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1. ミニッツオブミーティング

Minutes of Discussions
on the Project Formulation Study
on
the Traffic Improvement
in Phnom Penh City
in the Kingdom of Cambodia

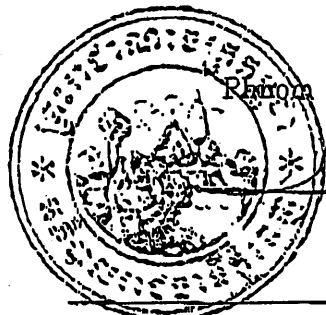
In response to the request for the technical cooperation project (TCP) named "Traffic Improvement in Phnom Penh City" submitted to Japan in August 2003, the Japan International Cooperation Agency (JICA) decided to conduct the Project Formulation Study on the Traffic Improvement in Phnom Penh City (hereinafter referred to as "the Study").

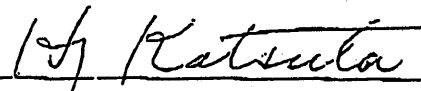
JICA sent to Cambodia the Project Formulation Study Team (hereinafter referred to as "the Team"), headed by Mr. KATSUTA Hozumi, JICA Expert to the Ministry of Public Works and Transport (MPWT). The Team is scheduled to stay in Cambodia from April 7 to May 15, 2004.

The Team held discussions with the concerned officials of the Royal Government of Cambodia, conducted various traffic surveys, collected a lot of data and information, and identified background and relevance of the request.

A result of the Study will be reported to JICA headquarters and Ministry of Foreign Affairs in Japan.

Phnom Penh, May 6, 2004




Mr. KATSUTA Hozumi
Leader
Project Formulation Study Team
Japan International Cooperation Agency

H.E. Mr. Mam Bun Neang
First Vice Governor
Municipality of Phnom Penh
Kingdom of Cambodia

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ATTACHMENT

1. Objective of the study

The objectives of the study are as follow:

- (1) To mature Terms of Reference (TOR) of the request for the technical cooperation project (TCP) named "Traffic Improvement in Phnom Penh City" submitted to Japan in August 2003 and to identify relevance of the TCP.
- (2) To formulate cooperation framework toward urban transport issues.

2. Approval of the project

Japanese side explained whether the TCP be approved or not depends on a result of this study. Japanese side also explained JICA would conduct a preparatory study of the project in order to finalize a project design matrix (PDM) and to sign the Record of Discussions(R/D) after the project is approved.

Cambodian side understood it and requested to commence the TCP as early as possible.

3. Responsible agency

The responsible agency is Department of Public Works and Transport (DPWT) of the Municipality of Phnom Penh (MPP). Office of Traffic Police (OTP) of MPP is a co-agency for implementation of the project. Japanese side requested the MPP to establish a Joint Coordinating Committee (JCC) when the project is approved.

4. Counterpart personnel

Japanese side explained that capacity development through technology transfer to counterparts is one of most important objectives for TCP scheme and emphasized that positive participation of counterparts is a key factor for success of the project. Appropriate number of counterparts should be assigned from DPWT and OTP during the project period.

5. Draft framework of the TCP

Based on a series of discussions and surveys, a draft framework of the TCP has been prepared as attached. Cambodian side requested bus operation should be included in the TCP. Responding to Cambodian request, Japanese side explained that preparatory study for introduction of bus operation was identified as a first step in the TCP.

Member list

<Japanese Side>

Mr. KATSUTA Hozumi, Team Leader, JICA Expert to Ministry of Public Works and Transport

Mr. MAKITA Tokuhiko, Urban Planning and Road Planning, JICA Expert to MPWT

Mr. KOIZUMI Yukihiro, Urban Transport and Project Coordinator, JICA Cambodia Office

Ms. TAMAGAKE Mitsue, Social and Environmental Consideration, JICA Cambodia Office

Mr. KOTO Masato, Traffic Management, METS

Dr. MASUJIMA Tetsuji, Road Safety, ALMEC

Mr. KOREZUMI Tomoaki, Embassy of Japan

Mr. CHIKARAISHI Juro, JICA Cambodia Office

Mr. MITSUGI Hiroto, JICA Cambodia Office

<Cambodian Side>

H.E. Mr. Kep Chuk Tema, Governor of the Municipality of Phnom Penh (MPP)

H.E. Mr. Mam Bun Neang, First vice governor, MPP

H.E. Mr. Trac Thai Sieng, Vice Governor, MPP

Mr. Mann Chhoeum, Chief of Cabinet, MPP

Mr. Nhem Saran, Director, Department of Public Works and Transport, MPP

Mr. Ea:1 Narin, Deputy Director, Department of Public Works and Transport, MPP

Mr. Kim Yideth, Chief of Office, Office of Traffic Police, Phnom Penh Municipal Police, MPP

Mr. Moueung Sophan, Chief, Department of Public Works and Transport, MPP

Mr. Sovannarith Top, PMU Staff, Department of Public Works and Transport, MPP

Framework of the Technical Cooperation Project (Draft)

1. Background

The main cause of the traffic congestions and accidents, and deterioration of the urban environment in Phnom Penh City is the mixed traffic of cars, 2-wheel vehicles and even pedestrians brought about by the poor road facilities, the non-observance of traffic rules and the inadequate transport system. The increase of number of cars and 2-wheel vehicles, especially motorcycles, has accelerated this problem. Considering this situation and the growing concentration of population in Phnom Penh, the improvement of the traffic is one of the most urgent urban issues in Phnom Penh. Following are the transport/traffic problems by category in Phnom Penh.

- 1) Traffic problems caused by poor road facilities and traffic management
 - There still exists the problematic roundabout with large volume of traffic.
 - Many road markings in the city are faded and they are almost invisible.
 - Signalized intersections are limited and there are various types of signals.
 - Limited urban road space is used inefficiently, such as the traffic is concentrated to several improved road section.
 - Many unpaved secondary roads can be seen in the urbanized area.
- 2) Traffic problems caused by violation of traffic rules and regulations
 - Drunk driving
 - Speeding
 - Driving in the opposite lane
 - Left-turn traffic without intersection
 - Violation of the traffic signal
 - Pedestrian crossing the road without pedestrian crossing
 - Illegal parking
 - Driving without driving license
 - Not enough traffic enforcement because of the lack of enforcement capacity of traffic police officers
- 3) Traffic problems caused by inadequate transport system
 - Lack of adequate trunk public transport system such as bus
 - Motodop, the 2-wheel vehicle causing the traffic congestion and accidents, plays the role of the main public transport system in the city.

2. Purpose

The purpose of the Technical Cooperation Project (TCP) is to conduct the relatively small-scale project in collaboration between Cambodia and Japan and to strengthen the capacity of the implementing agency of the projects. And finally, Cambodia side performs the project from planning to implementation stage, that is, the sustainable urban improvement system, which, from planning to implementation stage, is taken root in Cambodia.

3. Framework of the Technical Cooperation Project (Traffic Improvement in Phnom Penh City)

Considering the countermeasures of the urban transport problems in Phnom Penh, which include 3Es (engineering, education and enforcement) + P (public transport) and the purpose of TCP, the selected schemes of the 'Traffic Improvement in Phnom Penh City' are summarized in Table 1 together with the procedure of the evaluation.

Table 1 Selected Scheme for the Technical Cooperation Project

Countermeasures	1. Agency (in charge of Project)	2. Personnel	3. Project Period	4. Financial Scale	5. Ease of Technology Transfer	6. Evaluation Indicators of Project Performance	7. Availability of Japanese Resource	8. Degree of Social Acceptance	9. Other Factors	10. Overall Evaluation
1. Engineering Scheme										
1-1 Traffic Management - Road Section and Intersection (Median and Island Installation, Traffic Light, Markings/Signage, One-way System, Pedestrian Movement Control, etc.)	DPWT	420	Within 2-3 years	Small/Medium	○	○	⊙	○		○
1-2 Improvement of Pedestrian Space	DPWT	420		Unknown	○	○	⊙	○	Partially On-going by DPWT	Not included in TCP, because of partially on-going schemes by DPWT. (Partially covered by 1-1)
1-3 Parking Control	DPWT	420		Unknown	○	○	⊙	○	Partially On-going by DPWT	
1-4 Large Scale of Road Development	DPWT	420		Large	○	○	⊙	△	On-going by DPWT	Not included
2. Education Scheme (Traffic safety education)										
2-1 Elementary/High School	OTP, MOEYS & DPWT	430	Needs continuous effort	Small	○	○	○	○	On-going by H.I.	Not included in TCP, because of various agencies involved and the on-going schemes by other organizations (Partially covered by 3-2)
2-2 Driving School	MPWT		Needs continuous effort	Small	○	○	○	○		
2-3 Workplace and Community			Needs continuous effort	Small	○	○	○	○		
2-4 Road User	MTP & MPWT	430	Needs continuous effort	Small	○	○	○	○	On-going by H.I.	

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3. Enforcement Scheme																							
3-1 Revision and Completion of the Road-Related Laws	MPWTT							Unknown		△		△							○			On-going by the Government	Not included in TCP, because this issue is a government matter.
3-2 Strengthening of the Traffic Enforcement	OTP	430	Within 2-3 years	Small					○	○	○												○
4. Improvement of Public Transport System																							
4-1 Preparatory study for the Introduction of the Bus System (Improvement of the Para-transit System, etc.)	PPT DPWT	1		Small					△	○	○												○ is necessary to strengthen the capacity of PPT.
4-2 Introduction of City Bus	PPT DPWT	1		Unknown					△	○	○												Not included in TCP, because there are various unknown factors, such as implementing body of the bus operation.

Legend:

5. Easiness of Technology Transfer : ○=Easy
 6. Evaluation Indicators of Project Performance : ○=Possible to find evaluation indicators
 7. Possibility of Acceptance by Japanese Side : ◎=Possible
 8. Degree of Social Acceptance : ○=High degree of social acceptance
 10. Overall Evaluation : ○=Evaluated
 △=Would not be easy
 △=Possible to find evaluation indicators but would not be easy
 ○=Could be accepted
 △=Not nearly as high

Note: TCP (Technical Cooperation Project), OTP (Office of Traffic Police), DPWT (Department of Public Works and Transport), MPWT (Ministry of Public Works and Transport), PPT (Phnom Penh Transport Authority), MOEYS (Ministry of Education, Youth and Sports), H.I. (Handicap International)

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2. 収集資料リスト

地域	アジア
国名	カンボジア国
調査団名	プノンペン市都市交通改善 プロジェクト形成調査
調査の種類	プロジェクト形成調査
配属機関名	(株)メッツ研究所、㈱アルメック
現地調査期間	2004年4月7日～5月16日
担当者氏名	古藤 政人、増島 哲二

番号	資料の名称	版型	図/表/文等の別	ページ数	オリジナル/コピーの	部数	収集先名称又は発行機関	寄贈/購入(価格)の
1	Trend of Traffic Accident in Phnom Penh	A4	グラフ	5	コピー	1	Municipality of Phnom Penh	寄贈
2	Statistical Number of Vehicles in Phnom Penh in 2001	A4	表	1	コピー	1	Transport Office in DPWT in MPP	寄贈
3	Statistics of Vehicles Registered 1990-2002	A4	表	2	コピー	1	Ministry of Public Works and Transport	寄贈
4	Annual Report 2002, Handicap International Cambodia	A4	印刷物	30	オリジナル	1	Handicap International Cambodia	寄贈
5	Handicap International Road Safety Activities in Cambodia	A4	報告書	5	コピー	1	Handicap International Cambodia	寄贈
6	Completed road improvement in Phnom Penh (2001-2004)	A4	表	5	コピー	1	Public Works Office in DPWT in MPP	寄贈
7	Completed and planned road improvement in Phnom Penh (2002-2005)	A4	図面	1	コピー	1	Public Works Office in DPWT in MPP	寄贈
8	Completed road improvement in Phnom Penh (2003-2004 and 2004-2005)	A4	表	2	コピー	1	Public Works Office in DPWT in MPP	寄贈
9	of Provincial - Municipal of Department of Public Works and Transport	A4	レポート	3	コピー	1	Public Works Office in DPWT in MPP	寄贈
10	Traffic accident-prone Location in Phnom Penh City	A4	レポート	2	コピー	1	Phnom Penh Municipal Police	寄贈
11	Draft Law on Land Traffic	A4	レポート	6	コピー	1	Ministry of Public Works and Transport	寄贈
12	Neangkonghing Circle and Olympic Circle Plans by World Bank	A4	図面	2	コピー	1	Ministry of Public Works and Transport	寄贈
13	Statistical Number of Vehicles in Phnom Penh in 2003	A4	表	4	コピー	1	Transport Office in DPWT in MPP	寄贈
14	Organization chart and the budget of DPWT	A4	レポート	2	コピー	1	Transport Office in DPWT in MPP	寄贈
15	Organization chart of Municipal Traffic Police	A4	図	1	コピー	1	Phnom Penh Municipal Police	寄贈
16	Equipment needed for traffic enforcement	A4	レポート	1	コピー	1	Phnom Penh Municipal Police	寄贈
17	Training program on traffic enforcement	A4	レポート	1	コピー	1	Phnom Penh Municipal Police	寄贈
18	Traffic accident data first quarter in 2003 and 2004	A4	レポート	2	コピー	1	Phnom Penh Municipal Police	寄贈
19	Statistical Year Book 2003	A4	印刷物	467	オリジナル	1	Statistics, Ministry of Planning	購入(20ドル)
20	Technical Assistance for Asean Road Safety	A4	レポート	8	コピー	1	Asian Development Bank	寄贈
21	Reorganization of Nean Kong Hing and Olympic Traffic Circles	A4	レポート	9	コピー	1	World Bank	寄贈
22	DPWTと民間バス会社の市内バス運行にかかる契約書(クメール)	A4	レポート	8	コピー	1	DPWT in MPP	寄贈
23	各種単価	A4	メモ	3	コピー	1	DPWT in MPP	寄贈

3. 交通実態調査

5-3-1 調査概要

交通実態調査は、2004年4月26日から4月30日に、ローカルコンサルタントであるマックスウェル・フォン株式会社に委託して行なわれた。調査の概要は以下のとおりである。

1) 断面交通量調査

調査地点： 34箇所(図 5.3.1 参照)

調査時間： 14時間(21箇所、6:00-20:00)、7時間(11箇所、6:00-13:00)

調査方法： 15分間隔で車種別方向別の通過台数をマニュアルでカウントし、15分毎に記録する(表 5.3.1-調査票参照)

車種： 11タイプ(調査票参照)

2) 交差点交通量調査

調査地点： 6交差点(図 5.3.1 参照)

調査時間： 3時間(6:00-9:00)

調査方法： 15分間隔で車種別流入流出方向別の通過台数をマニュアルでカウントし、15分毎に記録する(表 5.3.2-調査票参照)

車種： 3タイプ(バイク、小型車、大型車)

3) 旅行速調査

調査路線： 8路線(図 5.3.1 参照)

調査期間： 3時間帯(6:00-7:00, 12:00-13:00, 16:30-17:30)

調査方法： 一般交通の流れに乗って自走し、主要交差点での通過時間、距離を記録する(表 5.3.3-調査票参照)。

4) 道路利用者インタビュー調査

調査地点： 3箇所(Central Market, Olympic Market and Deum Kor Market)

調査時間： 14時間(6:00-20:00)

サンプル数： 合計 100 サンプル/地点(バイク:20、モトドップ運転手:20、モトドップ乗客:20、自動車運転手:10、タクシー運転手:10、タクシー乗客:10、歩行者:10)

調査方法：各道路利用者に調査票を用いて直接聞き取りを行う。(表 5.3.4-調査票参照)。

図 5.3.1 調査地点・路線

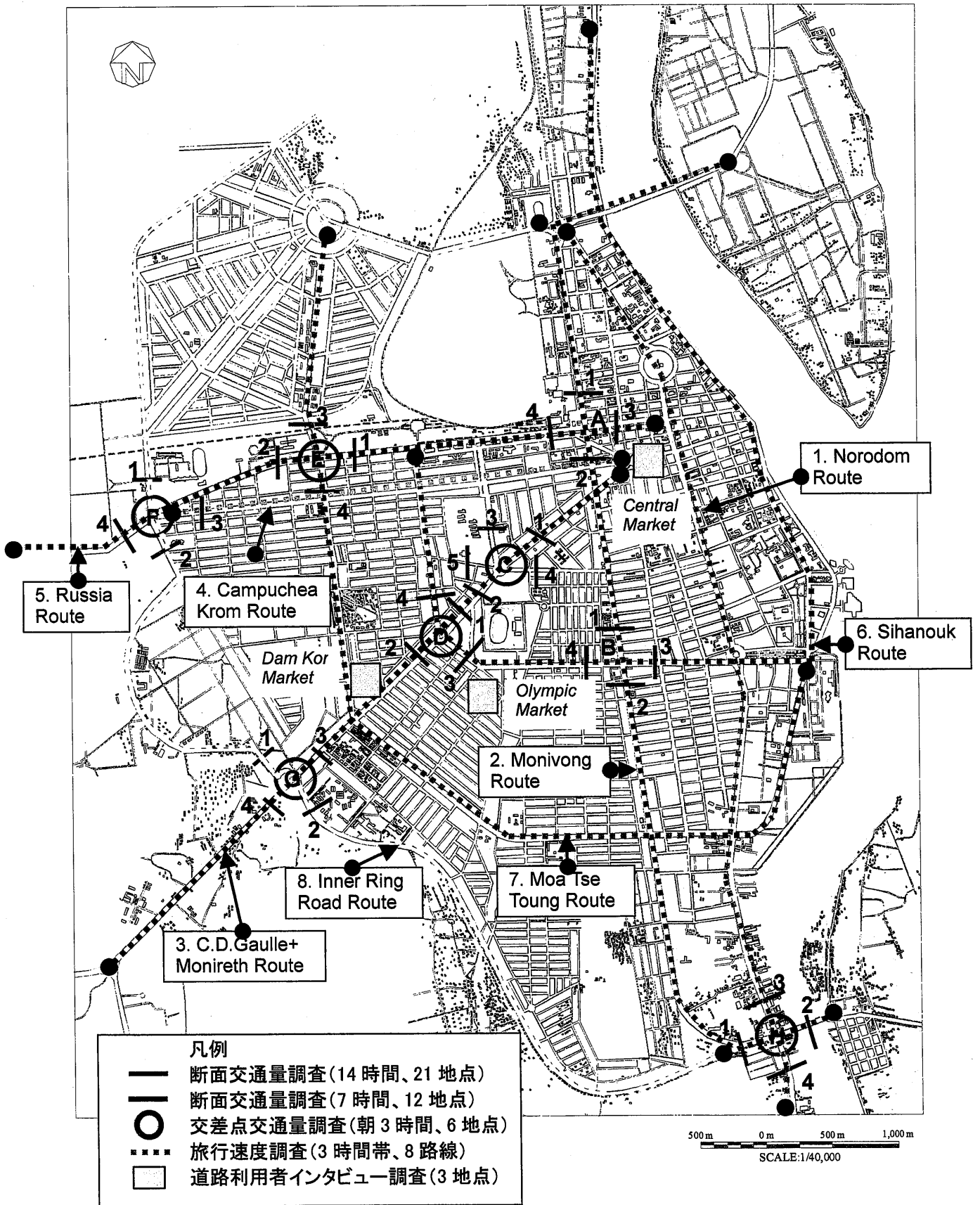


表 5.3.1 断面交通量調査票

	Road Name and Direction											
	1	2	3	4	5	6	7	8	9	10	11	1~10
	Passenger Cars/4WD	Sedan-type Taxi	Mini Bus/ Pss. Van	Pick-up/ Small Truck	Standard and Large Bus	Large Truck/Trailer & Tractor	Motorumok	Motodop/ Motorbike	Cyclo	Bicycle	Pedestrian	Vehicle Total (Except Pedestrian)
Passenger Car Unit	1.00	1.00	1.50	1.50	3.00	3.00	1.00	0.50	0.50	0.25	0.10	PCU
6:00 ~ 6:30												0
6:30 ~ 7:00												0
7:00 ~ 7:30												0
7:30 ~ 8:00												0
8:00 ~ 8:30												0
8:30 ~ 9:00												0
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18:00 ~ 18:30												0
18:30 ~ 19:00												0
19:00 ~ 19:30												0
19:30 ~ 20:00												0
14-hr Traffic	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Traffic	0	0	0	0	0	0	0	0	0	0	0	0

表 5.3.2 交差点交通量調査票

0.50	Intersection Name, Approach and Direction								
	1	2	3	4	5	6	7	8	
	Passenger Cars/4WD	Sedan-type Taxi	Mini Bus/ Pss. Van	Pick-up/ Small Truck	Standard and Large Bus	Large Truck/Trailer & Tractor	Motorumok	Motodop/ Motorbike	
Passenger Car Unit	1.00	1.00	1.50	1.50	3.00	3.00	1.00	0.50	
	Light Vehicle				Heavy Vehicle		Motorcycle		
6:00 ~ 6:30									
6:30 ~ 7:00									
7:00 ~ 7:30									
7:30 ~ 8:00									
8:00 ~ 8:30									
8:30 ~ 9:00									
3-hr Traffic			0			0		0	
Peak Hour Traffic			0			0		0	
Peak Hour Start			6:00			6:00		6:00	
Peak Hour End			7:00			7:00		7:00	

表 5.3.3 旅行速度調査票

Route No.: Monivong Supervised by: _____ Travel Time / From: _____ Direction / From: _____
 Date: _____ Recorded by: _____ To: _____ To: _____

#	Check Point	Cumulative Distance (km)	Cumulative Time (hr:min:sec)			Stop Time I (sec)		Stop Time II (sec)		Sectional Distance (km)	Sectional Time (sec)	Average Speed (km/h)	Remarks
			hr	min	sec	sec	sec	sec	sec				
1						-	-	-	-	-	-	-	-
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表 5.3.4 道路利用者インタビュー調査票

Location: _____ Time: _____ Surveyor: _____

Respondent:

1. Motorcycle driver 2. Motodop driver 3. Motodop passenger 4. Car driver
 5. Taxi driver 6. Taxi passenger 7. Pedestrian

I. ABOUT YOURSELF

1. Sex:	1. <input type="checkbox"/> Male	2. <input type="checkbox"/> Female				
2. Age	1. <input type="checkbox"/> <19	2. <input type="checkbox"/> 20-29	3. <input type="checkbox"/> 30-39	4. <input type="checkbox"/> 40-49	5. <input type="checkbox"/> 50-59	6. <input type="checkbox"/> > 60
3. Educational Background	1. <input type="checkbox"/> Primary School	2. <input type="checkbox"/> High School	3. <input type="checkbox"/> University/College	4. <input type="checkbox"/> Vocational Training	5. <input type="checkbox"/> None	
4. Working Status:	1. <input type="checkbox"/> Working	2. <input type="checkbox"/> Studying (Univ./Col.)	3. <input type="checkbox"/> Schooling	4. <input type="checkbox"/> Housewife/jobless	5. <input type="checkbox"/> Retired	
5. What is the purpose of this trip?	1. <input type="checkbox"/> To Home 2. <input type="checkbox"/> To Work 3. <input type="checkbox"/> To School 4. <input type="checkbox"/> Business 5. <input type="checkbox"/> Private 6. <input type="checkbox"/> Sightseeing 7. <input type="checkbox"/> Others					
6. Do you have a driving license?	5.1 Motorcycle		1. <input type="checkbox"/> Yes	2. <input type="checkbox"/> No		
	5.2 Car		1. <input type="checkbox"/> Yes	2. <input type="checkbox"/> No		
7. Do you know about the traffic rules	1. <input type="checkbox"/> Yes, I know very well 2. <input type="checkbox"/> Yes, but not so well 3. <input type="checkbox"/> No, I don't know					
	6.1 If answer is (1) or (2), from whom did you learn the traffic rules?					
	1. <input type="checkbox"/> Family 2. <input type="checkbox"/> Elementary school 3. <input type="checkbox"/> High school/University					
	4. <input type="checkbox"/> Driving school 5. <input type="checkbox"/> Office 6. <input type="checkbox"/> Traffic police 7. <input type="checkbox"/> Others (specify,)					

II. TRAFFIC CONDITIONS

8. What is your assessment on traffic conditions in Phnom Penh City?						
	Assessment			Comparison with 3-4 years ago		
	Bad	So-so	Good	Improved	No change	Worsen
1) Travel Conditions (in peak hours)	1	2	3	1	2	3
2) Travel Conditions (off-peak hours)	1	2	3	1	2	3
3) Road Facility Condition	1	2	3	1	2	3
4) Traffic Safety Condition	1	2	3	1	2	3
5) Air Quality	1	2	3	1	2	3
6) Noise Level	1	2	3	1	2	3

III. TRAFFIC SAFETY

9. What is the major reason of traffic accidents happened in Phnom Penh City?

- 1. Bad driving behavior of road users
- 2. Poor physical conditions of roads
- 3. Inadequate traffic control and safety facilities (traffic signal, markings, pedestrian crossing etc.)
- 4. Weak traffic enforcement by traffic police
- 5. People don't follow the traffic rules and regulations

9.1 If answer is (1), whose driving behavior is the most dangerous on traffic?

1. Motorcycle 2. Bicycle 3. Motodop 4. Car 5. Taxi 6. Truck 7. Cyclo 8. Pedestrian

10. Did you already have a road traffic accident?

1. Yes 2. No

10.1 If answer is (1), how many times did you have accidents within a year?

1. One Time 2. Two Times 3. Three Times 4. More than Three Times

11. Where is the most dangerous traffic point in Phnom Penh?

Please specify:

12. In order to improve traffic safety and efficiency, what countermeasures are important?

Countermeasures	Importance			Priority (select 3)
	Important	Indifferent	Not important	
1) Strengthening enforcement by traffic police	1	2	3	1
2) Proper traffic control at intersection	1	2	3	2
3) More traffic education to the people	1	2	3	3
4) Reduction of max speed	1	2	3	4
5) Introduction of more traffic signals	1	2	3	5
6) Introduction of more street lights	1	2	3	6
7) Proper and visible lane marking	1	2	3	7
8) More traffic information and warning signs	1	2	3	8
9) Improvement of pedestrian crossing	1	2	3	9

IV. TRAFFIC MANAGEMENT AND ENFORCEMENT

13. What do you think about a new traffic management scheme such as mounted median?

1. Good 2. So-so 3. Bad 4. No comments

V. BUS SERVICES

<p>14. Do you know about the bus service which was operated as the public experiment 3 years ago?</p> <p>1. <input type="checkbox"/> Yes, I know 2. <input type="checkbox"/> I know, but not clear 3. <input type="checkbox"/> I don't know</p>
<p>15. Will you use bus for your daily trip, if the new city bus service is introduced?</p> <p>1. <input type="checkbox"/> Yes 2. <input type="checkbox"/> No 3. <input type="checkbox"/> Conditional (depending on the services of bus)</p> <p><i>13.1 If you answer "Conditional", what is the most important service of bus?</i></p> <p>1. <input type="checkbox"/> Operation (travel time, waiting time, operating hours) 2. <input type="checkbox"/> Transfer to other route</p> <p>3. <input type="checkbox"/> Vehicle quality/safety 4. <input type="checkbox"/> Fare 5. <input type="checkbox"/> Access to bus stop 6. <input type="checkbox"/> Others _____</p>
<p>16. What is the reasonable fare from here to Central Market/Chba Ampao Market for future bus system?</p> <p>Please specify:Riels</p>

Thank you very much for your kind cooperation!

5-3-1 主な調査結果

1) 交通量

表 5.3.5 に断面交通量調査の結果を示す。

2) 旅行速度

表 5.3.6 に旅行速度調査の結果を示す。

3) 道路利用者インタビュー

表 5.3.7 に道路利用者インタビュー調査の結果を示す。

表 5.3.5 断面交通量調査結果

Intersection	Section Code	Road	Direction		12-hour vehicle traffic volume (6:00-18:00)				Total	Total PCU
			From	To	Light Vehicle	Heavy Vehicle	M/C	B/C, Cyclo		
					1.00	3.00	0.30	0.30		
A - Monivong / Russian	A1-1	Monivong	IS	South	8,653	89	36,454	1,678	46,874	20,359
	A1-2	Monivong	South	IS	9,279	130	41,066	1,437	51,912	22,420
	A1 Total				17,932	219	77,520	3,115	98,786	42,778
	A2-1	Monivong	IS	North	6,454	39	27,261	1,364	35,117	15,158
	A2-2	Monivong	North	IS	6,680	104	29,597	1,164	37,546	16,222
	A2 total				13,135	143	56,858	2,528	72,663	31,380
	A3-1	Russian	Ang Duong	IS	5,961	18	11,631	498	18,108	9,653
	A3-2	Russian	IS	Ang Duong	8,949	14	24,333	735	34,032	16,513
	A3 Total				14,910	32	35,964	1,233	52,139	26,165
	A4-1	Russian	Pochenton	IS	10,946	34	46,379	1,233	58,591	25,330
	A4-2	Russian	IS	Pochenton	13,634	81	45,570	1,906	61,191	28,119
	A4 Total				24,580	114	91,949	3,139	119,782	53,449
B - Monivong / Sihanouk	B1-1	Monivong	IS	North	7,329	68	39,615	1,131	48,143	19,757
	B1-2	Monivong	North	IS	5,619	60	30,200	1,150	37,029	15,204
	B1 Total				12,948	128	69,815	2,281	85,172	34,961
	B2-1	Monivong	IS	South	8,253	62	40,018	1,263	49,596	20,823
	B2-2	Monivong	South	IS	7,719	66	28,246	1,121	37,152	16,727
	B2 total				15,972	128	68,264	2,384	86,748	37,550
	B3-1	Sihanouk	East	IS	6,790	44	33,004	1,153	40,991	17,169
	B3-2	Sihanouk	IS	East	5,028	29	20,893	1,428	27,378	11,811
	B3 Total				11,818	73	53,897	2,581	68,369	28,980
	B4-1	Sihanouk	IS	West	5,641	27	23,582	1,172	30,422	13,148
	B4-2	Sihanouk	West	IS	7,054	37	28,412	1,522	37,025	16,145
	B4 Total				12,695	64	51,994	2,694	67,447	29,293
C - Monireth / Tep Phan	C1-1	Charles de Gaulle	IS	Center	5,813	44	32,327	2,170	40,354	16,294
	C1-2	Charles de Gaulle	Center	IS	6,326	25	43,036	1,831	51,218	19,861
	C1 Total				12,139	69	75,363	4,001	91,572	36,155
	C2-1	Monireth	IS	Southeast	7,189	16	58,898	2,866	68,969	25,766
	C2-2	Monireth	Southeast	IS	6,721	47	61,810	2,539	71,117	26,167
	C2 total				13,910	63	120,708	5,405	140,086	51,933
	C3-1	Tcheco Slovaquie	IS	North	5,766	39	26,048	2,646	34,499	14,491
	C3-2	Tcheco Slovaquie	North	IS	5,537	26	35,452	2,344	43,359	16,954
	C3 Total				11,303	65	61,500	4,990	77,858	31,445
	C4-1	Tep Phan (East)	IS	East	6,297	30	33,444	2,495	42,266	17,169
	C4-2	Tep Phan (East)	East	IS	6,098	23	34,936	2,333	43,390	17,348
	C4 Total				12,395	53	68,380	4,828	85,656	34,516
C5-1	Tep Phan (West)	IS	West	6,273	11	44,419	2,360	53,063	20,340	
C5-2	Tep Phan (West)	West	IS	4,192	18	29,083	2,321	35,614	13,667	
C5 Total				10,465	29	73,502	4,681	88,677	34,007	
D - Monireth / Sihanouk	D1-1	Monireth	IS	Center	7,041	19	46,887	2,615	56,562	21,949
	D1-2	Monireth	Center	IS	6,837	25	45,332	1,689	53,882	21,018
	D1 Total				13,877	44	92,219	4,303	110,444	42,967
	D2-1	Monireth	Southeast	IS	6,669	25	33,524	2,253	42,472	17,478
	D2-2	Monireth	IS	Southeast	7,160	83	43,666	1,560	52,468	20,976
	D2 total				13,829	108	77,190	3,813	94,940	38,454
	D3-1	Sihanouk	Monivong	IS	8,530	66	48,067	2,780	59,443	23,982
	D3-2	Sihanouk	IS	Monivong	11,306	125	84,269	3,064	98,764	37,882
	D3 total				19,835	191	132,336	5,845	158,208	61,863
	D4-1	Nerhu	North	IS	7,945	32	36,405	2,137	46,518	19,604
	D4-2	Nerhu	IS	North	6,837	25	45,332	1,689	53,882	21,018
	D4 Total				14,781	57	81,737	3,825	100,400	40,622
E - Russian / Mao Tse Toung	E1-1	Russian	Center	IS	9,822	109	31,638	1,406	42,975	20,062
	E1-2	Russian	IS	Center	9,094	49	34,788	1,634	45,565	20,168
	E1 Total				18,916	158	66,426	3,040	88,540	40,230
	E2-1	Russian	IS	Pochenton	5,720	75	23,938	1,359	31,092	13,534
	E2-2	Russian	Pochenton	IS	7,060	111	23,312	1,182	31,665	14,741
	E2 total				12,780	186	47,250	2,541	62,757	28,275
	E3-1	Kim El Sung	IS	North	9,256	165	37,009	2,135	48,565	21,494
	E3-2	Kim El Sung	North	IS	8,150	69	46,252	3,259	57,730	23,210
	E3 Total				17,406	234	83,261	5,394	106,295	44,705
	E4-1	Mao Tse Toung	IS	South	2,769	22	19,668	1,849	24,308	9,290
	E4-2	Mao Tse Toung	South	IS	3,645	50	20,022	1,881	25,598	10,366
	E4 Total				6,414	72	39,690	3,730	49,906	19,656

Intersection	Section Code	Road	Direction		12-hour vehicle traffic volume (6:00-18:00)				Total	Total PCU
			From	To	Light Vehicle	Heavy Vehicle	M/C	B/C, Cyclo		
					1.00	3.00	0.30	0.30		
F - Russia / Road 271/598	F1-1	Road 598	North	IS	4,126	114	11,777	1,302	17,319	8,392
	F1-2	Road 598	IS	North	2,344	103	11,861	1,205	15,513	6,572
	F1 Total				6,469	217	23,638	2,507	32,832	14,964
	F2-1	Road 271	IS	South	5,498	114	23,950	1,623	31,185	13,512
	F2-2	Road 271	South	IS	6,709	246	26,974	1,587	35,516	16,015
	F2 total				12,207	360	50,924	3,210	66,701	29,527
	F3-1	Russian	IS	Center	8,026	166	41,599	1,882	51,674	21,569
	F3-2	Russian	Center	IS	7,637	121	30,067	1,470	39,294	17,460
	F3 Total				15,663	287	71,666	3,352	90,969	39,029
	F4-1	Russian	IS	Pochenton	14,196	264	49,265	2,806	66,531	30,610
	F4-2	Russian	Pochenton	IS	12,287	126	49,678	3,348	65,439	28,573
	F4 Total				26,483	390	98,943	6,155	131,971	59,183
G - Monireth / Road 271	G1-1	Road 271	IS	North	4,243	535	18,699	1,791	25,268	11,995
	G1-2	Road 271	North	IS	4,453	450	19,286	1,652	25,841	12,084
	G1 Total				8,696	985	37,985	3,443	51,109	24,079
	G2-1	Road 271	IS	South	3,326	518	28,585	640	33,069	13,648
	G2-2	Road 271	South	IS	4,073	446	18,437	1,060	24,016	11,260
	G2 total				7,399	964	47,022	1,700	57,085	24,908
	G3-1	Monireth	IS	Center	5,775	95	37,215	1,137	44,222	17,566
	G3-2	Monireth	Center	IS	5,080	78	36,811	2,737	44,706	17,178
	G3 Total				10,855	173	74,026	3,874	88,928	34,744
	G4-1	Road 217	IS	Bridge	4,192	73	25,053	2,106	31,424	12,559
	G4-2	Road 217	Bridge	IS	4,554	36	33,166	2,447	40,203	15,346
	G4 Total				8,746	109	58,219	4,553	71,627	27,905
H - Monivong / Road 271 /	H1-1	Monivong	IS	Center	7,267	249	68,541	1,175	77,232	28,929
	H1-2	Monivong	Center	IS	7,030	246	52,883	1,361	61,520	24,041
	H1 Total				14,297	495	121,424	2,536	138,752	52,970
	H2-1	Bridge	IS	Bridge	7,768	203	107,768	1,079	116,818	41,031
	H2-2	Bridge	Bridge	IS	7,755	290	111,219	1,007	120,271	42,293
	H2 total				15,523	493	218,987	2,086	237,089	83,324
	H3-1	Norodom	IS	North	11,568	152	69,390	802	81,912	33,082
	H3-2	Norodom	North	IS	8,401	36	32,570	827	41,834	18,528
	H3 Total				19,969	188	101,960	1,629	123,746	51,610
	H4-1	NR2	IS	South	9,032	150	42,855	1,412	53,449	22,762
	H4-2	NR2	South	IS	7,663	175	42,761	1,277	51,876	21,399
	H4 Total				16,695	325	85,616	2,689	105,325	44,162

表 5.3.6 旅行速度調查結果

Route	Direction	Distance	Travel Speed (km/h)			Average Speed (km/h)
			AM	Noon	PM	
Norodom	North Bound	8.7	31.9	31.5	21.5	28.3
	South Bound	8.7	29.1	30.3	19.1	26.2
	Both Direction	17.3	30.5	30.9	20.2	27.2
Monivong	North Bound	8.4	21.8	28.2	21.6	23.8
	South Bound	8.4	21.4	27.9	20.8	23.3
	Both Direction	16.8	21.6	28.1	21.2	23.6
Monireth	North Bound	5.9	23.0	31.2	20.6	24.9
	South Bound	5.9	21.6	29.5	22.2	24.4
	Both Direction	11.8	22.3	30.3	21.4	24.7
Campuchea	East Bound	3.6	25.6	25.2	18.1	22.9
	West Bound	3.6	28.3	26.3	20.3	25.0
	Both Direction	7.1	26.9	25.7	19.1	23.9
Russian	East Bound	9.2	33.6	32.5	28.3	31.5
	West Bound	9.2	34.2	32.2	31.7	32.7
	Both Direction	18.4	33.9	32.4	29.9	32.1
Sihanouk	To Norodom	4.7	31.4	29.9	15.7	25.6
	To Russian	4.7	27.7	30.8	15.3	24.6
	Both Direction	9.4	29.5	30.3	15.5	25.1
Mao Tse Toung	To Norodom	8.6	20.7	29.6	21.0	23.8
	To Russian	8.6	20.7	28.1	17.3	22.0
	Both Direction	17.1	20.7	28.8	19.0	22.8
Inner Ring Road (Road 271)	To Monivong	13.2	29.8	35.6	33.0	32.8
	To Russian	13.2	32.7	36.3	29.5	32.8
	Both Direction	26.4	31.2	36.0	31.1	32.8

表 5.3.7 道路利用者インタビュー調査結果

I. PROFILE OF THE RESPONDENTS

No. of Respondents

Survey Location	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Demkor Market	20	20	20	10	10	10	10	100	33.3
2. Olympic Market	20	20	20	10	10	10	10	100	33.3
3. Phar Tmey Market	20	20	20	10	10	10	10	100	33.3
Total	60	60	60	30	30	30	30	300	100.0
%	20	20	20	10	10	10	10	100	-

Q1. Sex

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Male	44	60	33	29	30	13	20	229	76.3
2. Female	16		27	1		17	10	71	23.7
Total	60	60	60	30	30	30	30	300	100.0

Q2. Age

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. -19	5	1	4			2	3	15	5.0
2. 20-29	22	11	22	11	9	3	9	87	29.0
3. 30-39	17	20	16	10	14	12	10	99	33.0
4. 40-49	10	24	9	6	6	9	7	71	23.7
5. 50-59	5	4	8	2	1	2		22	7.3
6. 60-	1		1	1		2	1	6	2.0
Total	60	60	60	30	30	30	30	300	100.0

Q3. Educational Background

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Primary School	13	22	18	14	10	9	12	98	32.7
2. High School	23	16	20	10	16	12	8	105	35.0
3. University/College	21	1	12	4		4	3	45	15.0
4. Vocational School	1	4	3	2	3	2	5	20	6.7
5. None	2	17	7		1	3	2	32	10.7
Total	60	60	60	30	30	30	30	300	100.0

Q4. Working Status

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Working	26	22	25	17	13	13	12	128	42.7
2. Studying (Univ./Coll.)	15	1	6	6		1	3	32	10.7
3. Schooling	8	3	3	3		1	3	21	7.0
4. Housewife/Jobless	8	33	24	3	17	12	12	109	36.3
5. Retired	3	1	2	1		3		10	3.3
Total	60	60	60	30	30	30	30	300	100.0

Q5. Trip Purpose

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. To home	20	5	15	11		14	9	74	24.7
2. To work	8	7	16	6		7	9	53	17.7
3. To School	17		8	3		2	2	32	10.7
4. Business	13	39	8	7	26	2	2	97	32.3
5. Private		4	13	3		4	6	30	10.0
6. Sightseeing						1	1	2	0.7
7. Others	2	5			4		1	12	4.0
Total	60	60	60	30	30	30	30	300	100.0

Q6. Ownership of Driving License

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
Motorcycle									
1. Yes	2					1	2	5	1.7
2. No	57	56	59	10		18	26	226	75.3
3. No answer	1	4	1	20	30	11	2	69	23.0
Total	60	60	60	30	30	30	30	300	100.0
Car									
1. Yes	2	2	8	25	30		5	72	24.0
2. No			13	5		1	7	26	8.7
3. No answer	58	58	39			29	18	202	67.3
Total	60	60	60	30	30	30	30	300	100.0

Q7. Awareness of Traffic Rules

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Yes, know very well	17	5	11	20	11	9	5	78	26.0
2. Yes, but not so well	43	53	45	10	18	21	24	214	71.3
3. No, I don't know		2	4		1		1	8	2.7
Total	60	60	60	30	30	30	30	300	100.0

1. Family	17	19	20			12	9	77	26.4
2. Elementary School	2	4	9			4	3	22	7.5
3. High School/Univ.	27	4	6	2		10	4	53	18.2
4. Driving School	9	3	12	25	26	2	8	85	29.1
5. Office			4	1	1	1		7	2.4
6. Traffic Police	2	9	4	2	1	1	2	21	7.2
7. Others (Mass Media)	3	19	1		1		3	27	9.2
Total	60	58	56	30	29	30	29	292	100.0

II. TRAFFIC CONDITIONS

Q8. Assessment of Traffic Conditions

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1) Travel Conditions (peak hours)									
1. Bad	38	33	42	21	20	7	17	178	59.3
2. So-so	22	18	16	9	7	19	12	103	34.3
3. Good		9	2		3	4	1	19	6.3
Average	1.37	1.60	1.33	1.30	1.43	1.90	1.47	1.47	-
2) Travel Conditions (off-peak hours)									
1. Bad	9	6	10	1	2	4	3	35	11.7
2. So-so	43	48	48	15	14	19	26	213	71.0
3. Good	8	6	2	14	14	7	1	52	17.3
Average	1.98	2.00	1.87	2.43	2.40	2.10	1.93	2.06	
3) Road Facility Conditions									
1. Bad	2	6	31	4	2	9	1	55	18.3
2. So-so	41	41	27	15	21	18	20	183	61.0
3. Good	17	13	2	11	7	3	9	62	20.7
Average	2.25	2.12	1.52	2.23	2.17	1.80	2.27	2.02	
4) Traffic Safety Conditions									
1. Bad	23	24	24	9	16	9	11	116	38.7
2. So-so	25	33	35	13	13	14	18	151	50.3
3. Good	12	3	1	8	1	7	1	33	11.0
Average	1.82	1.65	1.62	1.97	1.50	1.93	1.67	1.72	
5) Air Quality									
1. Bad	37	48	49	23	19	15	17	208	69.3
2. So-so	21	11	10	5	9	9	11	76	25.3
3. Good	2	1	1	2	2	6	2	16	5.3
Average	1.42	1.22	1.20	1.30	1.43	1.70	1.50	1.36	
6) Noise Level									
1. Bad	44	45	41	17	15	17	19	198	66.0
2. So-so	16	14	18	13	13	8	9	91	30.3
3. Good		1	1		2	5	2	11	3.7
Average	1.27	1.27	1.33	1.43	1.57	1.60	1.43	1.38	

Comparison with 3-4 years ago

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1) Travel Conditions (peak hours)									
1. Improved	31	39	23	22	23	13	18	169	56.3
2. No Change	3	16	23	2	2	7	6	59	19.7
3. Worsen	26	5	14	6	5	10	6	72	24.0
2) Travel Conditions (off-peak hours)									
1. Improved	17	24	11	16	13	15	9	105	35.0
2. No Change	18	25	44	3	14	7	19	130	43.3
3. Worsen	25	11	5	11	3	8	2	65	21.7
3) Road Facility Conditions									
1. Improved	43	33	23	17	8	21	15	160	53.3
2. No Change	11	17	31	6	7	7	5	84	28.0
3. Worsen	6	10	6	7	15	2	10	56	18.7
4) Traffic Safety Conditions									
1. Improved	19	34	23	11	7	10	12	116	38.7
2. No Change	24	16	23	10	16	4	10	103	34.3
3. Worsen	17	10	14	9	7	16	8	81	27.0
5) Air Quality									
1. Improved	23	7	9	10	6	8	10	73	24.3
2. No Change	11	17	16	3	8	4	8	67	22.3
3. Worsen	26	36	35	17	16	18	12	160	53.3
6) Noise Level									

III. TRAFFIC SAFETY

Q9. Reasons of Traffic Accidents

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Bad driving behavior of road users	42	37	38	12	14	17	18	178	59.3
2. Poor Physical conditions of roads	2	2	5	2	5	2		18	6.0
3. Inadequate traffic control and safety		2	4	5		1	1	13	4.3
4. Weak traffic enforcement by police	7	5	4	4	4	7	6	37	12.3
5. Poor awareness of traffic rules and re	9	14	9	7	7	3	5	54	18.0
Total	60	60	60	30	30	30	30	300	100.0

Q9-1. Bad Driving Behavior

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Motorcycle	2	1	4	1	2	1	3	14	7.9
2. Bicycle								0	0.0
3. Motodop	28	24	20	9	10	9	9	109	61.2
4. Car	6	3	8		2	2	2	23	12.9
5. Taxi	5	8	5	2			3	23	12.9
6. Truck						3		3	1.7
7. Cyclo								0	0.0
8. Pedestrian						1	1	2	1.1
9. No Answer	1	1	1			1		4	2.2
Total	42	37	38	12	14	17	18	178	100.0

Q10. Experience of Traffic Accidents

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Yes	21	15	15	11	12	10	6	90	30.0
2. No	39	45	45	19	18	20	24	210	70.0
Total	60	60	60	30	30	30	30	300	100.0

Q10-1. Frequency

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. One time	8	4	7	5	5	4	2	35	38.9
2. Two times	7	7	8	6	3	5	1	37	41.1
3. Three times	4	4			3	1	3	15	16.7
4. More than three times	2				1			3	3.3
Total	21	15	15	11	12	10	6	90	100.0

Q11. Location of Accident-prone Points

Q12. Important Countermeasures

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1) Strengthening enforcement by traffic police									
1. Important	32	32	42	10	11	18	15	160	53.3
2. Indifferent	16	25	17	11	7	12	7	95	31.7
3. Not Important	12	3	1	9	12		8	45	15.0
Average	1.67	1.52	1.32	1.97	2.03	1.40	1.77	1.62	-
2) Proper traffic control at intersection									
1. Important	32	29	28	8	8	13	12	130	43.3
2. Indifferent	20	31	31	16	15	15	18	146	48.7
3. Not Important	8		1	6	7		2	24	8.0
Average	1.60	1.52	1.55	1.93	1.97	1.63	1.60	1.65	-
3) More traffic education to the people									
1. Important	55	43	41	25	19	22	17	222	74.0
2. Indifferent	5	17	19	5	7	8	11	72	24.0
3. Not Important					4		2	6	2.0
Average	1.08	1.28	1.32	1.17	1.50	1.27	1.50	1.28	-
4) Reduction of max speed									
1. Important	50	57	52	20	17	27	29	252	84.0
2. Indifferent	9	3	8	9	5	3	1	38	12.7
3. Not Important	1			1	8			10	3.3
Average	1.18	1.05	1.13	1.37	1.70	1.10	1.03	1.19	-
5) Introduction of more traffic signals									
1. Important	40	43	42	18	21	12	11	187	62.3
2. Indifferent	13	17	18	9	9	18	16	100	33.3
3. Not Important	7			3			3	13	4.3
Average	1.45	1.28	1.30	1.50	1.30	1.60	1.73	1.42	-
6) Introduction of more street lights									
1. Important	22	29	32	11	10	15	7	126	42.0
2. Indifferent	24	31	28	16	17	11	19	146	48.7
3. Not Important	14			3	3	4	4	28	9.3
Average	1.87	1.52	1.47	1.73	1.77	1.63	1.90	1.67	-
7) Proper and visible lane markings									
1. Important	5	21	25	8	14	10	8	91	30.3
2. Indifferent	34	38	35	18	13	13	17	168	56.0
3. Not Important	21	1		4	3		7	41	13.7
Average	2.27	1.67	1.58	1.87	1.63	1.90	1.90	1.83	-
8) More traffic information and warning signs									
1. Important	28	28	34	14	15	10	9	138	46.0
2. Indifferent	12	29	26	10	11	15	16	119	39.7
3. Not Important	20	3		6	4	5	5	43	14.3
Average	1.87	1.58	1.43	1.73	1.63	1.83	1.87	1.68	-
9) Improvement of pedestrian crossing									
1. Important	23	42	39	5	16	13	20	158	52.7
2. Indifferent	22	17	21	17	4	13	7	101	33.7
3. Not Important	15	1		8	10	4	3	41	13.7
Average	1.87	1.32	1.35	2.10	1.80	1.70	1.43	1.61	-

Priority of countermeasures (selected 3 important countermeasures)

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1) Strengthening enforcement by traffic	28	20	21	8	10	16	10	113	12.6
2) Proper traffic control at intersection	9	9	1	6	5	2	8	40	4.4
3) More traffic education to the people	55	50	49	25	23	23	20	245	27.2
4) Reduction of max speed	34	52	50	19	24	28	26	233	25.9
5) Introduction of more traffic signals	25	16	21	6	6	3	4	81	9.0
6) Introduction of more street lights	6	8	12	10	4	5	2	47	5.2
7) Proper and visible lane markings	1	6	3	0	1	0	3	14	1.6
8) More traffic information and warning signs	15	3	7	9	5	6	6	51	5.7
9) Improvement of pedestrian crossing	7	16	16	7	12	7	11	76	8.4

IV. TRAFFIC MANAGEMENT AND ENFORCEMENT

Q13. Opinion to newly introduced mounted median

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Good	9	9	21	11	10	3	8	71	23.7
2. So-so	33	36	19	12	11	24	12	147	49.0
3. Bad	11	10	1	4	7	2	4	39	13.0
4. No Comments	7	5	19	3	2	1	6	43	14.3
Total	60	60	60	30	30	30	30	300	100.0

V. BUS SERVICES

Q14. Awareness of Public Experiment by JICA

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Yes, I know	20	19	29	9	15	7	17	116	38.7
2. I know, but not clear	25	36	23	14	15	20	9	142	47.3
3. I don't know	15	5	8	7		3	4	42	14.0
Total	60	60	60	30	30	30	30	300	100.0

Q15. Willingness to use bus

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Yes	19	33	40	17	16	12	19	156	52.0
2. No	22	6	15	5	7	4	3	62	20.7
3. Conditional	19	21	5	8	7	14	8	82	27.3
Total	60	60	60	30	30	30	30	300	100.0

Important service of bus

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total	%
1. Operational aspect	9	9		6	5	4	3	36	43.9
2. Transfer to other route								0	0.0
3. Vehicle quality/safety	4		4			4		12	14.6
4. Fare	6	11	1	2	2	5	5	32	39.0
5. Access to bus stop								0	0.0
6. Others		1				1		2	2.4
Total	19	21	5	8	7	14	8	82	100.0

Q16. Reasonable Bus Fare

	1. M/C Driver	2. Motodop Driver	3. Motodop Passenger	4. Car Driver	5. Taxi Driver	6. Taxi Passenger	7. Pedestrian	Total
Min.	200	500	500	300	500	500	500	200
Max.	1,000	2,000	1,300	1,000	2,000	1,300	1,300	2,000
Average	767	934	803	687	875	827	683	808

4. プロジェクト・デザイン・マトリックスとプラン・オブ・オペレーション (ドラフト)

Project Design Matrix (PDM)
 Project Title: The Traffic Improvement in Phnom Penh City
 Project Implementation Agency: Department of Public Works and Transport in the Municipality of Phnom Penh (DPWT) and Phnom Penh Municipal Police, Office of Traffic Police
 Target Group: Staff of DPWT, Municipal Traffic Police Officers and Road Users in Phnom Penh City

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Ultimate Development Goals To maintain the sustainability of urban activities and urban environment in Phnom Penh City	Phnom Penh citizens feel that an urban environment is improved.	Interview survey results by counterparts	The urban planning policies of the Government of Cambodia remain unchanged, especially, transport issues.
Overall Goals To improve the traffic conditions in Phnom Penh City			Population in Phnom Penh is not drastically increased.
Project Purposes 1. To maximize the limited urban road space, especially in the city center 2. To create a safe and comfortable road space and driving environment in Phnom Penh City 3. To improve the public transport system in Phnom Penh City 4. To strengthen the capacity of planners, engineers and police officers in DPWT and Municipal Traffic Police Officers	1-1 Decrease the volume- capacity ratio at selected intersections and road sections 1-2 Increase the travel speed around/at selected intersections and road sections 2-1 Decrease of no. of traffic accidents compare with the previous year 2-2 Improve the driving manner of vehicle drivers 3-1 Public transport users feel safer than before.	1-1 Traffic survey results by counterparts 1-2 Traffic survey results by counterparts 2-1 Traffic accident data from Municipal Police Office 2-2 Interview survey results by counterparts 3-1 Public transport user interview survey	Traffic volume in the city is not drastically increased.
Results/Outputs 1. Traffic flow will be smooth in the city center. 2. Road users will observe the traffic rules 3. Safe, convenient and reasonable bus system will be operated. 4. Skill and capacity of planners, engineers and police officers in DPWT and Municipal Traffic Police Officers will be improved.			

<p>Activities</p> <p>1. Improve the traffic flow at selected intersections and roads</p> <p>1-1 Preparatory work</p> <p>1-2 Selection of planned intersections and roads</p> <p>1-3 Alternative improvement designs and measures</p> <p>1-4 Public experiment</p> <p>1-5 Survey, analysis and conclusion</p> <p>1-6 Implementation of selected intersections and roads</p> <p>1-7 Overseas training</p> <p>1-8 Studies, surveys, analysis and implementation for other intersections and roads</p> <p>1-9 Seminar and workshop</p> <p>2. Strengthen the traffic enforcement by the municipal police officers</p> <p>2-1 Preparatory work</p> <p>2-2 Preparation of the traffic enforcement manuals</p> <p>2-3 Training of traffic police officers by counterparts</p> <p>2-4 Establishment of penalty collection system</p> <p>2-5 Traffic Safety Campaign</p> <p>2-6 Survey and analysis</p> <p>2-7 Revision of the manual</p> <p>2-8 Overseas training</p> <p>2-9 Traffic enforcement</p> <p>2-10 Seminar and workshop</p> <p>3. Introduction of city bus system in Phnom Penh</p> <p>3-1 Preparatory work</p> <p>3-2 Strengthening of the responsible agency of the bus operation</p> <p>3-3 Discussion and studies of preconditions of bus operation</p> <p>3-4 Improvement of paratransit system</p> <p>3-5 Supervising of public transport</p> <p>3-6 Overseas training</p> <p>3-7 Seminar and workshop</p>	<p>Inputs</p> <p>[Cambodian side]</p> <ul style="list-style-type: none"> • Assignment of counterparts - DPWT engineer from Public Works Office: 5 - Municipal police officer: 5 - DPWT engineer from Transport Office: 5 • Provision of project office • Provision of subsidy of the bus operation cost <p>[Japanese side]</p> <ul style="list-style-type: none"> • Dispatch of experts - Project leader - Road design engineer - Traffic management engineer - Traffic safety engineer - Bus operation engineer • Overseas training of counterparts • Provision of training materials, etc. 	<ul style="list-style-type: none"> • Trained road design and traffic management engineers continue working in DPWT. • Trained traffic police officers continue working in the Municipal Traffic Police. • Trained bus operation engineers continue working in DPWT. <p>Preconditions</p> <ul style="list-style-type: none"> • Citizens including motodop drivers, do not oppose the project.
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表 5.4.2 Plan of Operation for the Traffic Improvement in Phnom Penh City (Tentative)

Activities	Year 1				Year 2				Year 3			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
1. Improvement of the Selected Intersections and Roads												
1-1 Preparatory work	■											
1-2 Selection of planned intersections and roads	■	■										
1-3 Alternative improvement designs and measures		■	■									
1-4 Public experiment			■	■								
1-5 Survey, analysis and conclusion			■	■	■	■						
1-6 Implementation of selected intersections and roads						■	■					
1-7 Overseas training								■				
1-8 Studies, surveys, analysis and implementation for other intersections and roads								■	■	■	■	
1-9 Seminar and workshop												■
2. Strengthening of the Traffic Enforcement by the Municipal Police Officers												
2-1 Preparatory work	■											
2-2 Preparation of the traffic enforcement manuals	■	■										
2-3 Training of traffic police officers by counterparts		■	■									
2-4 Establishment of penalty collection system			■	■								
2-5 Traffic Safety Campaign			■	■	■	■	■	■	■	■	■	■
2-6 Survey and analysis				■	■	■						
2-7 Revision of the manual						■		■			■	
2-8 Overseas training								■				
2-9 Traffic enforcement								■	■	■	■	
2-10 Seminar and workshop												■
3. Preparatory Work for the Introduction of the Bus System												
3-1 Preparatory work	■											
3-2 Strengthening of the responsible agency of the bus operation	■	■										
3-3 Discussion and studies of preconditions of bus operation		■	■	■								
3-4 Improvement of paratransit system			■	■								
3-5 Supervising of public transport					■	■	■	■	■	■	■	■
3-6 Overseas training								■				
3-7 Seminar and workshop												■

Note

- Collaboration between Japanese experts and Cambodian counterparts
- Activities mainly by Cambodian side
- Overseas training
- Seminar and workshop

5. JICA カンボジア事務所説明用パワーポイント資料

プロジェクト形成調査
「プノンペン市都市交通改善」

都市交通マスタープラン以降の
プノンペン市の都市交通状況

-プノンペン市都市交通にかかるわが国の協カスタンズ-

2004年5月13日

The Project Formulation Study on the Traffic Improvement in Phnom Penh City

目次

1. 2000年のプノンペン市の概観
2. 2000年と2004年の都市交通の比較
3. 交通事故
4. 道路利用者のインタビュー調査結果
5. 2001年以降の交通施設整備状況
6. プノンペン市の都市交通の問題・課題
7. 2015年都市交通マスタープランの概要
8. プノンペン市都市交通へのわが国の協カスタンズ
9. 技術協力プロジェクト「プノンペン市都市交通改善」のフレームワークについて

2

The Project Formulation Study on the Traffic Improvement in Phnom Penh City

1. 2000年のプノンペン市の概観(その1)

社会経済指標

項目	市街地	郊外部	全域
人口(千人)	591	561	1,152
雇用(千人)	254	332	586
車両台数(千台)		296	
2輪車(千台)		248	
4輪車(千台)		48	

全国の1人当たりGNP=\$215

3

The Project Formulation Study on the Traffic Improvement in Phnom Penh City

1. 2000年のプノンペン市の概観(その3)

交通特性

代表交通手段

交通目的

6

The Project Formulation Study on the Traffic Improvement in Phnom Penh City

2. 2000年と2004年の交通状況の比較

交通量の変化

2000

2004

凡例
0000 2000 4000 (No.271)
Inner Ring Road (No.271)

5

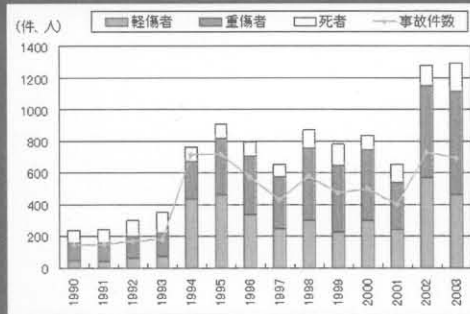




クバルタナル(モニボン橋西詰め)の交通混雑

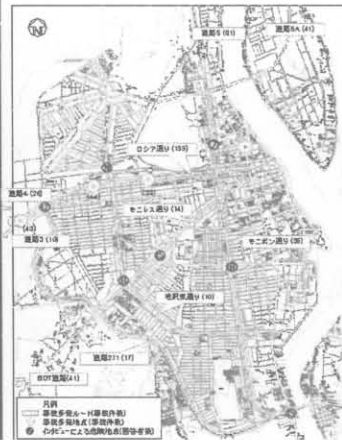
3. 交通事故(その1)

事故件数、死傷者別の推移



3. 交通事故(その2)

交通事故多発
路線・地点



3. 交通事故(その3)

事故原因

- ・規則違反: 90件
 - ・速度超過: 53件
 - ・飲酒運転: 28件
 - ・その他: 3件
- (2004年1~4月に発生した交通事故174件の内訳)

4. 道路利用者インタビュー結果(その1)

属性、免許の有無、交通状況について

- ① 3つのマーケットで道路利用者各100人のインタビューを行った。男76%、女24%。86%が20歳から49歳。多くは30歳代。学歴は高卒と小学卒がそれぞれ33%。職業は43%は労働者、36%は主婦/失業者。
- ② モトドップを含むバイク運転手の94%は無免許(100cc以下は免許不要)。タクシー運転手を含む自動車運転手の8%が無免許。
- ③ 97%の人は交通規則を知っている。29%の人は自動車学校で交通規則を覚えた。26%は家族から。
- ④ 交通状況については、大気汚染(69%)、騒音(66%)及びピーク時の旅行状況(59%)などの評価が低い。
- ⑤ 3、4年前より状況が改善がみられるのは、ピーク時の旅行状況や道路施設であり、大気汚染や騒音は悪化している。

4. 道路利用者インタビュー結果(その2)

交通安全について

- ① 事後発生理由の多くは運転マナーの悪さ(59%)から、次いで交通規則についての不注意(18%)や交通警察の取締りの不備(12%)などとなっている。
- ② 多くの人(61%)が最も運転マナーが悪いのはモトドップ運転手であると感じている。
- ③ インタビューに答えた人の30%が、過去一年間に交通事故にあっており、そのうちの37%は年2回年あっている。

4. 道路利用者インタビュー結果(その3)

交通改善のための対策とバス運行について

- ① 重要な交通混雑改善対策は、制限速度を下げる(84%)、交通安全教育の強化(74%)、交通信号を増やす(62%)、交通警察の強化(53%)、横断歩道の整備(53%)などである。
- ② 3年前のバス運行実験を覚えていた人は全体の86%。バスが運行された場合、利用するかという質問には52%の人が「利用する」と答え、27%の人が「条件次第では利用する」と答えている。その条件は、44%が運行間隔などの運行条件次第、39%の人が料金次第と答えている。
- ③ 市内の主要なマーケット間をバスで利用する場合、平均的に約800リエルをバス料金として払うと答えている。

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5. 2001年以降の交通施設整備状況(その1)

改良済み道路
(2001-2003)

- 幹線道路 拡幅・舗装
- 幹線道路 アスファルト舗装
- 準幹線道路 アスファルト舗装
- 準幹線道路 簡易舗装



整備された道路No.310

5. 2001年以降の交通施設整備状況(その2)

2004年以降の整備予定路線

- アスファルト舗装
- DBST舗装



5. 2001年以降の交通施設整備状況(その2)

信号、中央分離帯の設置

- ⊙ 既存信号(15箇所) 既存
- ⊗ 信号の更新(6箇所)
- ⊕ 新設信号(2箇所)
- 中央分離帯



新しい信号



6. プノンペン市の都市交通の問題・課題

道路構造等の問題・課題

- ① 交通量の多い交差点にラウンドアバウトが残っている
- ② マーキングが不備
- ③ 信号交差点が少なく、信号タイプが統一されていない
- ④ 集散道路等に道路舗装がされていない区間が多く残る

交通法等の法令遵守上の問題

- ① 飲酒運転、スピード違反、逆行レーン走行、信号無視など
- ② 横断歩道以外での歩行者の道路横断
- ③ 不法駐車(歩道部への駐車含む)
- ④ 交通警察官が少なく、取締りへの執行が十分でない等

交通システムの問題

- ① 適切な公共交通が無い
- ② モトドップが公共交通需要の多くを担っているが、無許可であり都市内の交通混雑に与える影響も大きい

7. プノンペン市都市交通マスタープランの概要(1)

2015年を目標年次として
プノンペンにおける交通
問題を解決し、持続可能
な都市の発展を支える

- 戦略1. 土地利用計画と整合
する交通網の確立
- 戦略2. 利便性の高い公共
交通システムの導入
- 戦略3. 効率的で快適・安全
な交通システム整備
- 戦略4. 都市環境及び交通
環境の改善
- 戦略5. 効率的な交通管理シ
ステムの確立



7. プノンペン市都市交通マスタープランの概要(2)

主要関連指標の予測値

項目	年	市街地	郊外部	全域
人口(千人)	2000	591	561	1,152
	2015	750	1,070	1,820
2輪車(千台)	2000		248	
	2015		570	
4輪車(千台)	2000		48	
	2015		166	
発生集中量 (千トリップ/日)	2000	1,564	1,678	3,242
	2015	2,605	2,776	5,381

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8. プノンペン市都市交通にかかるわが国の協力のスタンス(その1)

今までの都市交通分野への協力の成果と課題

成果: 都市交通マスタープランが策定され持続的・総合的な都市交通整備の方向性と短期的な対策が一部実施された
課題: 予想以上に進む都市化と交通量の増大

低い交通マナーと交通事故の急増
依然として公共交通の中心はバラトランジットであるモトドップであり、基幹公共交通システムが無い

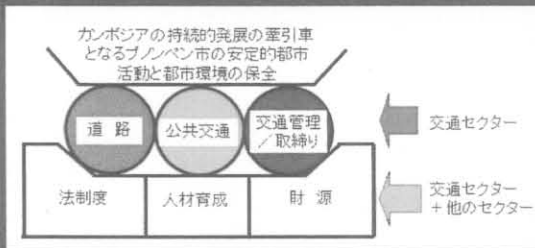
2015年を目標とするわが国の協力の方向性

都市交通マスタープランを尊重しつつ、変化する交通環境に柔軟に対応可能な協力を進める。

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8. プノンペン市都市交通にかかるわが国の協力のスタンス(その2)

都市交通分野への協力の重要性



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8. プノンペン市都市交通にかかるわが国の協力のスタンス(その3)

分野	2010年頃まで	2015年頃まで	2015年以降
建設	都市部域の幹線道路の保存管理と定期点検の促進		
	都市部域での道路計画・整備した道路整備		
	都市部域での道路計画・整備した道路整備		
	有償道路の整備		
公共交通	モトドップを中心とするバス・トラム・バイク		
	バイクを中心とした道路公共交通システムの導入とモトドップの削減		
交通管理/取締り	道路計画・整備に合わせた交通管理・取締りの実施		
	道路計画・整備に合わせた交通管理・取締りの実施		
交通管理/取締り	ATC (総合的交通安全システム)		
	総合的交通安全システム		
交通管理/取締り	交通管理/取締りの強化		
	交通管理/取締りの強化		
交通管理/取締り	交通管理/取締りの強化		
	交通管理/取締りの強化		

凡例
 主にカンボジア側で行なうシステム
 主にカンボジアと日本が協働で行なうシステム
 主に日本側の協力で行なうシステム

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9. 技術協力プロジェクト「プノンペン市都市交通改善」のフレームワークについて

- ① 本技術移転プロジェクトは、プノンペン市が直面する交通問題解決に日本側とカンボジア側が共同で調査を行い、最終的にはカンボジアに持続可能な都市交通改善方策の立案から実施までのシステムを根付かせることにある。
- ② そこで、プノンペンの交通問題・課題を踏まえ、これらの解決策として対応可能な分野(3E:技術、教育及び取締り+P:公共交通)と、技術協力プロジェクトの目的・スコープ等を考慮し、幾つかの視点で評価した結果、次の3つのスキームが当面の検討対象に選ばれた。
 - 市内の交差点/道路区間の交通管理施策
 - 交通取締りの強化
 - バス導入のための準備作業

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9. 技術協力プロジェクト「プノンペン市都市交通改善」のフレームワークについて(その2)

- ③ カウンターパート
プノンペン市公共事業局(OPWT)を中心とし、市交通警察(OTP)、市土地管理・都市計画局(DLMUPC)等からもプロジェクト専属として任命されることが望ましい。特に交通管理、交通取締りの実施にあたっては、市交通警察の協力が鍵となる。
- ④ 技術協力プロジェクトの重要性、緊急性
プノンペン市はJICA作成のマスタープランに基づき市内道路の整備等、交通対策を実施してきたが、ピーク時には交通渋滞が頻繁に発生し、交通事故も多発しておりなど、施設整備とあわせて交通管理の強化がますます重要な対策となっている。このため本技術協力プロジェクト要請に対する重要性、緊急性は非常に高く、早期の協力が望まれる。

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