

# THE STUDY ON THE ROAD NETWORK DEVELOPMENT

## ATTENDANTS LIST OF 3rd WORKSHOP OF TASKFORCE TEAMS

On 30 September 2005

No.	Name	Position	Organization
1	MR. BOU DINER	Technical Official	RCC
2	MR. NHEM MAO	Engineer	RCC
3	MR. THAO KIMHONG	Civil Engineer	HEC
4	MR. SOM SOTHEA	Officer	KPS
5	MR. SOK SRUN	Deputy	Kg. Cham
6	MR. MING SETH	Deputy	DRI
7	MR. PHAT KONG	Deputy	MEF
8	MR. KIM PHALLY	Vice chief office	MRD/DRR
9	MR. TOUCH MENG		HEC
10	MR. KANG PHIRITH	MPWT	HEC
11	MR. CHEAM SOVANNY	MPWT	Planning
12	MR. NOP KILARITH	RIF	RIF
13	MR. SIM SOKHA	Jica Study	Jica study team
14	MR. TAN THIRA	Officer	MPWT
15	MR. YIN BORIN	Officer	MPWT
16	MR. EAN NARIN	Deputy	PWD PP
17	MR. HEM SAM ONN	Officer	DPW Kandal
18	MR. LEANG CHHAY	Engineer	RID
19	MR. SAN PISET	Counterpart	MRD
20	MR. MAO PHANARITH	Counterpart	MPWT
21	MR. NOU RETHY		MPWT
22	MR. YOU DARA	Counterpart	MPWT
23	MR. TAKASHI SHIMIZU	Deputy Team Leader	Jica study team
24	MR. J. SANTOS	Member	Jica study team



The Study on the Road Network Development  
4<sup>th</sup> WORKSHOP of Taskforce Teams

(1) Date: 08 December, 2005

(Thursday), 2005, 8:30am—11:30am

(2) Venue: MPWT, Conference Room at 1<sup>st</sup> floor

(3) Schedule:

8:30-8:40am Welcome remark by Deputy Team Leader of JICA Study Team  
Mr. Takashi SHIMIZU

8:40-8:45am Self-Introduction of the participants

8:45-9:00am Explanation by Study Team

- Objective of Workshop
- Explanation of today's schedule
- Distribution of Feedback Sheet

Session 1: Progress of the Activities by Working Groups

At this session, the working groups will make presentations regarding the assigned topics within 20min., and then discuss the points within 10min.

09:00-09:30am Regional Development Strategy at Northeast of Cambodia  
by Mr. You Dara

09:30-10:00am Identified Issue of MRD and DRR by Mr. San Piset (MRD)

10:00-10:15am *Tea break is provided during the workshop*

10:15-10:45am Environmentally Sustainable Transport by Mr. Than Thira (MPWT)

10:45-11:15am Basic System in Commencement of Road Maintenance by  
by Mr. Pheng Sovicheano

11:15-11:30am Free Discussion and Wrap up



**JICA Study Team**  
 The Study on the Road Network Development  
 in Cambodia  
 08 December 2005  
**REGIONAL DEVELOPMENT  
 STRATEGY AT NORTHEAST OF  
 CAMBODIA**  
 By You Dara , MPWT

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**CONTENTS**

1. Introduction
2. View of National Development Plans
3. Directions of Future Development
4. Northeast Areas of Cambodia
5. Conclusion

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**1. Introduction**

- The kingdom of Cambodia, with the increasing number of population and vehicles every year and with the effort of the Royal Government concentrating on construction and rehabilitation of road infrastructure to facilitate rapid and smooth transportation of goods and passengers in order to boosting national economy and particularly reducing people poverty;
- Kratie ,Stung Treng, Mondul Kiri, Ratanak Kiri are part that located Northeast of Kingdom of Cambodia, while we can predict increase of Tourism, and agricultural production.

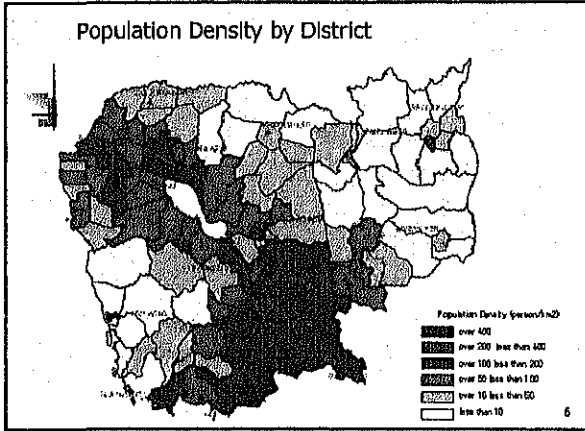
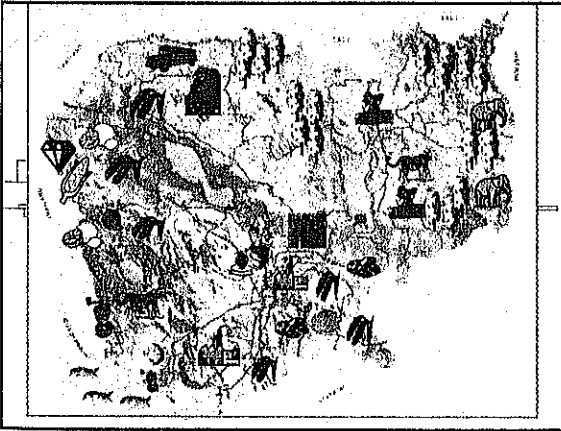
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**2. View of National Development Plans**

**Focus:**

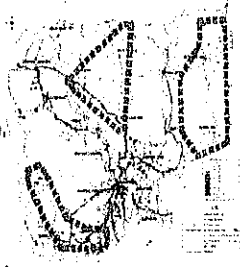
- i) **Economic growth, and**
- ii) **Rural development with high potentiality . (Ex. tourism, Product increase as plantation and population growth)**

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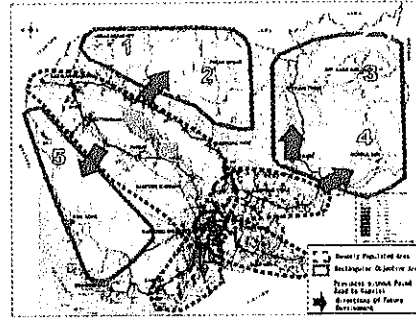


## TOURISM ZONE IN CAMBODIA

1. Temple Tourism Zone :  
Triangle of Siem Reap, Preah Vihea and Kompong Thom
2. Coastal Tourism Zone :  
Kep, Sihanouk Ville, Koh Sdach, Koh Kong.
3. Natural Tourism Zone :  
Eastern basin of the Mekong River : Stung Treng , Ratanak Kiri and Mondul Kiri, is potential



## 3. Directions of Future Development



## 4. Northeast Areas of Cambodia

### Geography: Kratie Province

Source: Information ketrong

Length from Phnom Penh by RNo. 5 & 7:	Population	District	Territories
340 km	280,000	5	11,094 km <sup>2</sup>

### Transportation

#### a. Road Sector:

- RNo.7 Length about 340Km
- P.P-Kratie: good condition
- RNo.7&73 Length about 240Km (dry season)

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## Kratie Province (Cont.1)

Source: Information ketrong

#### b. Waterways Sector: P.P-Kratie L=220km

By Mekong river able to use transportation during flood and dry season, but more costly than using road and take time, therefore passengers use road.

#### c. Aviation Sector:

There is local airport, which runway length 11,000m, but airway can not compete with waterway and road.

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## Kratie Province (Cont.2)

Source: Information ketrong

#### e. Tourism Sector:



Temple 100 columns

Prek kamy

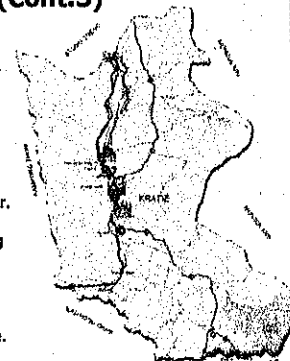
Mekong Beach

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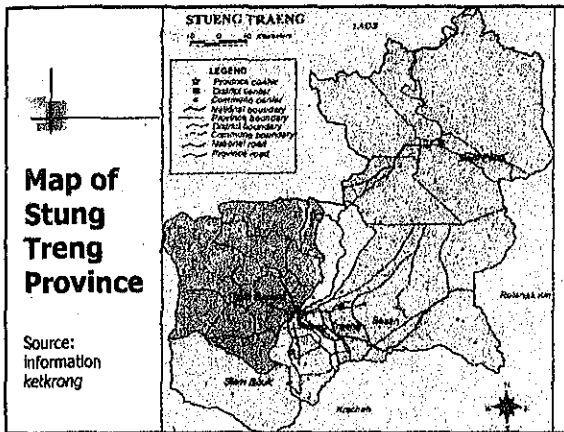
## Kratie Province (Cont.3)

#### Left side Mekong river

- Minority people living.
- Poor road liking.
- Flood session use board Access to the market take full day.
- Improvement left side Mekong river.
- Improvement of landing facilities, ( river ports connection), increasing cross transportation.
- Improvement laterite road, People don't move much to urban.
- Increasing use RNo.7
- Budget is the 1<sup>st</sup> problem to decide.



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### Stung Treng Province (Cont.1)

Source: Information ketkrong

#### 1. Geography: Stung Treng Province

Length from Phnom Penh	Population	Family	Territories
by RNo. 6 & 7: 481 km	90,638	17,644	11,092 km <sup>2</sup>

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### Stung Treng Province (Cont.2)

Source: Information ketkrong

#### Transportation

**a. Road Sector:**  
 RNo.7 Length about 481Km  
 P,P-Kratie: good condition  
 Kratie-St.Treng: Under construction, China loan

**b. Waterways Sector:**  
 By Mekong river able to use transportation on flood and dry session, but more costly than using road and take time, therefore passengers use road.

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### Stung Treng Province (Cont.3)

Source: Information ketkrong

**c. Aviation Sector:**  
 There is local airport , but alrway can not compete with waterway and road.

**d. Local port:**  
 MPWT Constructed pilot project for improvement of landing facility of Thala district, that sponsored by JICA and cooperated with waterway department.

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### Stung Treng Province (Cont.4)

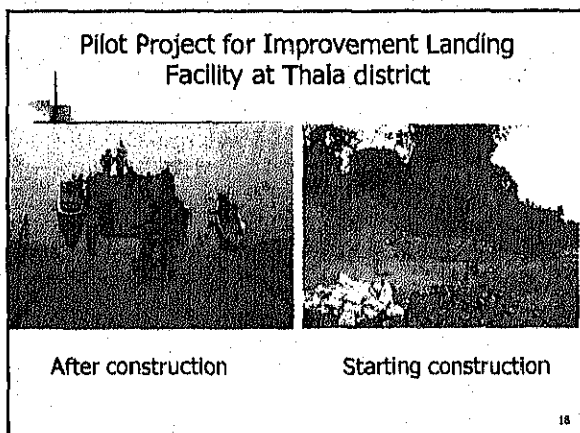
Source: MPWT

**e. Selection Thala district for pilot project:**  
 Outline of the flow for selecting site as follow :

```

  graph LR
    A["Provinces of 5 main base port  
(Kompong Cham, Kratie, Stung Treng, Seim Reap Kompong Chhnang)"] --> B["Selection of Provinces  
Stung Treng"]
    B --> C["Thala"]
    D["Geographical, Social characteristic  
Role of River Transport"] --> B
    E["Relation with the base port  
Number of Passengers"] --> B
  
```

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## Mondol Kiri & Ratanak Kiri Province

Source: Information ketkrong

### Mondol Kiri

Length from Phnom Penh	Population	District	Territories
RNo. 6, 7, 76: 372km	45,613 (Y 2004)	5	14,682 km2

### Ratanak Kiri

Length from Phnom Penh	Population	District	Territories
RNo. 6, 7, 78: 582 km	114,451 (Y 2003)	9	11,052 km2

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## Mondol Kiri & Ratanak Kiri Province

- People living standard : farmers, Find Vines, Resin, and wild fruits and Agro-Industry.
- Rice Growing: Kas Gnek district in Modol Kiri is the potential area for rice growing.
- Climate : is good living 18C-25C
- Tourism: Good view natural forest and water fall and seeing group living people in forest.

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## Mondol Kiri & Ratanak Kiri Province

- Road linking: Increasing rehabilitation linking provincial road from town to town and repairing national road.
- RN.78 is poor condition from RN7-Ratanakiri.
- RN7 from Kratie to Au PongMorn under construction by China.

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- What is potential in this area ?  
Rice, Pine tree , Precious stones  
Eco-Tourism (water fall, Nature resources)

- What is Importance to do ?

Rehabilitation section RN.78

Rehabilitation section RN.76

- Improvement:

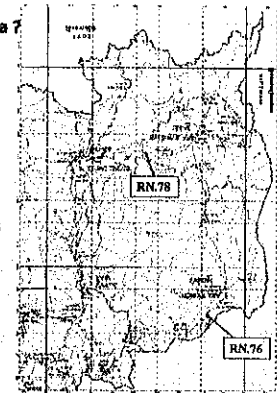
Access roads to tourism places

Access roads to the market

Pavement road in town

- Income increase for people

- Reduction poverty



## 5. Conclusion

- 1) Improve, as much as possible, a road network sufficient for serving provincial economic , social activities and increasing tourism sector;
- 2) Increase communication Northeast region with the centre of Cambodia;
- 3) Setting the goal those region to become developments potential areas by geography demand;
- 4) Encourage local and foreign investors for investments those region for reducing poverty;
- 5) Improve a road to be all weather condition.

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Thank You

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**Ministry of Rural Development  
and Rural Road Department**

Phnom Penh, 08 December, 2005

San Piset  
Counterpart of JICA Study Team



**Contents:**

- I. Identified Issue of MRD and DRR
- II. Road Inventory
- III. Guideline for Road Maintenances



**Strategic Objective**

To contribute to improving social and economic conditions of rural Cambodia through the sustainable development and maintenance of rural roads by:

- Improved policy, planning and programming of rural infrastructure
- Improved funding for development and maintenance
- Improved quality and timely delivery of the outputs
- Institutional strengthening
- Development of human resources of MRD and commune councils



**Identified issues of MRD**

**Improved policy, planning and programming of rural infrastructure**

- Road Law
- Updating and approval of rural road policy
- Targeting poorer provinces and provinces with poor rural road conditions
- Road Inventory and road management information system
- Design standard of rural roads
- Transport services



- Making road and water transport complementary to each other
- Technical support documents
- Standard tool for road prioritisation
- Ensuring road management responsibilities among different parties
- Integrating the HIV-AIDS issues in roads programme
- Axle Load control



**Improved funding for development and maintenance**

- Assessment of needs for road development funds
- Assessment of needs for the maintenance funds
- Lowering the cost of improvement of roads by stage construction
- Improved maintenance funding from the centre



### **Improved quality and timely delivery of the outputs**

- *involvement of private sector in roads' development and maintenance*
- *Use of labour-based technology*
- *participation of women in roadworks*
- *Equipment for labour based construction*
- *Alternative surfacing for rural roads*
- *Implementation of environmental mitigation measures during construction*



### **Institutional strengthening**

- *Filling of vacant position within MRD – provincial and central*
- *Strengthening the MRD offices at the district level so that these offices can help the commune councils in road management*
- *Improve channels for communication and coordination*



### **Development of human resources of MRD and local governments**

- *Training needs assessment.*
- *Development of a training plan and training modules*
- *Training implementation*
- *Training of trainers*
- *Trips to countries in the region to exchange ideas*
- *Sensitisation MRD technical staff on the benefits of labour based technology*
- *Training of MRD staff on the implementation of roadworks using LBT*



### **Identified issues of DRR**

#### **A- Construction and Rehabilitation:**

- *Have no National Standard for Rural Road Construction and Rehabilitation.*
- *Lack of Transports and budget to the field for survey.*
- *Lack of Light Equipments provide to PDRD for implementation works.*
- *Lack of Human resource in DRR and PDRD.*
- *Lack of material for control Road System.*



#### **B- Maintenances:**

- *National budget not enough for Rural Road Maintenance.*
- *Have no own account for DRR and PDRD.*
- *Have no advance for Road Maintenances.*

#### **C- Monitor:**

- *Lack of Training on construction & Rehabilitation*
- *Have no budget to process of work.*
- *Lack of material for control Road System.*



#### **D- Plan Design:**

- *Lack of equipments such as: material drawing, GPS, Computer System ,etc.*
- *Lack of Technical staff.*
- *Lack of Technical Advisor.*



## Rural Road Inventory

- Completed enter 6 provinces data in 24 provinces of Rural Road Inventory in PC and other still collecting.

Name of Provinces	Total Length (Km)
1-Kampot	232.78
2-Kampong Chang	871.47
3-Kandal	1,879.02
4-Takeo	1330.19
5-Prey Veng	500.13
6-Kampong Thom	1,462.48
<b>Total</b>	<b>= 6,276.07</b>



## Guideline for Road Maintenances

In this part MRD divided two kinds of Road Maintenances:

- Guidance Notes for the Road Maintenance Management System (RMMS) for Routine Maintenance and
  - Guidance Notes for the Road Maintenance Management System (RMMS) for Periodic Maintenance.
- (Published by ADB Loan No. 1385-CAM (SF))



## Submit forms

### 1- Routine Maintenances:


- Table of Budget expenditure for Routine Maintenances for 24 provinces.
- Routine Maintenance Guideline
- Table of estimate cost for Routine Maintenances
- Table of estimate cost for Routine Maintenances for Road length 1000m and width 4,5,6,7m (Road had been used 1year).

### 2-Periodic Maintenances:


- Periodic Maintenance Guideline
- Table of total estimate cost for Periodic Main-
- Project Information sheet
- Table of estimate cost for Road Periodic Main-
- Table of detail of study on volume (m3) for Periodic Main-
- Timetable



# Thank you !



THE STUDY ON ROAD NETWORK DEVELOPMENT IN THE KINGDOM OF CAMBODIA



**"ENVIRONMENTALLY SUSTAINABLE" TRANSPORT**

Prepared by:  
Mr. TANTHIRA

08/12/2005

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TABLE OF CONTENTS

- I. Introduction
- II. EST
- III. My Ideas and Suggestions

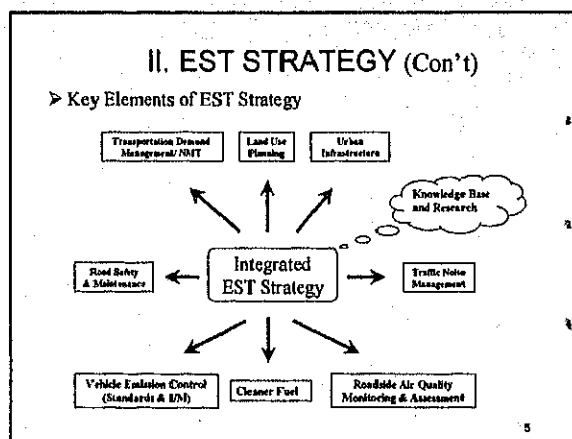
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I. INTRODUCTION

As I was assigned to participate in the training in Japan so in this presentation I will firstly present on my understanding of EST strategy which I have learnt during 6 weeks intensive training on urban transport and environment, and then I will talk about my ideas and suggestions to promote EST in Cambodia.

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- II. EST STRATEGY
- What is EST ?
- Economic aspect
  - Environment aspect
  - Social aspect
- 4



- II. EST STRATEGY (Con't)
- I. Land Use Planning
    - Integration of Land use planning in Transport planning
    - Land use planning must be highly considered on negative effect of auto motorization and sprawling suburbanization
    - Land use planning is required to attract houses and living environment in inner city assuring higher QOL than suburbs
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## II. EST STRATEGY (Con't)

2. **Urban Infrastructure**
  - People and Environmental friendly
  - Public transport must be introduced
3. **Transportation Demand Management/ NMT**
  - Encourage of public transport use
  - New construction and Improvement of transport facilities are not always an effective solution to cope with future traffic demand
  - Park and Ride system
  - Promote to use non motorized transport

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## II. EST STRATEGY (Con't)

4. **Vehicle Emission Control (I/M)**
  - Emission Standard
  - Cleaner Fuels
  - Vehicle Inspection and Maintenance
  - Transport Planning and Demand Management
5. **Cleaner Fuels**
  - Compressed Natural Gas
  - L.P.G

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## II. EST STRATEGY (Con't)

6. **Roadside Air Quality Monitoring**
  - *Installation of Vehicle Emission Monitoring Stations*
  - Enforcement of Vehicle Emission Standard
7. **Traffic Noise Management**
  - Enforcement of Traffic Noise Standard
  - *Installation of Noise Barriers*
  - Installation of Sound Absorber Panel
  - Use Porous Asphalt Pavement
  - Set up Buffer Zone

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## II. EST STRATEGY (Con't)

8. **Road Safety and Maintenance**
  - *Improvement of Road Networks*
  - Improvement of Road Safety at Hazardous Spots
  - Community Roads
  - *Traffic Control System by ITS*
9. **Knowledge Base**
  - Experts
  - Research Institute
  - Public Awareness

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## III. My Ideas and Suggestions

- ❖ **Land use planning**
  - Land use planner must closely cooperate with transportation planner
  - Land use planning should consider the increase of demand in future
- ❖ **Urban Infrastructure**
  - Public transport should be introduced especially city bus
  - Pedestrian lane should be provided and improve
- ❖ **Transportation Demand Management**
  - City bus is an appropriate transportation mode to cope with the future demand
  - Efficient use of existing infrastructure
  - Non Motorized transport should be encouraged

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## III. My Ideas and Suggestions (Con't)

- ❖ **Vehicle Emission Control (I/M)**
  - **Vehicle emission gas standard must be formulated urgently**
  - **Setting up vehicle inspection stations**
  - **Select private company for the responsibility of vehicle maintenance**
  - **Enforcement of vehicle emission standard should be done step by step**
- ❖ **Cleaner Fuels**
  - Encourage people to use unleaded gasoline
  - Choose private company to import cleaner fuels
  - Review the imported tax for normal fuels


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### III. My Ideas and Suggestions (Con't)

- ❖ **Roadside Air quality Monitoring and Assessment**
  - Air monitoring station should be installed along the arterial roads
  - Institutional capacity building should be done
  
- ❖ **Traffic Noise Management**
  - Enforcement of Noise Pollution Standard
  - Set up Buffer Zone along the Roads
  
- ❖ **Road Safety and Maintenance**
  - Improvement of road networks
  - Enforcement of traffic law
  - Improvement of traffic control system



**THE STUDY ON ROAD NETWORK  
DEVELOPMENT  
IN THE KINGDOM OF CAMBODIA**



**ACTION PLAN**

**"THE REDUCTION OF TRAFFIC"  
ACCIDENT AND CONGESTION  
IN PHNOM PENH**

Prepared by:  
Mr. TAN THIRA

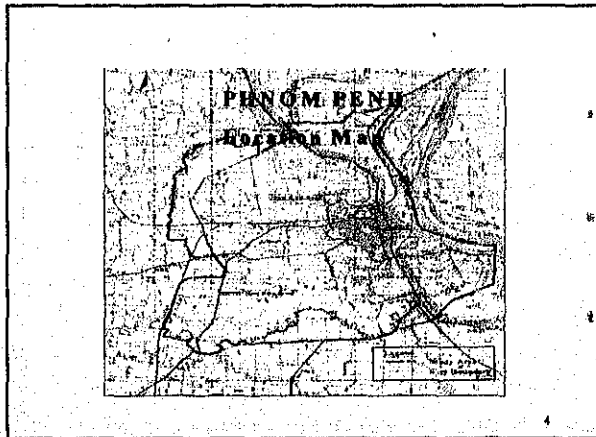
08/12/2008

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- I. Introduction
- II. Current Situation
- III. Proposed Actions
- IV. Implementation of Action Plan
- V. Conclusion

## I. INTRODUCTION

For many years, Cambodia's population has been rapidly increased, especially in Phnom Penh, the metropolitan area. In the year 2004, the population in Phnom Penh is approximately 1.27 million with annual growth of 2.5% (NIS, 2005). This figure will be reached 1.98 million by the year 2020. In parallel with the increase of population, The urbanized area has rapid extended to 438.91 km<sup>2</sup>. Additionally, automobile shows a remarkable increase (2.6 times increase 1991-2000 period) in terms of number of registered vehicles with a total of approximately 295,000 motorized vehicles, of which about 247,000 are motorcycles and 48,000 are passenger cars.



## II. CURRENT SITUATION

> The traffic congestion and accident are increasingly contributed by

- The insufficient of traffic management facilities such as *traffic signals, signs and pavement markings*
- Poor traffic control management
- Ineffective intersection operation
- Mixed traffic by private vehicle ( Motorcycle)
- Lack of public transport
- Lack of public awareness

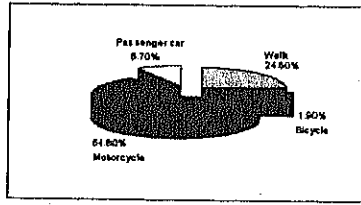
## II. CURRENT SITUATION (Con't)

	2000	2005	2010	2015
GDP per capita (\$)	215	267	350	447
Population	~1,300,000	1,811,000	1,820,000	1,983,000
Automobile	295,830	419,000	578,000	738,000
Motorcycle	247,507	342,000	458,000	570,000
Passenger car	48,132	77,000	120,000	168,000

SOURCE: The Study on The Transport Master plan of PP (2001)

## II. CURRENT SITUATION (Con't)

### Trip Composition by transport Mode



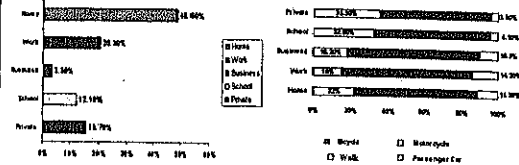
SOURCE: The Study on The Transport Master plan of PP (2001)

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## II. CURRENT SITUATION (Con't)

### Trip Composition by Purpose

### Modal Share of Transport Mode by Trip Purpose



SOURCE: The Study on The Transport Master plan of PP (2001)

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## II. CURRENT SITUATION (Con't)

### Road traffic Accidents in Phnom Penh (1997-2004)

Category	1997	1998	1999	2000	2001	2002	2003	2004
Number of Accident	429	472	576	550	587	667	732	750
Fatality	84	108	133	140	145	171	182	204
Serious injury	335	419	437	499	443	528	678	791
Minor injury	250	271	307	358	374	402	433	462

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## III. Proposed Action

- > Urban Street Improvement
  - Improvement of Collector and Local Roads
  - Overhead Crossing
- > Traffic Management and Control
  - Intersection Improvement
  - Traffic Enforcement
  - Traffic Signal and Pavement Marking Improvement
  - Traffic Safety Education
- > Public Transport ( city bus system)

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## IV. IMPLEMENTATION OF ACTION PLAN

Action	Description	Responsible Agencies	Time Frame	Cost Estimation (\$)	Possible Partner	Indicator
Urban Street Improvement	* Reconstruction of collector road of 23.5km	RDPWT/ Department of public works and transport of PPT	* 2006-2010 (77km)	* - 3.35 mil * - 2.7 mil * - 3 mil * - 0.5 mil	* ODA/WB loan * ODA/WB Loan * ODP/WB Loan * Local fund	Record of traffic accident data, Air quality
	* Reconstruction local road of 22 km * Overhead crossing		* 2006-2010			
Traffic Management	* Intersection improvement	Department of public works and transport of municipality of Phnom Penh	* 2006-2008	* - 0.1 mil	* Local fund	Record of traffic accident data, Air quality
	* Traffic signal/ pavement marking	RDPWT/DPWT of PP	* 2006-2008	* - 2.78 mil	* ODA/ WB loan	
	* Traffic Enforcement	Road Transport Department/ Municipal traffic police of PP	* 2006			
	* Traffic Safety Education	Road Transport Department/ DPWT of PP/ Municipal traffic police of PP/Ministry of education	* 2006-2010	* - 0.5 mil	* OOI	
Public Transport	* Bus fleet and facilities	Municipality of PPT/DPWT of PP	* 2006-2008	* - 2 mil	* Local Fund/ Private fund	11

## V. CONCLUSION

For successful execution, it is crucially important that this action plan must be accepted by the government of Cambodia and a steering committee established to carry out the implementation. Moreover, all responsible agencies must be well cooperated in the implementation of this action. Finally, this action plan should be involved by other development partners to financially and technically support.

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PHNOM PENH  
CAPITAL CENTER



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# DRAFT GENERAL CONCEPT ROAD MAINTENANCE IN CAMBODIA

Prepared by  
PHENG SOVICHEANO  
DEPUTY GENERAL DIRECTOR  
GENERAL DEPARTMENT OF PUBLIC WORKS  
MINISTRY OF PUBLIC WORKS AND TRANSPORT

## 8 BASIC SYSTEMS IN COMMENCEMENT OF ROAD MAINTENANCE IN CAMBODIA

1. KNOWLEDGE OF ASSET
2. LEVEL OF ROAD SERVICES
3. PREDICTING TRAFFIC DEMANDS
4. ROAD PERFORMANCE MONITORING
5. MAINTENANCE MANAGEMENT
6. CASH FLOW
7. ASSET MANGEMENT PLANNING
8. CHAIN OF COMMANDS

## 8 BASIC SYSTEMS IN COMMENCEMENT OF ROAD MAINTENANCE IN CAMBODIA (cont.)

### 1. KNOWLEDGE OF ASSET

- (i) Road Inventory
- (ii) Condition Assessment
- (iii) Asset Cost

### 2. LEVEL OF ROAD SERVICES

- (i) Road Service Standard
- (ii) Maintenance Standard/ Spec/ Method Statement

### 3. PREDICTING TRAFFIC DEMANDS

## 8 BASIC SYSTEMS IN COMMENCEMENT OF ROAD MAINTENANCE IN CAMBODIA (cont.)

### 4. ROAD PERFORMANCE MONITORING

### 5. MAINTENANCE MANAGEMENT

- (i) Road Inventory
- (ii) Condition Assessment
- (iii) Diagnostic
- (iv) Treatment Selection
- (v) Prioritization
- (vi) Work Estimation
- (vii) Maintenance Works

## 8 BASIC SYSTEMS IN COMMENCEMENT OF ROAD MAINTENANCE IN CAMBODIA (cont.)

### 6. CASH FLOW

- (i) Disbursement Procedures
- (ii) Accounting & Internal Auditing Systems

### 7. ASSET MANGEMENT PLANNING

- (i) Cost Effective Life Cycle
- (ii) Investment Criteria
- (iii) Vehicle Operating Costs
- (iv) Economic Analysis

## 8 BASIC SYSTEMS IN COMMENCEMENT OF ROAD MAINTENANCE IN CAMBODIA (cont.)

### 8. CHAIN OF COMMANDS

- (i) Organization Structure
- (ii) Functions of NRMC, MPWT, DoR, DoF & PPWDs and the ways forward
- (iii) Implementation Schedules

## 1. KNOWLEDGE OF ASSET

### • Road Inventory

- Provide existing road inventories to PPWDs / trainings to DoR and PPWDs on data verification and collection
- Delegate road inventories to PPWDs to carry out within their territorial responsibilities
- Update road inventories & submit to DoR
- DoR to sum up road inventories submitted by PPWDs and store data bases of routes and network

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## KNOWLEDGE OF ASSET (cont.)

### • Road Inventory (cont.)

- Provide trainings to PPWDs where NRs rehabilitated such as, Kandal, Takeo, Preyveng, Svayreang, Kompongspueu, Kampot, Sihanouk Ville, Kompongchhnang, Pursat, Battambang, Banteaymeanchey, O'dormeanchey, Seim Reap, Kompongcham, Kratie & Steung Treng

8

## KNOWLEDGE OF ASSET (cont.)

### • Road Inventory (cont.)

- Provide operational budgets and facilities to DoR and PPWDs to carry out the program

### • Asset Cost

- Road network valued and updated by MPWT - Knowledge of network capital investment & required maintenance budget to sustain investment

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## 2. LEVEL OF ROAD SERVICES

### • Level of Road Services:

- MPWT & MRD to set level of road services based upon 5 parameters:

Parameters	Satisfactory	Critical	Unacceptable
• Rutting (mm)	?	?	?
• Cracking	?	?	?
• Riding Quality (mm/km)	?	?	?
• Deflection	?	?	?
• Skid Resistance	?	?	?

### • Road Maintenance Standard / Specification / Method Statement

- MPWT & MRD to develop maintenance standard / Specification / Method Statement

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## 3. PREDICTING TRAFFIC DEMANDS

- Keep update traffic statistics on all National Roads by VMS purchased under WB and ADB (Overload Inspection Team supplies collected data to DoR)
- Forecast subsequent annual traffic demands for maintenance planning and/or road upgrading purposes by DoR

11

## 4. ROAD PERFORMANCE MONITORING

- Provide trainings to DoR on know-how skills and required equipment to monitor road performance
- Provide operational budget and facilities to DoR to sustain the program
- DoR provides Norms (materials, labors and equipment) to PPWDs for budget planning & project estimations

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## 5. MAINTENANCE MANAGEMENT

- Road Inventory
- Condition Assessment
- Diagnostic
- Treatment Selection
- Prioritization
- Budget Planning
- Maintenance Implementation Works

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## MAINTENANCE MANAGEMENT (cont.)

- **Road Inventory and Condition Assessment**
  - Trainings- use engineers who were trained on road inventory under ADB Maintenance TA & current WB RI TA to carry out trainings to DoR & PPWDs
  - Ensure source of operational budget for (i) equipment and facilities and (ii) sustaining the program

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## MAINTENANCE MANAGEMENT (cont.)

- **Diagnostic and Treatment Selection**
  - Involve experienced technical staffs and Laboratory facilities in analyzing the road failures and justifying treatment selections on sound technical principles
  - Prepare technical reports on the findings and submit as 1<sup>st</sup> part of work estimations

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## MAINTENANCE MANAGEMENT (cont.)

- **Prioritization and Budget Planning**  
(Budget is never enough)
  - PPWDs to find out likely budget allocations from DoR, GDPW, MPWT and NRM
  - Prioritize maintenance works to ensure road asset sustainability

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## MAINTENANCE MANAGEMENT (cont.)

- **Prioritization and Budget Planning**  
(cont.)
  - Prepare estimations based upon lump sum (PBS) and/or Unit Rate Contracts depend on type of works
  - Estimations are prepared based upon Norms (labors, equipment & materials) provided by DoR
  - Estimation should possess two parts: (i) technical report and (ii) financial report

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## MAINTENANCE MANAGEMENT (cont.)

- **Maintenance Works**
  - Maintenance works carry out using force account units of PPWDs and out sourcing (50/50)
  - FA supervised by DoR and out sourcing by DoR (Maybe - the Local Consultants)

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## 7. ASSET MANGEMENT PLANNING

- **Cost Effective Life Cycle**
  - Select the right pavement types & maintenance treatments and apply them at the right time
- **Investment Criteria**
  - Capital and periodical or routine maintenance costs are based upon pure economic

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## ASSET MANGEMENT PLANNING (cont.)

- **Vehicle Operating Costs**
  - Travel time and distance ( vehicle operating cost inputs, fuel, etc and driver and occupant time costs)
  - Accident costs
- **Economic Analysis**
  - CBR – capital investment project where the incentives reduce user costs

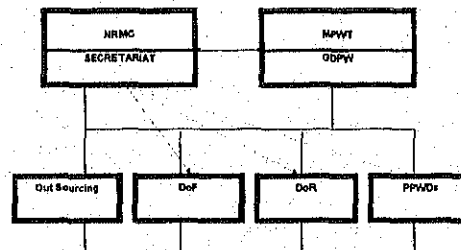
20

## 6. CASH FLOW

- Establish disbursement procedures to ensure smooth cash flow
- Introduce accounting & internal auditing systems to DoR, DoF and PPWDs

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## 8. CHAIN OF COMMANDS - ORGANIZATION CHART



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## CHAIN OF COMMANDS - NRMC FUCTION

1. Determine allocations of maintenance budget
2. Coordinate, examine and review program
3. Apportion, disburse and monitor use of funds
4. Provide sound, timely account and reports
5. Arrange financial and technical audits

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## CHAIN OF COMMANDS - NRMC FUCTIONS (cont.)

6. Prepare draft budget recommendation to RGC to increase/decrease add/special taxes
7. Approval of Contracts
8. Prepare Formats of PBS & Unit Rate Contracts
9. Prepare Procurement Guidelines

Note: (i) Functions 1-5 proposed by JICA Study Team

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### CHAIN OF COMMANDS - MPWT FUNCTIONS

1. Negotiate with NRMCM on fiscal maintenance budget
2. Provide oversight on GDPW, DoF, DoR and PPWDs
3. Provide Level of Road Service, Spec. & Method Statement
4. Procurement of Consultants and Contractors
5. Provide TAs to DoR, DoF and PPWDs

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### CHAIN OF COMMANDS - DoR FUNCTIONS

1. Establishment of Road Maintenance Unit
2. Responsible for planning on road & bridge maintenance and improvement
3. Receive and review the PPWDs annual RM budgets
4. Prepare draft MPWT maintenance budget for MPWT to negotiate with NRMCM

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### CHAIN OF COMMANDS - DoR FUNCTIONS (cont.)

6. Provide Norms to PPWDs for work estimations
7. Road Performance Monitoring
8. Supervision of PPWDs FA Works and/or Contractors
9. Review & endorse IPCs submitted by FA Units or Contractors (in conjunction with DoF)
10. Collection of traffic data & predicting traffic demands for road maintenance and improvement planning
11. Introduction of software in Road Maintenance Management

Note: Functions 11 are covered by DoF Study Team, and Function 11 is covered in part 1.

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### CHAIN OF COMMANDS - DoF FUNCTIONS

1. DoF to implement disbursement procedures to ensure smooth cash flow
2. DoF to introduce accounting & internal auditing systems to DoR and PPWDs

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### CHAIN OF COMMANDS - PPWDs FUNCTIONS

1. Establishment of Road Maintenance Groups
2. Carry out an update of road inventories
3. Carry out condition assessment
4. Make diagnostic on road and structure failures
5. Determine treatment selection

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### CHAIN OF COMMANDS - PPWDs FUNCTIONS (cont.)

6. Determine prioritization of road maintenance
7. Plan provincial fiscal budget for road maintenance
8. Carry out road maintenance works using force account system
9. Adoption of software for road maintenance (treatment selection)

Note: Function 9 will commence in year 3

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## Implementation Schedules

The table contains a grid of implementation schedules. The columns represent different phases or stages, and the rows represent individual tasks or activities. The text is small and difficult to read, but the structure is a clear grid.

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THANK YOU

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# THE STUDY ON THE ROAD NETWORK DEVELOPMENT

## ATTENDANTS LIST OF 4th WORKSHOP OF TASKFORCE TEAMS

On 08 December 2005

No.	Name	Position	Organization
1	MR. TAKASHI SHIMIZU	Deputy Team Leader	Jica Study
2	MR. TOSHIO KIMURA	Jica Study Team	Jica Study
3	MR. SEAK PENGKEANG	JICA Staff	Jica
4	MR. DUY CHAN DARA	Dep. chief office	MPWT
5	MR. HAM SOUANNA	Vice. Chief office	MPWT
6	MR. ON RAKSMEY	Vice. Chief office	PWD Kandal
7	MR. CHHAR THOL	Technical Staff	HEC
8	MR. NOP KILARITH	Counterpart	RI
9	MR. TAN THIRA	Counterpart	PWRC
10	MR. MAKITA. TOKUHIRO	Jica Expert	MPWT
11	MR. YOU DARA	Counterpart	MPWT
12	MR. YIN BORIN	Counterpart	MPWT
13	MR. SIM SOKHA	Jica Study Team	Jica Study
14	MR. PHENG SEMDER	DRD/ DGPW	MPWT
15	MR. MAO PHANARITH	PWRC	PWRC
16	MR. SAN PISET	Counterpart	MRD



The Study on the Road Network Development  
5<sup>th</sup> WORKSHOP of Taskforce Teams

- (1) Date: 06 July, 2006 (Thursday), 8:30am--12:00am
- (2) Venue: MPWT, Conference Room at 1<sup>st</sup> floor
- (3) Schedule:

8:30-8:45am Welcome remark by H.E. Tram Iv Tek, Secretary of State, MPWT

Session 1:

The presenters will make presentations regarding the assigned topics within 15min., and then discuss the points within 5min in principle.

08:45-09:00am Outline of the Road Network Master Plan Study by Mr. Cheam Sovanny (MPWT)

09:00-09:20am Traffic Survey and Analysis by Mr. Nop (MPWT)

09:20-09:40am Socio-economic Condition by Mr. San Piset (MRD)

09:40-10:00am Environmental Sustainable for Road Network Development in Cambodia by Mr. Yim Cham Nan (MOE)

10:00-10:15am *Tea break is provided during the workshop*

Session 2:

10:15-10:35am Budget Distribution for Road Maintenance by Mr. Phat Kong (MEF)

10:35-10:55am Road Maintenance by Mr. You Dara (MPWT)

10:55-11:15am Methodology for ORTHO Map Profile and Road Map Presentation by Mr. Mao Phannarith (MPWT)

11:15-11:30am Results of the Master Plan Study (Priority of the Roads) by Mr. Cheam Sovanny (MPWT)

11:30-11:50am Free Discussion and Wrap up

11:50-12:00am Closing Remarks by Mr. Shinkai (Leader, JICA Study Team)



# Traffic Survey Analyses



**JICA Study Team  
on the Road Network Development in  
Cambodia**

**NOP Kilarith**

**July 6, 2006**

# Contents

- Background
- Objective
- Survey Items

## I. Background

- The Japan International Agency (JICA) study team is conducting the study on the road network development in Cambodia in cooperation with the Ministry of Public Works and Transport.
- Traffic survey shall be conducted along one and two digit national road and three digit provincial roads .
  - Traffic count - 60 stations
  - OD Survey - 41 Stations
  - Travel Time Survey-21 Stations

## II. Objectives of the survey

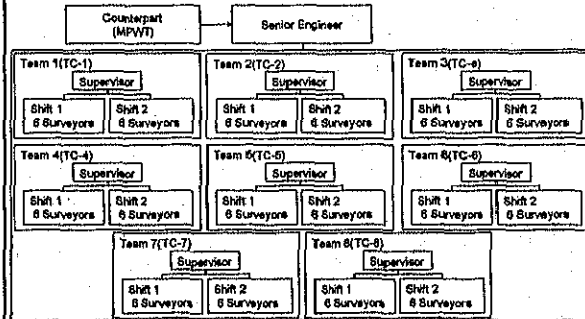
- To grasp the nationwide traffic movement and its volume both of passengers and commodity
- Collected data will be used for;
  - Future traffic demand forecast
  - Road network development plan
  - Road maintenance plan

## III. Survey Items

- **Traffic Count Survey**
  - Traffic volume by vehicle type, time and direction
- **Origin and Destination Interview Survey**
  - Movement of passengers and commodity
- **Travel Time Survey**
  - Travel time between major cities
- **Training of DPWT Staff**
  - Periodic survey implementation by the Government

### III.1.1 Traffic Count Survey

#### ■ Basic Team Structure





### III.1.6 OD Interview Survey.

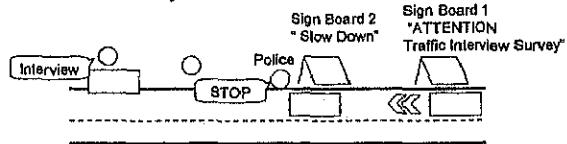
#### III.2.1 Survey Item

- Origin and Destination of the trip
- Trip purpose
- Seating capacity and No. of passengers on board
- Major commodity
- Load factor
- Estimated travel time
- Whether the vehicle is registered or not

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### III.1.7 OD Interview Survey

#### III.2.2 Survey Method



- Minimize the friction to the traffic flow
  - Interview will be conducted on the road shoulder
- Don't make a waiting queue of the interviewee vehicle
  - Police shall stop the car after the surveyor finish the preceding interview

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### III.1.8 OD Interview Survey

#### ■ Interview Item

- 5) Major Commodity
  - 1) Agriculture
    - Rice, Vegetable, Fruit, etc.
  - 2) Forest
    - Log, Timber, Plywood, etc.
  - 3) Marine
    - Fish, Shell, Seaweed, etc.
  - 4) Mineral
    - Coal, Copper, Iron, Salt, etc.
  - 5) Metal & Machine
    - Steel, Generator, Car & Bike, etc.
- 6) Chemical
  - Cement, Petroleum, Alcohol, Acid, etc.
- 7) Light Industry / Electronics
  - Machine Parts, IC Electronic Appliances, etc.
- 8) Miscellaneous Industry
  - Garment, Shoes, etc.
- 9) Construction
  - Sand, Gravel, Asphalt, Concrete, Re-Bar, Beam, etc.
- 10) Others

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### III.1.9 OD Interview Survey

#### ■ OD Zone Code (Inside of Cambodia)

Code	Province	Code	Province	Code	Province	Code	Province
010	Phnom Penh	080	Krong Kaeb	150	Banteay Mean Chey	220	Mondul Kiri
020	Kandal	090	Krong Preah Sihanouk	160	Kampong Cham	230	Stoeng Treng
030	Prey Vexeng	100	Koh Kong	170	Kampong Thum	240	Ratanak Kiri
040	Svay Rieng	110	Kampong Chhnang	180	Preah Vihear		
050	Takaev	120	Pousat	190	Siam Reap		
060	Kampong Speu	130	Bat Dambang	200	Odder Mean Chey		
070	Kmpot	140	Pailin	210	Kracheh		

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### III.1.10 Travel Time Survey

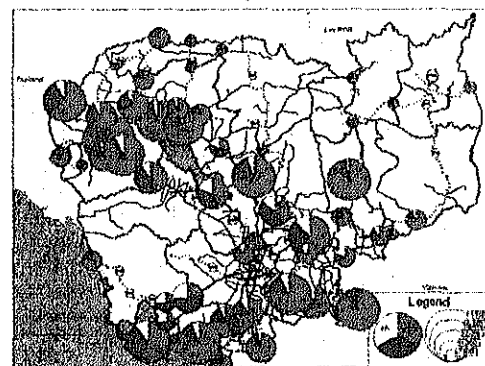
#### ■ Survey Route

- 1 round trip survey for each route
- Suspend the survey after sunset and restart in the next morning

Route No.	Start and End	Route No.	Start and End	Route No.	Start and End
1	P.P. to Border	11	NR1 to NR7	64	NR6 to Border
2	P.P. to Border	31	NR3 to NR33	67	NR6 to Border
3	P.P. to Veal Renh	33	NR3 to Border	68	NR6 to Border
4	P.P. to Sihanouk Ville	48	NR4 to Border	71	NR7 to NR6
5	P.P. to Polpet	51	NR5 to NR4	73 & 308	NR7 to Kracheh
6	P.P. to Siem Reap	56	NR5 to Samraong	76	NR7 to Sen Monrom
7	P.P. to Border	57	NR5 to Border	78	NR7 to Border

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### Survey Point



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# Socio-Economic Condition in Cambodia

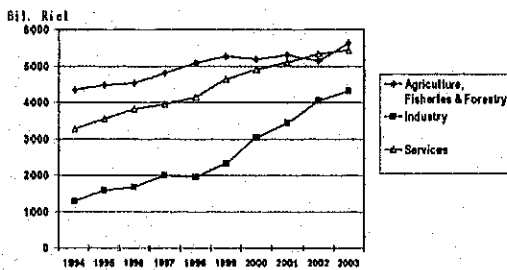
July 6th, 2005  
San Piset

## Contents

1. Recent Economic Trends in Cambodia
  - ❖ Agriculture, Industry, Service
2. Social Condition
3. Projection until 2020
4. Conclusion

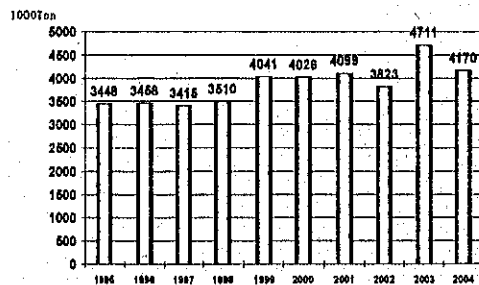
### 1. Recent Economic Trends in Cambodia

- Gross Domestic Product (GDP) by Sector



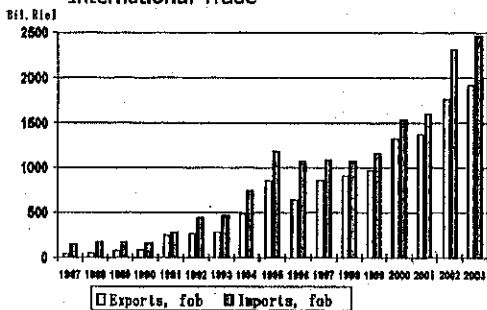
### 1.1 Agriculture Sector

- Paddy Production



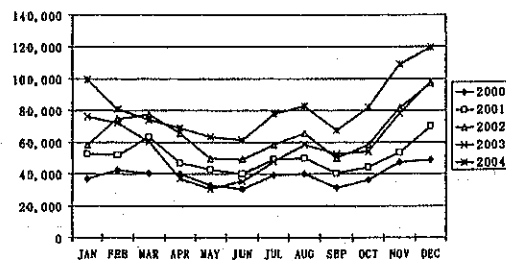
### 1.2 Industrial Sector

- International Trade



### 1.3 Service Sector

- Number of Foreign Visitors





## 2. Social Condition

- To grasp the characteristics of the areas:
  - Which areas have high population density?
  - Are education levels the same?
  - Which areas have high poverty?
  - Where are mature areas to develop business?
  - Where are potential areas for road projects?

What types of areas should be developed first in terms of the Road Project?

## 3. Projection until 2020

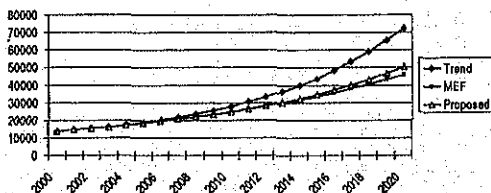
### 3.1 Projected Population based on NIS

- Annual growth rate of population is about 2%
- Border areas, industrial areas and new frontiers will have high growth ratios
- Farming areas will have low growth ratios

	Actual	Projection			
Year	2003*	2005	2010	2015	2020
Population	12,503,401	13,087,594	14,430,920	15,983,559	17,676,734

## 3.2 Projection of GDP

- Based on the trend, the growth rate is high
- According to MEF, the growth rate is moderate
- The Study Team forecast is in between



## 4. Conclusion

- Goal of road network is not completion of construction but contribution to the socio-economy in Cambodia.
- Comprehensive point of view is necessary while thinking about development of the Road network.
- Quantitative data and systematic method are useful in considering logically the realization of the projects.

Thank You

KINGDOM OF CAMBODIA  
NATIONAL RELIGION KING

The Study on the Road Network  
Development in Cambodia

Environmental Sustainable for Road Network  
Development in Cambodia

July 06, 2006, Phnom Penh, Cambodia

Prepare by: Mr. Yim Chamnan

Ministry of Environment

**Contents**

1. Department of Environmental Impact Assessment (EIA), Ministry of Environment
2. EIA Sub-decree
  - a) Required and EIA
  - b) Actors involve in EIA process in Cambodia
  - c) EIA process in Cambodia
3. Impacts of Road Network Development on the Environment
  - a) On the natural environment
  - b) On the social environment
4. Current significant problem of RND
5. Conclusion

**1. Environmental Impact Assessment (EIA) Department**

- The Royal Government of Cambodia (RGC) as MoE just established EIA Department in 1996 after the end of this course on Environmental Planning and Impacts Assessment, under the support by Asian Development Bank (ADB) from October, 1995 to June 1996

**2. EIA Department (cont.)**

The main functions of EIA department are:

- 1) Review assess of the environmental impact of proposed project (private and public) for making recommendation.
- 2) Analyzing the potential environmental effects of projects for make comment to the decision marker for decision, before project implementation.
- 3) Promote public participation in EIA process and coordinate with involved institutions and investors.
- 4) Monitor the implementation and environmental management plan of project for mitigation negative impacts.

**2. EIA Sub-decree**

**Article 1:**

To determine and EIA upon every private and public project or activity, and it must be reviewed by the Ministry of Environment prior to the submission for a decision.

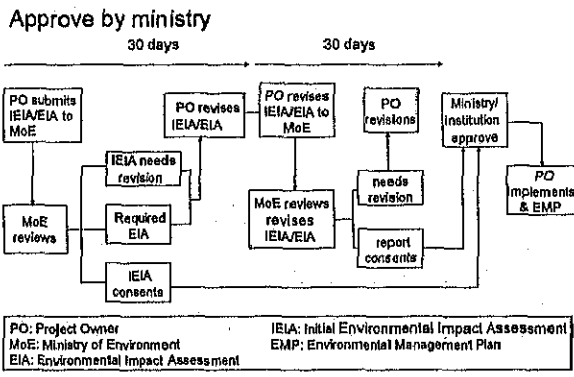
**a) Example List of the projects required EIA:**

<i>Type of the projects</i>	<i>Size / Capacity</i>
- Urbanization development	All sizes
- Industrial zones	All sizes
- Road construction	≥ 100 kilometers
- Railway construction	All sizes
- Bridge, Road construction	≥ 30 tones weight
- Port construction	All sizes
- Air port construction	All sizes

### b) Actors involve in EIA process

- Project Owner
- Ministry of Environment
- Council Development of Cambodia
- Relevant Ministries
- Local authorities
- Local Communities
- National and International organizations

### c) Chart of EIA process in Cambodia

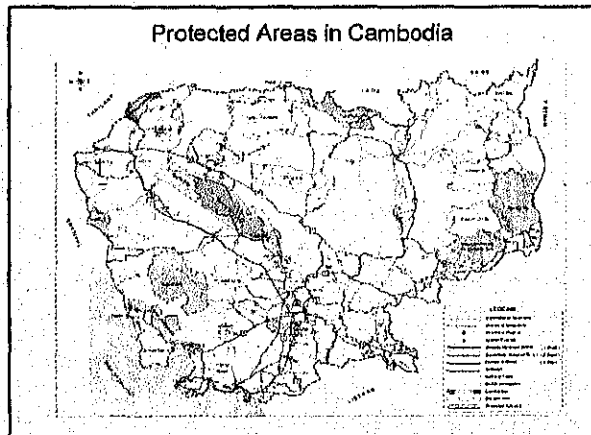


### 3. Impacts of Road Network Development (RND) on the Environment

The assessment of environmental impacts of RND should be considered to the main two stages: construction and operation & maintenance stages.

#### a) The natural environment

- Topography
  - Soil erosion
  - Hydrology system
  - Protected Areas such as: forest and wildlife
- A: national parks, B: wildlife sanctuaries,  
C: protected landscapes, D: multiple-use areas and  
E: protected forests



#### b) The social environment

- Land use:
  - + Residential land
  - + Agricultural land
  - + Communities land (cultivate and reserved land for indigenous/minority communities)
- Eco-tourism (Northeast, coastal areas and national parks)
- Economical activities (most happen during construction)

### 4. Summary of Current problems of RND

- a) Road network problems
  - Lack paved roads (low pavement condition)
  - Traffic jam in the main cities
  - Lack bridges crossing on main rivers
  - Road and bridges are narrow
  - Limited maintenance and monitoring

### **b) Social environment problems**

- Population growth and movement due to increase demand
- Illegal land encroachment on the ROW
- Weak law enforcement and cooperation
- Role and responsible are not clear
- Land uses are not clear
- Limited financial and institutional capacity of staffs in MPWT & MoE
- Insufficient guideline, standard and regulation
- Some road construction projects are not conduct IEIA or EIA report

### **5. Conclusion**

The RND is important for economical development in Cambodia such as: industry, tourism, agricultural development and other economical activities.

- The most RND in Cambodia are rehabilitation project
- The small direct impacts will be happened during construction stage (short time)
- The medium or serious indirect impacts will be happened during operation & maintenance stage (long time)

### **Conclusion (cont.)**

The government as: MPWT and MoE should:

- Provide capacity building to governmental officials (MPWT & MoE) on RND and environment
- Enforcement laws sub-decrees regulations and guideline
- Enforcement monitoring plan/activities during construction and operation & maintenance.
- Land use planning (village, commune, district province.. etc)

### **Conclusion (cont.)**

- Promote public participation in EIA of RND.
- Conduct IEIA or EIA report of proposed project and submit to MoE to review, comment and approve.
- Cooperate with relevant ministries and local authorities to mitigate the negative impacts from RND on the natural and social resources.

**Thank you**

**National & Provincial  
Road Maintenance**

Result-Based Management

06-July 2006  
PBAT KONG

1

**Budget distribution in 2006**

Budget allocated for road repair and maintenance, in 2006:

- National & provincial roads: 70 billion Riels
- Rural roads: 13 billion Riels
- Irrigation-related road: 3 billion Riels

2

**Budget for national and provincial roads**

- Annually, 8% of the budget is reserved for *Urgent Road and Bridge Repair and Traffic Intervention*. In 2006, it accounts for 5.6 billion riels.
- Routine maintenance: 10 billion riels
- Periodic maintenance and repair: 54 billion riels

3

**Budget for national and provincial roads**

*A. Budget for Urgent Repair*

- Definition: It is the budget reserved for the purpose of urgent repair of the existing road network which may be cut or obstructed suddenly and to restore the normal traffic reconnection.
- Ceiling 100 millions Riels per case.
- At the beginning of the year, MEF release Cash to MPWT amounting to 1/12 of the total urgent repair budget.
- MPWT executes and applies the replenishment method.

4

**B. Routine Maintenance**

1. Planning and Budgeting

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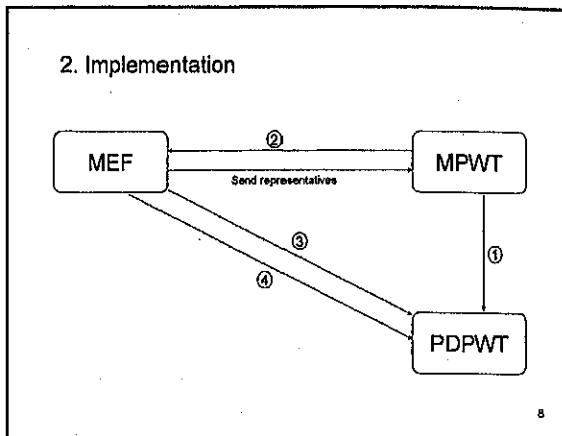
    graph TD
      MEF[MEF] --- 5 --- MPWT[MPWT]
      MEF --- 4 --- MPWT
      MEF --- 1 --- IC[Inter-Ministerial Committee]
      IC --- 2 --- MPWT
      IC --- 3 --- MPWT
      MPWT --- 1 --- PDPWT[PDPWT]
  
```

5

- ① PDPWT prepare provincial programs for routine maintenance and submit to MPWT. The programs should be long term.
- ② MPWT screens the requests and prepares national program for routine maintenance and submit to Inter-Ministerial Committee for discussion. MPWT should have a long term program for routine maintenance, but the program is subject to yearly updating.
- ③ Inter-Ministerial Committee, chaired by MPWT discusses and agrees on MOU. MOU covers both routine and periodic maintenance program according to the priority.
- ④ MPWT prepares the agreed maintenance program and submits to MEF for budgeting purpose.
- ⑤ Based on MOU, MEF agrees on commitment budget for annual routine maintenance programme.

6

MEF	Inter-Ministerial Committee	MPWT
<ol style="list-style-type: none"> <li>1. Sends representatives to join the Inter-Ministerial Committee.</li> <li>2. Issue official commitment budget for routine maintenance.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discusses and agrees on program of routine and periodic maintenance. There are two approaches: Bottom up and Top down</li> <li>2. Discusses and decides on guidance principals and policies, and on problem solving and corrective measures.</li> <li>3. Proposes for inspection.</li> </ol>	<ol style="list-style-type: none"> <li>1. Screens and prioritizes the proposed programs of PDPWT.</li> <li>2. Arrange the Inter-Ministerial Committee meeting.</li> <li>3. Prepares the agreed maintenance national program and submits to MEF for budgeting.</li> </ol>



- ① MPWT starts procurement and signs contracts with private contractors or PDPWT (force account). MPWT is delegated full power to manage the procurement process. Except it is implemented by PDPWT under force-account procedure, MPWT has to complete the procurement before the maintenance cycle.
- ② MPWT submits the signed contracts to MEF and requests for disbursement.
- ③ MEF start 1<sup>st</sup> disbursement before the start of program cycle.
- ④ Disbursement of 2<sup>nd</sup> and 3<sup>rd</sup> trench by MEF after inter-ministerial committee's site inspection.

MEF	MPWT
<ul style="list-style-type: none"> <li>- Disbursement (direct payment to contractors).</li> <li>- Sends representatives to join MPWT to evaluate / inspect / audit the works.</li> </ul>	<ul style="list-style-type: none"> <li>- Carries out tender / negotiation / contracts (MEF representatives to join).</li> <li>- Requests MEF for disbursement.</li> <li>- Certifies result.</li> <li>- Evaluate / Inspect / Audit / performance and results.</li> </ul>

- ### Time frame for disbursement
1. Maintenance Cycle is 1 year. In 2006 generally it starts from January 15, 2006 and ends in January 15, 2007.
  2. 3 trenches of disbursement:
    - 1<sup>st</sup> trench before commencement of the cycle 40% of contract price or 40% of the commitment cost in the case of force account.
    - + MPWT must have the programme agreed earlier and has the contract signed and submitted to MEF before the commencement of the maintenance cycle.
    - 2<sup>nd</sup> trench, 30% of contract price before beginning of month 5, this year before may 15.
    - 3<sup>rd</sup> trench: before beginning of month 9, this year before September 15.
  3. Before the disbursement of the 3<sup>rd</sup> trench MPWT has to set up committee joined by MEF representative to certify the result based on the conditions specified in the contract.

- ### C. Periodic Maintenance
- #### I- Planning/Budgeting:
- Prepared by MPWT and submit to Inter-Ministerial Committee for discussion.
  - MOU is signed with a list of the approved projects, together with routine maintenance programme.
  - MPWT prepares detail designs, bill of quantities and submit to MEF for budgeting.

## II- Implementation:

- Procurement: apply general procurement procedures. MEF is considering to delegate more power to MPWT.
  - ◆ Force-account: price negotiation.
  - ◆ Private contractor: an open public tender is required to hire contractor.
- Disbursement:
  - ◆ Force-account:
    - ✓ 1<sup>st</sup> disbursement as advance payment, 20% to 40% of project value.
    - ✓ 2<sup>nd</sup> and 3<sup>rd</sup> disbursement according to contract.
    - ✓ 10% of contract value is retained till expiration of the defect liability period (in general 6 months for gravel road and 1 year for paved road).
  - ◆ Private contractor:
    - Cash advance is not applied.
- Evaluation/Site Inspection: from 2 to 3 times, according to project size. In general, 1<sup>st</sup> disbursement takes place during the course of implementation (40% to 50% of the project completion), 2<sup>nd</sup> disbursement is at the project completion and 3<sup>rd</sup> disbursement is at end of the defect liability period.

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## Disbursement Facilitation at MEF

1. Single department to prepare payment order and to control payment order (Financial Controller) in 5 working days.
2. Service standard for cash disbursement at National Treasury 7 working days, but it need to be improved by Public Financial Management.
3. Total period for cash disbursement 17 working days.
4. MEF delegates full procurement power to MPWT.

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## Audit

The spending of the *Fund for Repair and Maintenance of Roads (FRMR)* is subject to post-audit.

Thank you.

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**MINISTRY OF PUBLIC WORKS AND TRANSPORT  
JICA Study Team**

**Current Road Maintenance Road Maintenance in  
Cambodia**

06 July 2006

Presented by You Dara, MPWT

**PRESENTATION OUTLINE**

1. Introduction
2. Responsibilities
3. The Management Cycle
4. General Management Structure
5. Road Inventory
6. Existing Road Maintenance and Operation

**1. Introduction**

- ♦ Road and bridge maintenance is a daily requirement and cannot be left to emergency restoration;
- ♦ Maintenance adequate drainage of the roads is the most cost effective conservation action possible;
- ♦ Maintaining low road roughness (high riding comfort) has the greatest impact on vehicle operating costs;
- ♦ Bridges are vital links in the road chain and must be maintained with no degradation.

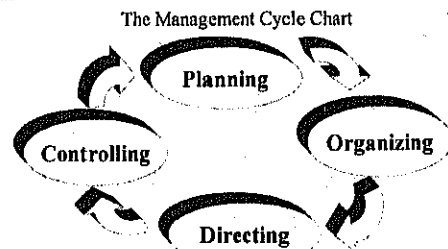
**2. Responsibilities**

- ♦ To manage maintenance activities;
- ♦ To negotiate the problem budget and disbursement with MEF;
- ♦ To manage all of disbursements for the maintenance activities;
- ♦ To manage technical matters for routine maintenance;

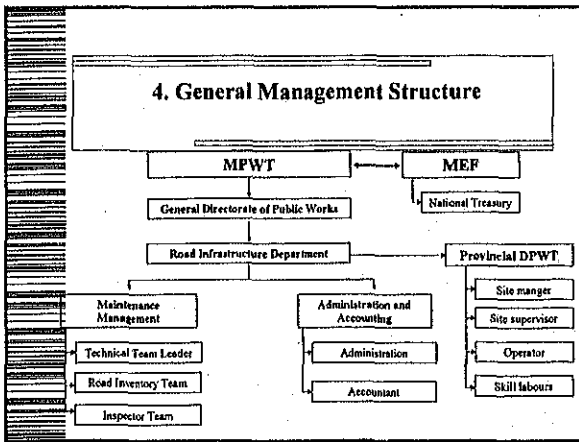
**2. Responsibilities (Cont.1)**

- ♦ To inspect the quality, quantity, materials and mandate applied and disbursement;
- ♦ To provide appropriate answers to Provincial Maintenance Unit when problems are coming up;
- ♦ To evaluate and finalize the maintenance activities;
- ♦ To prepare related documents for the next routine maintenance program.

**3. The Management Cycle**







### 5. Road Inventory

These works will be classified as the following:

1. Type of roads condition survey;
2. Number of bridges and condition;
3. Number of culverts and condition.

### 6. Existing Road Maintenance and Operation

**Type of Maintenance Works**

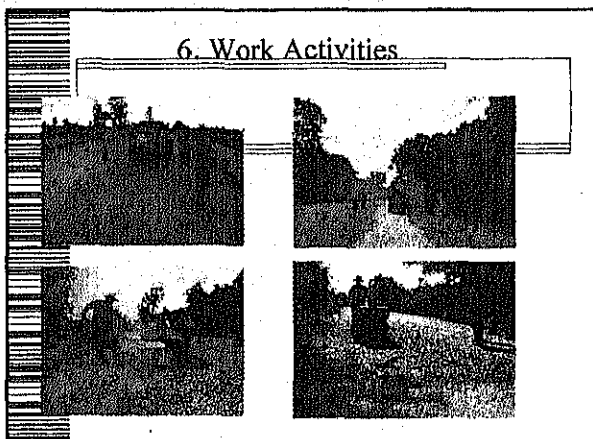
- > Maintenance works are classified as following three types from budgetary point of view in Cambodia:
  - 1) Routine maintenance
  - 2) Periodical maintenance
  - 3) Other maintenance
- > The present Routine Maintenance works are classified as following work codes.

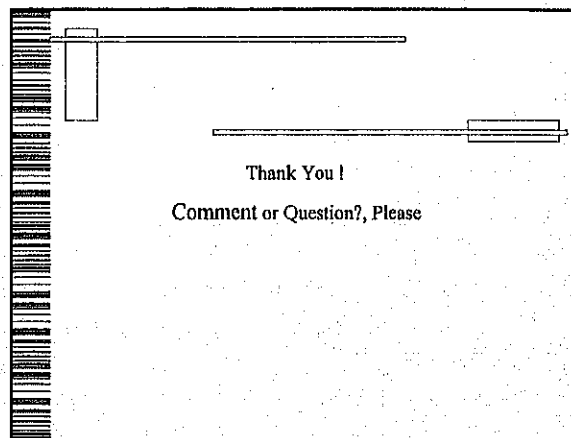
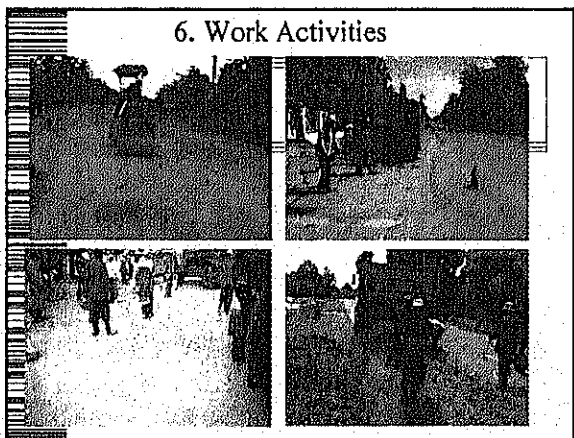
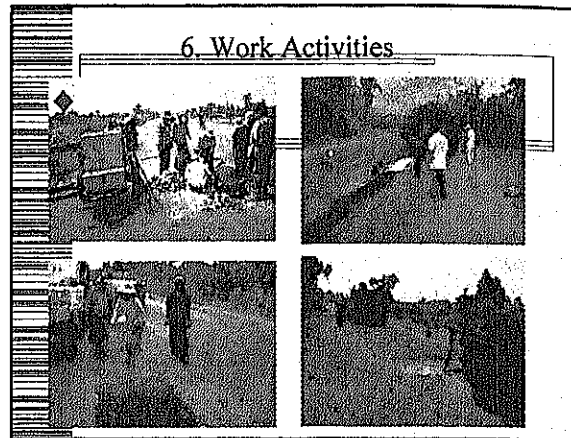
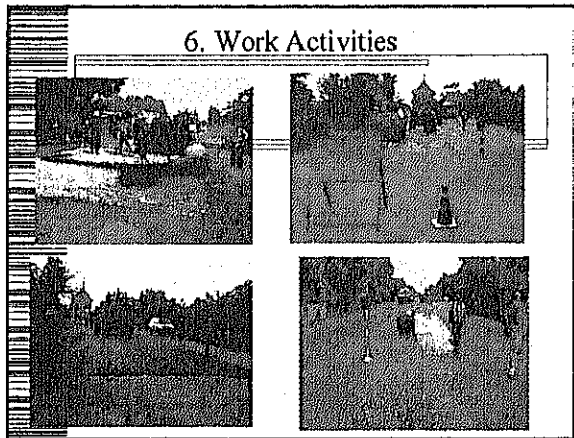
### 6. Existing Road Maintenance and Operation (Cont. 1)


Works Codes	Working Types
1100	Patch bituminous surface
1200	Grade shoulders
1130	Sealing on bituminous surface
1160	Patch DBST surface
1170	Patch macadam surface
1180	Patch bituminous surface
1190	Patch laterite surface
1280	Grade shoulders
1250	Grade earth/gravel roads
1260	Heavy grading
1260M	Material for heavy grading
2100	Clean ditches
3100	Clean culvert
3130	Repair culvert
3150	Install culvert

### 6. Existing Road Maintenance and Operation (Cont. 2)


- ◆ Total length of classified roads maintained by MPWT, those are currently maintaining
  - 1,369.87 km of 1 digit national roads
  - 9,696,677,744.00 Riels
- ◆ Maintenance Operation Agency
  - Department of Public Works and Transport is the maintenance agency under the management of MPWT;
  - MPWT has 24 Cities-Provinces Department of Public Works and Transports; and
  - DPWT is responsible for 1 digit national road.







The Study on Road Network Development  
in  
the Kingdom of Cambodia



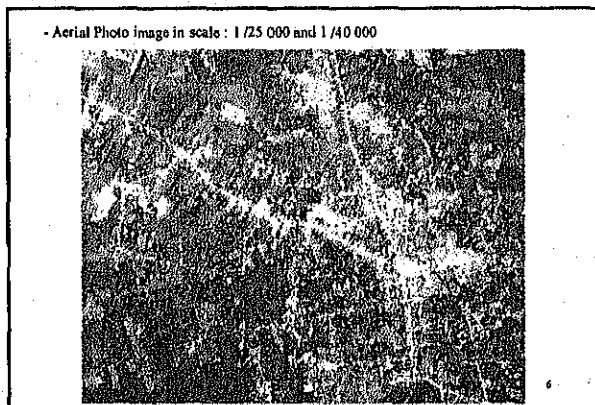
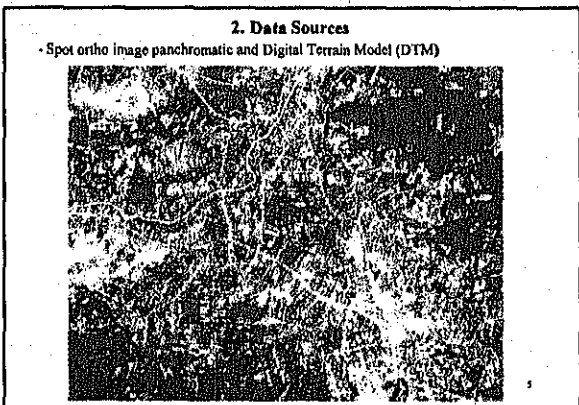
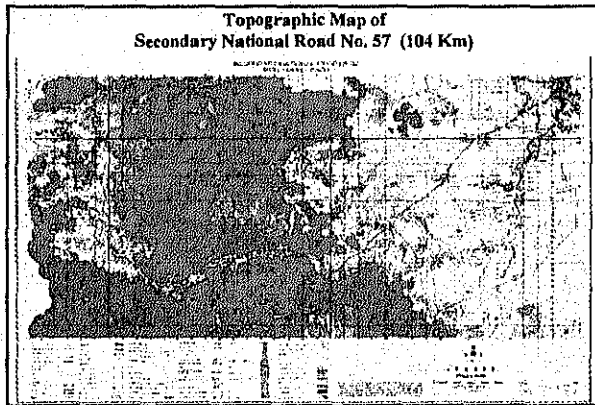
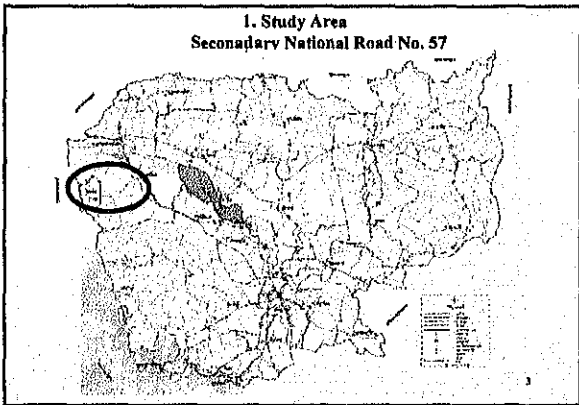
**METHODOLOGY  
of  
Ortho Map Profile  
for  
Secondary National Road No. 57**

Prepared by Mr. Mao Phanarith  
July 2006

### Table Content

1. Study Area
2. Sources and Support Data
3. Methodology
4. Data conversion
5. Output
  - In GIS Application.
  - In AutoCAD Software.

2



- List of Aerial Photo image  
in scale : 1 /25 000 and 1 /40 000

Aerial photo 1992

No	Photo Number	Run
1	1227	26
2	1228	26
3	1229	26
4	1232	26
5	1242	27
6	1246	27
7	1257	27
8	1258	27
9	1227	28
10	1223	28
11	1224	28
12	1223	28
13	1224	28
14	1229	28
15	1230	28
16	1230	28
17	1232	28
18	1232	28
19	1234	28
20	1234	29
21	1239	29
22	1240	29
23	1241	29

Aerial photo 2002

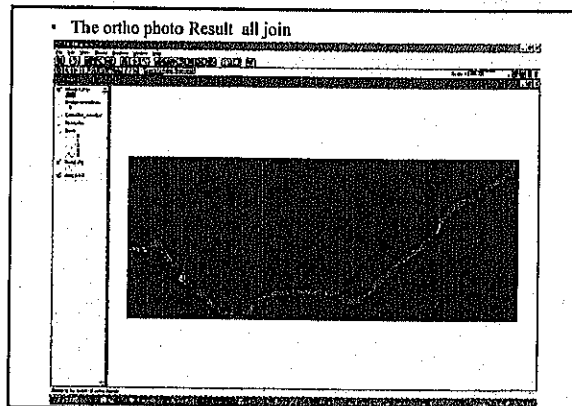
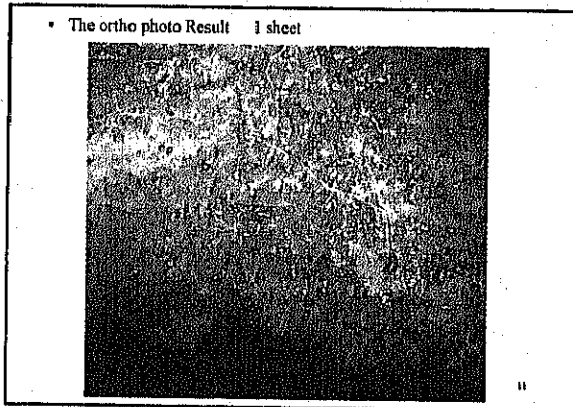
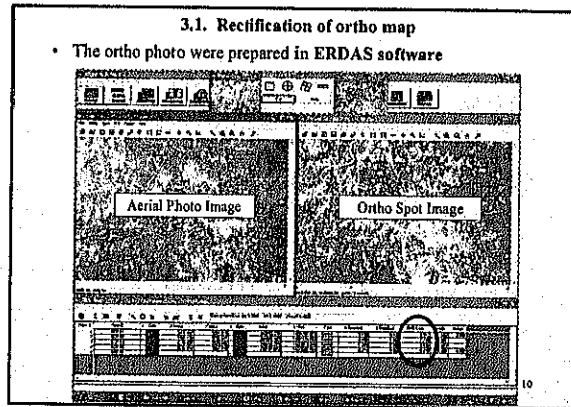
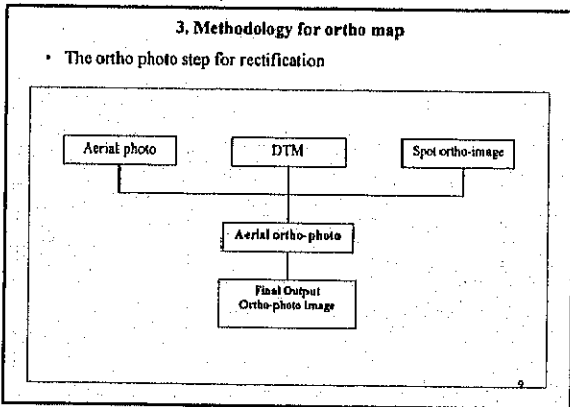
No.	Photo Number	Run
1	2458	42
2	2470	42
3	2236	43
4	2237	43
5	2258	43
6	2216	44
7	2218	44

- Map Projection parameters

- The projection parameters was as the same as projection system of GIS Base Data ( JICA Data 2003 ) The define projection as teh following :

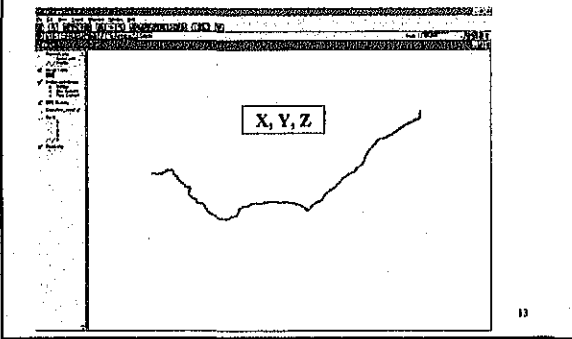
Projection : UTM, Zone 48  
 Ellipsoid : Everest  
 datum : Indian 1960  
 Units : Meters

For the next future should be use Datum WGS84.



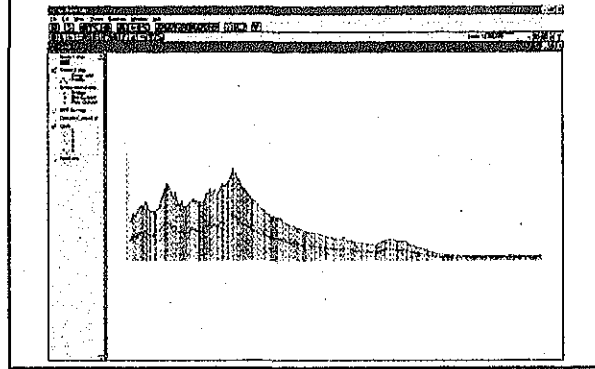
### 3.2. Making Profiles

- GPS Surveys point



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- Road profile for Secondary National Road No. 57



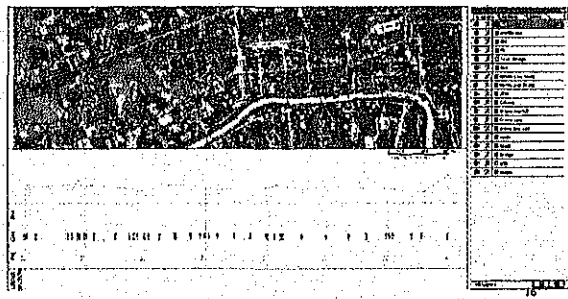
### 4. Data Conversion

From GIS Application, We can convert to AutoCAD format  
.DXF format

15

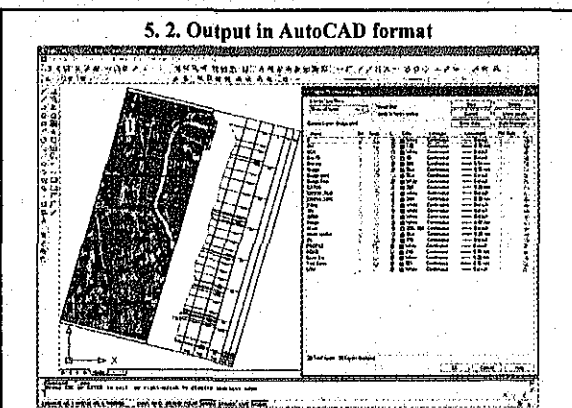
### 5. Output

#### 5.1. Output in GIS Application Format



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#### 5.2. Output in AutoCAD format

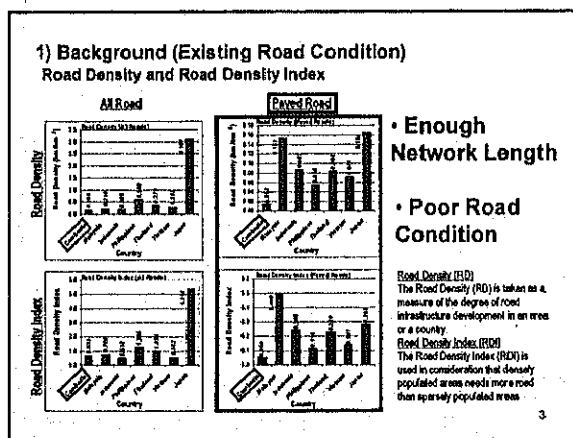
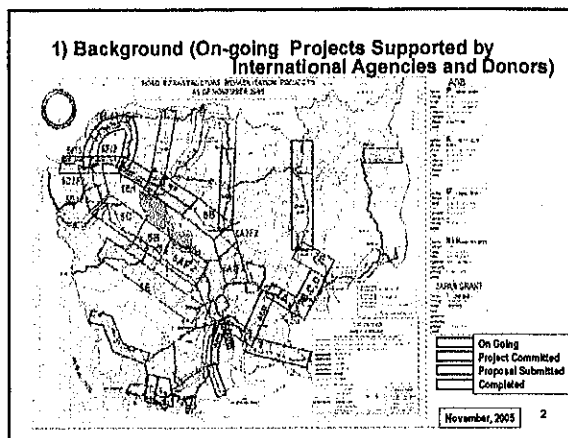
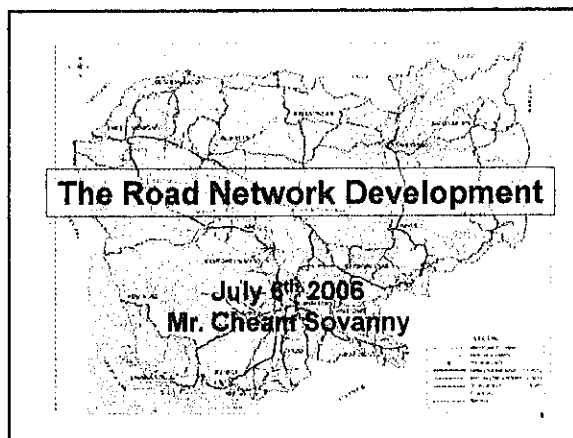


# THANKS

18

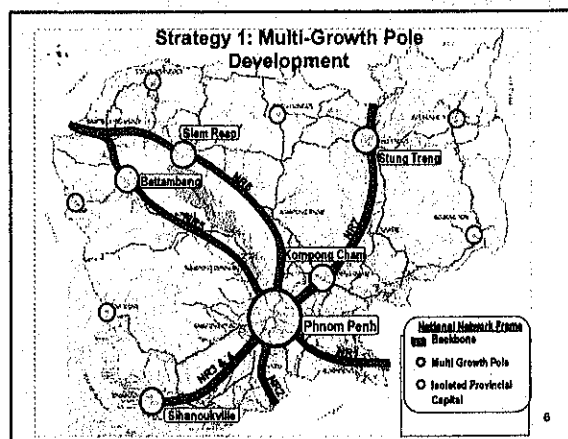




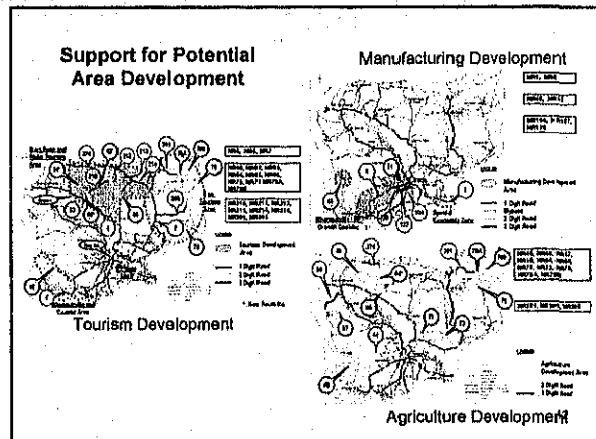
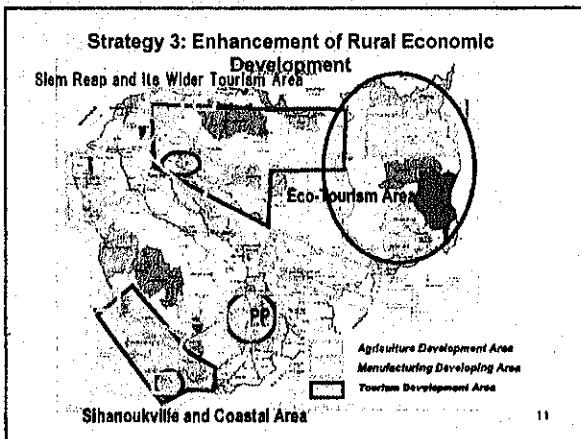
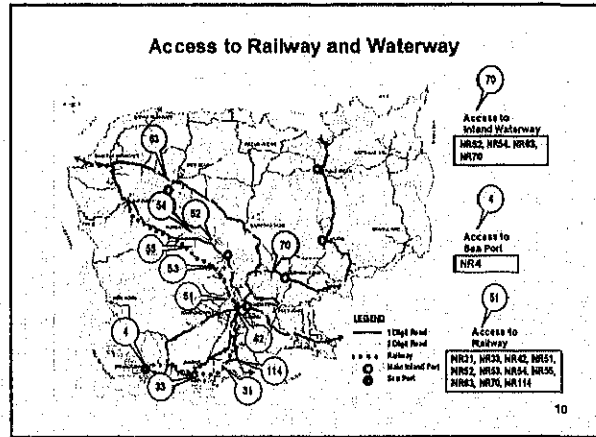
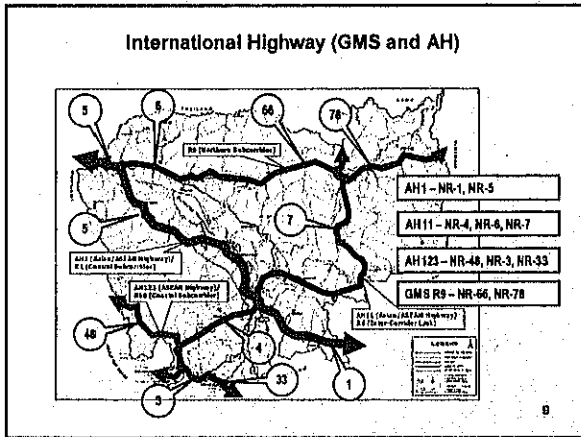
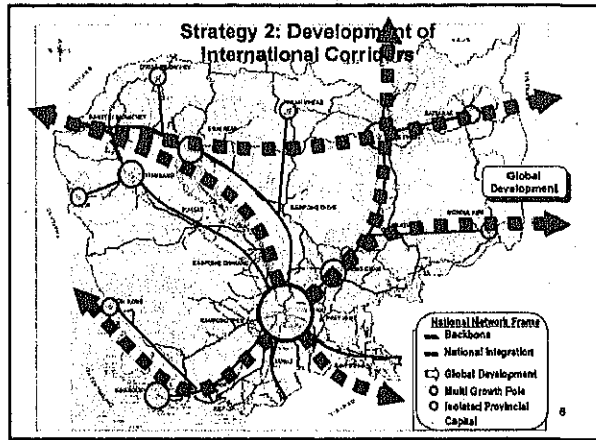
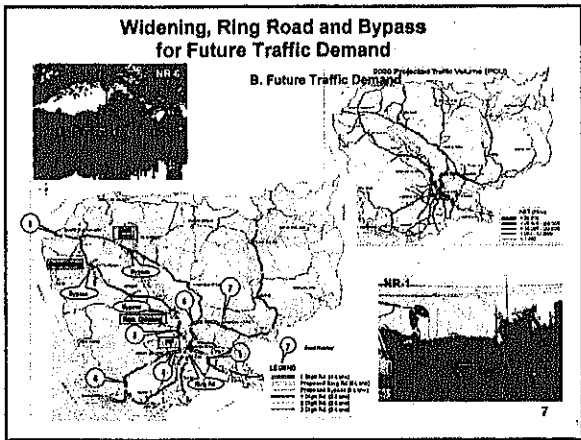


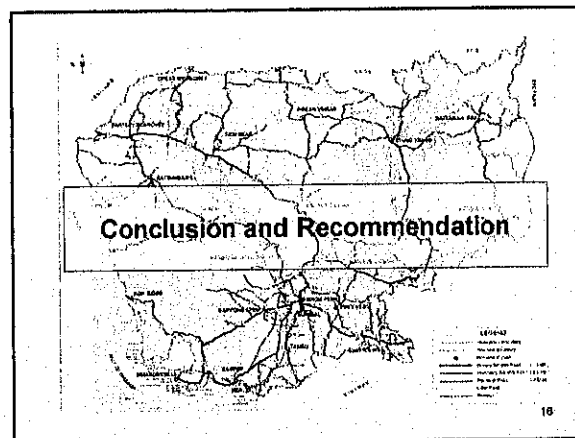
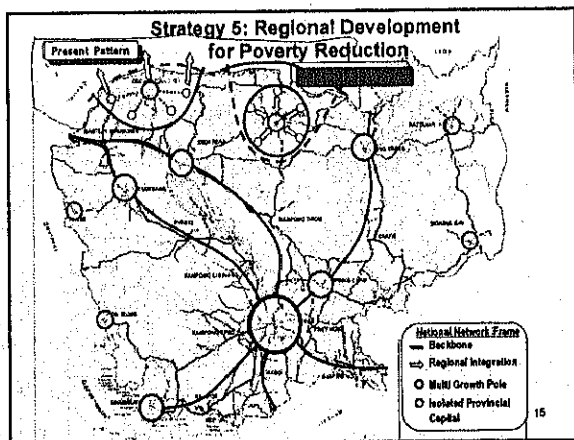
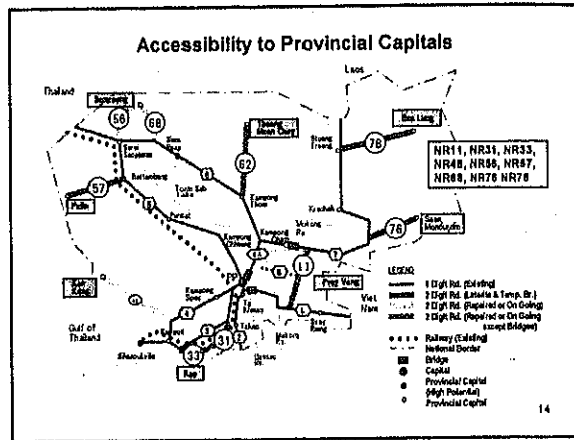
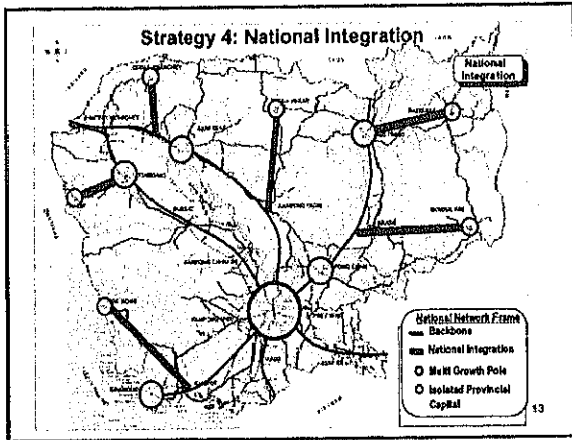
- ## 2) Road Development Principles
- Improvement of Existing Road Network
    - Use Existing Road Network
    - Improvement of Existing Road
      1. Pavement Upgrade for 1 & 2 Digit Roads
      2. Maintenance for 3 Digit & Rural Roads
  - Strengthening of Road Network and Capacity
    - 4 Lane Widening, Ring Road and Bypass
  - Reinforcement of Road Network
    - Alternative Route
- 4

- ## 3) Road Network Development 5 Strategies
- Strategy 1: Multi-Growth Pole Development
  - Strategy 2: Development of International Corridors
  - Strategy 3: Enhancement of Rural Economic Development
  - Strategy 4: National Integration
  - Strategy 5: Regional Development for Poverty Reduction
- 5









#### 1) Conclusion and Recommendations

- Early Implementation of the Projects:
- i) Urgent Bridge Rehabilitation on 1 & 2 digit roads
- ii) Improvement of 2 digit road connecting to provincial towns
- iii) Ring Road and 2<sup>nd</sup> Bridges across Tonle Sab and Basac Rivers
- iv) Bypass at Siem Reap

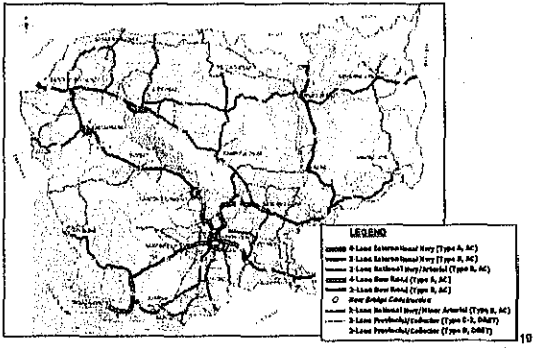
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#### Prioritization of Proposed Road

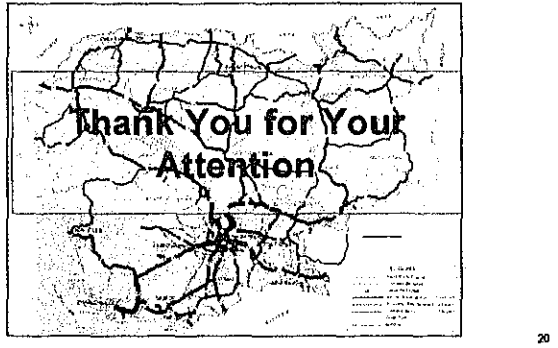
Program	1 Digit National Road	2 Digit National Road	3 Digit National Road
Short Term (2005-2010)	NR1-1 / NR1-2 / NR2-2 / NR3-2 / NR4-1 / NR5-1 / NR5-5 / NR6-4 / NR7-3 / NR7-4	NR33-2 / NR40 / NR56 / NR57 / NR62-1 / NR64 / NR65 / NR71 / NR72 / NR78-1 / NR78-2	Maintenance work only
Medium Term (2011-2015)	NR 4-3 / NR5-4 / NR6-1 / NR6-2 / PP Ring Road / 2 <sup>nd</sup> Chruy Changvar Bridge / 2 <sup>nd</sup> Monibong Bridge / Siem Reap Bypass	NR 22 / NR66-1 / NR68 / NR73 / NR78-1 / NR78A / NR78B	NR104 / NR114 / NR127 / NR210
Long Term (2016-2020)	NR 1-1 / NR1-3 / NR2-1 / NR3-1 / NR 5-2 / NR5-3 / NR6-3 / NR7-1 / NR7-2 / NR8 / Battambang Bypass / Kamp. Chaang Bypass	NR11 / NR13 / NR21 / NR21A / NR31 / NR 32 / NR33-1 / NR33A / NR41 / NR42 / NR44 / NR46 / NR51 / NR52 / NR53 / NR54 / NR55 / NR56 / NR60 / NR 61 / NR63 / NR66-2 / NR 70 / NR74 / NR76-2 / NR78A / NR78B	PR 111 + Connecting to NR21 / PR2041, 2082, 2076 / NR59, NR100 / Stung Treng - Chnam Khsan / Kampong Thom - Kratie / NR210 A / NR212 / NR213 / NR274 / NR301, NR301-1, NR301-2 / NR303 / NR308 / NR 316 / NR148 & 148A / New Road connecting to NR 13 and NR 7

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# Road Network Master Plan in 2020



# Road Network Master Plan in 2020



THE STUDY ON THE ROAD NETWORK DEVELOPMENT

PARTICIPANT LIST OF 5<sup>th</sup> WORKSHOP OF TASKFORCE TEAMS

On 06 July 2006

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4	Mr. Khun Soth	Research Center	MPWT
5	Mr. Sar Kimnath	Chief of Public work office	MPWT
6	Mr. Peov Meng Hai	Deputy Chief of PW office	MPWT
7	Mr. By Ban Villa	Road Infrastructure Dept.	MPWT
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9	Mr. Nay Channang	Road Infrastructure Dept.	MPWT
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15	Mr. You Dara	Counterpart	MPWT
16	Mr. Nop Kilarith	Counterpart	MPWT
17	Mr. Mao Phanarith	Counterpart	MPWT
18	Mr. Bun Khla	Representative	MOE
19	Mr. Som Savath	Representative	MOE
20	Mr. Chuop Sivutha	Representative	MOE
21	Mr. Yin Chamnan	Counterpart	MOE
22	Mr. Mean Ravuth	Representative	MRD
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No.	Name	Position	Organization
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29	Mr. Sremg Song	Representative	DPWT Kandal
30	Mr. Sou Tiro	Representative	DPWT Kandal
31	Mr. Cihng Kourng	Representative	DPWT Pursat
32	Mr. Ky Vyrin	Deputy Director	DPWT Battambang
33	Mr. Dit Sereyreatana	Deputy Office	DPWT Siem Reap
34	Mr. Mao Laing	Director	DPWT Kg. Thom
35	Mr. Ney Sona	Deputy Director	DPWT Takeo
36	Mr. Som Sothea	Deputy Director	DPWT Kg. Speu
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38	Mr. Dok Srun	Deputy Director	DPWT Kg. Cham
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42	Mr. So Sam Nam	Director	DPWT Ratanakiri
43	Mr. Sreng Sros	Representative	DPWT Kratie
44	Mr. Nop Heng	Deputy Director	DPWT Sihanouk ville
45	Mr. Thon Soravuth	Representative	DPWT Kampot
46	Mr. Yun Sarath	Director	DPWT Oddor M. Chey
47	Mr. Noun Cham Rong	Deputy Director	DPWT Prey Veng
48	Mr. Tey Siphon	Deputy Director	DPWT Svay Rieng
49	Mr. Men Phann	Deputy Chief	DPWT Svay Rieng
50	Mr. Din Kim	Director	DPWT Pailin
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57	Mr. Kazuo Yumita	Member	JICA Study Team
58	Mr. Shigeru Takara	Member	JICA Study Team
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60	Mr. Ippei Iwamoto	Member	JICA Study Team
61	Mr. Sim Sokha	Survey Assistance	JICA Study Team









  
**JICA**