thi Vai terminals.

Port cost of Sihanoukville port and Phnom Penh port in present situation is cited from Table 14.1.3 in Section 14.1.2. Port cost of Ho Chi Minh ports in present situation is cited from Table 14.2.3 and Table 14.2.4 in Section 14.2.1.

According to the survey of the Study Team, at the beginning of 2007, typical ocean freight rate is 2,600 USD/FEU for Sihanoukville—USWC and 2,000 USD/FEU for Ho Chi Minh—USWC. According to interviews with organizations concerned, inland waterway transportation cost is approximate 500 USD/FEU for Phnom Penh—Ho Chi Minh.

Cost and time of Route 2 & 3 is represented by cost and time of Route 2 because Route 2 is dominant. Transportation time at the base year is set as 26 days for Route 1 and 25 days for Route 2 & 3. For year 2020, transportation time for Route 2 & 3 is changed to 22 days considering direct calling of mother ships of Asia- North America trunk line to Cai Mep—Thi Vai terminals.

Different result of maritime and port renovation corresponds to the high, middle and low cases. For high case, port cost is set as 50% off and ship cost is set as 10% off for Route 1. For low case, there is no cost reduction for Route 1. For middle case, only port cost is set as 50% off.

Table 10.2.4 Probability of Route Selection (Route 1 and Route 2 & 3)

	2005	2020 (High) (*1)	2020 (Middle) (*2)	2020 (Low) (*3)
Route 1: Phnom Penh-Sihanoukville-USWC	87.5%	77.2%	73.2%	61.8%
Route 2 & 3: Phnom Penh-Ho Chi Minh-USWC	12.5%	22.8%	26.8%	38.2%

Source: JICA Study Team

*1: SV port cost 50%, SV ship cost 90%, Route 2&3 time 25d to 22d

*2: SV port cost 50%, Route 2&3 time 25d to 22d

*3: Route 2&3 time 25d to 22d

(b) Demarcation between the Mekong River (Route 2a) and National Road No. 1 (Route 3a) Phnom Penh and Ho Chi Minh is adopted as OD pair. Routes are renamed as Route 2a and Route 3a because they are partial routes of Route 2 and Route 3.

Cargo allocation to Route 3a is assumed according to the information that approximately 150 TEU containers per month are transported from Ho Chi Minh to Phnom Penh crossing the Bavet checkpoint, as mentioned in Section 10.1.5.

According to interviews with organizations concerned, trucking transportation cost is approximate 650 USD/FEU for Phnom Penh City—Ho Chi Minh City.

Transportation time of Route 2a at year 2020 is reduced 48 hours to 24 hours considering implementation of night navigation in the Mekong River in Vietnamese territory. Transportation time of Route 3a at year 2020 is set to be unchanged because the reduction by improvement of National Road No. 1 and development of the second Mekong River bridge may be balanced by the route extension from Ho Chi Minh to Cai Mep—Thi Vai area.

Barrier cost of Route 3a at year 2020 is set to be 50% off because facilitation of cross-border procedures, such as bilateral agreement on cross-border road transportation, has been progressing recently.

Table 10.2.5 Probability of Route Selection (Route 2a and Route 3a)

	2005	2020 (*1)
Route 2a: Phnom Penh-Mekong River-Ho Chi Minh	89.4%	71.2%
Route 3a: Phnom Penh-NR 1-Ho Chi Minh	10.6%	28.8%

Source: JICA Study Team

*1: Route 2a time 48h to 24h, Route 3a barrier cost 50%

Based on the selection probabilities, containerized cargo demarcation is forecasted as below. Demarcation at year 2010 is set by linear interpolation.

Table 10.2.6 Forecast of Demarcation of Containerized Cargo

(a) Sihanoukville port cost-performance highly improved

(Unit: TEU)

		2005		2010		2020	
High Case	Route 1 (Sihanoukville Port) (*1)	211,141	87.5%	349,000	85.0%	1,124,000	80.0%
	Route 2 & Route 3 (Ho Chi Minh Ports)	30,281	12.5%	62,000	15.0%	281,000	20.0%
	Route 2 (via the Mekong River)	-	(89.4%)	51,000	(82.9%)	197,000	(70.0%)
	Route 3 (via National Road 1)	-	(10.6%)	11,000	(17.1%)	84,000	(30.0%)
	Total	241,422	100.0%	410,000	100.0%	1,405,000	100.0%
Middle Case	Route 1 (Sihanoukville Port) (*1)	211,141	87.5%	320,000	85.0%	850,000	80.0%
	Route 2 & Route 3 (Ho Chi Minh Ports)	30,281	12.5%	57,000	15.0%	212,000	20.0%
	Route 2 (via the Mekong River)	-	(89.4%)	47,000	(82.9%)	148,000	(70.0%)
	Route 3 (via National Road 1)	-	(10.6%)	10,000	(17.1%)	64,000	(30.0%)
	Total	241,422	100.0%	377,000	100.0%	1,062,000	100.0%
Low case	Route 1 (Sihanoukville Port) (*1)	211,141	87.5%	293,000	85.0%	639,000	80.0%
	Route 2 & Route 3 (Ho Chi Minh Ports)	30,281	12.5%	52,000	15.0%	160,000	20.0%
	Route 2 (via the Mekong River)	-	(89.4%)	43,000	(82.9%)	112,000	(70.0%)
	Route 3 (via National Road 1)	-	(10.6%)	9,000	(17.1%)	48,000	(30.0%)
	Total	241,422	100.0%	345,000	100.0%	799,000	100.0%

Source: JICA Study Team

*1 may include cargo handled by neighbor ports, if ever.

(b) Shianoukville port cost-performance moderately improved

(Unit: TEU)

		2005		2010		2020	
High Case	Route 1 (Sihanoukville Port) (*1)	211,141	87.5%	335,000	81.7%	984,000	70.0%
	Route 2 & Route 3 (Ho Chi Minh Ports)	30,281	12.5%	75,000	18.3%	422,000	30.0%
	Route 2 (via the Mekong River)	-	(89.4%)	62,000	(82.9%)	295,000	(70.0%)
	Route 3 (via National Road 1)	-	(10.6%)	13,000	(17.1%)	127,000	(30.0%)
	Total	241,422	100.0%	410,000	100.0%	1,405,000	100.0%
Middle Case	Route 1 (Sihanoukville Port) (*1)	211,141	87.5%	308,000	81.7%	743,000	70.0%
	Route 2 & Route 3 (Ho Chi Minh Ports)	30,281	12.5%	69,000	18.3%	319,000	30.0%
	Route 2 (via the Mekong River)	-	(89.4%)	57,000	(82.9%)	223,000	(70.0%)
	Route 3 (via National Road 1)	-	(10.6%)	12,000	(17.1%)	96,000	(30.0%)
	Total	241,422	100.0%	377,000	100.0%	1,062,000	100.0%
Low case	Route 1 (Sihanoukville Port) (*1)	211,141	87.5%	282,000	81.7%	559,000	70.0%
	Route 2 & Route 3 (Ho Chi Minh Ports)	30,281	12.5%	63,000	18.3%	240,000	30.0%
	Route 2 (via the Mekong River)	-	(89.4%)	52,000	(82.9%)	168,000	(70.0%)
	Route 3 (via National Road 1)	-	(10.6%)	11,000	(17.1%)	72,000	(30.0%)
	Total	241,422	100.0%	345,000	100.0%	799,000	100.0%

Source: JICA Study Team

*1 may include cargo handled by neighbor ports, if ever.

(c) Sihanoukville port cost-performance not improved

		2005		2010		2020	
High Case	Route 1 (Sihanoukville Port) (*1)	211,141	87.5%	321,000	78.3%	843,000	60.0%
	Route 2 & Route 3 (Ho Chi Minh Ports)	30,281	12.5%	89,000	21.7%	562,000	40.0%
	Route 2 (via the Mekong River)	-	(89.4%)	74,000	(82.9%)	393,000	(70.0%)
	Route 3 (via National Road 1)	-	(10.6%)	15,000	(17.1%)	169,000	(30.0%)
	Total	241,422	100.0%	410,000	100.0%	1,405,000	100.0%
Middle Case	Route 1 (Sihanoukville Port) (*1)	211,141	87.5%	295,000	78.3%	637,000	60.0%
	Route 2 & Route 3 (Ho Chi Minh Ports)	30,281	12.5%	82,000	21.7%	425,000	40.0%
	Route 2 (via the Mekong River)	-	(89.4%)	68,000	(82.9%)	298,000	(70.0%)
	Route 3 (via National Road 1)	-	(10.6%)	14,000	(17.1%)	128,000	(30.0%)
	Total	241,422	100.0%	377,000	100.0%	1,062,000	100.0%
Low case	Route 1 (Sihanoukville Port) (*1)	211,141	87.5%	270,000	78.3%	479,000	60.0%
	Route 2 & Route 3 (Ho Chi Minh Ports)	30,281	12.5%	75,000	21.7%	320,000	40.0%
	Route 2 (via the Mekong River)	-	(89.4%)	62,000	(82.9%)	224,000	(70.0%)
	Route 3 (via National Road 1)	-	(10.6%)	13,000	(17.1%)	96,000	(30.0%)
	Total	241,422	100.0%	345,000	100.0%	799,000	100.0%

Source: JICA Study Team

*1 may include cargo handled by neighbor ports, if ever.

10.2.2 Non-Containerized Cargo Forecast**(1) Rice**

According to the procedure mentioned in section 10.1.5, rice cargo is forecasted as below;

Table 10.2.7 Rice Cargo Forecast

Cargo Type	2005		2010		2020	
Rice (import) (ton)	44,769	1.00	49,246	1.10	59,990	1.34
Sihanoukville	7,557	16.9%	8,323	16.9%	10,138	16.9%
Oknha Mong	37,212	83.1%	40,923	83.1%	49,852	83.1%

Source: JICA Study Team

Handling port: Sihanoukville and Oknha Mong

Cargo ship size: small boat or barge

(2) General Cargo

According to the procedure mentioned in section 10.1.5, general cargo is forecasted as below;

Table 10.2.8 General Cargo Forecast

Cargo Type	2005		2010		2020	
General Cargo (import) (ton)	48,972	1.00	53,869	1.10	65,622	1.34
Sihanoukville	4,600	9.4%	5,064	9.4%	6,169	9.4%
Oknha Mong	44,372	90.6%	48,805	90.6%	59,454	90.6%

Source: JICA Study Team

Handling port: Sihanoukville and Oknha Mong

Cargo ship size: small boat or barge

(3) Machinery

According to the procedure mentioned in section 10.1.5, machinery is forecasted as below;

Table 10.2.9 Machinery Cargo Forecast

Cargo Type	2005		2010		2020	
Machinery (import) (ton)	17,133	1.00	23,130	1.35	46,773	2.73
Sihanoukville	17,133	100.0%	23,130	100.0%	46,773	100.0%
Oknha Mong	0	0.0%	0	0.0%	0	0.0%

Source: JICA Study Team

Handling port: Sihanoukville

Cargo ship size: small boat or barge

(4) Cement

Cement demand of the ports hinterland is forecasted by the procedure mentioned in section 10.1.5. But two cement factories are under construction in Kampot province. Capacity of each factory is 1 million tons per annum. Factories are planned to be put into operation in 2007. Cement demand of the ports hinterland will be met by the factories. Surplus cement is planned to be exported.

In the western area of Cambodia, such as Banteay Meanchey, Oddar Meanchey, Preah Vihear and Battambang, province, cement is imported from Thailand through Poipet and other checkpoints on Thai border. This situation will not be effected by the operation of Kampot cement factories.

Table 10.2.10 Cement Cargo Forecast

Cargo Type		2005		2010		2020	
Cement (import) (ton)		554,754	-		-		
	Sihanoukville	144,462	26.0%		-		
	Oknha Mong	410,292	74.0%		-		
Cement (export) (ton)		-		1,251,082		485,522	
	Sihanoukville	-		325,281	26.0%	126,236	26.0%
	Oknha Mong	-		925,801	74.0%	359,286	74.0%
Cement Demand (ton)	Ports Hinterland	554,754	1.00	748,918	1.35	1,514,478	2.73
Cement Production (ton)	Kampot	-		2,000,000		2,000,000	
Cement (import) (ton)	Thai Border	1,000,000		1,350,000	1.35	2,730,000	2.73

Source: JICA Study Team

Handling port: Sihanoukville and Oknha Mong

Cargo ship size: small boat or barge

(5) Fertilizer

According to the procedure mentioned in section 10.1.5, fertilizer is forecasted as below;

Table 10.2.11 Fertilizer Cargo Forecast

Cargo Type		2005		2010		2020	
Fertilizer (import) (ton)		29,809	1.00	40,242	1.35	81,379	2.73
	Sihanoukville	0	0.0%	0	0.0%	0	0.0%
	Oknha Mong	29,809	100.0%	40,242	100.0%	81,379	100.0%

Source: JICA Study Team

Handling port: Oknha Mong

Cargo ship size: small boat or barge

(6) Sugar

According to the procedure mentioned in section 10.1.5, sugar is forecasted as below;

Table 10.2.12 Sugar Cargo Forecast

Cargo Type	2005		2010		2020	
Sugar (import) (ton)	33,372	1.00	36,709	1.10	44,718	1.34
Sihanoukville	6,813	20.4%	7,489	20.4%	9,123	20.4%
Oknha Mong	26,559	79.6%	29,221	79.6%	35,596	79.6%

Source: JICA Study Team

Handling port: Sihanoukville and Oknha Mong

Cargo ship size: small boat or barge

(7) Bitumen

According to the procedure mentioned in section 10.1.5, bitumen is forecasted as below;

Table 10.2.13 Bitumen Cargo Forecast

Cargo Type	2005		2010		2020	
Bitumen (import) (ton)	19,988	1.00	26,984	1.35	54,567	2.73
Sihanoukville	0	0.0%	0	0.0%	0	0.0%
Oknha Mong	19,988	100.0%	26,984	100.0%	54,567	100.0%

Source: JICA Study Team

Handling port: Oknha Mong

Cargo ship size: small bitumen tanker

(8) Steel

According to the procedure mentioned in section 10.1.5, steel is forecasted as below;

Table 10.2.14 Steel Cargo Forecast

Cargo Type	2005		2010		2020	
Steel (import) (ton)	82,387	1.00	111,222	1.35	224,917	2.73
Sihanoukville	18,408	22.3%	24,803	22.3%	50,156	22.3%
Oknha Mong	63,979	77.7%	86,420	77.7%	174,760	77.7%

Source: JICA Study Team

Handling port: Sihanoukville and Oknha Mong

Cargo ship size: small boat or barge

(9) Fuel

According to the procedure mentioned in section 10.1.5, fuel is forecasted as below.

It is known that the total value of fuel imported to Cambodia in Cambodian customs statistics is not consistent with the total value of fuel exported to Cambodia in foreign customs statistics. But since the true trade volume is unavailable, the volume in port cargo statistics, which is approximately equal to the volume in Cambodian customs statistics, is adopted as the base cargo volume.

Table 10.2.15 Fuel Cargo Forecast

Cargo Type		2005		2010		2020	
Fuel (import) (ton)	Sihanoukville	249,148	1.00	336,350	1.35	680,174	2.73
	Phnom Penh	464,366	1.00	626,894	1.35	1,267,719	2.73

Source: JICA Study Team

Handling port: Sihanoukville and Phnom Penh

Cargo ship size: 13,000—30,000 DWT tanker (Sihanoukville), 900 DWT river tanker (Phnom Penh)

(10) Coal

Petroleum products are the dominant industrial fuel in Cambodia at present. But coal is planned to be used as fuel in cement factories under construction in Kampot. (See item (4)) And shift of power generation fuel from heavy oil to coal is a global trend.

(a) Cement Production

According to the statistics of cement factories in Japan, 0.103 ton coal is required to produce 1 ton of cement. Total capacity of cement factories in Kampot is 2 million ton per annum. Therefore 206,000 tons of coal is required for the cement production.

(b) Power Generation

According to the definition of units, 1kWh=3.6MJ. According to the Agency for Natural Resources and Energy, Japan, calorific value of imported general coal is 26.6MJ/kg. Thermal efficiency of coal power generation is 43% at maximum. Based on these facts, 3.15×10^4 ton coal is required for 1kWh power generation.

According to Statistical Year Book 2005, total power generation in Cambodia at year 2004 is 6.63×10^8 kWh. Assuming that growth of power generation is proportional to the GDP growth, power generation is forecasted as 9.64×10^8 kWh at year 2010 and 1.95×10^9 kWh at year 2020.

Coal power generation accounts for approximately 30% of total power generation in Japan at present. Assuming that the share of coal power generation reaches 10% at year 2010 and 30% at year 2020 in Cambodia, 30,400 tons and 184,000 tons of coal are required respectively.

Table 10.2.16 Coal Cargo Forecast

Cargo Type	2005	2010	2020
Coal (import) (ton)	-	236,400	390,000
Cement Production (ton)	-	206,000 for 2 mil.	206,000 for 2 mil.
Power Generation (ton)	-	30,400 for 10%	184,000 for 30%

Source: JICA Study Team

Handling port: Sihanoukville

Cargo origin: Indonesia

Cargo ship size: 5,000 DWT bulker

(11) Wood Chip and Wood Pulp

Demand of pulp products has been expanding in China recently. Plantation of acacia and eucalyptus is developed in Cambodia so as to provide wood chip and wood pulp to China. According to interviews with organizations concerned, some Japanese companies are also interested in importing wood chips from Cambodia, though the details are not known.

Two pulp projects shown below are considered for the demand forecast. Outline of the projects is cited from a paper written by a third party. The forecasted cargo volume should be treated as the upper limit because these kinds of projects in Cambodia are sometimes delayed because of various barriers such as land disputes.

(a) Wood Chip

Green Rich, which is a subsidiary company of Indonesian paper and pulp company APP, got concession for a 60,200 ha eucalyptus plantation in Koh Kong province in 1998. Harvested wood is planned to be exported to China as wood chip. Green Rich developed a 18,000 ha plantation during year 2003 to year 2004.

Eucalyptus is cultivated with 7 year-cycle. Average amount of production is approximate 20m³ per annum per ha, which is 10 ton in borne dry status. Situation is almost the same for acacia.

Considering the start year of developing and production cycle, production will start after the year 2010. Assuming that 60,200 ha concession land is fully developed in near future, the amount of production is estimated as 602,000 tons at year 2020.

(b) Wood Pulp

Pheapimex-Fuchan, which is a joint venture of Cambodian developer Pheapimex and a Taiwanese company, got a concession for a 300,000 ha eucalyptus plantation in Kampong Chhnang and Pursat province in 2000. Harvested wood is planned to be exported to China as wood pulp, which is processed by a pulp mill which is planned to be set up in Kampong Chhnang.

According to the plan, 11,900 ha plantation is developed per annum. Assuming that plantation is developed according to design, $11,900 \times (2010 - 2000 - 7) = 35,700$ ha is ready for production at year 2010 and $11,900 \times (2020 - 2000 - 7) = 154,700$ ha is ready for production at year 2020.

0.8 tons of mechanical pulp, which is used for newspaper, is made of 1 ton of wood and 0.5 tons of chemical pulp, which is used for fine paper, is made of 1 ton of wood. Assuming that chemical pulp is produced, the amount of production is estimated as $154,700 \times 10 \times 0.5 = 178,500$ ton at year 2010 and $154,700 \times 10 \times 0.5 = 773,500$ ton at year 2020.

Table 10.2.17 Wood Chip and Wood Pulp Cargo Forecast

Cargo Type	2005	2010	2020
Wood Chip (export) (ton)	-	-	602,000
Wood Pulp (export) (ton)	-	178,500	773,500

Source: JICA Study Team

Based on plans of Green Rich and Pheapimex-Fuchan

Handling port: Sihanoukville

Cargo destination: China

Cargo ship size: 5,000 DWT bulker

(12) Wheat

Consumption of wheat is increasing recently because of changes of food lifestyle. It is expected that the import of wheat will increase in the planning period.

According to statistics of United Nations Food and Agriculture Organization (FAO,) per capita consumption of wheat at the base year is 2.84×10^{-3} ton per annum and annual average growth rate during year 2001 to 2005 is 7.39%. Assuming that the growth rate is the same during the planning period, per capita consumption is 4.06×10^{-3} ton per annum at year 2010 and 8.26×10^{-3} ton per annum at year 2020. Multiplying forecasted population in section 10.1.2 to these, total consumption is 59,700 tons at year 2010 and 148,000 tons at year 2020.

Table 10.2.18 Wheat Cargo Forecast

Cargo Type	2005	2010	2020
Wheat (import) (ton) -	-	59,700	148,000

Source: JICA Study Team

Based on Statistics of FAO

Handling port: Sihanoukville

Cargo origin: Australia

Cargo ship size: 5,000 DWT bulker

(13) Passenger Car

Number of passenger cars is increasing as a result of economic growth. Passenger cars are provided by import of complete cars. Passenger cars do not appear in port statistics in Cambodia because they are containerized cargo. It is possible that passenger cars will be carried by pure car carrier if the number of imported cars increases in future.

According to Cambodian Statistical Year Book 2005, annual increase at year 2004 is 15,700 cars and average annual growth rate during year 2000 to year 2004 is 16.5%. Assuming that the growth rate is the same during the planning period, annual increase at year 2010 is 39,300 cars and 181,000 cars at year 2020.

Table 10.2.19 Estimated Number of Passenger Cars in Cambodia

	1999	2000	2001	2002	2003	2004
Number	185,312	193,851	200,561	209,128	219,602	235,298
Increase		8,539	6,710	8,567	10,474	15,696

Source: Statistical Year Book 2005

Table 10.2.20 Passenger Car Cargo Forecast

Cargo Type	2005	2010	2020
Passenger Car (import) (cars)	15,700	39,300	181,000

Source: JICA Study Team

Handling port: Sihanoukville

Cargo origin: Thailand

Cargo ship size: Pure Car Carrier

Non-containerized cargo forecast is summarized as below;

Table 10.2.21 Non-Containerized Cargo Forecast

(Unit: ton)

		2005 (*1)	2010	2020
Import	Sihanoukville	303,659	701,259	1,340,533
	Non-Fuel	54,511	364,909	660,359
	Rice	7,557	8,323	10,138
	General Cargo	4,600	5,064	6,169
	Machinery	17,133	23,130	46,773
	Sugar	6,813	7,489	9,123
	Steel	18,408	24,803	50,156
	Coal	-	236,400	390,000
	Wheat	-	59,700	148,000
	Fuel	249,148	336,350	680,174
	Oknha Mong	221,919	272,595	455,608
	Rice	37,212	40,923	49,852
	General Cargo	44,372	48,805	59,454
	Fertilizer	29,809	40,242	81,379
	Sugar	26,559	29,221	35,596
	Bitumen	19,988	26,984	54,567
	Steel	63,979	86,420	174,760
	Phnom Penh	464,366	626,894	1,267,719
Export	Sihanoukville	-	503,781	1,501,736
	Cement	-	325,281	126,236
	Wood Chip	-	-	602,000
	Wood Pulp	-	178,500	773,500
	Oknha Mong Cement	-	925,801	359,286

Source: JICA Study team

*1: 2005 value may be adjusted and not always same as statistical data.

10.2.3 Passenger Forecast

As mentioned in section 10.1.4, the number of visitors, which includes tourists, from foreign countries has been increasing at a high growth rate in recent years and this trend is expected to continue in future. However, considering experience of neighbor countries, it is difficult to expect that such a high growth rate would continue during the whole planning period. It is possible that the growth will become saturated at a certain point. For example, in Thailand, tourist arrivals have already saturated and tourists by sea have also already saturated at 250,000 persons.

Table 10.2.22 Tourist Arrivals in Thailand

Year	2001	2002	2003	2004	2005
Tourist Arrivals ('000)	10,133	10,873	10,082	11,737	11,567
Sea ('000)	250	225	180	247	242

Source: Immigration Bureau, Police Department

It is assumed that visitor arrivals by water will be saturated at 250,000 persons at year 2020 and that growth rate is constant in the planning period. Same growth rate is applied to both Sihanoukville port and Phnom Penh port. Based on statistics, number of passengers per ship is set to be 450 persons at Sihanoukville port and 60 persons at Phnom Penh port.

Table 10.2.23 Forecast of Visitor Arrivals and Ship Call

Year	2005		2010		2020	
Visitor Arrivals by Water	11,550	1.00	32,225	2.79	250,058	21.65
Sihanoukville	2,550		7,115		55,208	
Phnom Penh	9,000		25,110		194,850	
Ship Call						
Sihanoukville	5		14		108	
Phnom Penh	150		419		3,248	

Source: JICA Study Team

10.3 Priority Issues and Tasks

10.3.1 Improvement of Maritime Services

In this section, strategic issues for the improvement of maritime service in Cambodia will be extracted from the list of issues on the present status of the Cambodian maritime sector summarized in Chapter 9.1. These issues should be adopted as a part of the Master Plan of the study.

The most urgent issue for the Cambodian maritime sector is to achieve efficient service at the global level in container trade. Cambodia now has a policy to encourage manufacturing industries which entails importing materials and exporting products to and from foreign countries. It is indispensable for the economic development to provide a globally competitive container transport system. Otherwise, the development plan will not be attractive for foreign direct investment (FDI).

Service level of present container trade is not sufficient in a couple of aspects when compared to neighboring countries as pointed out in Chapter 4.

Shipping lines are offering loop services all over the world. As a result, a very complex service network has already been established for trunk lines and feeder lines as well. In this network, shippers or forwarders can easily find the transportation route to connect the set of origin and destination for individual cargo. It is also possible to find alternative paths for each transportation need that inevitably invites competition within shipping lines. This type of network is called “the global container network” in which the globally standardized service is expected in terms of cost, time and convenience.

There are two container ports in Cambodia, Sihanoukville and Phnom Penh. Neither port is a gateway to the global container network yet. The annual throughput of Sihanoukville port has already reached 220,000TEU. However, the number of visiting loops is limited; Sihanoukville has to depend on Singapore or Laem Chabang to connect it to the global container network. It will be necessary to increase throughput to about the level of 1,000,000TEU a year to be one of the gateways of the global network. Although the throughput of Phnom Penh port is limited now, it is increasing very rapidly.

One reason for the rapid development of Phnom Penh port is the concentration of manufacturing factories around Phnom Penh City. Distance to the port is much shorter than that of Sihanoukville. Another reason is the development of HCMC area as a container port. Throughput is rapidly increasing and the trunk line loop is expected to call HCMC area very soon. HCMC area can be considered as a gateway to the global network even now. The development of HCMC area itself as a gateway is remarkable. At the same time, it has a significant impact on Cambodian container transport as it connects Phnom Penh port to the global container network directly through the Mekong River.

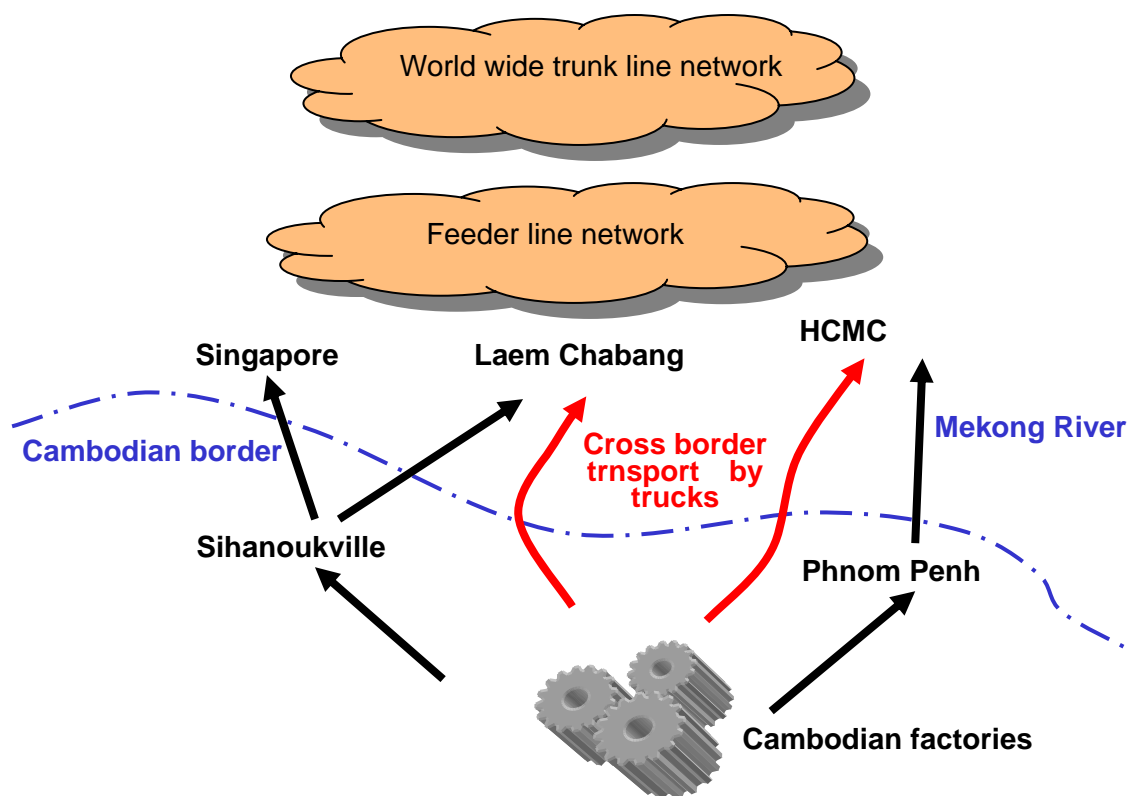


Figure 10.3.1 Access to the global container network from Cambodia

Although two ports are designated as autonomous ports already, even more efforts are expected to invite shipping lines to visit. That is called “port sales” in private sectors’ port management.

Water-borne bulk transport plays a significant role in Cambodia. Oil products and cement are principal cargoes at the moment. The importance of oil transport to the national economy should be emphasized. Oil consumption will usually increase at a higher rate than GDP in the case of developing countries.

Bulk transport may lead to the establishment of a national fleet. Although container transport is too complex a business for newcomers, bulk trade is much simpler. It is of course desirable for a country to run its fleet itself for the sound development of the maritime sector.

Cambodia has many issues to solve in administration, legislation and the implementation of international conventions. Many maritime issues are not only national matters but also international ones. Although IMO takes care of international maritime issues as one of the organizations of the United Nations, the implementation must be executed under the sovereignty of member countries. It is the responsibility of member countries to implement IMO’s resolutions for the safety of ships and marine environment protection.

Open registry system is one of the important issues for Cambodia. All ships are requested to register in some country. The country that accepts the registration of the specific ship is called the Flag State of the ship. Cambodia does not follow internationally accepted standards when registering a ship and thus the number of detentions by Port State Control is the largest and detention rate is one of the worst for Cambodian flag vessels. This situation causes various problems and obstructs the sound development of the maritime sector of Cambodia.

The draft of the maritime code of Cambodia is ready now and is expected to be finalized in the near future. Ship safety regulations and other related legislation should be considered urgently. Many of the international conventions are not ratified yet. It is necessary to indicate the priority of ratifying such conventions and to propose the roadmap of implementation in the master plan.

The most important issue for the governmental sector would be the lack of an implementation body. The establishment of the Cambodian Coast Guard is expected by MPWT to handle the ship safety and marine environment protection as well as the generic duty of coast guard. Although it is a matter for the Cambodian government to decide what sort of body to establish, the study team would like to emphasize the urgency of an implementation body for the development of maritime sector.

It is generally recognized that the capacity development of human resources is an important issue. Seafarer's training, port operation personnel's training and ship inspector's training have been identified in this particular study. Among the above-mentioned scope, the adaptation to STCW was conceived as the most urgent issue. STCW is the standard for watch keeping of officers for ocean going vessels. Although Cambodia is listed on the white list of IMO, the white list is planned to be reviewed again by 2010. If Cambodia cannot remain on the white list, there will be a negative impact on the future development of maritime sector.

Maritime Training Center commenced in 2006 at PPAP under the cooperation of Antwerp Maritime College. This project's very sharply defined objective is to clear the IMO review. Consequently, project size is small and no facilities for practical training are available. Practice training facilities of the Vietnamese maritime university will have to be relied for the time being. Preparation of practical training facility is expected by the time of IMO review.

In parallel to the officers' training, rating crews' training should be considered to supply them for the global seafarers market. Although the rating crews are oversupplied in the market, it must be a matter of manning cost. Cambodia wishes to provide younger generation with better opportunity of employment. Global rating crew market can absorb a significant number of employees as long as the Cambodian average wage level stays low.

In connection with the port development, safety and utilization of port facilities should be given due attention. At present, machinery vendors prepare initial training and familiarization is acquired by on the job training. Along with the improvement of port utility ratio, systematic approach is required for better port operation. Personnel training course should be mandatory in the very near future.

Global container transport network is a very complex system. There are various interrelations among many of the stakeholders and the system has thus become very hard to understand. Skill and experience seems to be the only solutions for this issue. On the other hand, academic research for logistics is gaining popularity. Many maritime colleges are beginning to offer research projects and training courses all over the world. Cambodia should also establish this sort of institute.

Based on the above, the situation of Cambodia and neighboring countries, and also taking into account the urgency and feasibility, measures summarized in tables in section 9.1 are evaluated as follows:

Table 10.3.1 Evaluation of Measures

<i>Category</i>	<i>Issues</i>	<i>Measures</i>	<i>Importance</i>	<i>Urgency</i>	<i>Feasibility</i>	<i>Sub-sections to be referred</i>
Competitive maritime service	Upgrading the Sihanoukville port to gateway status	Integrated development of Sihanoukville SEZ and port				11.1 14.2
		Development of Phnom Penh Sihanouk Ville Growth Corridor is also expected				11.1
		Intensive effort for port sales				14.2
		Joint venture with international terminal operators				11.1
	Enhancement of Phnom Penh to allow HCMC container transport	Day of the week service				11.1
		Night navigation				11.5
		Employing larger size vessels in Mekong River transport by dredging				11.5
	No Cambodian enterprise for container transport. Dependence on the foreign logistics enterprises. Enterprises are deeply related to huge buyers Foreign companies manage most cargo transport. No Cambodian sales agents. Individual factory (shipper / consignee) has no access to shipping companies	Enhancement of private companies for logistics and forwarder business				11.1
		Encouragement of private shipping and sales agents				11.1
		Reconsideration of the role of KAMSAB				11.1
		Reduction of empty container ratio				11.1
	Water-borne transport by Cambodian vessels is rare. Establishment of reliable transport of oil product and bulk cargo CIF contract with foreign enterprise in tanker transport	Consideration of own fleet transport for oil and bulk cargo				11.5
		Effective national incentives for Cambodian operated vessels (tanker, bulk)				11.5
	Opening of cement factory	Observation (cement factory)				
	Trend of passenger transport	Observation (passenger boat)				
	Double check at border by Customs and CAMCONTROL	More efficient quality control system should be employed				11.1
	Implementation of new Cambodian risk management system by IIFG into port security system	Strengthen the connection between port security system and IIFG				11.1
		Consciousness of Supply Chain Management in port operation				11.1

Legislation and convention	Legislation of maritime code Legislation of Ship Safety Regulation	Introduction of experts			14.7
	Ratification of International Conventions (listed below) Reviewing the relationship between national regulation and international conventions	Application of internationally accepted code like Safety Regulation for non-conventional Sized Ships (UNDP/IMO) ASEAN or Regional Cooperation for common rule			14.7 14.7
Inspection and registry	Ship registration is not executed Ship inspection is not executed	Capacity building of ship inspector Use of classification society			14.6 14.6
	Open registry	Strong political decision-making (open registry)			14.4
	Lack of implementation body	Establishing a body for CSC			14.6
Implementation of conventions	Port State Control	Join Tokyo MOU			14.6
	Search and rescue Lack of facilities	Regional Coordination Center Donation of GMDSS			14.6 14.6
	Oil pollution prevention	Framework program of Cambodia, Thailand and Vietnam Sharing the cleaning material, information and human resources Settlement of National Oil Spill Response Center			14.6 14.6 14.6
	Lack of implementation body	Establishing a body for CSC			14.6
Seafarers registration	No record of number of Cambodian seafarers No effective registration and certification system exists for Cambodian seafarers Endorsement system for foreign certificate	Introduction of expert. Common understanding of required skill in inland water navigation Establishing a body for CSC			14.5 14.5 14.5
Seamen Training	Officers' training	Maritime training center was opened in 2006			
	STCW compatible training facilities	Donation of facilities for practice training			14.5
	Rating crew training	Establishment of training center			14.5
	No ship-repairing yard	New shipyard (repairing)			
	Dry port development	Larger scale and rail linked operation is expected (Dry port)			14.1
	Van pool and container repairing	Larger scale is expected (Van pool/ container repairing)			14.1

Details of measures are described in the following sections:

- 11.1 Proposals for Achieving Global Standard in Container Shipping Services
- 11.2 Ship Registration, Ship Inspection, Port State Control and Ship repair Industry

- 11.3 Maritime Education and Training
- 11.4 Ratification and Implementation of International Conventions
- 11.5 Coastal Shipping and Inland Water Transportation

- 14.1.3 Development of Container Depot with Rail Linked
- 14.2.1 Diversification of Liner Services and Close Connection with SEZs
- 14.4 Improvement of Flag State Control
- 14.5 Establishment of Maritime Practical Training Center
- 14.6 Maritime Safety
- 14.7 Strengthening of Maritime Administrative Enforcement Capabilities

10.3.2 Improvement of International Competitiveness in the Port Sector

There are various kinds of issues to be solved in the Cambodian port sector. Many issues are related to other issues and difficult to be solved by an individual measure. Ports play the role as infrastructure not by virtue of one port facility but by one port with various facilities as a whole.

In order to enhance international competitiveness, it is necessary that the port sector in Cambodia formulates a comprehensive strategy to enhance port operation and service.

Issues listed in Chapter 9.2 are composed of hard measures (physical measures) and soft measures (non-physical measures). To increase the competitiveness of ports, it is required to construct necessary facilities and to use these facilities efficiently.

Here, the issues are classified into port development and improvement, port management and operation, and port administration in order to identify the measures that need to be taken.

Table 10.3.2.1 Strategic Issues in Port Sector

	Measures	Development/Improvement	Port Management/Operation	Port Administration
S/P	Enhancement of Connection with Trunk Line		*	
S/P	Introduction of Unified Port Procedures		*	*
S/P	Installation of Container Scanner	*	*	
S/P	Establishment of Permanent Organization for Port Promotion		*	
S/P	Establishment of Competitive Charge		*	
S	Enhancement of Cost and Service, Implementation of Port Promotion		*	*
S	Introduction of Efficient Container Terminal Operation with Modern System	*	*	
S	Efficient Use of Port Area and Procedural Enhancement in Port	*	*	
S	Improvement of Necessary Port Facilities such as Bulk Terminal	*		
S	Improvement of Passenger Terminal	*		
S	Effective Use of Port Area	*	*	
S	Port Management and Operation Strategy that Maximizes Advantage of Sea Port	*	*	
S	Increase in Number of Calling Vessels, and Rearrangement of Calling Day		*	
S	Improvement of Conditions on Road Transportation		*	
S	Improvement of Port Facilities	*		
S	Port Development for Port-related Industry	*		
S	Promotion for Location of Industry near Port	*	*	
S	Creation of Industrial Core in port SEZ	*	*	
P	Increasing Capacity of Container Handling	*	*	
P	Implementation of maintenance Dredging	*		
P	Installation of Container Handling Equipment	*	*	

P	Improvement of Container Yard	*	*	
P	Improvement of Road in Phnom Penh City		*	
P	Port Management and Operation Strategy that Maximizes Port's Advantageous Location	*	*	
P	Improvement of Navigational Conditions		*	
P	Improvement Bulk Cargo Handling Facility	*		
P	Port Development at New Site	*		
G	Mechanism to Cope with Customer's Request	*	*	
G	Research and Port Promotion		*	
G	Expansion of Port Facilities to Cope with Increasing Cargo	*		
G	Adequate Execution of Present Institution		*	*
G	Establishment of Port Administration System for Private Ports			*
G	Establishment of Comprehensive Port Administrative System			*
G	Establishment of System for Oil Spill Contingency	*	*	*
G	Enhancement of Administration on Port Security		*	*
G	Establishment of Proper System on Port Administration			*
G	Formulation of National Port Policy			*
G	Establishment of Institution on Port Development			*
G	Establishment of Coordinating System among relevant Plans/Policies			*
G	Establishment of Port Statistics System		*	*
G	Establishment of Administrative Organization to Cope with Latest Demands			*
G	Capacity Development in the Field of Port Development		*	*
G	Capacity Development in the Field of Port Management		*	*
G	Capacity Development in the Field of Port Administration		*	*
G	Training of Port Terminal Manager and Operator		*	*

S/P: Sihanoukville Port and Phnom Penh Port

S: Sihanoukville Port

P: Phnom Penh Port

G: Ports in General

(1) Port Development and Improvement

In order to become bases of international logistics and industrial activities, ports have to provide port facilities with enough capacity and size and equipment supporting smooth cargo handling for all users. Considering that cargo volume is increasing together with economic growth, the introduction of larger vessels and the increasing use of IT technology in cargo handling, ports have to continuously develop and improve port facilities and equipment.

Development of ports by improvement of port facilities and installation of equipment with necessary capacity and size is one of the most basic and important issues for the port sector in Cambodia.

(Sihanoukville port)

Issues on development and improvement of Sihanoukville Port are composed of issues of long-term policy, improvement of port facilities and enhancement of container terminal to meet international standards.

Port development under a strategy that maximizes the advantage of sea ports, promotion for location of industry near port, creation of industrial core in Port SEZ and effective use of port are

issues connected to long-term policies of Sihanoukville Port. These issues have to be addressed in a strategic manner.

Regarding the improvement of port facilities, facilities for cargo such as equipment of offshore oil project and coal for a cement factory as well as a passenger terminal responding to tourism promotion are required at present. Effective use of existing facilities has to be considered at first when new demand arises. If the existing facility is inadequate, then improvement works or construction of new facilities are examined. At that time, it is necessary to consider the functional layout in the port area.

Completion of a new container terminal under construction and its efficient operation shall be one of the most important and urgent issues.

a) Long-term Policy

Port Management and Operation Strategy that Maximizes Advantage of Sea Port, Promotion for Location of Industry near Port, Creation of Industrial Core in Port SEZ, Effective Use of Port Area

b) Improvement of port facilities

Efficient Use of Port Area, Improvement of Necessary Port Facilities, Improvement of Passenger Terminal, Port Development for Port-related Industry

c) New Container terminal

Efficient Container Terminal with Modern System, Installation of New Container Scanner

(Phnom Penh Port)

Issues on development of Phnom Penh Port consist of long-term policy and improvement of port facilities for enhancement of container handling. Phnom Penh Port has an advantageous location at Phnom Penh City where many activities concentrate, but on the other hand, has to cope with problems on navigation restrictions and conflicts with urban activity. Relocation of the present port to a new site is under discussion as a long-term policy issue.

Container cargo volume is increasing rapidly and is forecasted to exceed the capacity of the present port facility. Locating the container yard outside the port is an urgent issue.

a) Long-term policy

Port Development at New Site, Increasing Capacity of Container Handling, Improvement Bulk Cargo Handling Facility, Port Management and Operation Strategy that Maximizes Port's Advantageous Location

b) Improvement of port facilities

Increasing Capacity of Container Handling, Installation of Container Handling Equipment, Installation of Container Scanner, Improvement of Container Yard, Implementation of Maintenance Dredging

Improvement of port facilities corresponding to customer's request as well as port development for large volume and/or heavy cargo handling and installment of necessary facilities for oil spill contingency are common issues for both ports.

(2) Port Management and Operation

Some port management and operation issues are specialized to each port but many are common to both ports. The most important issue in port management from the viewpoint of competitiveness is to provide easy-use port facilities and high quality service to port users.

Efficient port service, improvement of port procedures, improvement of conditions surrounding port and management policy are identified as important measures in port management and operation.

a) Efficient port service

Increasing Capacity of Container Handling, Installation of Container Handling Equipment, Improvement of Container Yard, Enhancement of Connection with Trunk Line, Increase in Number of Calling Vessels, and Rearrangement of Calling Day, Establishment of Competitive Charge, Enhancement of Cost and Service, Implementation of Port Promotion

b) Improvement of port procedures

Introduction of Unified Port Procedures, Efficient Use of Port Area and Procedural Enhancement in Port, Installation of Container Scanner

c) Improvement of conditions surrounding port

Enhancement of Connection with Trunk Line, Improvement of Conditions on Road Transportation and River Navigation, Improvement of Road near Port, Efficient Use of Port Area, Port Security, Oil Spill Contingency

d) Management policy

Port Management and Operation Strategy that Maximizes Port's Advantageous Location and Advantage of Sea Port, Promotion for Location of Industry near Port, Mechanism to cope with Customer's Requests, Establishment of Permanent Organization for Port Promotion, Research and Port Promotion

Port management and operation shall be conducted by individual port management bodies but some issues shall be common in the port sector. These issues are closely related to port administration and described in the next section.

(3) Port Administration

Establishment of the basic port system, establishment of port policy, observing international conventions, supervising private sector and fostering human resources are basic components of port administration.

a) Establishment of basic port system

Adequate Execution of Present Institution, Establishment of Proper/Comprehensive System on Port Administration, Establishment of Port Administration System for Private Ports, Establishment of Institution on Port Development, Establishment of Administrative Organization to Cope with Latest Demands, Introduction of Unified Port Procedures System, Enhancement of Cost and Service, Implementation of Port Promotion, Establishment of Port Statistics System

b) Establishment of port policy

Formulation of National Port Policy, Establishment of Coordinating System among relevant Plans/Policies, Establishment of Port Statistics System

c) Observing international conventions

Enhancement of Administration on Port Security, Establishment of System for Oil Spill Contingency

d) Fostering human resources

Capacity Development in the Field of Port Development/Port Management/Port Administration, Training of Port Terminal Manager and Operator

10.3.3 Economic Zone Promotion

Sihanoukville has the only deep sea port in Cambodia and is expected to be a leading area of industrial development as well as Phnom Penh, though it doesn't have large industrial cluster yet.

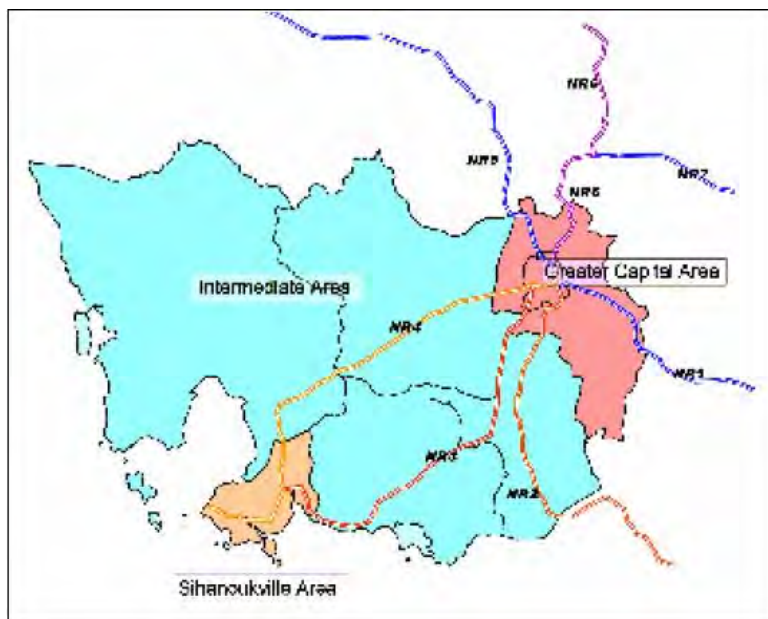
Future developing image of Sihanoukville area in "The Study on Regional Development for the Phnom Penh - Sihanoukville Growth Corridor(Development study project, 2001-2003)" is summarized in this section as basic information of economic zone promotion in the area.

Mesh analyses are also conducted to make future development strategy and zoning image of the area considering natural and socio-economic conditions.

(1) Future Developing Image of Sihanoukville Area in "The Study on Regional Development for the Phnom Penh - Sihanoukville Growth Corridor"

This study defined the area including Phnom Penh, Sihanoukville and intermediate provinces as the "Growth Corridor" leading industrial development of Cambodia and formulated a master plan to year 2015.

The study divided the "Growth Corridor" into three areas of Greater Capital Area, Sihanoukville Area and Intermediate Area (see below figure) and examined roles and development scenario of each area.



Source: The Study on Regional Development for the Phnom Penh - Sihanoukville Growth Corridor

Figure 10.3.3.1 Growth Corridor and Areas

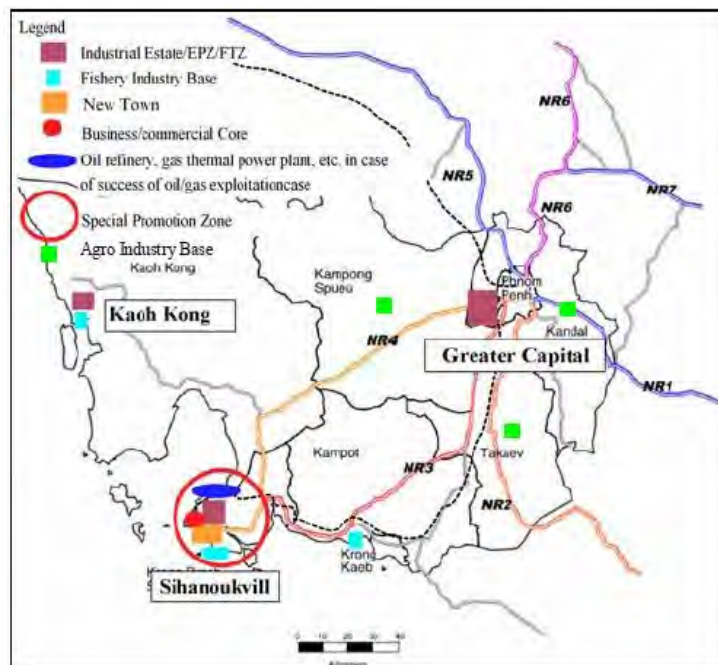
Sihanoukville Area is defined as the most attractive area for FDI such as export-oriented industry as well as Greater Capital Area, because the area has an international port able to connect with world major ports, Route No. 3, 4 connecting with Phnom Penh, and a high growth rate of population.

As the first step to attract FDI, Special Economic Zone must be realized using all possible measures. And "Sihanoukville Port Free Zone" is defined as the immediate priority project.

Intermediate Area is defined as predominantly rural area having high potential for agriculture and

fisheries. Therefore it is necessary for this area to develop agro and fishery industries using local resources.

Future development image of the study is as below figure.



Source: The Study on Regional Development for the Phnom Penh - Sihanoukville Growth Corridor

Figure 10.3.3.2 Future Development Image of the “Growth Corridor” Study

(2) Mesh Analysis Examining Future Development Direction of Sihanoukville and Neighboring Area

It is necessary for formulating a port and regional development strategy to specify functions to be introduced to the area considering natural, socio-economic conditions and existing infrastructures and to examine appropriate zoning. Therefore Mesh analysis is conducted by the study team to examine future development direction of Sihanoukville and neighboring area.

Regarding the mesh analysis, refer to 12.4.

Chapter 11 Master Plan for Maritime Sector

11.1 Proposals for Achieving Global Standard in Container Shipping Services

The study is forecasting that container throughput will be 1,405 thousand TEU in 2020 in the high case; throughput at Sihanoukville port is 984 thousand TEU while that at HCMC via Phnom Penh port would be 422 thousand TEU. Compared with throughput in 2005 (241 thousand TEU), volume is expected to increase over 6 times increase in 15 years.

11.1.1 Container Shipping Service in Sihanoukville port

Above mentioned 984 thousand TEU in 2020 is equivalent to the handling of 20,000 TEU per week, and which means similar lifting results to around 30 loop ships calling to Sihanoukville port. In 2005 only 9 loops were deployed, therefore about 3 times as many ships would call Sihanoukville in 2020.

Nowadays, almost all garments have been produced in Phnom Penh for export, however production center of trade items will shift its location to Sihanoukville SEZ or the growth corridor between Phnom Penh and Sihanoukville. Also, the import source of parts or material would be diversified in the future. More routes of container lines would require more capacity in the container terminal, which is operated not only by autonomous port but also by joint venture with international operator as landlord port. Sihanoukville port is also expected to expand its terminal capacity as well as to change its management such as by introducing privatization, the same as Laem Chabang port in Thailand or Vietnam Southern ports. Chapter 7 of this reports deals with the container service of neighboring countries, and Chapter 14 mentions ICD in Thailand or Vietnam.

Nowadays, all containers are carried by foreign shipping lines and cargo is consolidated by foreign freight forwarders. The globalization of the container business makes it difficult for independent domestic companies to successfully compete in the container business; only joint ventures with access to foreign investment can survive. In particular, international freight forwarder is essential. In Cambodia foreign logistics or freight forwarder, such as MAERSK Logistics or APL Logistics, controls almost all cargo and it seems too difficult to establish the forwarding business without foreign partners from developed countries.

Shipping agent will face a similar situation as other container related business in the future. In 2020 it is expected that around 30 loops will call Sihanoukville, and these loops have different container ships with different operation system. Shipping agents are requested to interface their computer system with different EDI belonging to shipping lines. In Vietnam shipping agent activity was originally granted only to VOSA, but this situation has changed due to “Doi Moi” policy and privatization by accession to the World Trade Organization. New shipping agents have been approved as joint ventures with foreign shipping lines, and even 100% of foreign investment was established for MAERSK Line. In the future many loops of container service would be provided by a lot of shipping lines at Sihanoukville port, and corresponding precedents in China or Vietnam would be reference to Cambodia.

According to the Sub-Decree No.81 SD/PK, only KAMSAB was entitled to provide agency and brokerage services to ship owners and charterers in Cambodia, and no others have been allowed such services in both liner and tramp shipping. Also there is no lawful provision of agency activity, creating confusion among foreign shipping companies who have already established their own shipping agent in Cambodia.

There are a lot of shipping agents established by foreign shipping companies in Cambodia in order to operate their container ships efficiently, but these agents cannot perform typical services such as attending to local procedures for vessel's entry into and exit from ports, applying for pilotage and

ship's berth, arranging for loading, unloading, reception, delivery, tallying, weighing and measuring of cargo storage in warehouse, shipyard or port, arranging for repairs and technical inspection of vessels and applying for inspection of ship's holds, spraying insecticide, decimating rats, and cleaning and sweeping of ship's holds, booking services and arranging embarkation and disembarkation formalities for passengers and luggage, attending to procedures for landing of crew members for business contact with competent authorities or ministries, arranging supplies of food, freshwater, fuel, collecting and transferring freight, indemnities, arranging salvage to vessels in distress, arranging all business contacts between vessel and port, shippers and consignees during vessel's stay at port. Also the Sub-Decree No.81 SD/PK requires a vessel owner or charterer to provide necessary information to KAMSAB; vessel characteristics, vessel arrival information, and river and sea vessel transportation documents through telegram or letter, with deposit at bank. But actually this information is supplied from shipping agents to KAMSAB, which results in a different and complicated agency system in Cambodia, and shipping lines have to pay agency fee not only to their own shipping agents but also to KAMSAB. All arrangements by KAMSAB interrupt direct business dialogues or negotiation between shipping lines and port operator, consequently port services are not user-friendly in Cambodia. Instead, KAMSAB plays the role of government sector in terms of ship entry and exit.

KAMSAB is the sole agent to have been authorized by the sub-decree, and neither competition nor negotiation is recognized for shipping agency activities in Cambodia. Maritime Code should stipulate the criteria of agency activity and open the door to the private shipping agents.

Currently double inspections are carried out by the Customs and Excise Office and by the CAMCONTROL. One is for the execution of quantity inspection, and the other is quality inspection of import and export cargo. An Inter-Institutional Facilitating Group (IIFG) was formulated in 2006, and they are going to achieve effective risk management and one stop service to the Customs clearance by the electronic system as well as a joint inspection by the Customs and another institution. Such efforts will also enhance the port security system, and will shorten the lead time of Cambodian trade. In this sense, container service in Cambodia will be upgraded to the same level as the global standard through ratifying the FAL65 Convention. In particular, the quality of garment is guaranteed by ISO standard as an international practice, therefore special inspection to garment would be a complicated procedure. Consciousness of Institutional Facilitation and SCM would achieve more efficient port operation with more cargo volume in the future.

In 2005 only 9 loop services were assigned at Sihanoukville port, which was equivalent to throughput of 211 thousand TEUs, and it is also forecast that 12 loops (equivalent to 349 thousand TEUs at High case) in 2010 as well as 30 loops (equivalent to 1,124 thousand TEUs at High case) will be required in 2020 respectively. More throughput at Sihanoukville port would require more loop services in the future. Currently container service is provided on a fixed day schedule: 2 ships are deployed for a 14 day loop, and 3 ships are deployed for 21 day turnaround. Ship operation is well organized under consortium with sister ships provided by each member line, and space charter arrangement has also been introduced to improve space utilization for container ships. In the case of 35 loops between Laem Chabang and East Asian ports, 19 loops are operated under consortium and the remaining 16 loops are operated by an independent shipping line. Especially among the Intra Asia routes, calling ports are diversified and joint operation or space charter improves service frequency.

In the future (around 2015), about 20 loop services will be required at Sihanoukville port, which is almost double the capacity over 2005. These loops will compete with each other to select calling ports, and consortium may be formed to mitigate fierce competition by joint operation or space charter. It is likely that a traditional foreign operator will form a partnership with a new Cambodian owner whose only role will be to provide the ship. Almost the entire container business, that is marketing, sales and operation is carried out by the foreign operator, and the Cambodian owner is just a receiver of time charterage from the consortium. However, Cambodian owners can learn a lot

during this period and eventually become operators themselves, in the foreign shipping lines will handle agency activities to ensure that the container business with Cambodia meets international standards.

Cambodian ship owners should be established in and around 2015, when many consortiums would assign new loops at Sihanoukville port. Whenever a new loop is applied to Sihanoukville, it will be determined whether a Cambodian owner can join the consortium or not. To promote Cambodian owners, time charterage should be lower than the market price.

11.1.2 Container Shipping Service in Phnom Penh port

The study forecasts that container throughput via HCMC and Phnom Penh port will increase to 422 thousand TEU in 2020 in the high case, and trade share of this route will achieve 30% in 2020, 17.5-point increase from 12.5% in 2005.

The IWT container feeder between HCMC is a characteristic service through the Mekong River, which was inaugurated by SOVEREIGN Based Company from Taiwan in 2002, and followed by China Shipping from China, DEMADEPT and SONG DAO in Vietnam. In 2005 a total of 7 barges have been deployed to this container service of 254 voyages with total capacity of 54,500 TEU. Actual lifting results amounted to 30,281 TEU.

Table 11.1.1 Container Lifting Results at Phnom Penh

	2002	2003	2004	2005
Import Laden	242	4,134	7,054	14,077
Import Empty	100	306	985	867
Import	342	4,440	8,039	14,944
Export Laden	237	2,072	3,237	3,767
Export Empty	167	1,118	4,250	11,570
Export	404	3,190	7,487	15,337
Total	746	7,630	15,526	30,281

Source: PPAP

In 2002, the lifting results at Phnom Penh port amounted only to 746TEU, but then it soared to 7630TEU in 2003, 15,526TEU in 2004 and 30,281TEU in 2005.

It is easy to understand why these has been such a great increase in Import Laden containers to Phnom Penh. (The above figure shows that imports increased by three times from 2003-2005, reaching 14,077TEU.) In the container flow analysis by PPAP for the first half in 2005, Import Laden container shares 56% from China and 38% from Vietnam, while in the commodity analysis, Ceramic/Tile shares 27% and Fabric/Knitted Fabric shares 22%. These commodities are heavy weight; Ceramic/Tile is about 20 tons/TEU, Fabric/Knitted Fabric is about 7 tons/TEU. Therefore heavy construction material from Vietnam is mainly carried by IWT barge, as such weights exceed the load limitations of road, as well as import garment material from China transshipped at HCMC. Also garment export to USA, which is the main commodity of Cambodian export, is estimated 150TEU through Phnom Penh port in 2005, and shares only 0.4% of garment export 37,328TEU to USA.

Table 11.1.2 Container Trade at Phnom Penh

Import			Export		
Trade Partner	TEU	Share	Trade Partner	TEU	Share
China	3703	56%	China	603	44%
Vietnam	2525	38%	Vietnam	497	37%
Taiwan	119	2%	Japan	118	9%
Korea	105	2%	Taiwan	70	5%
Singapore	45	1%	USA	48	4%
Others	101	2%	Others	36	3%
Total	6497	-	Total	1356	-

Source: PPAP

The lifting results through the Mekong River are composed of; 1) trade items between Cambodia and Vietnam, 2) transshipment items at HCMC between Cambodia and China, and 3) other transshipment items at HCMC between Cambodia and Intra Asia countries as well as USA/EU. In the case of 1) Vietnam trade, Phnom Penh and HCMC are on equal footing in terms of loading and discharging, however in the case of 2) and 3) of transshipment, Phnom Penh is dependent on HCMC as a feeder port status. Therefore the service quality of IWT is much affected by the container service provided at HCMC, including ship size or port rotation. In addition, cargo compartment and empty container ratio in Phnom Penh port would also be affected.

If Port Relocation changed HCMC ports dramatically, Phnom Penh port would be also affected. If New Deep Ports were developed in Baria Vung Tau province and Post Panamax Container ships were calling there, Phnom Penh port would be also affected as a feeder port in terms of its cargo destinations or its empty container ratio. Phnom Penh port is always affected by the latest move of HCMC or South Vietnamese ports.

Now in South Vietnam, there are two big projects including HCMC Redevelopment and Deep-sea port plans in Baria Vung Tau province. Following table 14.3.3 shows the container handling capacity at South Vietnam ports in the future.

As of 2005, the total capacity is 2.8 million TEU for 6 terminals alongside the Saigon River and the Dong Nai River. In 2010, the capacity is estimated to increase to 7.7 million TEU with 9 terminals, and in 2015 the capacity is estimated to substantially increase to 11.7 million TEU with 17 terminals.

Special attention needs to be paid to the port development in the Cai Mep Area with 14 meter deep draft. There are 5 development plans on going, and the Saigon Newport Terminal will be the first operator starting from 2009, followed in the APM (MAERSK Line) Terminal, Gemadept Terminal, SSA Terminal. The final operator will start from 2012 in the Japanese ODA Container Terminal.

These deep draft terminals can accept Post PANAMAX container ships between Cai Mep and USA or EU ports directly. Saigon Newport Terminals, which will start the first terminal operation in 2009, has a lot of offers from trunk lines to negotiate calling large sized ships at Cai Mep in Vietnam.

This trend will force the Inland Water feeder to be more customer friendly service. In order to connect Phnom Penh cargo onto trunk lines without fail, the feeder service must have fixed day and fixed time schedule, requiring a powerful barge engine capable of proceeding against the strong current in the Mekong River without delay, and negotiations with the Vietnamese government to enable night navigation for foreign flag ship. Also the design of container barge should be changed to accommodate 45 feet long body containers. Therefore the feeder operator will need to make substantial investments to connect export cargo onto the trunk line, however this is a good chance to raise the level of IWT container services to global standards.

Table 11.1.3 Handling Capacity at South Vietnam

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Saigon River											
VICT	600	600	600	600	600	900	900	900	900	900	900
Saigon Port CSG	300	300	300	300	300						
Ben Nghe	250	250	250	250	250						
Bong Sen (Lotus)	25	25	25	25	25						
Dong Nai River											
Saigon Newport Cat Lai	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400
Mid-Stream Operations	300	300	300	300	300	300	300	300	300	300	300
Saigon Newport Nhon Trach							500	500	500	500	500
Soi Rap River											
Saigon Premium (DP World)					750	750	750	750	750	1,500	1,500
Saigon Port Soi Rap							50	50	50	50	50
Hiep Phouc #2											50
Long An Terminal											50
Cai Mep											
Saigon Newport Terminal					400	400	900	900	900	900	2,000
SSA Terminal						1,350	1,350	1,350	1,350	1,350	1,350
APM Terminal						950	950	950	950	950	950
Gemadept Terminal						900	900	900	900	900	900
ODA Container Terminal								900	900	900	900
Thi Vai											
PSA Terminal						750	750	750	750	750	750
ODA General Cargo								50	50	50	50
Thi Vai International Port								50	50	50	50
Phu My General Cargo Port								50	50	50	50

Source: JICA Study Team

11.1.3 Shipping and Port Cost Comparison

The FOB Charge payable by Cambodian shippers is estimated in the following table, from their factory to Sihanoukville port and to Phnom Penh port respectively. This shows the domestic costs, assuming that a garment exporter will pick up a 40' empty container from each port to the factory located in Phnom Penh, and will return a 40' laden container with garments of \$100,000 in value to each port. Shipper has to pay these costs, even though the purchase contract was fixed as "Free Onboard" basis. In the case of buyer's consolidation, forwarders will arrange all the inland transportation on behalf of shipper and settle to pay all the FOB Charge.

Table 11.1.4 Domestic Related Costs (FOB Charge)

FOB Charge	Payable to	Sihanoukville	Phnom Penh
1 Lift on charge empty	Port thru trucker	\$48.40	\$50.60
2 -ray scanner	Customs	x	x
3 Truckage (round)	Trucker	\$264.00	\$39.60
4 Toll charges (round)	Thru trucker	\$33.24	x
5 X-ray scanner	Customs	x	x
6 Lift off charge laden	Port thru trucker	\$68.20	\$68.20
7 THC	Shipping lines	\$100.00	x
8 VAT 10%	Customs	x	x
9 Declaration fee	Customs thru customs broker	\$5.00	\$5.00
10 Survey fee	CAMCONTROL	\$100.00	\$100.00
11 Ocean freight	Shipping lines	x	x
Total		\$618.84	\$263.40

Source: JICA Study team

Total FOB charge is approx. \$620 in the case of Sihanoukville shipment which includes Lift on charge and Lift off charge, truckage for round trip, toll charge of route no.4, THC paid to shipping lines, Customs declaration fee, CAMCONTROL survey fee. But -ray scanner is waived for empty container, and x-ray scanner is not yet available; VAT 10% is waived for garment export,

and ocean freight is payable by the consignee. In the case of Phnom Penh, the same FOB charge would be \$270, a difference of \$350 per 40' container. Most garment factories are located in Phnom Penh, reported by GMAC that 220 factories are located in Phnom Penh among total 284 garment exporters in Cambodia, so the advantage of FOB charge to Phnom Penh port is one of reasons that its throughput is increasing. This can be understood as “domestic port competition” in Cambodia.

In order to compare port expense between Sihanoukville port and others, following table shows a comparative analysis of port charges in the case of a hypothetical container ship with the following parameters: 1,100 TEU capacity, Gross Register Ton 9,800, Arrival draft 8.3 meters, Loading 300 TEUs and Discharging 300 TEUs, Gearless type and 2 sets of quay crane working 10 hours. Also the empty container ratio was calculated 35% at Sihanoukville, 29% at HCMC and 30% at Laem Chabang according to each port statistics.

Table 11.1.5 Port Expense

Port Charge	Sihanoukville	Ho Chi Ming City	Laem Chabang
Navigation	\$9,563	\$7,663	\$2,457
Berth	\$2,994	\$1,041	\$225
Cargo operation	\$27,385	\$21,875	\$25,890
Other service	\$2,585	\$935	\$2,160
Total	\$42,532	\$31,513	\$30,732
Port Charge/TEU	\$71	\$53	\$51
Empty Ratio	35%	29%	30%
Port Charge/Laden	\$109	\$74	\$73

Source: JICA Study team

Port charge of Navigation contains port dues, channel dues, tonnage due, pilotage, and tug boat service. Port charge of Berth contains wharfage, mooring, and hatch opening and closing. Port charge of Cargo Operation is the Container Handling Charge and its accessory service charges. And Port charge of Other Service consists of agency fee and tally service etc. As a result, Port charge per laden container is estimated as \$109/TEU at Sihanoukville port, \$74/TEU at HCMC port, and \$73/TEU at Laem Chabang. The reason that Sihanoukville port is more expensive is that all the charges are based on the official tariff and there is no negotiation with shipping lines, such as volume discount or some other incentives for shipping line. In addition, VAT 10% is added on all the charges. At VICT in HCMC or Laem Chabang ports, however, the container terminal is managed by a joint venture with international terminal operators and port charges are basically fixed by international procedure through dialogue and negotiation, and at HCMC some items are exempted of VAT and at Laem Chabang all VAT is refunded to shipping lines. In addition, shipping lines can decide if tally service or boarding agent is necessary.

Meanwhile, container handling charge, which is the largest cost among the port charges, is compared as follows;

Table 11.1.6 Container Handling Charge

	Sihanoukville Official Tariff + VAT	Ho Chi Ming City Negotiable	Laem Chabang Negotiable
20' Laden	\$62.70	\$47.25	\$54.00
20' Empty	\$33.00	\$27.30	\$35.00
40' Laden	\$93.50	\$72.45	\$85.00
40' Empty	\$49.50	\$39.90	\$55.00

Source: JICA Study team

Ocean Freight, Port Expense and FOB Charge, which are major components of ocean transportation cost, are benchmarked with neighboring countries in order to illustrate the competitiveness of Cambodian maritime transport. In this sense, competitiveness means lower price and lower cost. The ocean freight rate of a 40' container to the USWC destination is US\$ 2,600 from Sihanoukville, US\$ 2,000 from HCMC and US\$ 2,100 from Laem Chabang. The FOB Charge of a 40' container from the factory to the port is US\$ 620 including 230 km truckage from Phnom Penh to Sihanoukville (see Table 14.1.3). This cost changes by distance between factory and port, and factories in HCMC or Thailand are not as concentrated as in Phnom Penh. Roughly calculated the distance between factory and port or ICD is less than 50 km in HCMC and about 50 km in Thailand; therefore, FOB Charge in HCMC or Laem Chabang is much cheaper than Cambodia. Port Expense, which is paid by shipping lines and is included in ocean freight as indirect cost to the shipper, is illustrated in above Table 11.1.5, Table 11.1.6 and Figure 11.1.1.

Table 11.1.7 Ocean Freight & Cargo Volume to USA

	USWC incl. BAF going rate	Cargo Volume 2005 Export/Import TEU
Sihanoukville	\$2,600	37,328 / 5,694
Ho Chi Ming City	\$2,000	246,070 / 49,474
Laem Chabang	\$2,100	451,261 / 126,489

Source: JICA Study Team

(Freight Jan. 2007)

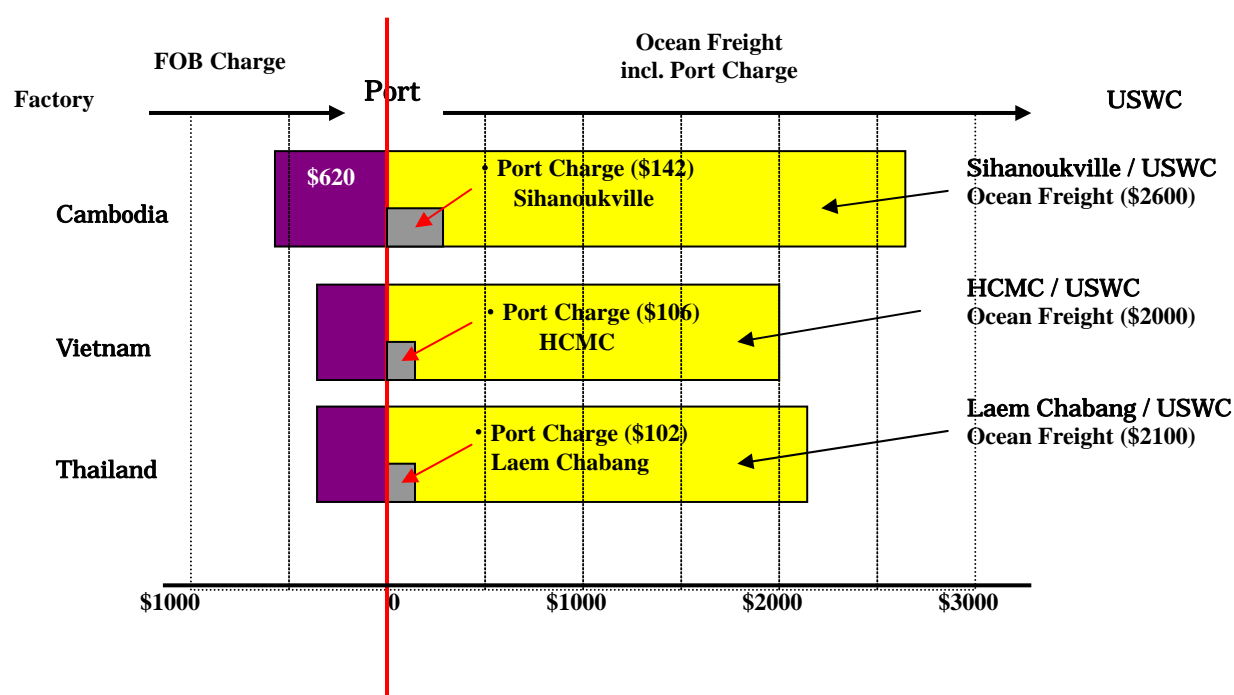


Figure 11.1.1 Maritime Price and Cost

Note:

FOB Charge in Cambodia: From Phnom Penh to Sihanoukville Port (about 230 km)

FOB Charge in Vietnam and Thailand: Not specified due to the fact that no particular distance is assumed between factories and port

11.2 Ship registration, Ship inspection, Port State Control, and Ship repair industry

In order for Cambodia to build up a maritime institutional regime that meet world standards, it is crucial to strengthen the organizational and planning capabilities of the Merchant Marine Department of MPWT by promoting the enforcement power of Ship registration, Ship inspection,

Seafarers registration, and Port State Control.

Following issues must be tackled by 2020, starting with the Action Plan (Chapt.14) as the urgent measures.

11.2.1 Flag State Implementation

It must be the first priority to improve the present state of the open registry system. All the MOU organizations in the world have a data base for inspection, and have a system to exchange the data of sub-standard vessels and inspection records through Internet. The systems have proved effective to the PSC inspection, and surely strengthen the port state control activities in the world. On May 2007, The Convention on Wreck Removal was adopted. Responsibilities of ship owners are clarified to ensure the prompt and effective removal of wrecks and payment of compensation for the cost involved when the ship sinks in foreign territorial seas. All the ship owners are obliged to have insurance upon anticipation of sunken accidents.

World Port State Control MOU will adopt the insurance obligation as one of their check items on the PSC inspection. Thus the controls on the sub-standard ships are being strengthened recently. Employing sub-standard vessels will no longer offer any economic advantage. Cambodia should implement Flag State Control in order to survive as an open registry countries as well as to comply with International Conventions. Cambodia shall improve present state of the face isolation from international societies. Cambodia must tighten up the control over the ship registration company and related ship classification societies. This requires technical and systematic supervision over a long period of time.

In this regard, changing the competent authority from the National Committee for the Management of Registration of Cambodian Flag Ships, the Council of Ministers to MPWT(MMD) may initially be the practical choice. The next step is to draw up a practical strategy and tactics to improve the system. The competent authority should be informed of all the inspection records as well as the data for class approval from the classification societies. The office in charge should have an appropriate system to confirm and maintain the records. Additional reports must be compulsory when detention information arrives from world MOUs. The report must include counter measures for the detained ship, which the competent authority confirms and approves. In addition, the authority should set a concrete quota for both the ship registration company and related ship classification societies such as annual targets to decrease the number of detentions. Strong penalties should be assessed when they don't reach the target. (Refer to Chapt.14 (Action Plan))

11.2.2 Establishment of Regulations for Ships

The draft Cambodian Maritime Code has already referred to the ratified Conventions such as SOLAS and MARPOL. The big issue should be the domestic implementation regulations for already ratified Conventions. These Conventions include a tremendous amount of technical regulations as Annexes and Codes. Furthermore, these technical regulations will be revised frequently. It requires tremendous amount of translation and examination works if all those were translated to the Cambodian language. As the domestic implementation regulations need to be adopted urgently, some expedients should be employed so that the translation to the Cambodian language can be minimized.

11.2.3 Establishment of Regulations for Ships applicable to Non-Conventional Sized Ships

MPWT Instruction No.006 reflects the special conditions of Cambodian coastal shipping. However, the regulation has no provisions on Lord Line, Stability, Tonnage Measurement, and requirements of Electrical Installation, which are required for standard safety regulations. It is recommended modify the regulation to include such safety requirements for the future prospects of costal

shipping including new ship buildings and imports of ships. Improvement of safety regulations should avoid formalities and should target the improvement of actual conditions. The safety regulations and inspection systems should target reasonable and practical execution given the limited man power.

In this regard, the regulation should include up-graded reference standards and recommendation standards, as well as minimum compulsory requirements. Special care for traditionally built wooden vessels should be taken. Two prepared a world standard regulation applicable to coastal ships, "Safety Regulations for Non-Convention Sized Ships". This regulation was adopted as the "Safety Regulations for Non-Conventional Sized Ships in Asian Region", after discussion in 1995 IMO Bombay Seminar and 1996 Tehran Seminar. Countries not only in the Asian region but also in Caribou region adopted the regulation as their national regulations after modifying it to incorporate local conditions. It will be a useful reference guide for establishing domestic safety regulations for Cambodia.

Attention should be paid to the following.

(1) The regulation relaxed the requirements of Convention vessels as reasonable and practical as possible for the Non-Convention Sized Ships.

(2) Quite a few countries in Asia have their own domestic rules covering all provisions such as Load Line, Structure/Equipments, Inspection, Operation Control, and Maintenance. The regulation targets the future harmonization of domestic rules of Asian countries for coastal shipping. In this regard, the regulation includes all the necessary items.

(3). There are three ways to utilize the regulation

a) To adopt it as a reference standard or a recommended standard in addition to the present domestic rules/standard.

b) To adopt it as a domestic regulation. In this case, the administration may tighten or relax the requirements taking into account local conditions.

c) To adopt it as a regional standard or a regulation

(4) Basic Concept of the IMO Regulation

1) The provisions specified in the Regulations take into account, as far as it is reasonable and practicable, standards and requirements adopted by the main international conventions (SOLAS 74, Load Line 96, STCW 78/95, MARPOL 73/78, TONNAGE 69, and COLEG 72) that are also applicable to smaller than convention sized ships

2) Application: all vessels of more than 15m including barge

Applicable standards are shown by kind of vessels and length criteria

Applicable to new ships, but Administrations may chose items for existing ships by their judgments

3) Tonnage Measurement:

Apply TONNAGE 69 to all ships more than 24m in length, and some ships less than 24m if necessary.

4) Consideration is given to traditionally built wooden vessels

5) Fixed fire extinguishing system is applicable to ships with engine of 750KW and more

6) Special requirements for carriage of dangerous goods

7) The provisions of ISM Code are specified by the difference of ownership

8) Minimum requirements for height of hatchway coamings and sill height for machinery space openings are defined by length of ships.

9) The applicable formula for basic freeboard are given according to ship length

10) Minimum bow height should be defined by each Administration taking local conditions into consideration

11.2.4 Procurement of Ship Inspectors, Port State Control Officers and other technical officers

MMD have only 8 technical staffs (4 staffs each in Office of Ship inspection, and Office of Coastal State Control, and Search & Rescue). In addition to this, Department of Public Works and Transport in 4 municipality offices engage in implementation works for MMD. All the ship inspection and PSC implementation works are shouldered by them. Training to improve the technical capability of these staff and procurements of new technical staff needs to be employed urgently. Control over the Open Registry Company and the ship classification societies require more technical staff equipped with sufficient knowledge. Although there is no training system in MMD, they have some technical staffs with experience in foreign countries such as graduates of World Maritime University (WMU) and various technical cooperation programs. MMD should have their own training program utilizing those experts and cultivating their own teaching materials. On the job training in Sihanoukville Port and Phnom Penh Port will be useful.

Next step will be to utilize technical cooperation programs in foreign countries for the training of ship inspectors and other technical officers. IMO has various kinds of technical support programs for developing countries. They have also programs to accept trainees to World Maritime University (WMU). IMO has dispatched technical consultants to Cambodia three times in 2006 (for FAL, Maritime Administration, and PSC). It seems that IMO has strengthened technical cooperation to Cambodia, but Cambodia should request ever more cooperation. ASEAN Action Plan includes provisions for technical cooperation among ASEAN countries stating that it aims to “Strengthen the institutional capacity, human resource base and cooperation linkages of ASEAN Member Countries for achieving improved maritime safety, security and preventing marine pollution”. Cambodia should be encouraged to utilize this provision for training in neighboring countries. Recently, many countries including Japan have introduced their bilateral technical cooperation programs. Training for ship inspectors and PSC officers may be included in these schemes. Tokyo MOU has a technical cooperation program to dispatch PSC expert to developing countries for consultation. Cambodia should request to Tokyo MOU for PSC consultancy. (Refer to Chapt.14 (Action Plan))

11.2.5 Appropriate response to the Ship Repair Industry

There is no modern style shipyard along the coastline of Cambodia. All the domestic cargo vessels of more than 50GT are obliged to go to Thailand or Vietnam for dry dock, and more than 100 ships smaller than 50GT use very shabby repair facilities.

It is hoped that the number of Cambodian coastal ships will grow in proportion with the growth of coastal shipping, but this is rather a long term prospect; rapid growth is not predicted. On the other hands, the ship operators of container vessels and cargo vessels who visit Cambodian ports don't feel a big inconvenience as they can utilize foreign shipyards. It is desirable to have at least one repair dock along the coast line of Cambodia to cope with emergency such as accidents in the Cambodian area. But even a simple style dockyard such as a floating dock may encounter management risk because of present scarce demands. As the coast line of Cambodia is rather short, emergency ships can go to Thailand or Vietnam.

The practical solution to improve the ship repair condition in Cambodia is to refurbish Steung Hav shipyard capacity up to 500GT until 2020.

11.3 Maritime Education and Training

The development of human resources in the maritime sector is a first priority matter in Cambodia.

In the field of MET, EU has been assisting with the soft component of MET for officers by PPAP and SAP. MET has been carried out at the Maritime Training Center since 2006; however it has been difficult to complete all necessary practical trainings at the Center because of lack of facilities and equipment that meet international standards. Furthermore, the education and training for rating has never been initiated. Since rating training can be carried out in a relatively short period, it should be introduced as soon as possible to increase employment opportunities for Cambodians

Rating crew-training issue was included in the study at the strong request of the counter part. As the goal is providing the young Cambodian generation with good job opportunities, the final size of crew supply should be as large as possible, even if numbers are small in the initial stage. Hopefully, 1,000 Cambodian seafarers can be supplied to the global seafarers' market each year. The training system of the Philippines can be a valuable reference since 40% of seafarers in the global market are supplied by the Philippines.

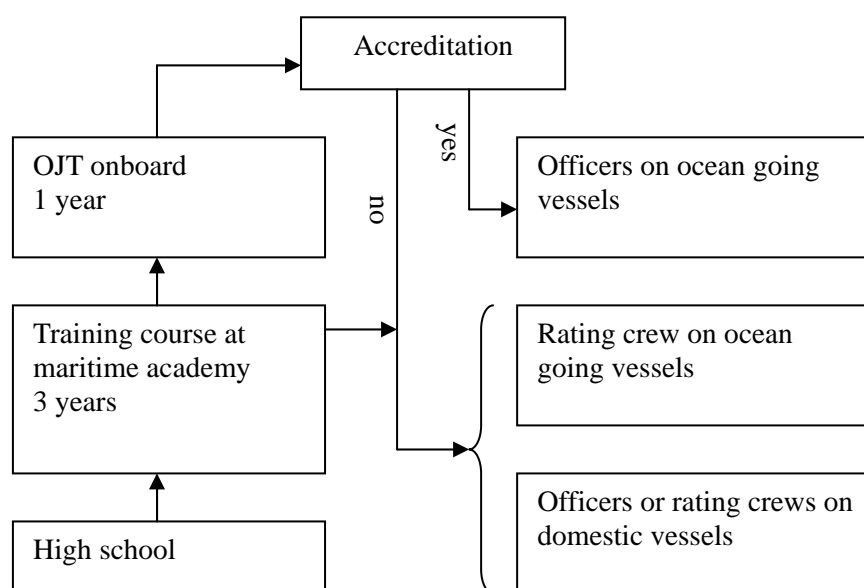


Figure 11.3.1 Seafarers' Training System in the Philippines

Schematic seafarers' training system in the Philippines is shown in Figure 11.3.1. After graduating from high school, candidates join the maritime academy and take a 3 year course. OJT of 1 year onboard is required before the seafarer qualifies for the maritime license. If a candidate fails, he becomes a rating-crew of ocean going vessels or an officer / rating-crew of the domestic vessels.

One of the distinct features in the Philippines is that there is no difference between officers and rating-crew training. It must be caused in the process of improving the maritime training system from rating-crew training to officer training. At this time, there are 3 levels of maritime training defined by the higher education authority, universities, autonomous academies and academies. As the result, rating-crew training, that is not a matter of higher education, has been ignored and resulted in inefficient system. If Cambodia targets the maritime training for rating-crew, a much more efficient training system is required in order to create opportunities for Cambodians in the global seafarers' market. A qualification system that meets global standards must also be established.

It is necessary to fill the gaps which exist in maritime sector in order to reach the goal effectively and efficiently.

(1) Issues in MET

MET in Cambodia has been implemented at the Maritime Training Center which is located in Phnom Penh Autonomous Port. For the class lecture, the Antwerp Maritime Academy has been assisting with the curriculum development, teaching material improvement, educational method instruction, evaluation method buildup, quality assurance instruction and others. As a result of such great efforts, the Center was inaugurated in November, 2005. The Belgium side will keep assisting with this training for the time being. The purpose of this Project in the short term is for Cambodia to pass the examination of the “White List” of STCW Convention which will be done in 2010.

However, there are no facilities and equipment which are necessary for implementing the practical training; therefore the practical trainings which are stipulated in STCW Convention will be carried out at the Vietnam Maritime University temporality. To provide the required facilities and equipment, assistance from donors is necessary.

(2) Necessary facilities and Equipment for MET

(a) Mandatory Practical Training Certificate for all seafarers

Name of Course	Necessary Facilities and Equipment
Personal Survival Techniques	Life-Jacket, Immersion Suit, Rescue Boat(with Derrick), Survival Raft(with Dropping Platform), Radio Equipment, Distress Signal
Fire Prevention and Fire-Fighting	Fire-Fighting Equipment(Fire-Fighter's Outfits, Fire-Extinguisher) , Stretcher
Elementary First-Aid	Dummy for resuscitation, other basic medical apparatus

N.B: These facilities and equipment are necessary not only for officer but for rating training.

Source: STCW and JICA study team

(b) Mandatory Practical Training Certificate for seafarers for certain duty or type of ship

Name of Course	Necessary Facilities and Equipment
Rescue Boat	Rescue Boat(above mentioned)
Survival Raft	Survival Raft(above mentioned)
High Speed Rescue Boat	High Speed Rescue Boat
Advanced Fire-Fighting	Fire-Fighting Facility for closed space, others same as Fire Prevention and Fire-Fighting
Proficiency in Medical First Aid	Same as Elementary First-Aid
Radar Plotting	Radar/ARPA Simulator
Radar/ARPA	--- ditto.---
GMDSS	GMDSS Simulator
Oil Tanker Familiarization	Liquefied Cargo Handling Simulator
Chemical Tanker Familiarization	--- Ditto.---
Liquefied Gas Tanker Familiarization	--- Ditto.---
Ship Handling Simulator	Ship Handling Simulator
BRM	Ship Handling Simulator

Source: STCW and JICA study team

(c) Necessary Equipment for practical training which is not mentioned in detail on STCW Convention

Name of Course	Necessary Facilities and Equipment
Navigation	Chart, Sextant, Electronic Navigation Equipment, Magnetic Compass, Gyro Compass
Marine Engineering	Diesel Engine Plant, Engine Room Simulator, Hydro Pneumatic Control, Sequence Circuit Equipment, Refrigerating Equipment, Automatic Control Equipment

Source: STCW and JICA study team

(3) Maritime Practical Training Center Development Plan

It is very difficult to provide all necessary practical trainings mentioned above in Cambodia until the implementation of reexamination of “White List” of STCW Convention in 2010, due to time constraints and financial burden. Although the Cambodian side may temporally rely on the assistance of VIMARU for the practical training, it may be necessary at least to draw a plan for the measures to be taken and provide as much equipment as possible at the time of reexamination.

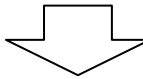
Such practical training facilities and equipment require specific knowledge in order to be utilized effectively in training courses. In order to achieve this level of practical training, the knowledge-based and technical instruction should be given to instructors in charge of the practical training. The fundamental training guideline can be found in the IMO Model Courses; however the individual training manual based on actual conditions is also necessary.

From such points of view, the following matters should be taking into consideration to develop the Maritime Practical Training Center:-

- (a) to secure the employment for the graduates
- (b) to examine the specification of necessary facilities and equipment
- (c) to provide training for instructors
- (d) to instruct the operation, utilization and maintenance of the facilities and equipment
- (e) to prepare the practical training manual, curriculum and text

For such tasks, the Table 11.3.1 shows the possible outline of the planning.

Table 11.3.1 Plan for the Maritime Practical Training Center

year/period		Maritime Practical Training Center	Legal System Development and others	Maritime Training Center	
07	1 st H	Discussion on the cooperation scheme with donor and planning Planning of MET	“Maritime Code” Complete 		
	2 nd H			N-2 First Student graduates	
08	1 st H	PR of the plan of MET for employment MET of rating preparation, facilities and equipment preparation, Instructor training			
	2 nd H				
09	1 st H	Provision of facilities and equipment Technical instruction, Prepare the teaching guideline	Maritime Related Domestic Law completed	E-2 First Student class starts	
	2 nd H				
10	1 st H	Start the rating training and practical training Planning the development plan Discuss the advanced rating training Discuss trainings for tanker and Ro-Ro. (Expected number of students : 100)			
	2 nd H			Reexamination of “White List” of STCW Convention	
11	1 st H	Review the employment promotion strategy		N-3/E-3 Class starts	
	2 nd H	Review the development plan			
12	1 st H	According to the development plan, discuss the specification of facilities and equipment for the courses which need Simulator. And discuss the budget. Installation, technical instruction and preparation of instruction manual of facilities and equipment for such courses and advanced rating training courses. (Expected number of students : 500)			
	2 nd H				
13	1 st H				
	2 nd H				
14	1 st H				
	2 nd H				
15	1 st H				
	2 nd H		External Assessment and Review of the system and Program		
16	1 st H		Response to the external assessment Discuss the possibility of research activity utilizing facilities and equipment for practical training Start the research activity (Expected number of students : 1,000)		
	2 nd H				
17	1 st H				
	2 nd H				
18	1 st H				
	2 nd H				
19	1 st H				
	2 nd H				
20	1 st H				
	2 nd H	External Assessment and Review of the system and Program			

Source: JICA study team

The categories of ship's officer on the STCW Convention are as follows. The Maritime Training Center will cover the education and training for N-2 and E-2 (Operational Level) and N-3 and E-3 (Management Level) among them. There are no differences in the kinds of facilities and

equipment; only the level of content is different between the Operational Level and Management Level. Then, the basic rating training is planned to be implemented at the Maritime Practical Training Center; however such training is not mentioned as mandatory training in STCW other than “Mandatory Practical Training for all seafarers”. At present, the mandatory trainings are stipulated as NR-1 and ER-1, and will be added as NR-2 and ER-2 mentioned below. It is expected that first of all, the basic rating trainings are commenced and then, the advanced rating trainings are continued later as the up-grading trainings for the experienced ratings at the Maritime Practical Training Center sequentially.

(a) Navigation

N-1 Officers in charge of a navigational watch and of masters on ships of less than 500 gross tonnage, engaged on near-coastal voyages

N-2 Officers in charge of a navigational watch on ships of 500 gross tonnage or more

N-3 Masters and chief mates on ships of 500 gross tonnage or more

NR-1 Rating forming part of a navigational watch

NR-2 Rating as able seafarer deck

(b) Marine Engineering

E-1 Officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room

E-2 Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of between 759 kW and 3,000 kW propulsion power

E-3 Chief engineer officers and second engineer officers on ship powered by main propulsion machinery of 3,000 kW power or more

ER-1 Rating forming part of a watch in a manned engine-room or designated to perform duties in a periodically unmanned engine-room

ER-2 Rating as able seafarer engine

(4) Seafarers' certificate of competency and registration of seafarers

Seafarers of ocean-going vessels should be educated and trained on each specific level, have the experience of service on board and hold the certificate of competency controlled by the competent authority of the party. Moreover, the periodical renewal of the certificate of competency is also necessary every five years. In order to meet this obligation, it is necessary to control the seafarers' individual data, such as a registration situation, record of sea-service, record of renewal of the certificate of competency and so on. Other than the above mentioned certifications such as (a) Navigation and (b) Marine Engineering, the competent authority should issue the specific certificates officially, such as “mandatory certificate for all seafarers” and “mandatory certificate for personnel on certain types of ships”.

(5) Relevance of the Plan

The theoretical education in class and practical training are the two main cores of the Maritime Education and Training. Although the practical training will be assisted by VIMARU, for the sake of coherence it might be better to conduct training in the Maritime Training Center in Phnom Penh. Furthermore, the number of students is 28 and if the Center becomes a higher educational institute with a 4-year system, it is necessary to send 60 students annually to Vietnam. When the Center expands its target to the international seafarers market, the number of the students will increase.

Moreover, the expected duration of rating training (six months) is comparatively shorter than that of officer training (four years) therefore it is possible to meet the earlier outputs from the Maritime Practical Training Center. The Cambodian ratings are expected to contribute to the necessity of urgent supply of efficient ratings in the neighboring area; which leads to the stabilization of safe operation of ships, development of maritime culture in Cambodia and promotion of the Cambodian maritime industry.

Therefore, this Plan has a high relevance because of the financial aspect, efficiency of education and training, synergy effect by cooperation with EU and high degree of expectation from the industry.

(6) On-board Training

The Maritime Training Center is located close to the passenger terminal of Phnom Penh Autonomous Port. The on-board training both for Navigation and Marine Engineering Courses will be implemented on the Tug boat owned by the Phnom Penh Autonomous Port. This situation is very advantageous as the acquisition, maintenance and operation costs are low. The actual practical training will be conducted by seafarers and pilots who have sufficient practical experience. In order to standardize the on-board training, "On-board Training Manual" and "Training Record Book" should be prepared.

11.4 Ratification and Implementation of International Convention

11.4.1 Implementation of Port State Control

Port State Control (PSC) is the inspection of foreign ships in national ports to verify that the condition of the ship and its equipment comply with the requirements of international regulations and that the ship is manned and operated in compliance with these rules.

Many of IMO's most important technical conventions contain provisions for ships to be inspected when they visit foreign ports to ensure that they meet IMO requirements.

These inspections were originally intended to be a back up to flag State implementation, but experience has shown that they can be extremely effective, especially if organized on a regional basis. A ship going to a port in one country will normally visit other countries in the region before embarking on its return voyage and it is to everybody's advantage if inspections can be closely coordinated.

This ensures that as many ships as possible are inspected but at the same time prevents ships being delayed by unnecessary inspections. The primary responsibility for ships' standards rests with the flag State - but port State control provides a "safety net" to catch substandard ships.

IMO has encouraged the establishment of regional port State control organizations and agreements on port State control - Memoranda of Understanding or MOUs - have been signed covering all of the world's oceans: Europe and the north Atlantic (Paris MOU); Asia and the Pacific (Tokyo MOU); Latin America (Acuerdo de Viña del Mar); Caribbean (Caribbean MOU); West and Central Africa (Abuja MOU); the Black Sea region (Black Sea MOU); the Mediterranean (Mediterranean MOU); the Indian Ocean (Indian Ocean MOU); and the Arab States of the Gulf (GCC MOU (Riyadh MOU)).

Cambodia is going to implement Port State Control mainly in the context of Port Security employing Office of Coastal State Control and Office of Ship inspection in MMD. Cambodia should take note to the following three points.

First, Port State Control has been introduced to back up the Flag State Control. It is a world noticed fact that Cambodian open registry ships contain many sub-standard ships and many have been detained. In this regard, Cambodia is expected to strengthen Flag State Control. Flag State Control is the base structure of Port State Control.

Secondly, it is recommendable that MMD prepares manpower for Port State Control. The Office of Coastal State Control and Office of Ship inspection has only 8 staff members in total. It is

necessary for MMD to increase the PSC enforcement staff by training staff in the municipality office. The same can be for Flag State Control. It is a very urgent task to train ship inspectors for MMD.

The third point is that the PSC operation should be employed in the framework of regional cooperation. It is one of ASEAN Actions to strengthen the institutional capacity for achieving improved maritime safety. Cooperation of PSC in the ASEAN region will be effective for eliminating sub-standard ships.

It is important that MMD has a program to participate in the activities of Tokyo MOU. All the MOU in the world require member countries to achieve a certain level of Flag State Implementation. Tokyo MOU may not accept Cambodia as an official member until good results are achieved on Flag State Implementation. But Cambodia can utilize the consultation program of Tokyo MOU to strengthen its PSC technical potential

11.4.2 Maritime Safety, Marine Pollution Prevention, and SAR

Corresponding to measures targeted for 2020, it is vitally important to strengthen administrative activities of MPWT (MMD) as the coordinator (Focal Point) among responsible administrators for maritime security, marine pollution prevention, and SAR. Another issue is to establish a Coastal Communication Center to cooperate with neighboring countries for Maritime Safety, Marine Pollution Prevention, and SAR.

Regarding oil pollution prevention measures, Cambodia entered a joint agreement with Thailand and Vietnam known as “Joint Statement of Three Countries on Partnerships in Oil Spill Preparedness and Response in the Gulf of Thailand”. MMD is assigned as the Domestic Focal Point in both agreements. Regarding Maritime Security, Cambodia became one of the first members to the “Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP)”. On the other hand, SAR program are only in the beginning stage in Cambodia. For Cambodia, which has rather short coast line and rather small marine territory, it is a big load to have an SAR establishment independent from Maritime Safety and Marine Pollution Prevention systems. It is thus an important task to integrate Maritime Safety, Marine Pollution Prevention, and SAR into one organic system, by uniting regional and domestic communications system. To that end, the following tasks must be carried out.

(1) Establishment of Coastal Communication System

The Gulf of Thailand is a semi-closed sea, and an oil spill accident would affect all the neighboring countries. The communication systems among the coastal countries thus play an important role. From this point of view, it is necessary to establish a Regional Coordination Center which satisfies both the GMDSS requirements of SAR and requirements of regional communication system on emergency such as oil spill accidents. The center will become the general information and communication center for Maritime Safety, Marine Pollution Prevention, and SAR. The length of Cambodian coastal line is only 433Km. One capable facility will be sufficient for the task.

(2) Establishment of Regional Cooperation System for SAR

All the countries surrounding Gulf of Thailand except Cambodia have already established Regional Coordination Centers (RCC) and Local User Terminals (LUT) which cover all their responsible area. As for the SAR Regional Cooperation, some bilateral and multilateral agreements are already arranged. But no countries surrounding the Gulf of Thailand except Singapore and Vietnam have ratified SAR Convention yet.

SAR Convention became effective in 1985, but ratification was slow due to the many obligations it entailed; this was especially true for developing countries. The Conventions was amended in

1998 to reduce responsibilities of individual countries through regional cooperation. As a result, the number of ratified countries increased from 56 to 88.

There seems to be complex circumstances for surrounding countries in the Gulf of Thailand not to ratify SAR Convention despite the fact they are prepared for the GMDSS system. One of the reasons might be that SAR area of each country has not been agreed upon. Once Cambodia is prepared for SAR system with GMDSS facilities, the regional cooperation system for SAR will be sufficient for all countries surrounding the Gulf of Thailand. This situation might accelerate the movement toward regional ratification of SAR Convention in the Gulf of Thailand.

(3) Procurement of Marine Pollution Prevention Facilities and Equipment and Arrangements for Operations

At present, government has no facilities or equipment dedicated for marine pollution prevention. Ships and personal for oil pollution accidents are supplied by SAR Team in Navy and Marine Police. Both Navy and Marine Police have no dedicated oil recovery vessels and are obliged to cope with their patrol boats and other vessels. The Coastal Communication Center should be equipped with marine pollution prevention equipment and operated by a dedicated operation team.

11.4.3 Road map to ratify International Conventions

There are many International Conventions that Cambodia is requested to ratify urgently.

(1) United Nations Conventions on the Law of the Sea 1982 (UNCLOS 82)

Cambodia signed the Convention at the adoption conference, and introduced the basic concepts into the draft Maritime Code, but still need an official procedure for declaration of implementation.

(2) London Convention on the Prevention of Marine Pollution by Dumping of Wastes and other matters 1972 (Dumping Convention)

Related to marine pollution prevention, Cambodia already ratified MARPOL related Conventions. Cambodia has also ratified “Basel Convention” to control trans boundary movements of Hazardous Wastes and their Disposal, but has not yet ratified "Dumping", which prohibits the dumping of certain hazardous materials, requires a prior special permit for the dumping of a number of other identified materials and a prior general permit for other wastes or matter. Cambodia should ratify the Convention, after completing domestic preparation.

(3) International Convention on Limitation of Liability for Maritime Claims 1976 (LLMC 76)

Now that Cambodia ratified “FUND Convention”, it should also consider ratification of “LLMC 76”, which limit the liability of ship owners (such as claims for loss of life or personal injury, and property claims) to a certain limit. PROTOCOL96 is now effective in force.

(4) STCW PROTOCOL95 and ILO Convention 147 “Merchant Shipping (minimum standards) Convention, 1976”

Cambodia is requested to ratify STCW PROTOCOL95 to fulfill the requirements of sea farers license. Also, ratification of ILO Convention 147 is crucial to implement port state control.

(5) Convention on Facilitation of International Maritime Traffic1965 (FAL 65)

This Convention will play important role for Cambodia to proceed as a cargo owner country under WTO and AFTA scheme. Cambodia should ratify the Convention including 2005 Amendment, after completing domestic preparations.

(6) International Convention on Maritime Search and Rescue 、 1998 Amendment (SAR98)

(7) In order to promote activities in IMO, “IMO Convention Amendments of 1993” should be

ratified.

All these not yet ratified Conventions are closely related to the Cambodian Maritime Code. It is preferable to ratify these conventions in harmonization with the adoption of the Code. On the other hands, it is most important to prepare for domestic implementation scheme.

The Study Team would like to recommend the following roadmap

The First Step: UNCLOS, Dumping, LLMC

The main frames of UNCLOS have already be an introduced to the Draft Maritime Code. “Dumping” and” LLMC” do not seem to require substantial preparation.

Second Step: STCW, ILO, FAL

These Conventions do not require substantial regional negotiation, but need domestic preparation for implementation. Cambodia already ratified STCW78, and also ratified ILO labor related Conventions as far as land based Conventions are concerned. To promote trade, FAL Conventions should be ratified as soon as possible, but substantial preparation involving the cooperation with related ministries such as MOC, related agencies such as KAMSAB and CAMCONTROL, and related industries is necessary for implementation. It is preferable to ratify these Conventions in harmonization with adoption of the Maritime Code.

Third Step: SAR

Establishment of Regional Coordination Centre and Domestic SAR Organization should be taken care of in the first place. After then, ratification of the Convention should be deliberated under the regional cooperation regime in the Gulf of Thailand.

11.5 Coastal Shipping and Inland Water Transportation

(1) Improvement of Inland Water Transport

At this moment there are two major bulk cargoes: cement and fuel oil. Cement has been imported from Thailand and discharged at Sihanoukville or Oknha Mong ports, but in the future, imported cement will be replaced by domestic production of the new factory in Kampot, which plans to have annual production of 1 million tons. Therefore it is expected that cement imports from Thailand by ship or barge might be suspended in future.

There is no refinery in Cambodia and all of fuel oil is imported from Singapore and Thailand. In 2005, 460 thousands tons was carried by IWT tanker barges to Phnom Penh and 250 thousands tons was carried by ocean going tankers to Sihanoukville. The Inland Water Transportation shares 60% of fuel oil import through the Mekong River.

In 2005, Fuel oil was transported by 706 small tanker barges, almost all by Vietnamese flag, and 12 LPG tankers by Thai flag. In Phnom Penh, fuel oil was discharged at 7 tank yards operated by the following fuel distributors: PETRONAS terminal and TOTAL terminal located at the riverside of Lower Mekong, MEKONG terminal alongside the Upper Mekong, and SOKIMEX terminal, SAVIMEX terminal, TELA terminal and MITTAPHEAP terminal located at the riverside of Tonlesap. The discharge volume in 2005 for each distributor is shown in the following table: SOKIMEX, the biggest fuel distributor in Cambodia, handled 249 tanker barges and discharged 159 thousands tons in 2005, which is equivalent to 34% of the total.

Table 11.5.1 Fuel Quantity at Mekong River Terminal

	Terminal	Quantity (Tons)	Ship (Call)	Share
1	SOKIMEX	158,611	249	34%
2	TELA	119,669	164	26%
3	TOTAL	69,583	90	15%
4	SAVIMEX	49,720	90	11%
5	PETRONAS	46,268	73	10%
6	Others	20,515	40	4%
	Total	464,366	706	100%

(Source: PPAP)

Fuel oil is traded by CIF contract basis to Cambodia, and supplier is entitled and obliged to arrange its transportation. From Singapore to Phnom Penh, fuel oil is once transported to Vietnam by big size products tankers, and then transshipped to IWT small tanker barges registered in Vietnam, or lightering from products tankers to IWT small tanker barges at Vung Tau. Vietnamese shipping lines operate IWT small tanker barges, for example VITACO subsidiary company of PETROLIMEX. There is also no refinery in Vietnam so far and almost all fuel oil is imported from Singapore. Therefore fuel oil is transported to Vietnam, Ho Chi Ming City or Vung Tau, together with Cambodian fuel oil imports.

(2) Own fleet transportation

SOKIMEX established IWT tanker barge operator in 1993, named SONG KIM CO. LTD in Vietnam, and owns 9 IWT tanker barges of Vietnamese flag. SOKIMEX arranges its fuel transportation by their own IWT tanker barges between Vietnam and Phnom Penh. Vietnam has an advantage for tanker operation in the field of shipbuilding and ship repairing industry, as well as crew manning resources. SONG KIM CO LTD has 70 staffs of officers and crew onboard, and the freight rate is reviewed once a year between SOKIMEX and SONG KIM.

Table 11.5.2 Tanker Fleet List by SONG KIM

Name	Built	DWT	Draft	LOA	Engine
SOKIMEX 01	2005	1500	3.24	60.99	1195
SOKIMEX 02	1995	650	2.90	46.40	500
SOKIMEX 04	1996	750	3.00	49.75	500
SOKIMEX 06	1994	750	3.00	49.75	250x2
SOKIMEX 09	1996	580	2.70	47.50	135x2
SOKIMEX 12	1996	750	3.00	49.75	250x2
SOKIMEX 14	1996	750	3.00	49.75	250x2
SOKIMEX 16	1996	750	3.00	49.75	500
SOKIMEX 18	1996	750	3.00	49.75	250x2

Source: SONG KIM CO LTD

These tankers transport Diesel Oil or Fuel Oil between Nha Be in Saigon River and SOKIMEX jetty in the Tonlesap River. Tankers can navigate at 10 knots in laden voyage and 14 knots in ballast voyage, so it takes about 36 hours from HCMC to Phnom Penh including customs formality at the border. Also, tankers are onboard by Vietnamese officers and crews and no pilotage is necessary within Vietnamese inland water territory, which is a greater advantage over Cambodian flag container barges.

It is expected that the draft for Inland Water Transportation will be increased to 6-7m by dredging Quan Chanh Bo bypass channel at estuary of the Bassac River and by improvement of Van Nao Pass. In addition, the fuel logistics in Vietnam would be changing by the Dung Quat refinery, which will start operation 130,000 barrels per day in 2009. New refinery may affect fuel logistics to Phnom Penh.

Such disadvantage should be resolved and PEC (Pilot Exemption Certificate) system should be introduced; in addition, some subsidies should be considered for Cambodian flag tanker and Cambodian crews onboard. Quan Chanh Bo bypass channel would provide deeper draft around 2015, when the new Cambodian fleet system would be introduced, requiring new jetty construction.