JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
NATIONAL TRAFFIC SAFETY COMMITTEE (NTSC), VIETNAM

THE STUDY ON
NATIONAL ROAD TRAFFIC SAFETY MASTER PLAN
IN THE SOCIALIST REPUBLIC OF VIETNAM UNTIL 2020

FINAL REPORT

VOLUME 1: ANALYSIS

March 2009

ALMEC CORPORATION
NIPPON KOEI Co., Ltd.

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(Average in 2008)

PREFACE

In response to the request from the Government of the Socialist Republic of Vietnam, the Government of Japan decided to conduct "The Study on National Road Traffic Safety Master Plan in Vietnam" and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA dispatched a study team headed by Mr. TAKAGI Michimasa of ALMEC Corporation, during the period from July 2007 to March 2009. The study team conducted the study with the Vietnamese counterpart team and held a series of discussions with the officials concerned of the Government of Vietnam. After the team returned to Japan, further studies were made and then the report was finally completed.

I hope that this report will contribute to the improvement of traffic safety measures and reduction of traffic accident in Vietnam.

I wish to express my sincere appreciation to the officials concerned of the Government of Vietnam for their close cooperation extended to the study team.

March 2009

TSUNO Motonori
Chief Representative of Vietnam Office
Japan International Cooperation Agency

March 2009

Mr. TSUNO Motonori
Chief Representative
Japan International Cooperation Agency
Vietnam Office

LETTER OF TRANSMITTAL

Dear Sir,

We are pleased to formally submit herewith the final report of the Study on National Road Traffic Safety Master Plan in the Socialist Republic of Vietnam.

This report compiles the result of the study which was undertaken both in Vietnam and Japan from July 2007 to March 2009 by the Team, organized by ALMEC Corporation and Nippon Koei Co., Ltd.

We owe a lot to many people for the accomplishment of this report. First, we would like to express our sincere appreciation and deep gratitude to all those who extended their extensive assistance and cooperation to the Team, in particular the National Traffic Safety Committee in Vietnam.

We also acknowledge the officials of your agency and National Police Agency as well as Ministry of Foreign Affaires for their support and valuable advice in the course of the Study.

We wish the report would contribute to the promotion and sustainable development of road traffic safety in Vietnam.

Very truly yours,

TAKAGI Michimasa
Team Leader
The Study on National Road Traffic Safety Master Plan
in the Socialist Republic of Vietnam

NATIONAL ROAD TRAFFIC SAFETY MASTER PLAN
IN THE SOCIALIST REPUBLIC OF VIETNAM UNTIL 2020
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ABBREVIATION

ADB	Asia Development Bank
ASEAN	Association of South East Asian Nations
CSR	Corporate Social Responsibility
D/D	Detailed Design
DOT	Department of Transport
EIRR	Economic Internal Rate of Return
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
FDI	Foreign Direct Investment
F/S	Feasibility Study
GDP	Gross Domestic Product
GOV	Government of Vietnam
GRSP	Global Road Safety Project
GTZ	German Technical Cooperation
HAIDEP	Hanoi Integrated Development and Environmental Program
HCMC	Ho Chi Minh City
ITS	Intelligent Transport System
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
M/C	Motorcycle
MIC	Ministry of Information and Communications
MOCI	Ministry of Culture and Information
MOET	Ministry of Education and Training
MOF	Ministry of Finance
MOH	Ministry of Health
MOJ	Ministry of Justice
MOPS	Ministry of Public Security
MOT	Ministry of Transport
NGOs	Non Governmental Organizations
NH	National Highway
NRADS	National Road Accident Data System
NTSA	National Traffic Safety Authority
NTSC	National Traffic Safety Committee
ODA	Official Development Assistance
OJT	On-the-Job Training
PDOT	Provincial Department of Transport
PTSC	Provincial Traffic Safety Committee

R&D	Research and Development
RRMU	Regional Road Management Unit
RSA	Road Safety Audit
RSMS	Road Safety Management System
SAPROF	Special Assistance for Project Formation
SIDA	Swedish International Development Cooperation Agency
TA	Traffic Accident
TDSI	Traffic Development and Strategy Institute
TDM	Traffic Demand Management
TRAHUD	Traffic Safety Human Resource Development Project in Hanoi
TS	Traffic Safety
TSA	Traffic Safety Audit
TSC	Traffic Safety Committee
TSPMU	Traffic Safety Project Management Unit
TUPWS	Transportation and Urban Public Works Services
UNICEF	United Nations Children's Emergency Fund
USD	United States Dollar
VITRANSS	Vietnam National Transport Development Study
VND	Vietnamese Dong
VR	Vietnam Register
VRA	Vietnam Road Administration
VRSP	Vietnam Road Safety Project
WB	World Bank
WG	Working Group
WHO	World Health Organization
WTO	World Trade Organization

1 INTRODUCTION

1.1 Background and Objective

1) Study Background

The open door policy has accelerated economic growth of the country since the 1990's. While the demand for passengers and goods transport were increasing sharply, Vietnam's road system is being built or renovated significantly with domestic funding as well as from loans from donor organizations. In the last decade, income growth and improvement of transport infrastructure have both contributed to a rapid increase in the number of motorized vehicles, especially motorcycles. As traffic volume expanded, traffic-related problems also increased: traffic conflicts and bottlenecks in urban areas became evident and traffic accidents in rural areas began to rise. On the other hand, the level of understanding and compliance to traffic safety requirements remains very low among the public. Authorities have also been not always aware of their critical role in restoring traffic safety and order.

Thus, traffic accident has become a major social problem, in which traffic safety is now regarded as one of the most urgent policy issues of the Government of Vietnam (GOV). Thus, in 1997, GOV established the National Traffic Safety Committee (NTSC) and local traffic safety committees in each province to implement traffic safety measures. The proposed National Traffic Safety Program (NTSP) for the period 2001-2005 has been approved and implemented as A Scheme to Ensure the Traffic Safety Order 2001-2005. With numerous efforts, the Traffic Accidents seems under control at first steps, but the results are still unstable and the number of Traffic Accidents, especially, number of fatalities is still high. Consequently, GOV instructed the NTSC to formulate a NTSP for the period 2006-2010 and a traffic safety strategy up to 2020.

2) Study Objectives

The objectives of the Study are as follows:

(i) To develop a National Road Traffic Safety Master Plan to 2020

(ii) To formulate an Action Program for National Road Traffic Safety 2008-2012

The Master Plan will provide various comprehensive strategies and develop sustainable fundamentals for the road traffic safety in Vietnam. The proposals are based on the existing conditions of the country, and thus, will be deemed feasible. They will address all aspects of the road transport system, as follows: (i) infrastructure; (ii) road users; (iii) vehicle; and (iv) legal framework, especially traffic safety policies and institutional issues. The activities included in the Action Program of 2008-2012 will form the first phase of implementation process for the whole complex of strategies from the Master Plan.

1.2 Study Area and Coverage

The Study area covers the entire geographical area of Vietnam focusing on the road sub-sector which accounts for 97% of traffic accidents, as well as on road-railway crossings.

1.3 Overall Study Framework and Scope

The Study will be implemented over a total of a15 months and is composed of the following three stages.

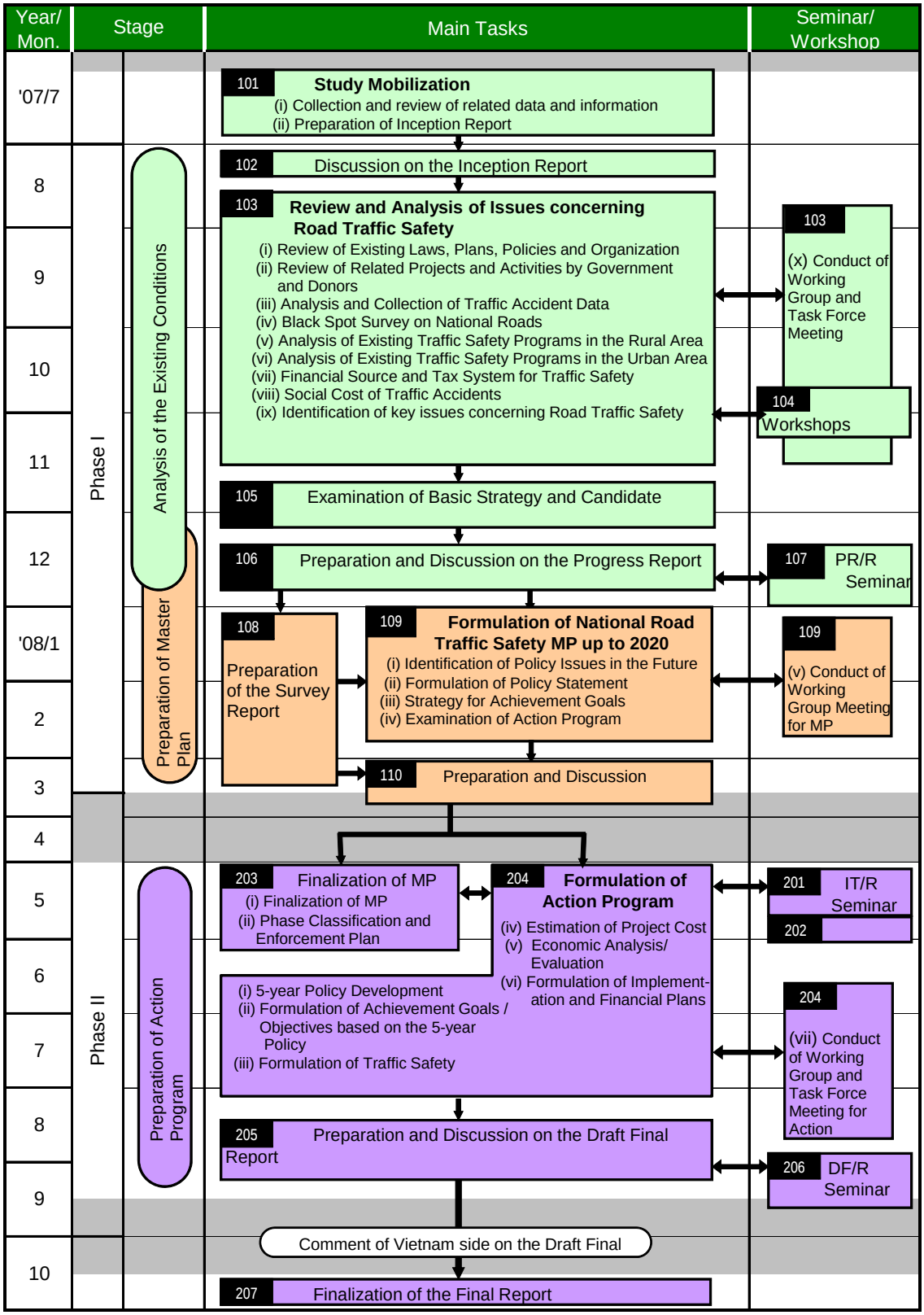
Analysis of the Existing Conditions (Phase 1): This stage includes: 1) study mobilization; 2) discussion on the Inception Report; 3) review and analysis of issues concerning road traffic safety; 4) conduct of workshops; 5) examination of basic strategy and candidate programs for traffic safety; 6) preparation of and discussion on the Progress Report; and 7) conduct of Progress Report Seminar.

Preparation of Master Plan (Phase 1): In this stage, the National Road Traffic Safety Master Plan is formulated based on the results of analysis made on existing conditions. This stage includes: 1) preparation of the Survey Report; 2) formulation of the master plan up to 2020; 3) preparation of and discussion on the Interim Report; and 4) conduct of Interim Report Seminar.

Preparation of Action Program (Phase 2): This stage includes: 1) finalization of the Master Plan; 2) preparation of the Action Program; 3) preparation of and discussion on the Draft Final Report; 4) conduct of the Draft Final Report Seminar; and 5) finalization of the Final Report.

Main tasks of the Study are shown in Figure 1.3.1.

Figure 1.3.1 Study Framework



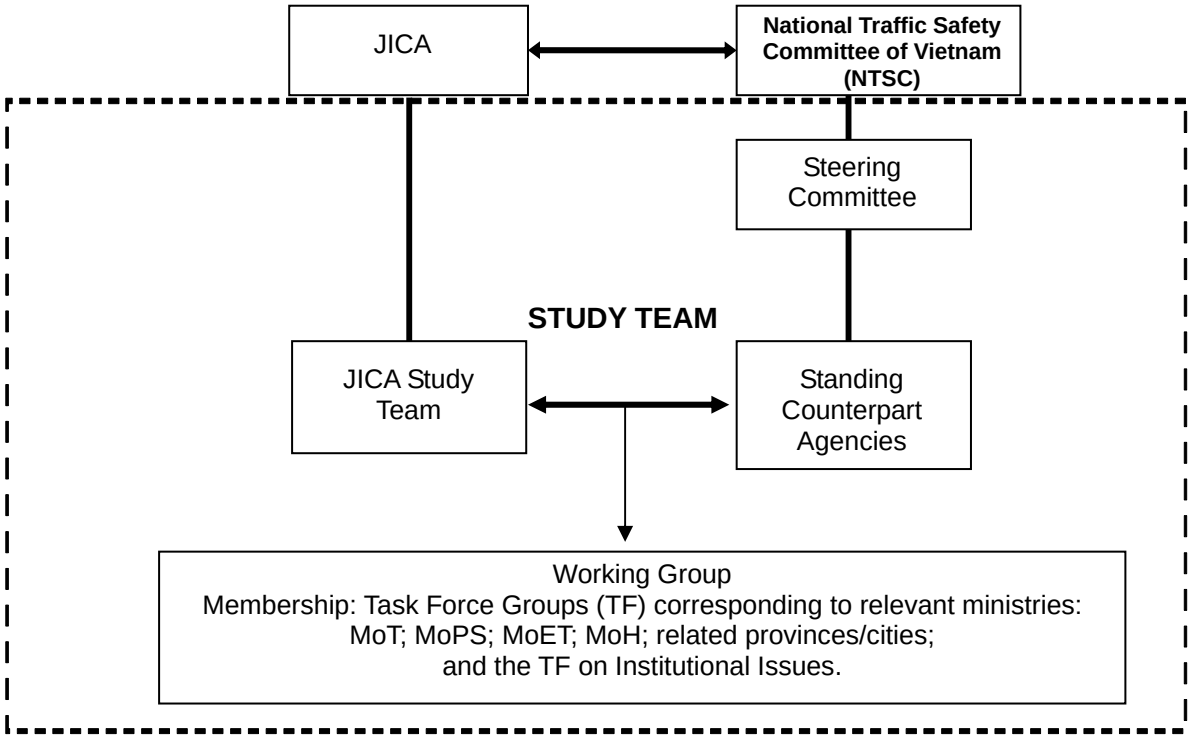
Source: JICA Study Team

1.4 Study Implementation

1) Implementing Organization of the Study

The Study was conducted in accordance with the typical scheme of Japanese technical cooperation where JICA dispatches the JICA Study Team while the Vietnam side organizes the Steering Committee and the Counterpart Team.

Figure 1.4.1 Organizational Chart for Study Implementation



Source: JICA Study Team

2) Coordination with Vietnamese Side

(i) Steering Committee/Technical Working Group

All the reports and important issues were presented and discussed in the Steering Committee meetings during each stage of the Study. The Steering Committee was composed of decision-makers from the counterpart agency and relevant agencies.

(ii) Counterpart Team

Under the Steering Committee, a Working Group was organized as core counterparts for this Study and was composed of the following:

(a) Representatives from NTSC

(b) Representatives from MOT

(c) Representatives from MOPS

(d) Representatives from MOET

(e) Representatives from MOH

(f) Representatives from MOF

(g) Representatives from MOCI

(h) Representatives from MOJ

Table 1.4.1 Members from the Vietnamese Government

Steering Committee		
Mr. Ho Nghia Dzung	Chairman, Minister	MOT
Mr. Tram Dai Quang	Vice Minister	MOPS
Mr. Pham The Minh	Vice Minister	MOT
Mr. Do Hoang Anh Tuan	Vice Minister	MOF
Mr. Le Thi Thu Ba	Vice Minister	MOJ
Mr. Pham Vu Luan	Vice Minister	MOET
Mr. Pham Van Duc	Deputy Director General	General Department for Public Security, MOPS
Mr. Bui Huynh Long	Chief of the Secretariat	NTSC
Mr. Le Ngoc Trong	Vice Minister	MOH
Ms. Ha Thi Lien	Member	The Central Vietnamese Fatherland Front
Mr. Do Quy Doan	Vice Minister	MOCI
Mr. Le Manh Hung	Secretary	Central Ho Chi Minh Youth Union
Mr. Do Dinh Nghi	Director General	Department of Railway-Road Traffic Police, General Department for Public Security, MOPS
Counterpart Team		
Mr Pham Van Duc	Deputy Director General	General Department for Public Security, MOPS
Mr Bui Huynh Long	Chief of the Secretariats	NTSC
Mr Trinh Ngoc Giao	Vice Director General	VR
Mrs Le Minh Chau	Director General	TSPMU
Mr Nguyen Thanh Phong	Vice Director	TDSI
Mr La Khac Hoa	Chief of Staffs	Department of Railway-Road Traffic Police, General Department for Public Security, MOPS
Mr Le Quang Hoa	Officer of Staffs	Department of Railway-Road Traffic Police, General Department for Public Security, MOPS
Mr Dang Van Chung	Inspector	VRA
Mr Do Tien Duc	Officer	DOT-MOT
Mr Le Van Dat	Vice Head of Traffic Safety Department	TDSI
Mr Nguyen Trong Thai	Vice Chief of the Standing Office	NTSC
Mr Le Van	Officer of the Standing Office	NTSC

Source: JICA Study Team

3) JICA Vietnam Office and Study Team

Under direct supervision from the JICA Vietnam Office, the JICA Study Team was dispatched to conduct the study. It was organized by ALMEC Corporation in association with Nippon Koei Co., Ltd. and is composed of twelve (12) experts and one (1) coordinator.

JICA Vietnam Office

NAKAGAWA Hiroaki	Resident Representative, JICA Vietnam Office
KOBAYASHI Kenichi	Deputy Resident Representative, JICA Vietnam Office

JICA Study Team

TAKAGI Michimasa	Team Leader/Organization
NAITO Hisatoshi	Traffic Safety Infrastructure
NAGAI Takayasu	Infrastructure Design / Estimation
SAITO Takeshi	Traffic Management / Enforcement
HOSHI Tadamichi	Traffic Safety Education
KOBAYASHI Kunio	First-aid Medical / Insurance
SUZUKI Tetsuji	First-aid System
SEKI Yosui	Driver's License / Car Inspection
Nguyen Huu Duc	Financial Analysis / Evaluation
MASUJIMA Tetsuji	Traffic Accident Analysis
FUKUDA Tuenjai	Region and Traffic Safety
IMAI Haruhiko	Traffic Safety Foundation
Nanette T. Abilay	Study Coordinator

4) Meetings/Seminar/Workshop

In accordance with the study framework illustrated in Figure 1.3.1., milestone meetings, seminars and workshops were conducted during the progress of the Study as shown in Table 1.4.2.

Table 1.4.2 Milestone Meetings, Seminars and Workshops Conducted

Date	Activity	Participants	Outcome
Milestone Meetings			
8 August 2007	Meeting with the Steering Committee	Ministry of Transport, NTSC, TSPMU, JICA Vietnam Office, JICA Study Team	Reconfirmation that the Study on National Road Traffic Safety Master Plan in Vietnam is necessary and that this Study will give the GOV a general view on Traffic Safety in the next years. The National Traffic Safety Committee fully concurred and will cooperate and assist to ensure the success of the Study.
14 August 2007	Meeting with the Counterparts	General Department of Police, TSPMU, JICA Vietnam Office, JICA Study Team	Agreement on the manner of coordination and cooperation between the Study team and counterparts to speed up the Study.
15 August 2007	Meeting with VRA, MOH, MOET	VRA, MOH, MOET, TSPMU, JICA Study Team	Agreement on the data collection mechanisms related to the issues of the Study.
21 August 2007	Meeting with Deparment of Transport	Department of Transport, TSPMU, JICA Study Team	Department of Transport will provide as soon as possible the data required by the Study Team.
21 August 2007	Meeting with TDSI	TDSI, JICA Study Team	Study Team and TDSI agreed on data exchange related to Master Plan and the Strategies for TS until 2010

Date	Activity	Participants	Outcome
22 August 2007	Meeting with Viet Duc hospital officials	Viet Duc Hospital officials, JICA Study Team	Viet Duc Hospital officials promised to provide necessary data on the means to transfer the victims to the hospital in the 1st quarter 2007
22 August 2007	Meeting with Road-Railway Traffic Police Bureau	C26 – Road and Railway Traffic Police Bureau, JICA Study Team	C26 agreed to provide relevant data requested by the JICA Study Team.
22 August 2007	Meeting with VRA	VRA, JICA Study Team	VRA agreed to provide relevant data requested by the JICA Study Team
30 Oct - 5 Nov 2007	Site visits and Consultations (Danang, Quang Tri, Can Tho)	Households, schools, DOET, Head of commune and households	Survey on the management of traffic safety education and collection of information on traffic safety education programs, methods and facilities.
24 February 2008	Discussion about "Some issues related to traffic safety education at schools" in MOET	MOET, JICA Study Team	Consensus on the need to standardize and develop the official materials of traffic safety education for all teachers to integrate into all subjects. In addition, training and retraining for teachers in terms of traffic safety, teaching methods, knowledge updating are considered very important.
4 June 2008	Discussion on traffic safety education in school and community in Hai Duong	DOET, JICA Study Team	Consensus that traffic safety education in schools plays an important role. Sectors, branches and localities of Hai Duong Province would closely and actively cooperate to maintain and develop traffic safety education activities.
18 June 2008	Meeting with Deputy Minister of MOT	MOT, DOT, VR, International Cooperation Department, Department of Science and Technology, NTSC, TSPMU, JICA Vietnam Office, JICA Study Team	The Master Plan is regarded as highly important and necessary. The final report should contain the long-term vision for Vietnam's traffic safety society.
Seminars/Workshops			
22 October 2007	Inception report workshop	MOPS, MOH, MOT, VRA, VR, Traffic Safety Committees of Hanoi, Haiphong, Nghe An, JICA Vietnam Office, JICA Study Team	There was consensus that Inception Report has reasonable structure and that contents are in accordance with the Memorandum of Understanding between the National Traffic Safety Committee and Japan International Cooperation Agency regarding "The Study on the Study.
9 November 2007	Workshop on "Traffic Safety Education in Schools"	NTSC, TSPMU, MOET, JICA Vietnam Office, JICA Study Team	Consensus that traffic safety education for students and pupils is a critical issue and that traffic safety education should be introduced in the extra-curricular activities. It was suggested that the contents should be revised, with prioritization based

Date	Activity	Participants	Outcome
			on time element, integration methods, and organization of extra-curricular activities so that they are suitable with each age group.
9 November 2007	Workshop on “Traffic Safety culture”	Central Department of Ideology & Propaganda, JICA Study Team	Consensus that traffic safety culture is an important issue to consider in reducing traffic accidents and in the conduct of traffic safety awareness and campaign activities. It was further agreed that the Master Plan will include a detailed discussion and plan for a campaign on the establishment of Vietnam’s traffic safety culture.
12 November 2007	Workshop on “Some issues about Infrastructure”	VRA, NTSC, TSPMU, local authorities, JICA Study Team	Confirmation that the Master Plan study shall ensure the a vision until 2020 which shall include required infrastructure investments based on proposed target programs.
13 November 2007	Workshop on “ Emergency in Traffic Accident”	MOH, JICA Study Team	Feedback was provided on the conduct of analysis of the current situation in emergency.
3 March 2008	Workshop and feedback seminar on some proposals and countermeasures related to traffic infrastructure, drivers’ training and testing, vehicle registration, inspection and management	VRA, MOT, VR, Road Railway Traffic Police Bureau, JICA Study Team	Feedback on proposed countermeasures and various suggestions were provided to the Study Team.
7 March 2008	Workshop on Medical Emergency development strategy for traffic safety master plan to 2020	Southern Units under MOH, JICA Study Team	Agreement on JICA Study Team’s analysis of current situation and proposals for countermeasures. Feedback was also provided for consideration in the next stage of the Study.
4 April 2008	Chaired by Lieutenant – General Pham Van Duc	MOPS, NTSC, MOT, TSPMU, MOET, JICA Vietnam Office, JICA Study Team	Feedback and comments from counterparts on the proposals presented by the JICA Study Team. Request was made for JICA Study Team to organize seminars to be able to solicit more opinions/comments from all PTSCs and related state agencies.
26 May 2008	Interim Report Seminar in Ho Chi Minh City	NTSC, Traffic Safety Committees of Southern Provinces, JICA Vietnam Office, JICA Study Team	Participants expressed appreciation and considered proposals presented by the JICA Study Team to be comprehensive and diversified.
21 July 2008	Interim Report Seminar in Hanoi	MOPS, MOT, Traffic Safety Committees of Hanoi and other northern provinces, JICA Vietnam Office, JICA Study Team	Participants expressed appreciation to the JICA Study Team. Various comments and suggestions were also submitted for consideration in and improvement of the report.

Source: JICA Study Team

2 CHARACTERISTICS OF THE STUDY AREA AND ROAD TRAFFIC ACCIDENTS

2.1 Profile of the Study Area

1) Natural and Physical Conditions

(i) Geography and Topography

Vietnam is located in the Pacific Ocean Rim with a total area of 331 thousand km^2 stretching in an "S" shape. The country is delineated by 3,260 km of coastline from China in the north to the Gulf of Thailand in the south, and by 4,369 km of border facing Lao PDR and Cambodia in the west and China in the north. The narrowest part of the country is about 50 km in the east-west direction, located in Thua Thien Hue Province.

The topographic conditions can be summarized as follows:

- Low flat lands are characteristic of the Red River delta and the Mekong River delta which may allow dense habitation but is vulnerable to floods.
- Mountainous areas, stretching along the border provinces with China and Lao PDR have always hampered traffic and made transport development costly.
- The Central Highlands is a unique upland since it is part of the Mekong River watershed which runs rainfall off to the Cambodian territory.

(ii) Land Use

Vietnam's population is very densely settled in the limited land area (6% of the total land) and almost all cultivable land is in use. Pressure on natural resources and the environment is acute. About 28% of land is cultivated and 44% is classified as forestry land. (Table 2.1.1 and Figure 2.1.1)

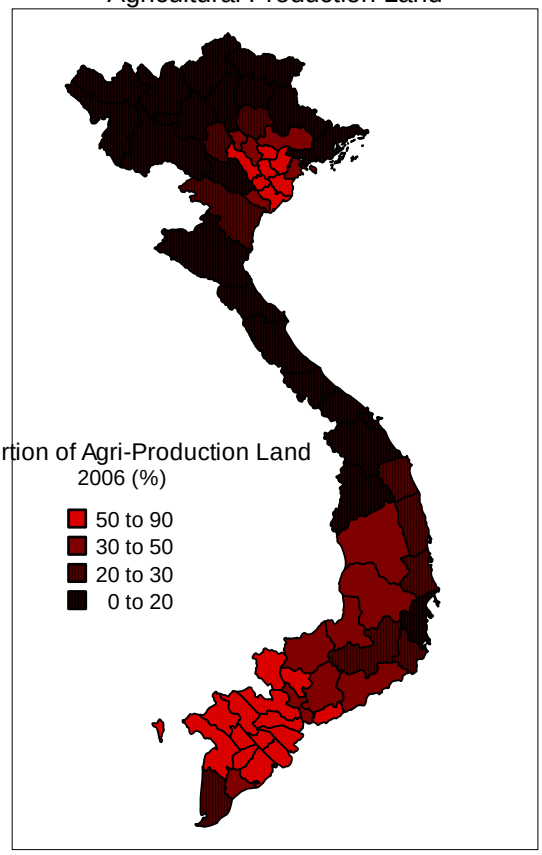
Table 2.1.1 Composition of Land Use by Region (2006)

Region	Total Area (km2)	Agricultural Production Land		Forestry Land		Specially Used Land		Homestead Land	
		% to total	% to region total	% to total	% to region total	% to total	% to region total	% to total	% to region total
I. Red River Delta	14,882	8.1	51.2	0.9	8.3	16.5	15.5	19.3	7.8
II. North East	64,024	10.4	15.3	24.6	55.5	14.5	3.2	13.3	1.2
III. North West	37,534	5.3	13.3	12.3	47.3	3.0	1.1	5.4	0.9
IV. North Central Coast	51,552	8.6	15.6	19.8	55.4	13.9	3.8	16.2	1.9
V. South Central Coast	33,167	6.2	17.6	10.1	44.0	13.8	5.8	9.0	1.6
VI. Central Highlands	54,660	17.0	29.2	21.2	56.1	8.9	2.3	6.9	0.8
VII. South East	34,809	17.1	46.3	8.7	36.0	13.8	5.6	11.8	2.1
VIII. Mekong River Delta	40,604	27.4	63.4	2.5	8.8	15.7	5.4	18.0	2.7
Vietnam	331,212	100	28.4	100	43.6	100	4.2	100	1.8

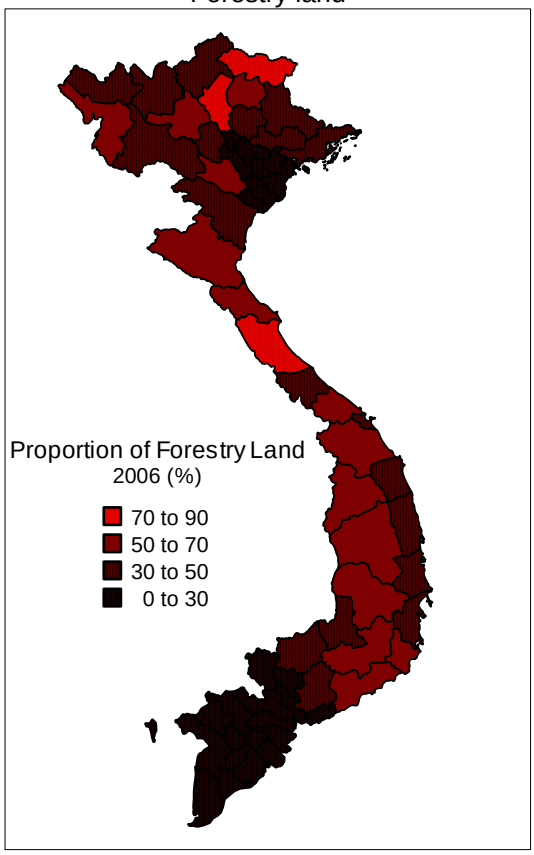
Source: Statistical Year Book of Vietnam, 2006

Figure 2.1.1 Composition of Land Use by Province (2006)

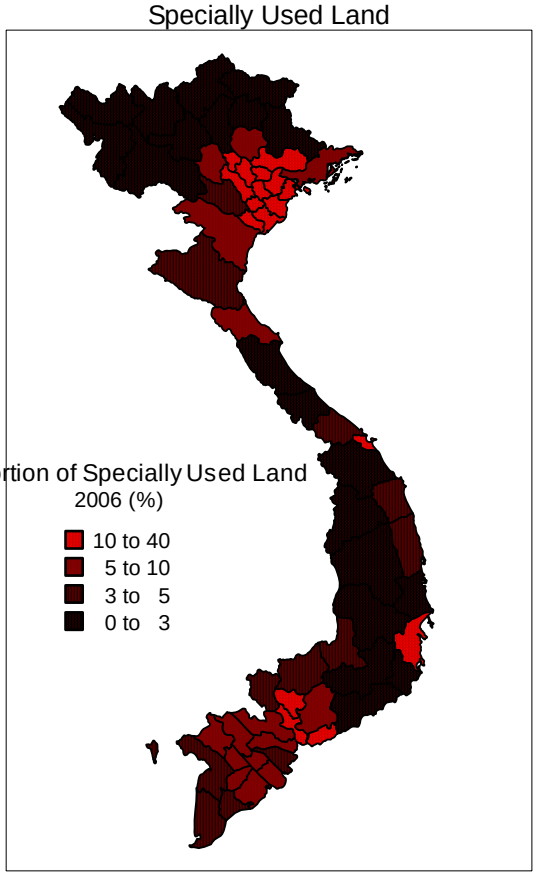
Agricultural Production Land



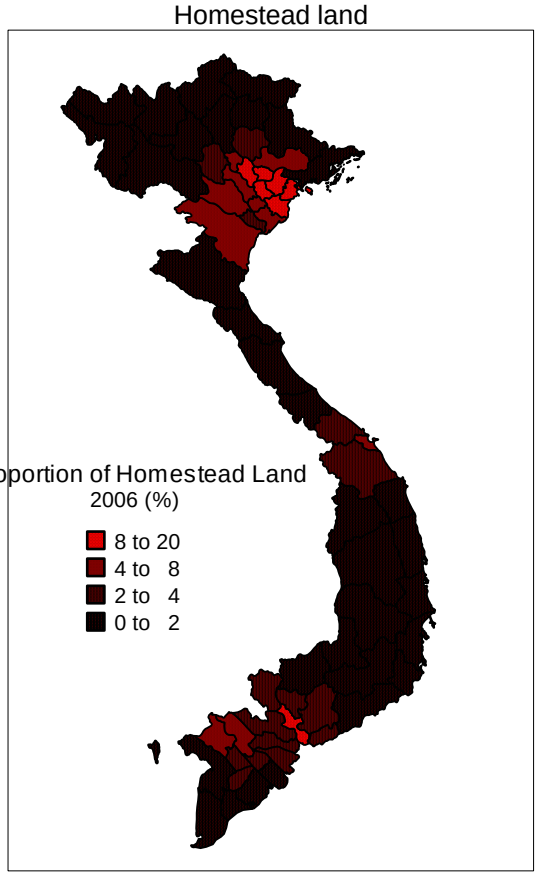
Forestry land



Specially Used Land



Homestead land



Source: Statistical Year Book of Vietnam, 2006

- Agricultural Production Land: This refers to the land use in agricultural production including annual crop land and perennial crop land. This land use occupies 28.4% of the total land and distributed significantly in the south, particularly in the regions of the Mekong River delta (27.4%), South East (17.1%) and Central Highlands (17.0%).
- Forestry Land: This refers to the land use in forestal production or experiment including productive forest, protective forest and specially used forest. Forest land covers 43.6% of the total land. In contrast to agricultural production land, forestry land is distributed mainly in the north and central, particularly in the regions of North East (24.6%), Central Highlands (21.2%) and North Central Coast (19.8%).
- Specially Used Land: This refers to the land being used for other purposes, not for agriculture, forestry and living.1 This land use covers limited land area (4.2% of the total land) and distributed nationwide. Particularly, in the Red River delta the specially used land shares higher proportion of 15.5%. In Danang and Hanoi, 30.6% and 22.6% of land is utilized for this land use, respectively.
- Homestead Land: This refers to the land used for housing and other works construction serving living activities of urban and rural residents. This land shares 1.8% of the total land but distributed nationwide in proportion to population. Particularly, in the Red River delta the homestead land shares higher proportion of 7.8%. In Hanoi, Bac Ninh and HCMC, 13.9%, 11.8% and 9.8% of land is utilized for this land use, respectively.

(iii) Climate

There are two seasons in Vietnam. However, these two seasons are different between north and south. In the north, one season is winter and the other is summer; while in the south, the two seasons are rainy and dry. The temperature is much higher in the south from November to March. At other times of the year the temperature difference between north and south is much less. In 2006, the average temperature in HCMC was over 26^{o}C all year round, and the variation between the maximum and minimum temperatures was quite low. On the other hand, in Hanoi, it ranged from below 18^{o}C to over 30^{o}C.

Floods in the form of either storm surges and river floods may occur during the rainy season due to typhoon, heavy rain in the Central Highlands and northeast Cambodia caused by the southwest monsoon, and heavy rain along the upper reaches of the Mekong River.

2) Demography

In the 1950s, Vietnam's annual population growth rate was 3.4%. As the government introduced the family planning policy, or the so-called "two-child policy" in the early 1960s, the growth rate fell to 2.2% in 1980 and less than 2% since 1996. However, Vietnam's population increased gradually and reached to about 83 million in 2006 (Table 2.1.2).

[1] It includes land use by offices and non-profit agencies; security and defense land; land for non-agricultural production and business and public land.

Table 2.1.1 Demographic Indicators by Region (2006)

Region	Population (million)		% Share 2006	2006 Pop. Density (per km^2)	'00-'06 Pop. Growth Rate (%/yr.)	Urban Population	
	2000	2006				2006 Rate (%)	'00-'06 Growth Rate (%/yr.)
I. Red River Delta	17.0	18.2	21.6	1,225	1.1	25.0	4.7
II. North East	8.9	9.5	11.2	148	0.9	18.9	1.7
III. North West	2.3	2.6	3.1	69	2.3	13.9	4.3
IV. North Central Coast	10.1	10.7	12.7	207	0.9	13.7	1.9
V. South Central Coast	6.6	7.1	8.5	215	1.2	30.1	2.8
VI. Central Highlands	4.3	4.9	5.8	89	2.3	28.1	3.2
VII. South East	12.1	13.8	16.4	396	2.3	54.7	3.1
VIII. Mekong River Delta	16.3	17.4	20.7	429	1.1	20.7	3.8
Vietnam	77.6	83.2	100.0	254	1.4	27.1	3.3

Source: Statistical Year Book of Vietnam, 2006

(i) Population Distribution

In Vietnam, population is concentrated in the three major metropolitan areas of Hanoi, HCMC and Danang. The people inhabits mostly in delta regions of the Red River and the Mekong River and coastal regions. In 2006, Hanoi and HCMC have 3.2 million and 6.1 million population and make up 3.8% and 7.3% of the country's population, respectively (Table 2.1.2).

(ii) Population Density

Country's average population density is 254 persons per km^2 in 2006. By region, the Red River delta has the highest population density of 1,225 persons per km^2, while the Central Highland has the lowest density of 89 persons per km^2. Hanoi and HCMC have high population density of 3,489 and 2,909 persons per km^2, respectively (Figure 2.1.2).

(iii) Population Growth

Average annual population growth rate from 2000 to 2006 is 1.4%. By region, higher population growth rate more than 2.0% is indicated in the North West, the Central Highland and the South East. Hanoi and HCMC recorded stable annual growth rates of more than 2.6%. The highest growth rate of 4.6% was indicated in Binh Duong province within HCMC metropolitan area where development of industrial estates is remarkable (Figure 2.1.3).

(iv) Urban Population

The population of people living in urban areas has been increased from 2000 to 2006 with 3.3% per year more than that of total population and reached to 27.1% of the total population in 2006. In the South East, urban population shares 54.7%. (Figure 2.1.4 and Figure 2.1.5).

Figure 2.1.2 Population Density by Province (2006)

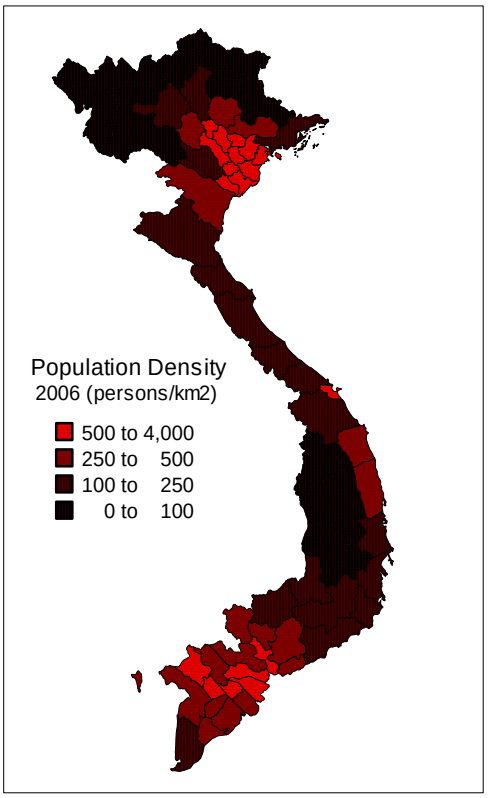


Figure 2.1.3 Population Growth Rate by Province (2000-2006)

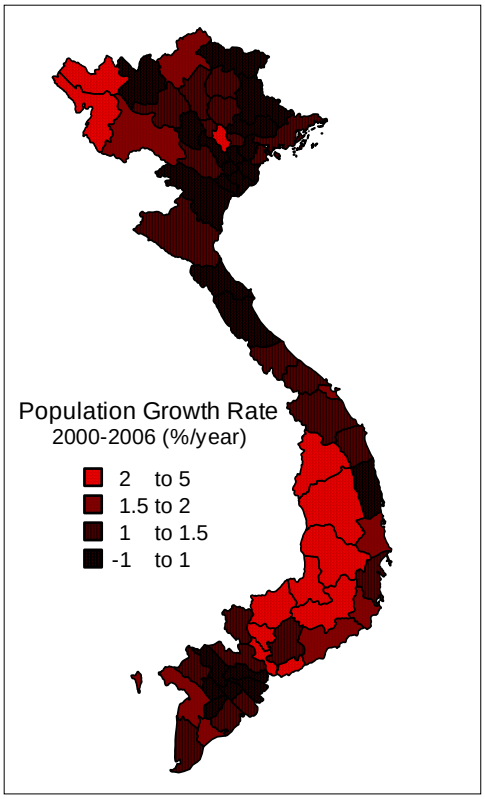


Figure 2.1.4 Urban Population Ratio by Province (2006)

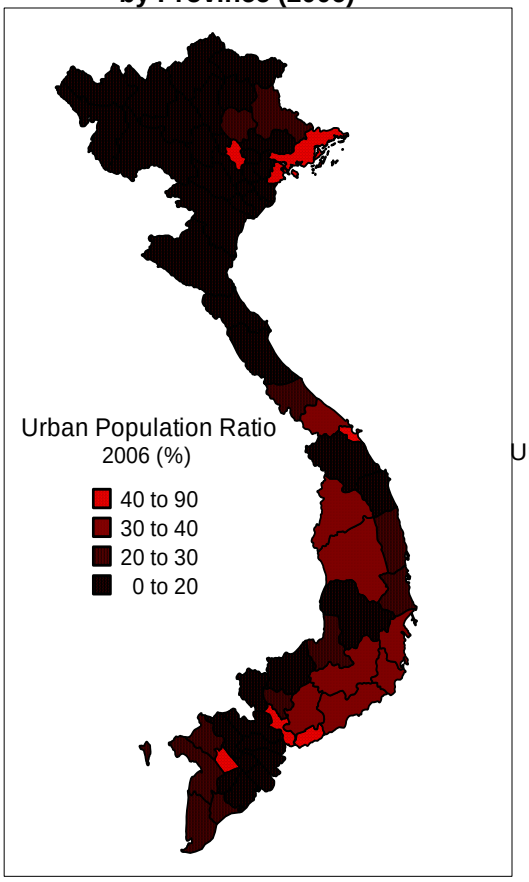
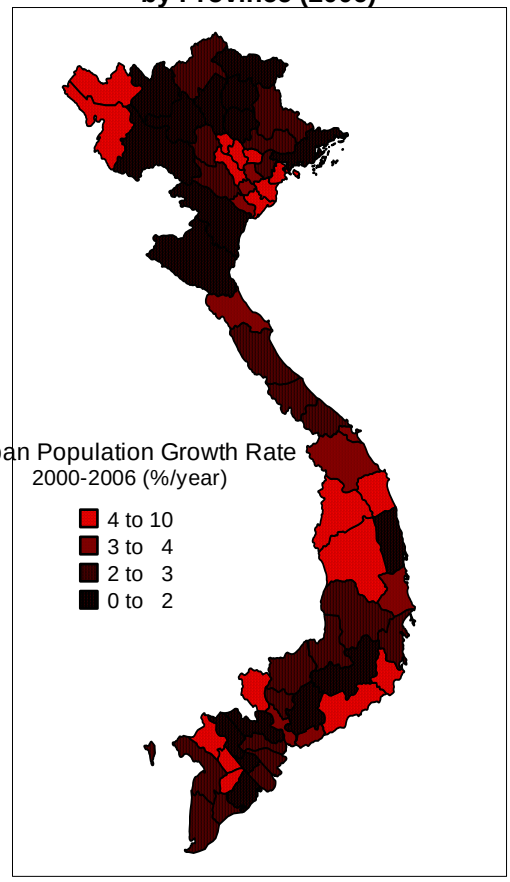


Figure 2.1.5 Population Density by Province (2006)



Source: Statistical Year Book of Vietnam, 2006

3) Economy

(i) Overview

After market elements as a part of the broad economic reform package called "Doi Moi (Renovation)" was introduced in 1986, Vietnam achieved around 8% annual GDP growth from 1990 to 1997. Although, GDP growth fell to 6% in 1998 and 5% in 1999 due to the East Asian financial crisis in 1997, growth then rose up again even against the background of global recession. Vietnam had an average annual GDP growth of 7.1% from 2000 to 2004, which further increased to 8.4% in 2005 and 8.2% in 2006, the second largest growth in Asia after that of China. GDP per capita however is still at a low level but has increased to USD722 in 2006 (Table 2.1.3).

In November 2006, Vietnam became WTO's 150th member. Vietnam's access to WTO should provide an important boost to Vietnam's economy and should help to ensure the continuation of liberalizing reforms and create options for trade expansion. However, WTO accession also brings serious challenges, requiring Vietnam's economic sectors to open the door to increased foreign competition.

Vietnam is now the world's largest coffee, cashew nuts and pepper exporter, and the second largest rice exporter worldwide. Vietnam has the highest percent of land use for permanent crops in the Greater Mekong Sub-region. Besides rice, key exports are coffee, tea, rubber, crude oil, pepper, garments and fishery products. However, agriculture's share of economic output has declined, falling as a share of GDP from 42% in 1989 to 19% in 2006, as production in other sectors of the economy has risen.

Paralleling its efforts to increase agricultural output, Vietnam has sought with some success to invigorate industrial production. Industry contributed 41% of GDP in 2006. However, most branches of heavy industry have stagnated or declined. Nevertheless, foreign direct investment (FDI), with much of it gravitating to the new industrial zones in the south, has gone some way towards transforming the industrial landscape of Vietnam.

Table 2.1.2 GDP Growth (2000-2006)

Indicators	Unit	2000	2001	2002	2003	2004	2005	2006
GDP (at current price)	Tri. VND	441.6	481.3	535.8	613.4	715.3	839.2	973.8
GDP per capita	Mill. VND	5.7	6.0	6.7	7.6	8.7	10.1	11.6
	USD	402	416	440	492	553	639	722
GDP (at 1994 price)	Tri. VND	273.7	292.5	313.2	336.2	362.4	393.0	425.1
Growth Rate	%/year	6.8	6.9	7.1	7.3	7.8	8.4	8.2
- Agriculture/ Forestry/ Fishing	%	23.3	22.4	21.8	21.1	20.4	19.6	18.7
- Industry/ Construction	%	35.4	36.6	37.4	38.5	39.4	40.2	41.0
- Service	%	41.3	41.0	40.8	40.5	40.3	40.3	40.3

Source: Statistical Year Book of Vietnam, 2006

(ii) Foreign Direct Investment (FDI)

The FDI in Vietnam accounted for 16% of the country's total investment capital in 2006. Based on statistics, during 1988 to 2006, the number of FDI projects has

accumulated to 8,266 and the total registered capital reached USD78.2 billion. The FDI in Vietnam has been mainly focused in manufacturing (5,338 projects with registered capital of USD41.5 billion or 53.1% of the total) and real estate business (1,014 projects with registered capital of USD8.1 billion or 10.4% of the total). Location of the FDI projects are distributed nationwide but mostly concentrated in the two regions of South East and Red River Delta which are accessible to major cities of HCMC and Hanoi and international ports of Saigon and Haiphong, accounting for 83.5% in terms of number of projects and 79.9% in terms of registered capital, respectively (Table 2.1.4).

Table 2.1.3 Foreign Direct Investment (1988-2006)

Region	Projects		Registered Capital	
	No.	%	Million USD	%
I. Red River Delta	1,781	21.5	20,241	25.8
II. North East	358	4.3	2,445	3.1
III. North West	27	0.3	115	0.1
IV. North Central Coast	125	1.5	1,473	1.9
V. South Central Coast	349	4.2	5,276	6.7
VI. Central Highlands	113	1.3	1,041	1.3
VII. South East	5,126	62.0	42,337	54.1
VIII. Mekong River Delta	334	4.0	2,315	3.0
Vietnam	8,266	100.0	78,248	100.0

Source: Statistical Year Book of Vietnam, 2006

(iii) Regional Economic Disparity

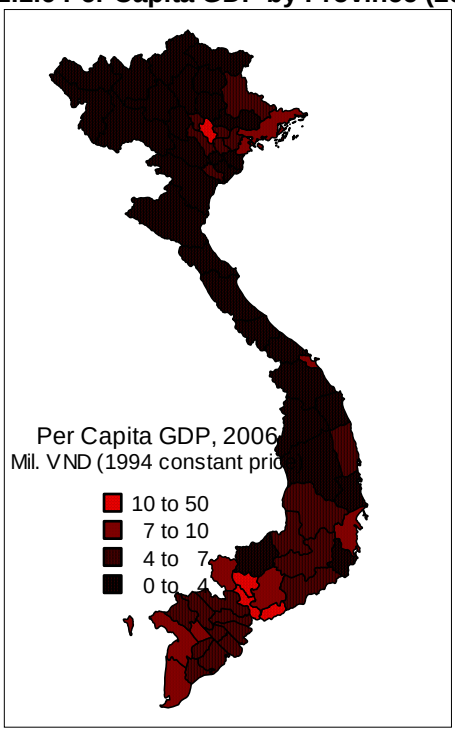
Average per capita GDP of Vietnam in 2006 is VND 6.5 million in terms of 1994 constant price. By region, GDP in the South East is comparatively very high at VND 13.9 million led by Ba Ria-Vung Tau with USD45.5 million and HCMC 16.3 million. Per capita GDP of Hanoi is also high at VND 11.8 million. On the other hand, per capita GDP of mountainous and highland regions in the central Vietnam is extremely low at VND 2-3 million (Table 2.1.5 and Figure 2.1.6).

Table 2.1.4 Per Capita GDP by Region (2006)

Region	GDP		Per Capita GDP
	Billion VND	%	Million VND
I. Red River Delta	113,738	20.9	6.2
II. North East	35,857	6.6	3.8
III. North West	6,943	1.3	2.7
IV. North Central Coast	37,331	6.9	3.5
V. South Central Coast	34,030	6.3	4.8
VI. Central Highlands	22,881	4.2	4.7
VII. South East	191,270	35.2	13.9
VIII. Mekong River Delta	101,974	18.7	5.9
Vietnam	544,024	100.0	6.5

Source: General Statistical Office
Note: 1994 constant price

Figure 2.1.6 Per Capita GDP by Province (2006)



2.2 Motorization and Road Transport Demand

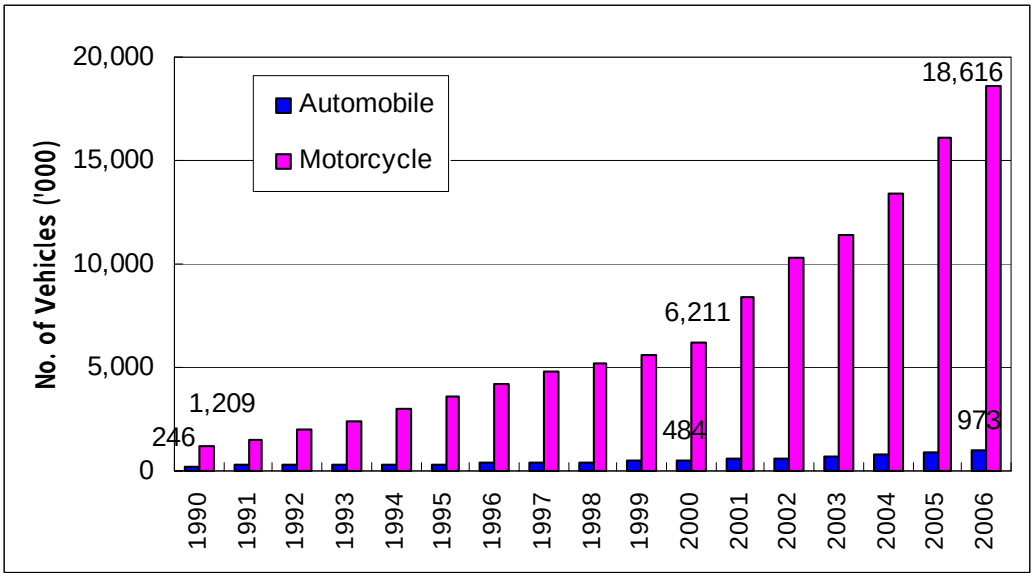
1) Registered Vehicles in Vietnam

(i) Rapid Motorization

In the 1990's, the number of registered motorized vehicles has rapidly increased with high annual growth rates of 17.8% for motorcycle and 7.0% for automobile. The number of motorcycles and automobiles has increased from 1.2 million and 246 thousand in 1990 to 6.2 million and 484 thousand in 2000, respectively.

This increasing tendency was accelerated after 2000 due to import of cheaper priced vehicles from China. The number of motorcycles and automobiles has further increased and reached about 19 million and 1 million, respectively, with higher annual growth rates of 20.1% and 12.3%, respectively. In 2006, the vehicle ownership rates are 220 motorcycles and 12 automobiles per 1,000 persons (Figure 2.2.1)

Figure 2.2.1 Number of Registered Vehicles (2006)



Source: National Traffic Safety Committee (NTSC)

(ii) Geographical Distribution

According to the data from the Road and Rail Traffic Police Department (PPTPD) under the Ministry of Public Security (MOPS) which has authority for the registration of road vehicles, automobiles and motorcycles are distributed nationwide but more than a half of them is concentrated in the regions of South East and Red River Delta where the two major metropolitan areas of Hanoi and HCMC are located. This tendency is more apparent in automobile, sharing 60% of the total (Table 2.2.1).

In HCMC and Hanoi, 224 thousand and 132 thousand of automobiles and 3.3 million and 1.1 million of motorcycles are registered, respectively. Ownership rates of automobile and motorcycle per 10,000 persons are calculated at 37 automobiles and 548 motorcycles in HCMC and 41 automobiles and 349 motorcycles in Hanoi (Figure 2.2.2).

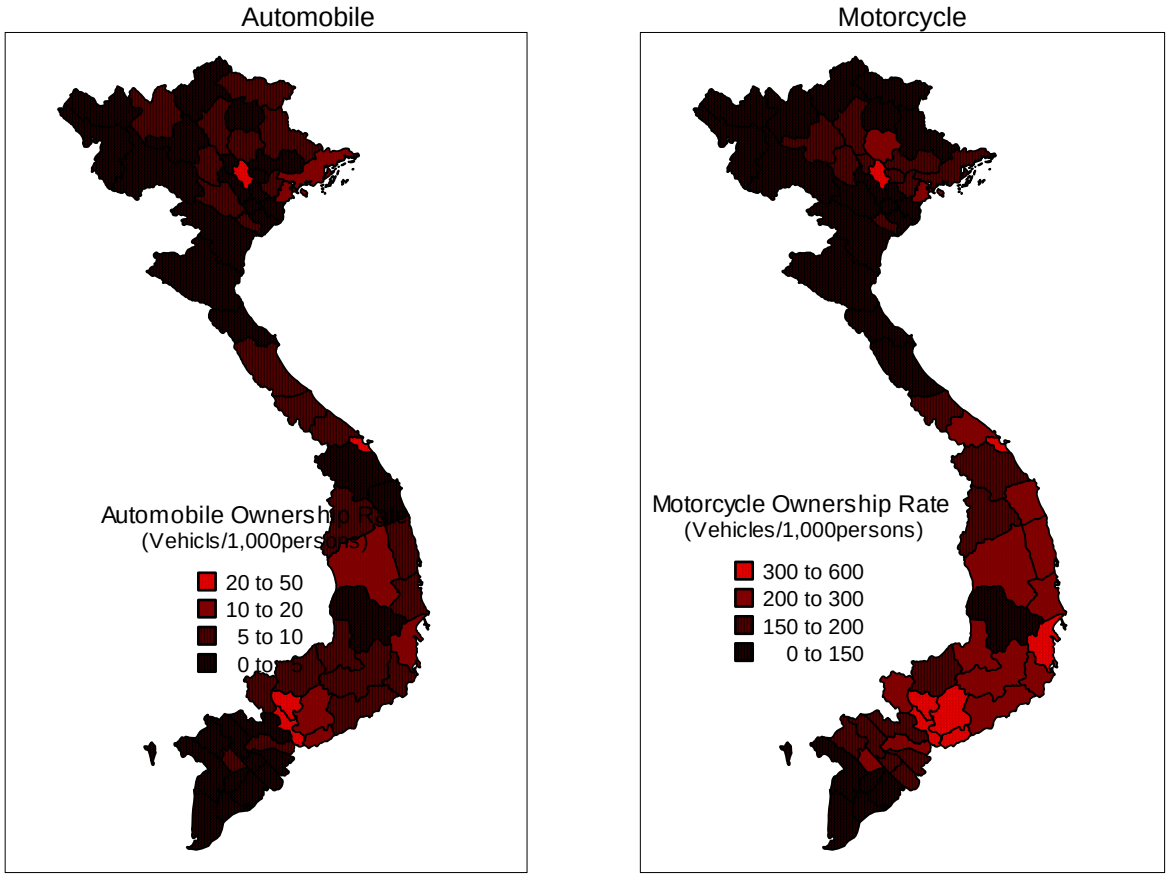
Aside from the vehicles registered by province, designated vehicles such as automobile belong to the central ministries and committees and foreign embassies. These accounted for 14,629 automobiles and 1,780 motorcycles.[2]

Table 2.2.1 Registered Vehicles by Region (2006)

Region	Automobile ('000)				Motor-cycle ('000)	Proportion (%)		Ownership (per 1,000 persons)	
	Car (9 pax)	Car (10 pax)	Truck	Total		Auto	M/C	Auto	MC
I. Red River Delta	83.5	24.4	104.9	212.8	3,494	25.6	19.5	12	192
II. North East	18.3	8.2	37.5	64.0	1,528	7.7	8.5	7	162
III. North West	2.8	1.2	5.7	9.7	287	1.2	1.6	4	110
IV. North Central Coast	12.5	6.3	32.0	50.8	1,481	6.1	8.3	5	139
V. South Central Coast	13.0	10.3	38.2	61.4	1,665	7.4	9.3	9	234
VI. Central Highlands	10.0	6.4	21.8	38.2	1,049	4.6	5.9	8	215
VII. South East	120.2	51.4	145.5	317.0	5,516	38.2	30.8	23	400
VIII. Mekong River Delta	15.9	16.1	29.1	61.1	2,879	7.4	16.1	4	165
RRTPD	9.5	1.7	3.4	14.6	2	1.8	0.0	-	-
Vietnam	285.7	126.0	418.1	829.8	17,901	100	100	10	213

Source: Road and Rail Traffic Police Department (PPTPD), Ministry of Public Security (MOPS)

Figure 2.2.2 Vehicle Ownership Rate by Province (2006)



Source: Road and Rail Traffic Police Department (PPTPD), Ministry of Public Security (MOPS)

[2] Accounted for motorcycles of MOPS only

2) Road Transport Demand

With the development of national economy, transport demand of people and goods is absolutely increasing. In Vietnam, road transport shares a dominant proportion among the total transport demand as shown in Table 2.2.2 and Table 2.2.3. In passenger transport, road transport shares 85% in terms of number of passengers and 63% in terms of passenger-km. Besides, in freight transport, it shares 67% in terms of tonnage and 15% in terms of ton-km.

Road transport demand in Vietnam is increasing yearly and opportunity for occurring traffic accident is also increasing. Annual growth rates of road passenger transport demand are 12% in the number of passengers and 8% in passenger-km. In freight transport by road transport, annual growth rates are 9% in tonnage and 8% in ton-km.

Table 2.2.2 Passenger Transport Demand (2000-2005)

Indicators		2000	2001	2002	2003	2004	2005	Annual Growth Rate '00-'05
No. of Passengers (million)		762	805	854	1106	1198	1288	11.1
Modal Share (%)	- Road	81.7	81.5	82.1	83.9	84.6	85.1	12.0
	- Rail	1.3	1.3	1.3	1.1	1.1	1.0	5.5
	- Maritime	-	-	-	-	-	-	-
	- Inland Waterway	16.6	16.7	16.2	14.6	13.9	13.3	6.3
	- Aviation	0.4	0.5	0.5	0.4	0.5	0.5	19.4
Passenger-km (billion)		33.0	36.4	39.4	43.8	48.8	54.6	10.6
Modal Share (%)	- Road	70.5	66.8	66.2	66.9	64.7	63.1	8.2
	- Rail	9.7	9.4	9.4	9.3	9.0	8.4	7.4
	- Maritime	-	-	-	-	-	-	-
	- Inland Waterway	6.5	6.9	6.3	7.5	7.0	6.6	10.9
	- Aviation	13.3	16.9	18.1	16.3	19.3	22.0	22.2

Source: Statistical Year Book of Vietnam, 2006

Table 2.2.3 Freight Transport Demand (2000-2006)

Indicators		2000	2001	2002	2003	2004	2005	Annual Growth Rate '00-'05
Cargo Volume (million)		206.0	223.3	241.0	264.0	295.5	317.3	9.0
Modal Share (%)	- Road	68.5	67.8	67.7	65.5	66.3	66.9	8.5
	- Rail	3.0	2.9	2.9	3.2	3.0	2.8	7.1
	- Maritime	7.5	7.5	7.7	10.4	10.6	10.4	16.3
	- Inland Waterway	20.9	21.7	21.7	20.9	20.0	19.8	7.9
	- Aviation	0.02	0.03	0.03	0.03	0.03	0.03	18.4
Cargo Ton-km (billion)		45.5	49.8	56.4	66.6	75.0	80.0	12.0
Modal Share (%)	- Road	17.3	16.3	15.3	13.9	14.1	14.5	8.0
	- Rail	4.3	4.1	4.2	4.1	3.7	3.7	8.6
	- Maritime	68.7	69.9	71.3	73.9	74.9	74.6	13.8
	- Inland Waterway	9.4	9.4	8.8	7.7	7.0	6.9	5.3
	- Aviation	0.3	0.3	0.3	0.3	0.3	0.3	16.3

Source: Statistical Year Book of Vietnam, 2006

3) Traffic Conditions on Major National Highways

(i) Profile of Data for Analysis

VITRANSS (The Study on the National Transport Development Strategy in Vietnam, 1999) is a major JICA-assisted transport planning study conducted for Vietnam. Road traffic survey was conducted for 39 stations on major national highways nationwide. In 2004, JICA also commissioned the Transport Development and Strategy Institute (TDSI) under the Ministry of Transport to conduct similar road traffic surveys to update the transport data. The result of these two road traffic surveys is shown in Table 2.2.4. The traffic volume in the table shows the 24-hours daily vehicular traffic for both directions.

(ii) Road Traffic Volume

As shown in Table 2.2.4, daily traffic volume varies by national highway and by section. Generally, arterial corridors such as national highways of No.1, No.5, No.13, and No.51 have larger automobile traffic volume ranging from 8,000 to 15,000 vehicles in 2004, particularly on the urbanized sections near the large cities of Hanoi, HCMC and Haiphong. On the other hand, the large motorcycle traffic volume of more than 10,000 in 2004 is observed not only on the urbanized sections of arterial corridors but also on the sections in the Mekong River Delta. On the other hand, some road sections on minor national highways in the central regions, Northeast and Northwest have less than 1,000 vehicles daily.

In terms of vehicular traffic volume, average increase ratios of traffic volume from 1999 to 2004 are 1.6 times in automobile and 1.9 times in motorcycle, respectively. Traffic volume at most of the section has been increased. There are a few sections that traffic volume was decreased.

(iii) Mixed Road Traffic

In Vietnam, a mixed traffic of automobiles and motorcycle is significant. Apparently, this traffic situation tends to be a cause of traffic accidents, because of traffic conflicts between vehicles with different running speeds and body size. As shown in Table 2.2.5, traffic volume of motorcycles accounted for more than 65% of the total traffic or 19 times of automobile in terms of vehicular traffic volume. In general, proportion of automobiles in the traffic on national highways is relatively higher compared to the traffic on the other lower classed roads such as provincial/city and district roads, since national highways are mainly used for long-distance trips. In the urbanized areas such as in Hanoi and HCMC, traffic volume of motorcycles accounted for more or less 90% in terms of vehicular traffic volume.

By type of automobiles, proportions of cars, buses and trucks in 2004 accounted for 7.5%, 8.6% and 18.1%, respectively. According to the traffic volume on major national highways from 1999 to 2004, the volume of motorcycles and cars showed rapid increases with growth rates of 13.7% and 12.5% per annum, respectively. Although, traffic volumes of buses and trucks were increased, their proportions were slightly decreased due to rapid increase of cars and motorcycles.

Table 2.2.4 Daily Road Traffic Volume on Major National Road (1999 and 2004)

NH No.	Re-gion	Province	Location	1999		2004		2004/1999	
				Auto-mobile	MC	Auto-mobile	MC	Auto-mobile	MC
1	1	Ha Nam	South Dong Van	6,358	4,343	12,251	8,834	1.93	2.03
1	1	Ninh Binh	North Ninh Binh Town	4,091	3,225	8,002	7,633	1.96	2.37
1	1	Bac Ninh	South Dap Cau	4,306	4,843	3,208	16,754	0.75	3.46
2	1	Vinh Phuc	North Ham Yen	487	2,142	588	1,487	1.21	0.69
5	1	Haiphong	East Du Nghia	4,040	3,895	8,922	10,481	2.21	2.69
6	1	Ha Tay	East Xuan Mai	1,952	2,993	4,113	10,423	2.11	3.48
10	1	Thai Binh	South Cau Nghin	546	1,963	2,246	3,212	4.11	1.64
10	1	Haiphong	East Kien Brdg.	469	912	4,485	7,948	9.56	8.71
18	1	Hai Duong	East Sao Do	2,650	3,126	4,320	7,556	1.63	2.42
1	2	Bac Giang	North Kep	2,193	1,888	3,322	4,246	1.51	2.25
2	2	Tuyen Quang	South Viet Tri Brdg.	3,659	3,405	5,053	6,302	1.38	1.85
3	2	Thai Nguyen	Dong Phu	563	860	1,030	1,600	1.83	1.86
3	2	Thai Nguyen	Ba Hang	2,184	2,762	4,189	7,309	1.92	2.65
37	2	Yen Bai	Thuong Bang La	49	464	141	730	2.88	1.57
70	2	Lao Cai	South of Bao Yen	276	772	624	2,342	2.26	3.03
4B	2	Lang Son	East Dinh Lap	66	673	161	732	2.44	1.09
6	3	Son La	North Thuan Chau	195	641	193	990	0.99	1.54
6	3	Hoa Binh	Northeast Tong Dau	586	324	1,144	1,153	1.95	3.56
21	3	Hoa Binh	North Lac Thuy	166	1,339	274	1,910	1.65	1.43
1	4	Thanh Hoa	North Bim Son	4,425	3,552	7,591	4,439	1.72	1.25
1	4	T.T. Hue	Lang Co	2,239	989	2,931	3,316	1.31	3.35
9	4	Quang Tri	West Dong Ha	803	1,090	1,365	2,863	1.70	2.63
1	5	Quang Nam	North Tam Ky	3,122	3,195	4,414	8,134	1.41	2.55
19	5	Binh Dinh	East An Khe Pass	1,642	746	2,700	4,571	1.64	6.13
26	5	Khanh Hoa	East Phuong Hoang Pass	943	1,458	968	1,366	1.03	0.94
14B	5	Quang Nam	East Dai Loc	262	2,080	733	4,451	2.80	2.14
1	7	Binh Thuan	Ham Thuan Nam	3,269	2,020	5,895	6,674	1.80	3.30
1	7	Dong Nai	South Ho Nai	21,184	31,131	15,417	19,205	0.73	0.62
13	7	Binh Duong	South Thu Dau Mot	6,820	15,467	9,465	23,584	1.39	1.52
14	7	Binh Phuoc	North Dong Xoai	1,169	2,774	2,501	5,551	2.14	2.00
20	7	Dong Nai	Ma Da Gui	2,132	2,333	5,516	6,582	2.59	2.82
22	7	Tay Ninh	East Trang Bang	3,284	6,336	6,367	10,079	1.94	1.59
51	7	B.R.V.T	North Phu My	4,265	5,473	9,050	18,580	2.12	3.39
1	8	Long An	North Tan An	11,683	14,005	19,939	21,193	1.71	1.51
1	8	Vinh Long	South Can Tho Ferry	2,632	2,945	4,696	28,430	1.78	9.65
30	8	Dong Thap	East Cao Lanh	1,386	8,062	2,053	26,791	1.48	3.32
60	8	Ben Tre	South Rach Mieu Ferry	932	11,806	2,342	16,843	2.51	1.43
80	8	Dong Thap	South Lap Vo	2,127	4,925	2,644	6,395	1.24	1.30
91	8	An Giang	West Long Xuyen	2,265	14,763	2,518	13,148	1.11	0.89
All stations								1.56	1.90

Source: 1999-VITRANSS, 2004-TDSI/JICA

Note: “Automobile” includes cars, buses and trucks. MC refers to motorcycles.

Table 2.2.5 Average Vehicle Composition of Major National Highways (1999 and 2004)

Year	Vehicle Type					Total	Motorcycle/ Automobile
	Automobile				Motor-cycle		
	Car	Bus	Truck	Total			
1999	7.4%	11.6%	19.8%	38.8%	61.2%	100%	1.6
2004	7.5%	8.6%	18.1%	34.2%	65.8%	100%	1.9
Growth Rate ‘99-’04 (%/year)	12.5%	5.5%	10.0%	9.2%	13.7%	12.1%	-

Source: 1999-VITRANSS, 2004-TDSI/JICA

Note: Figures are the average of 39 stations on major national highways nationwide.

2.3 Traffic Accident Analysis

The current situation of traffic accidents in Vietnam is discussed in this section. Vietnam's traffic accident situation is worsening and is getting more serious than that of other ASEAN countries. Recently, traffic accidents have become critical social problems and traffic safety is addressed as one of the urgent policy issues of the government.

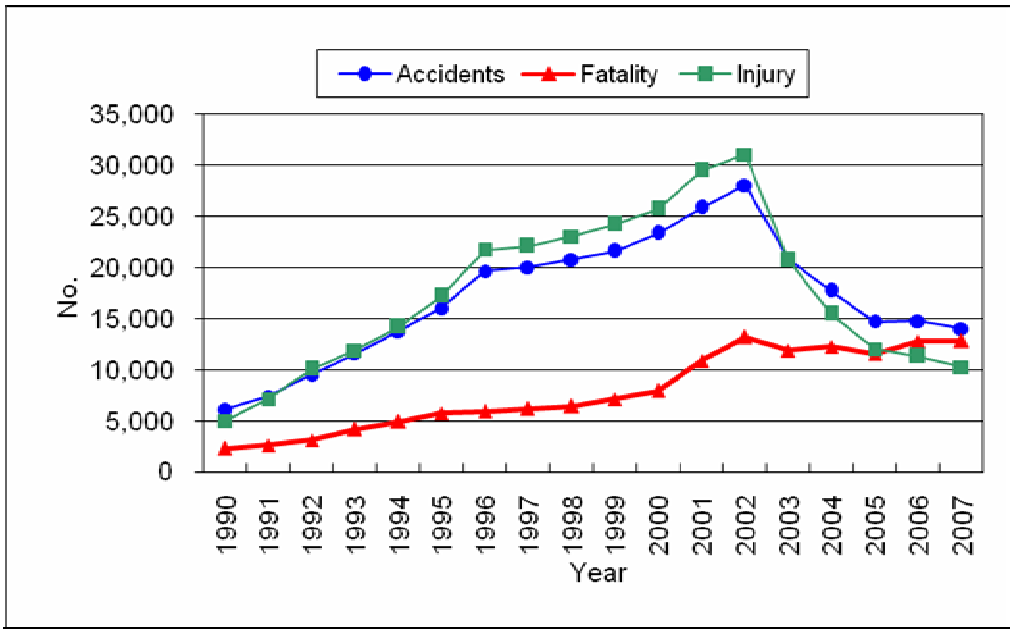
1) Road Traffic Accidents in Vietnam

(i) Trend of Road Traffic Accidents

Figure 2.3.1 and Table 2.3.1 show the annual number of road traffic accidents, fatalities and injuries from 1992 to 2007. In 2007, there were 13,985 road traffic accidents which resulted to 12,800 fatalities and 10,266 injuries. The road traffic accidents increased rapidly from 1990 to 2002, the peak year of traffic accidents, with an annual increase rate of 13.5%. During this 12-year period, the number of fatalities has particularly increased 5.8 times. The number of accidents, fatalities and injuries has reached 27,993, 13,186 and 30,999, respectively. However, the number of traffic accidents and injuries dramatically fell after 2003, although the number of fatalities remained high and relatively constant around 12,000 per year.

There may be systematic bias in the reporting of data on road traffic accidents since Vietnam's 0.87 fatalities per accident (2006) is extremely high as compared with its neighboring countries, with only 0.17 in Thailand and 0.02 in Malaysia (2000). Fairly constant fatalities from 2002 to 2006, in contrast to rapidly declining accidents and injuries in the same period, also point to statistical inconsistency. Significant under-reporting of accidents and injuries are suspected, relative to the number of fatalities which should be more reliable.

Figure 2.3.1 Road Traffic Accidents in Vietnam (1990-2007)



Source: National Traffic Safety Committee (NTSC)

Table 2.3.1 Road Traffic Accidents in Vietnam (1990-2007)

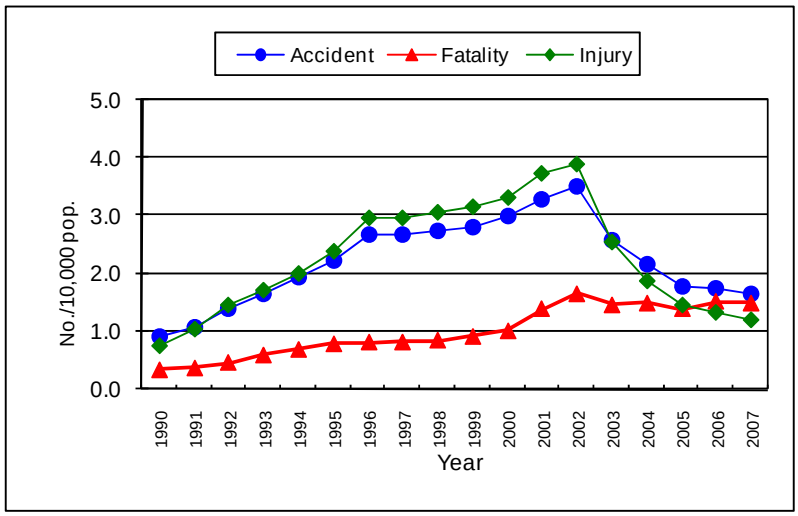
Year	Accidents			Fatalities			Injuries		
	No.	Growth Rate (%/yr.)	No. per 10,000 persons	No.	Growth Rate (%/yr.)	No. per 10,000 persons	No.	Growth Rate (%/yr.)	No. per 10,000 persons
1990	6,110	-	0.9	2,268	-	0.3	4,956	-	0.7
1991	7,382	20.8	1.1	2,602	14.7	0.4	7,114	45.3	1.0
1992	9,470	28.3	1.4	3,077	18.3	0.4	10,048	41.2	1.5
1993	11,582	22.3	1.7	4,140	34.5	0.6	11,854	18.0	1.7
1994	13,760	18.8	1.9	4,897	18.3	0.7	14,174	19.6	2.0
1995	15,999	16.3	2.2	5,728	17.0	0.8	17,167	21.1	2.4
1996	19,638	22.7	2.7	5,932	3.6	0.8	21,718	26.5	3.0
1997	19,998	1.8	2.7	6,152	3.7	0.8	22,071	1.6	3.0
1998	20,753	3.8	2.8	6,394	3.9	0.8	22,989	4.2	3.0
1999	21,538	3.8	2.8	7,095	11.0	0.9	24,179	5.2	3.2
2000	23,327	8.3	3.0	7,924	11.7	1.0	25,693	6.3	3.3
2001	25,831	10.7	3.3	10,866	37.1	1.4	29,449	14.6	3.7
2002	27,993	8.4	3.5	13,186	21.4	1.7	30,999	5.3	3.9
2003	20,774	-25.8	2.6	11,864	-10.0	1.5	20,704	-33.2	2.6
2004	17,663	-15.0	2.2	12,230	3.1	1.5	15,417	-25.5	1.9
2005	14,711	-16.7	1.8	11,534	-5.7	1.4	12,013	-22.1	1.4
2006	14,727	0.1	1.7	12,757	10.6	1.5	11,288	-6.0	1.3
2007	13,985	-5.0	1.6	12,800	0.3	1.5	10,266	-9.1	1.2

Sources: NTSC (accident data); VRA (vehicle data); GSO (population data)

(ii) Traffic Accident per Population

Figure 2.3.2 shows the fluctuation of indices of traffic accidents per 10,000 persons. The fluctuation trend is almost the same as those of numbers as described previously, because increase of population is constant at about 2% growth rate. Rates of accidents and injuries were increasing until 2002, but decreased later by less than 2 per 10,000 persons. However, fatality rate was still high at about 1.5 per 10,000 persons.

Figure 2.3.2 Road Traffic Accidents per 10,000 Population (1990-2007)



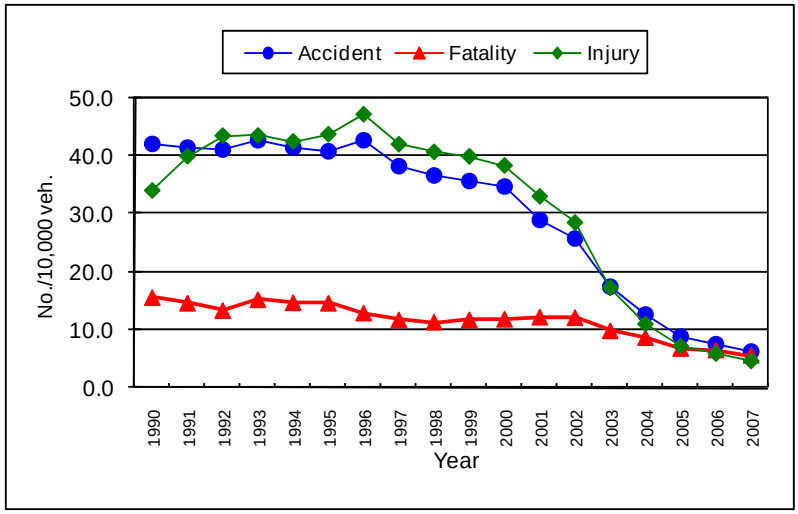
Source: JICA Study Team

(iii) Traffic Accident per Motorized Vehicles

The number of road traffic accidents has been increasing as the number of motorized vehicles including motorcycles increased. This is due to the rapid

motorization that Vietnam has been experiencing since the 1990s. As statistics would show, from 1990 to 2007, the number of motorized vehicles has sharply increased 13.5 times (4.0 times in cars and 15.4 times in motorcycle). On the other hand, as shown in Figure 2.3.3, the rates of accidents and injuries are sharply decreasing through the years. However, fatality rate still remains at a critical level of 5.6 per 10,000 motorized vehicles.

Figure 2.3.3 Road Traffic Accidents per 10,000 Motorized Vehicle (1990-2007)



Source: JICA Study Team

(iv) Geographical Distribution of Traffic Accidents

Traffic accidents are occurring nationwide. However, as shown in Table 2.3.2, more than 40% of accidents with nearly 6,000 fatalities are occurring in South Vietnam in 2006. HCMC accounted for 9% of the total accidents with more than 1,000 fatalities. In terms of rate per population, the regions of Southeast, Central Highlands, South Central Coast and Northeast indicated higher rate in each indicator of accident, fatality and injury.

Figure 2.3.4 shows the number of accident fatalities and fatality rate by province. As shown in this figure, provinces with more than 450 fatalities are located in HCMC and Dong Nai in the south and Hanoi in the north. On the other hand, provinces with high fatality rate (more than 2 fatalities per 10,000 persons) are distributed in the regions of Central Vietnam and the Southeast.

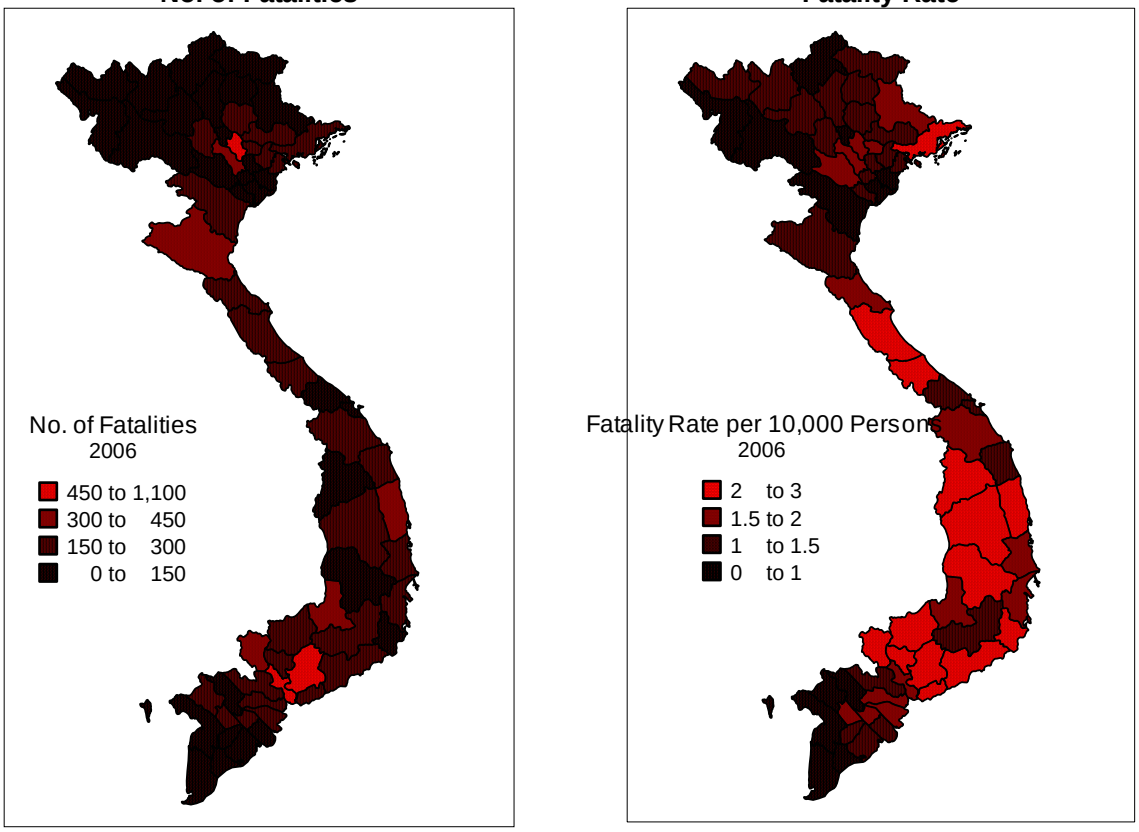
Table 2.3.2 Road Traffic Accidents by Region (2006)

Region	No. of Accidents	No. of Fatalities	No. of Injuries	Accident Rate (per 10,000 population)	Fatality Rate (per 10,000 population)	Injury Rate (per 10,000 population)
I. Red River Delta	2,716	2,156	1,832	1.5	1.2	1.0
II. North East	1,760	1,253	1,681	1.9	1.3	1.8
III. North West	383	290	393	1.5	1.1	1.5
IV. North Central Coast	1,277	1,288	810	1.2	1.2	0.8
V. South Central Coast	1,415	1,270	1,184	2.0	1.8	1.7
VI. Central Highlands	1,124	938	787	2.3	1.9	1.6
VII. South East	3,667	3,004	2,966	2.7	2.2	2.1
VIII. Mekong River Delta	2,230	1,937	2,146	1.3	1.1	1.2
Vietnam	14,572	12,136	11,799	1.7	1.4	1.4

Source: Road and Rail Transport Division, MOPS

Figure 2.3.4 Number of Accident Fatalities and Fatality Rate by Province (2006)

No. of Fatalities **Fatality Rate**



Source: Road and Rail Transport Division, MOPS

2) Comparison with Other ASEAN Countries

According to the Global Road Safety Partnership (GRSP) statistics, nearly 1 million people are killed and more than 10 million people are injured in road traffic accidents in the world every year. More than 75% of these occur in developing and transitional countries.

According to the traffic accident data of ASEAN countries (refer to Table 2.3.3), the level of traffic safety in Vietnam is very low. Regarding the total number of fatalities, Vietnam ranked third after Thailand and Indonesia in 2000 but has overtaken them to become No.1 by 2006.

In terms of fatalities to rate of population, Vietnam's figure is 1.5 per 10,000 persons in 2006 and ranked third after Malaysia (2.6) and Thailand (2.0). In terms of fatalities to motorized vehicles including motorcycle, Vietnam's figure is 6.5 per 10,000 vehicles and again ranked third after Myanmar (24.3) and Laos (19.1). In comparison, fatalities in Japan are 0.7 per 10,000 persons and 1.0 per 10,000 motorized vehicles.

Table 2.3.3 Comparison of Road Traffic Accidents Among Asian Countries (2000)

Country	Population (000)	Motorized Vehicles (000)	Accidents	Fatalities		
			No.	No.	Per 10,000 population	Per 10,000 Vehicles
Vietnam (2006)	**84,500**	**19,589**	**14,727**	**12,757**	**1.5**	**6.5**
Vietnam (2000)	**77,635**	**6,695**	**23,327**	**7,924**	**1.0**	**11.8**
Brunei	338	213	2,861	41	1.2	2.0
Cambodia	12,000	331	556	196	0.2	5.9
Indonesia	210,400	18,224	13,000	9,500	0.5	5.2
Laos	5,300	187	3,159	362	0.7	19.1
Malaysia	23,300	10,590	250,417	6,035	2.6	5.7
Myanmar	47,700	424	3,459	1,021	0.2	24.3
Philippine	75,600	3,506	10,595	969	0.1	2.8
Singapore	4,000	689	77,475	189	0.5	2.7
Thailand	60,700	19,728	67,800	12,040	2.0	6.1
Japan	129,260	89,250	917,609	9,066	0.7	1.0

Source: GRSP Conference Report, Hanoi, 2002

3) Analysis of Traffic Accident Data

In Vietnam, detailed data and information for nationwide traffic accidents compiled in a comprehensive database format is not available yet. The detailed data and information of each traffic accident is still kept with the local level and only representative data such as number of traffic accidents, fatalities and injuries are reported to the central level.

Therefore, in this Study, available data and information were collected by MOPS from the provincial departments of public security and simple analysis was conducted for the major items. In addition, the result of detailed analysis made by the People's Police Academy was obtained. The profile of these two data sources is shown in Table 2.3.4.

Table 2.3.4 Profile of Accident Data and Analysis Items

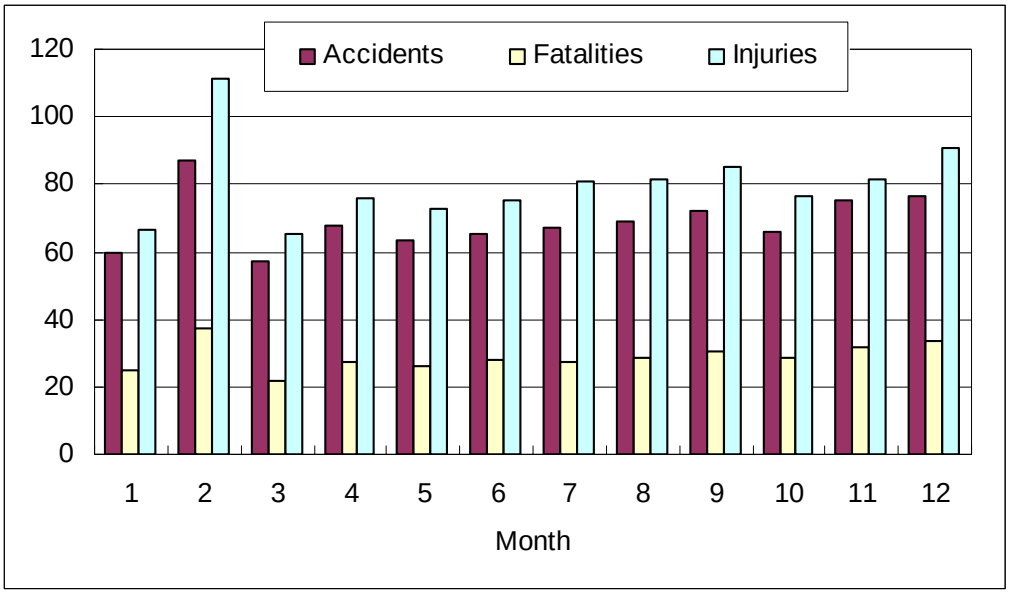
Data Source	**People's Police Academy** (based on the data from MOPS)	**Road and Rail Transport Division, MOPS**
Data Type	Sampled Data culled nationwide	Completed Nationwide Data
Data Year	2001 Sample Size: 17,462 Accidents (70% of the total) involving 7,334 fatalities and 20,954 injuries	2002 (25,381 accidents) 2003 (19,639 accidents) 2004 (16,874 accidents) 2005 (14,118 accidents) 2006 (14,572 accidents)
Items for Analysis	• Monthly Fluctuation • Weekly Fluctuation • Time Fluctuation • Age Distribution	• Type of Accidents • Road Classification • Type of Vehicles • Type of Causes • Type of Collision • Type of Road Section • Type of Intersection

Source: JICA Study Team

(i) Monthly Fluctuation

Figure 2.3.5 shows the monthly fluctuation of traffic accidents which occurred in 2001. As shown in this figure, February is the single leading month for the number of traffic accidents, fatality and injuries. On the other hand, other months have almost equivalent level of accident indicators.

Figure 2.3.5 Monthly Fluctuation of Traffic Accidents (2001)

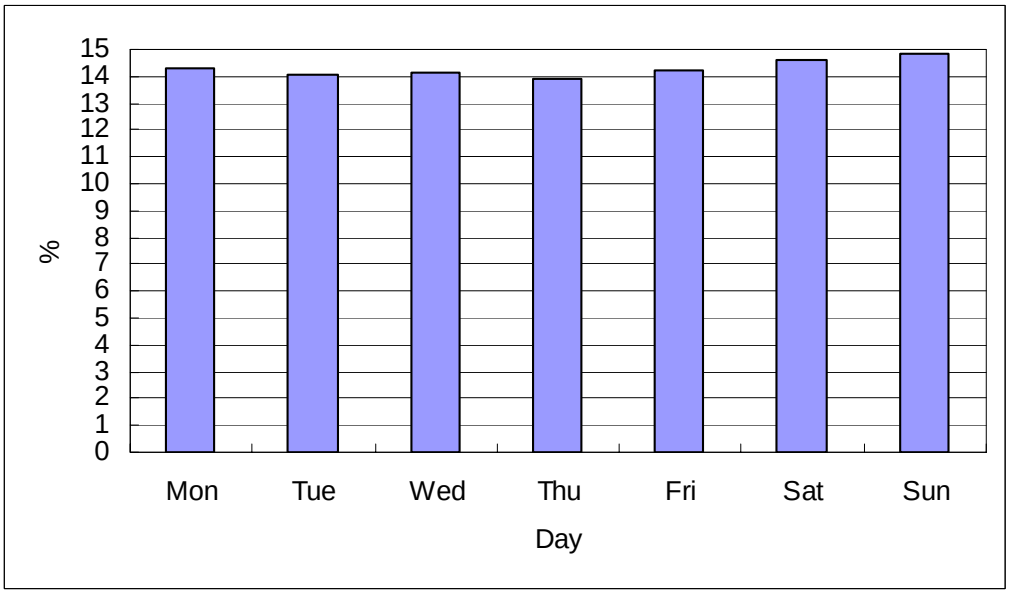


Source: People's Police Academy (Completed Nationwide Data)

(ii) Weekly Fluctuation

As shown in Figure 2.3.6, each day of the week has almost the same level of the number of traffic accidents, with a slight increase on the weekends.

Figure 2.3.6 Weekly Fluctuation of Traffic Accidents (2001)

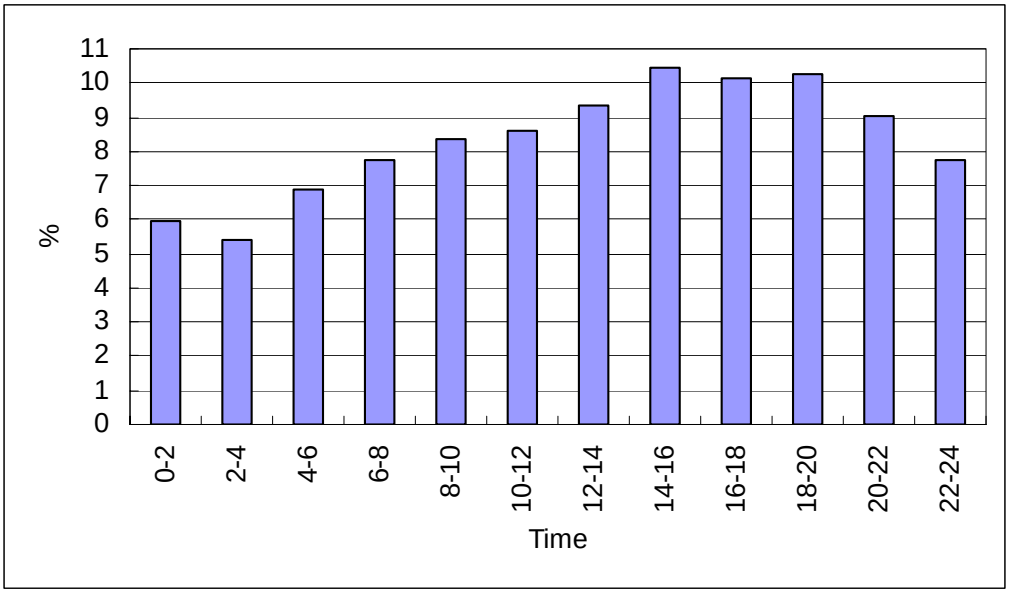


Source: People's Police Academy (Sampled Data Analysis)

(iii) Time Fluctuation

Figure 2.3.7 shows the time fluctuation of traffic accidents which occurred in 2001. As shown in this figure, traffic accidents tend to occur from the afternoon, highest during the period between 14:00 and 20:00.

Figure 2.3.7 Time Fluctuation of Traffic Accidents (2001)

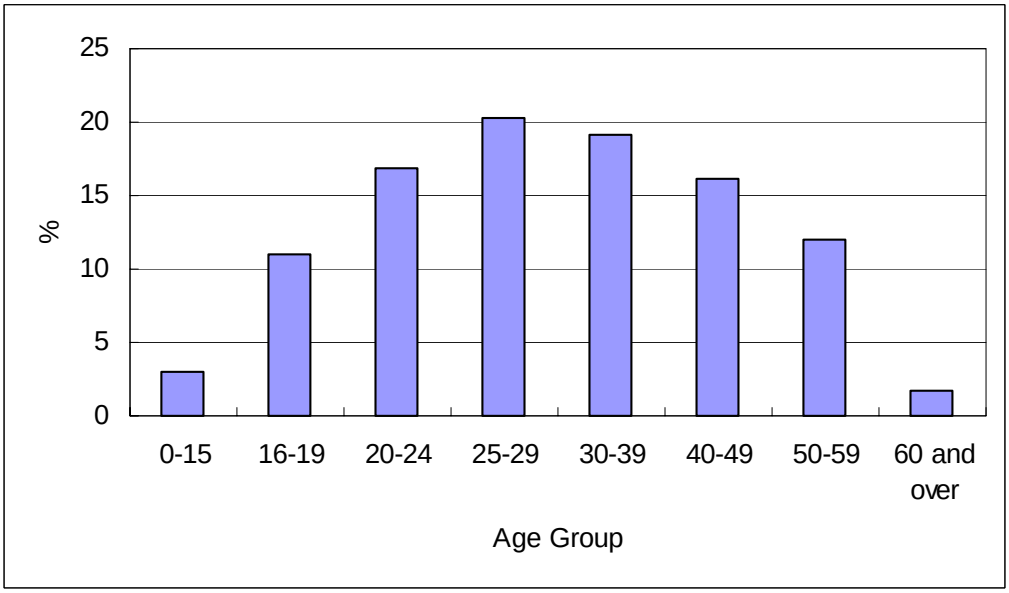


Source: People's Police Academy (Sampled Data Analysis)

(iv) Age Distribution

As shown in the Figure 2.3.8, age of accident offender forms a normal distribution. Age group from 20 to 29 years old accounted for 38% of the total offenders, followed by those in the 30's age group which shares 19% of the total. Young people aged below 20 years and those in the older age group of 60 years old and above still share 14% and 2%, respectively.

Figure 2.3.8 Traffic Accidents by Age Group (2001)



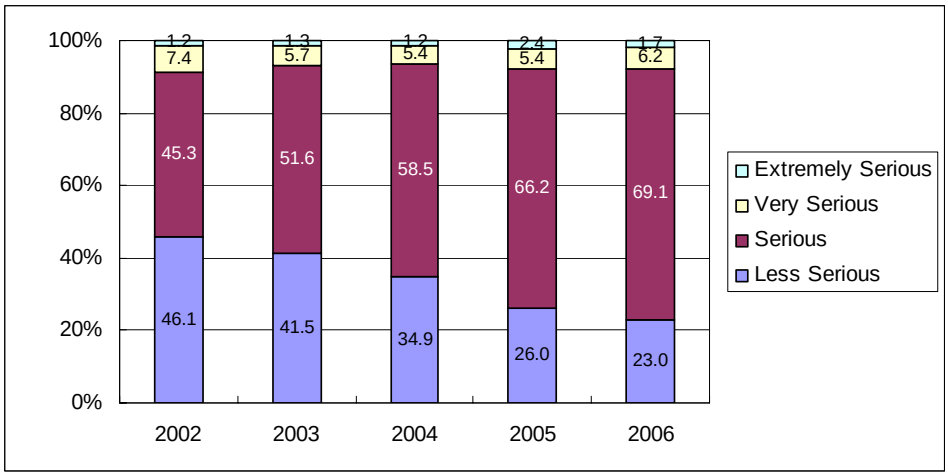
Source: People's Police Academy (Sampled Data Analysis)

(v) Accident Type

Figure 2.3.9 shows the composition of traffic accidents by accident type from 2002 to 2006. Accident type is defined by MOPS in its Decision 768/2006/QD-BCA (C11) issued in 20 June 2006, and classification is basically dependent on the seriousness of accident such as number of fatalities, injuries and property losses, etc.

As shown in this figure, in 2006, the serious accidents accounted for about 70% of the total accidents and the very serious and extremely serious accidents accounted for less than 8% of the total. Proportion of the serious accidents has been increasing as proportion of the less serious accidents has been decreasing since 2002.

Figure 2.3.9 Traffic Accidents by Accident Type (2002-2006)

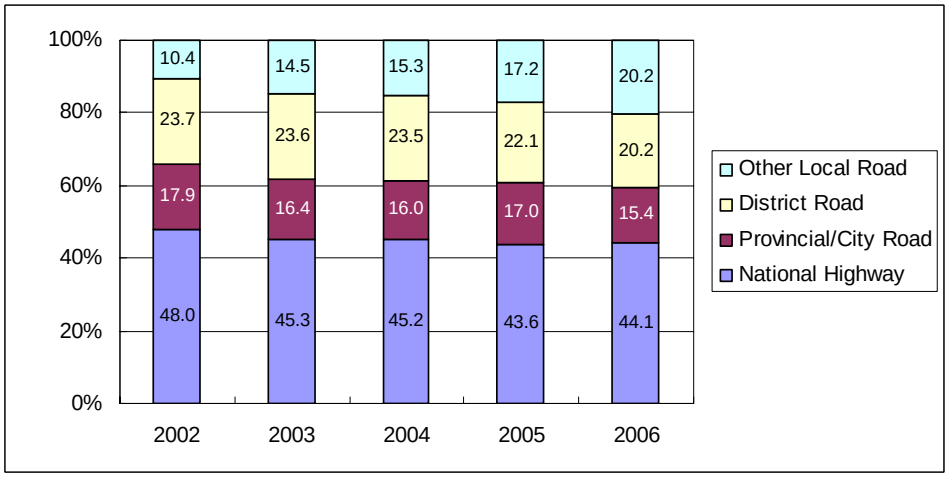


Source: Road and Rail Transport Division, MOPS

(vi) Road Classification

Almost half of road traffic accidents have occurred on the national highways where traffic volume and cruising speed are higher than other road as shown in Figure 2.3.10. Proportion of the other local roads has been gradually increased from 10% in 2002 to 20% in 2006.

Figure 2.3.10 Traffic Accidents by Road Classification (2002-2006)

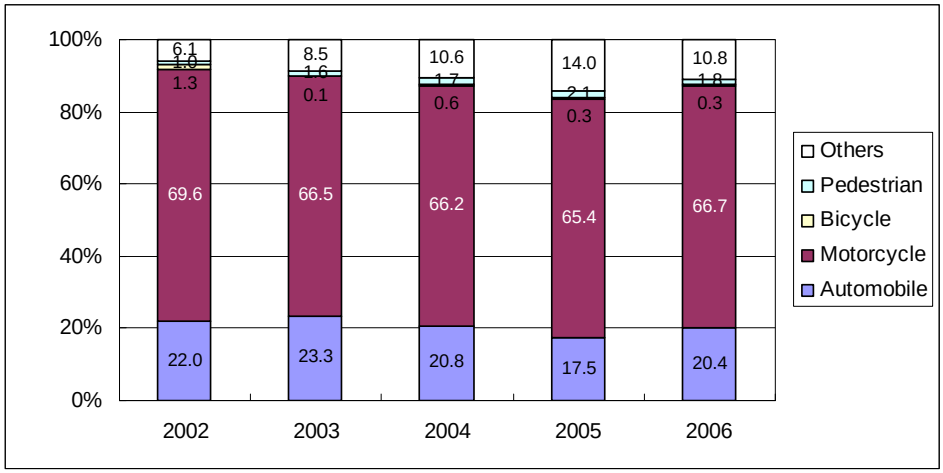


Source: Road and Rail Transport Division, MOPS

(vii) Vehicle Type

Figure 2.3.11 shows the composition of traffic accidents by vehicle type of offender from 2002 to 2006. By vehicle type, 67% of road traffic accidents were caused by motorcycle, 20% by automobile and 13% by other road users including bicycle and pedestrian.

Figure 2.3.11 Traffic Accidents by Vehicle Type (2002-2006)



Source: Road and Rail Transport Division, MOPS

(viii) Accident Causes

Table 2.3.5 shows the composition of traffic accidents by cause from 2002 to 2006. Most road traffic accidents in Vietnam are caused by road users' errors, among which, speeding is the primary cause accounting for 25%. Road infrastructure, especially national highways, has improved significantly in the last decade, but drivers' mindset has not changed accordingly. As a result, road users tend to speed up in highways with relatively less traffic. Wrong overtaking by trucks, buses and passenger cars expose low-speed vehicle, such as motorcycles and bicycles, to great risk in a mixed traffic situation. Under these circumstances, strict enforcement of traffic rules and effective traffic education of road users are crucial in reducing traffic accidents. In addition, physical measures such as improvement of surface conditions, paving of shoulders, re-designing of roads, and installation of traffic signs and signals are also necessary.

Table 2.3.5 Traffic Accidents by Cause (2002-2006)

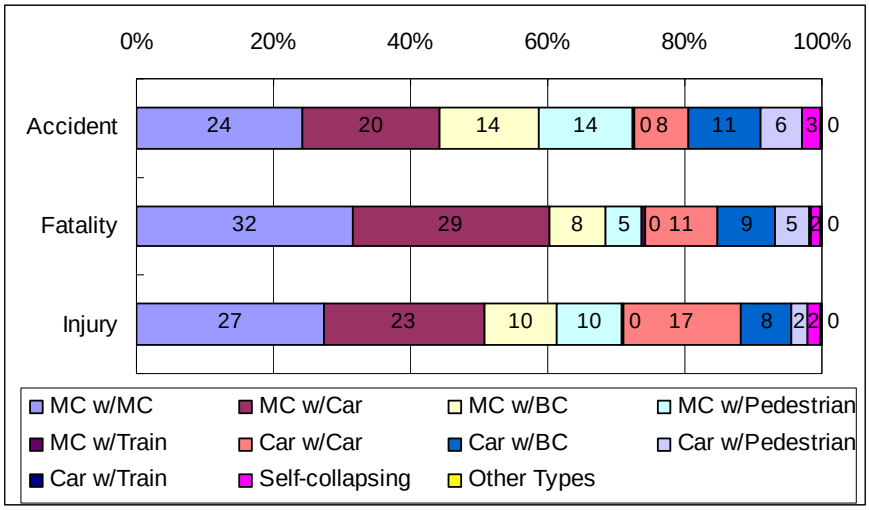
Causes	Proportion (%)				
	2002	2003	2004	2005	2006
1.Speeding	24.4	24.1	26.0	25.8	24.8
2. Wrong Overtaking	18.9	16.8	15.8	12.7	13.7
3. Wrong Lane Shifting	17.0	17.6	16.5	16.7	18.0
4. Turning Direction without Turning Signal	4.1	3.4	2.4	1.6	1.7
5. Passing Intersection with Red Signal	1.1	0.1	1.7	0.6	0.2
6. Not Keeping Safe Distance	6.9	0.9	2.4	1.8	0.4
7. Careless Driving	15.9	12.1	8.1	10.0	8.2
8. Careless Crossing of Pedestrians	0.7	2.3	2.9	3.2	2.6
9. Others	11.0	22.7	24.2	27.6	30.4

Source: Road and Rail Transport Division, MOPS

(ix) Collision Type

Figure 2.3.12 shows the composition of traffic accidents by collision type in 2001. In the case of fatality, more than 60% of fatalities are caused by accident between motorcycles and motorcycle with automobile. In the case of injury, accident between automobiles has higher proportion of 17% compared to other accident indicators such as the number of accidents and fatalities.

Figure 2.3.12 Traffic Accidents by Collision Type (2001)

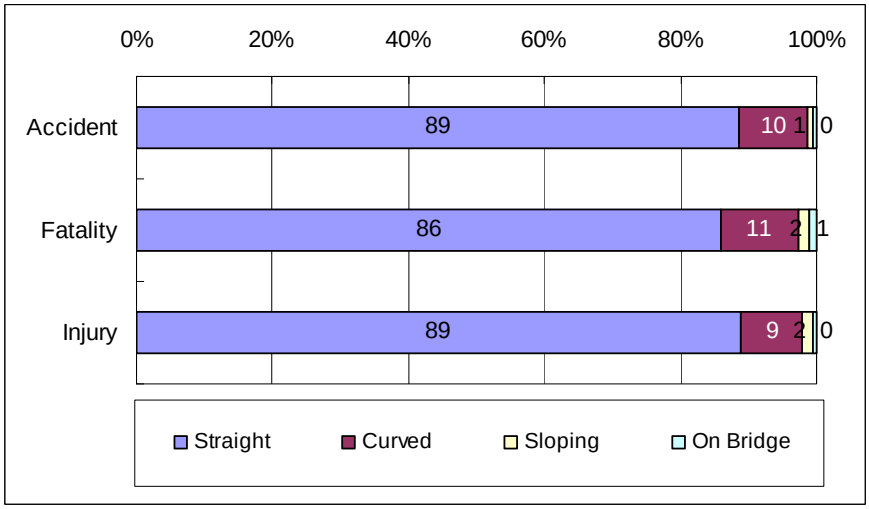


Source: People's Police Academy (Sampled Data Analysis)

(x) Road Section

Figure 2.3.13 shows the composition of traffic accidents which occurred on mid-block road section in 2001. About 90% of accidents occurred on the straight section of the road. In the case of fatality, accidents occurred on the curve section has relatively higher proportion (about 11%) as compared to the number of accidents and injuries.

Figure 2.3.13 Traffic Accidents by Road Section (2001)

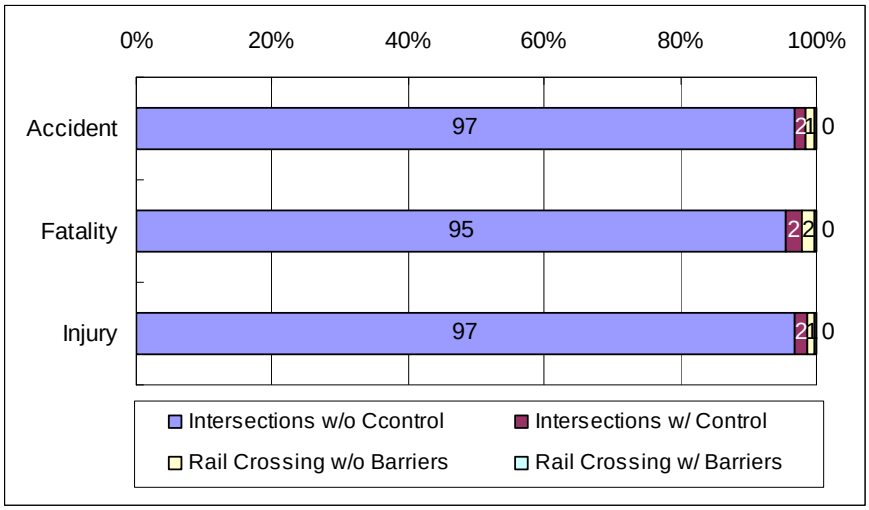


Source: People's Police Academy (Sampled Data Analysis)

(xi) Intersection Type

Figure 2.3.14 shows the composition of traffic accidents which occurred at intersections and crossings in 2001. Most of these accidents occurred at intersections without any control.

Figure 2.3.14 Traffic Accidents by Intersection Type (2001)



Source: People's Police Academy (Sampled Data Analysis)

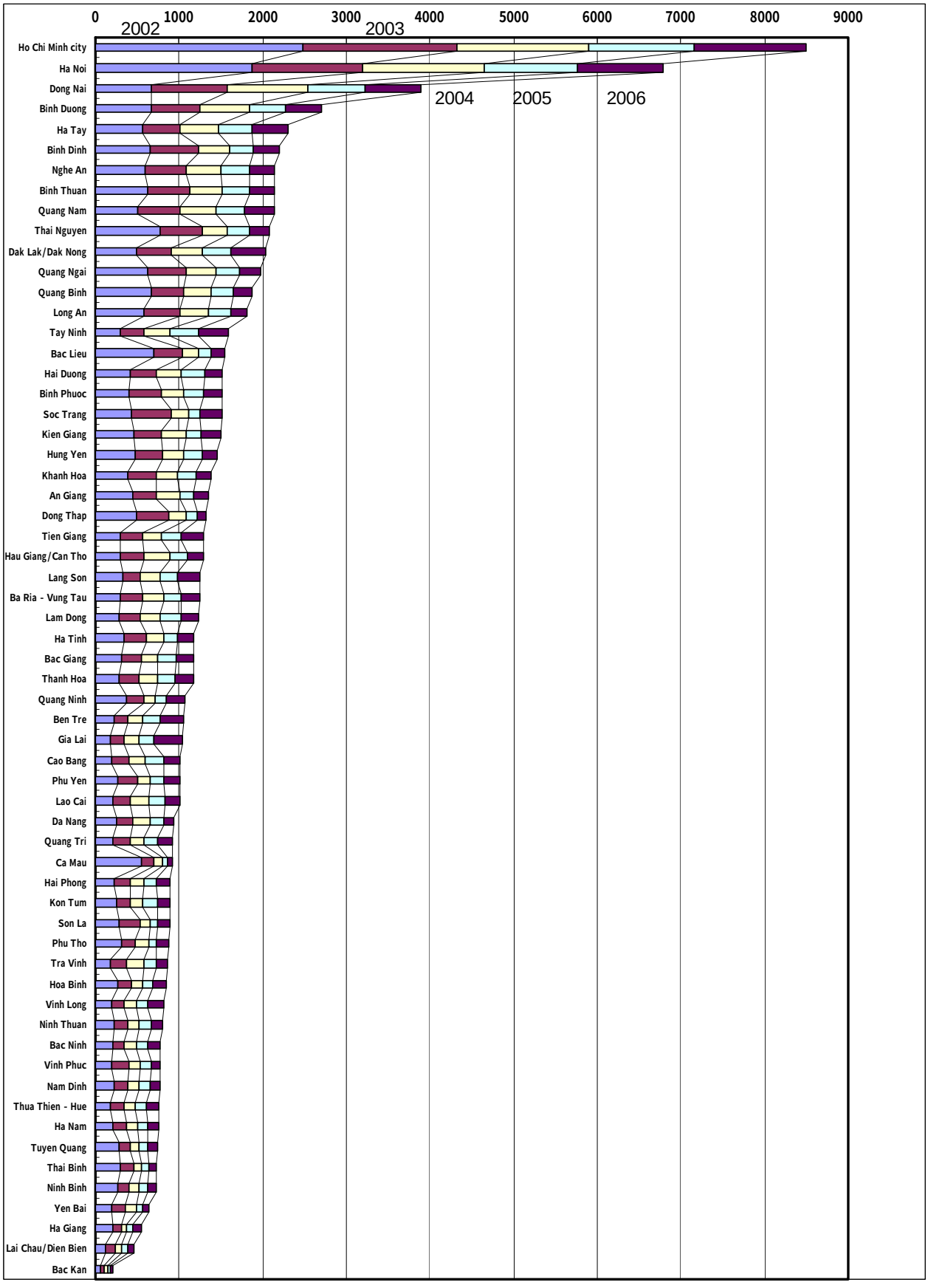
4) Traffic Accident by Province

To understand the traffic accident situations and traffic police activities of respective areas (district, province, city, town) and coverage areas (urban, rural, road type, expressway, etc), analysis of related data is necessary.

Figure 2.3.15 shows the number of traffic accidents by provinces and cities for five years from 2002 to 2006. Figure 5.3.16 to Figure 5.6.23 show the share of provinces and cities in terms of type of violation from 2002 to 2006.

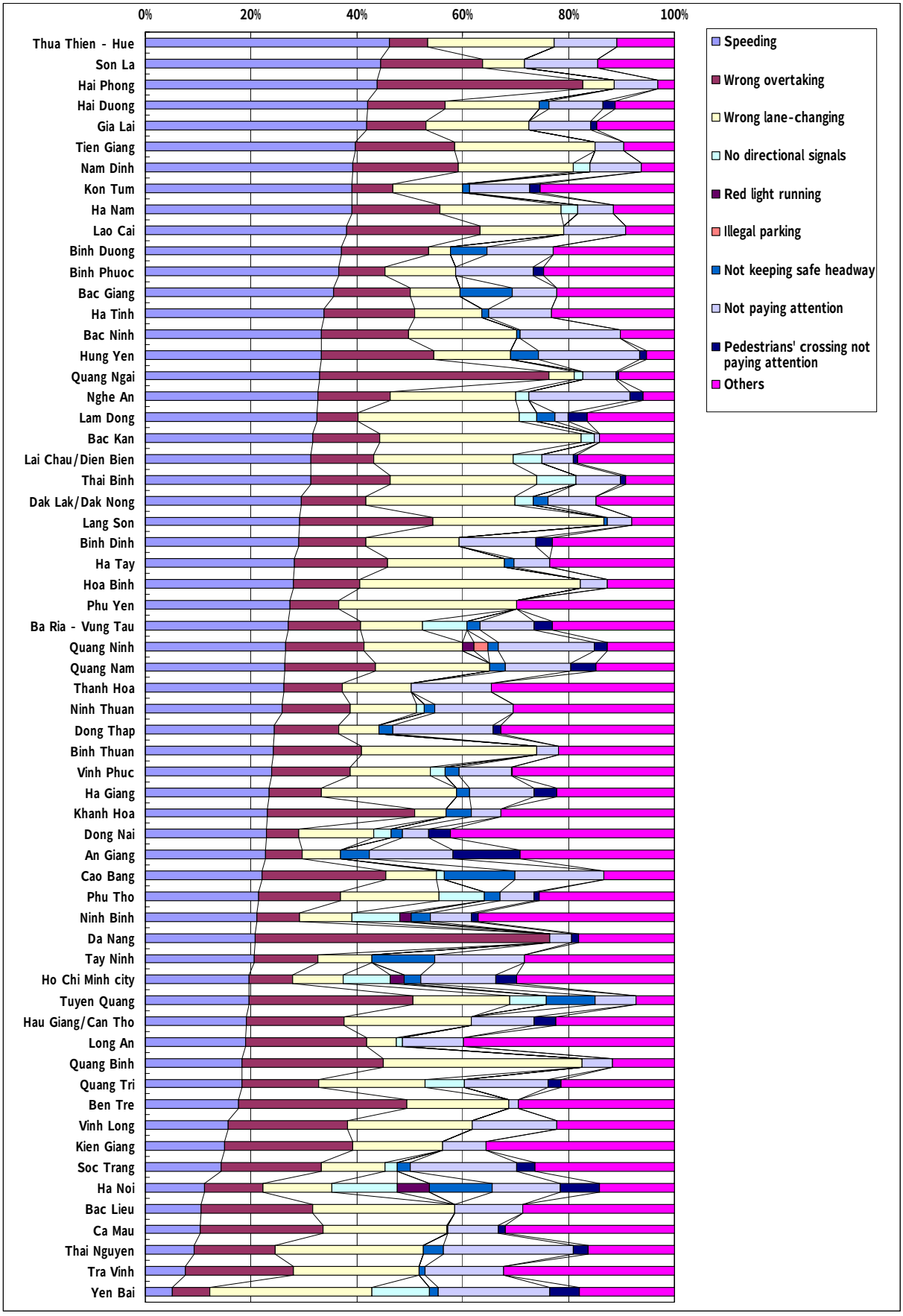
From these figures, traffic accident situations and traffic police activities in their respective areas of responsibility (in this, case province or city) are presented. And based on these situations, a program of traffic police activities including traffic law enforcement is planned.

Figure 2.3.15 Cities and Provinces with the Most Number of Accidents



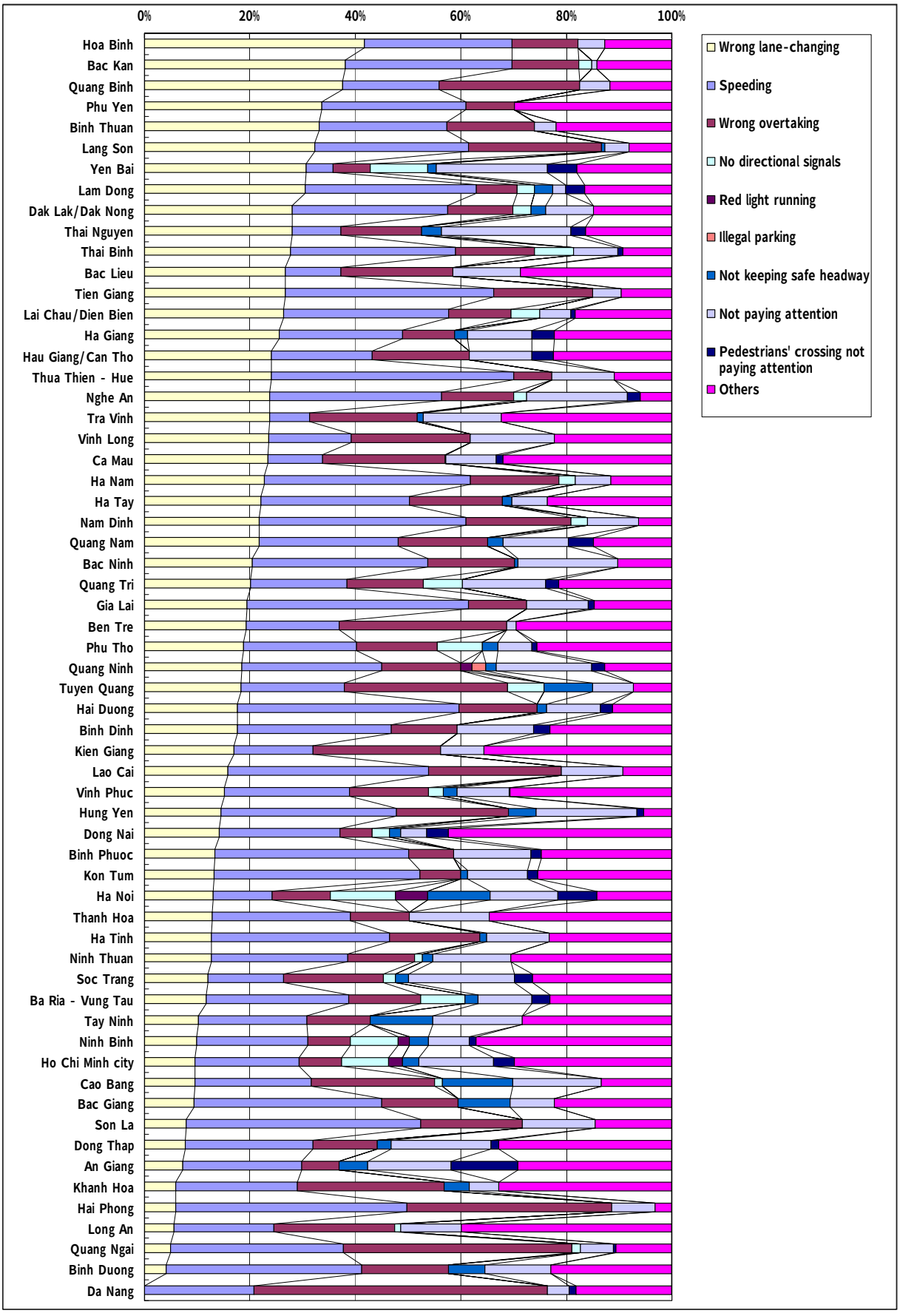
Source: JICA Study Team

Figure 2.3.16 Cities and Provinces with Highest Number of Accidents Due to Overspeeding



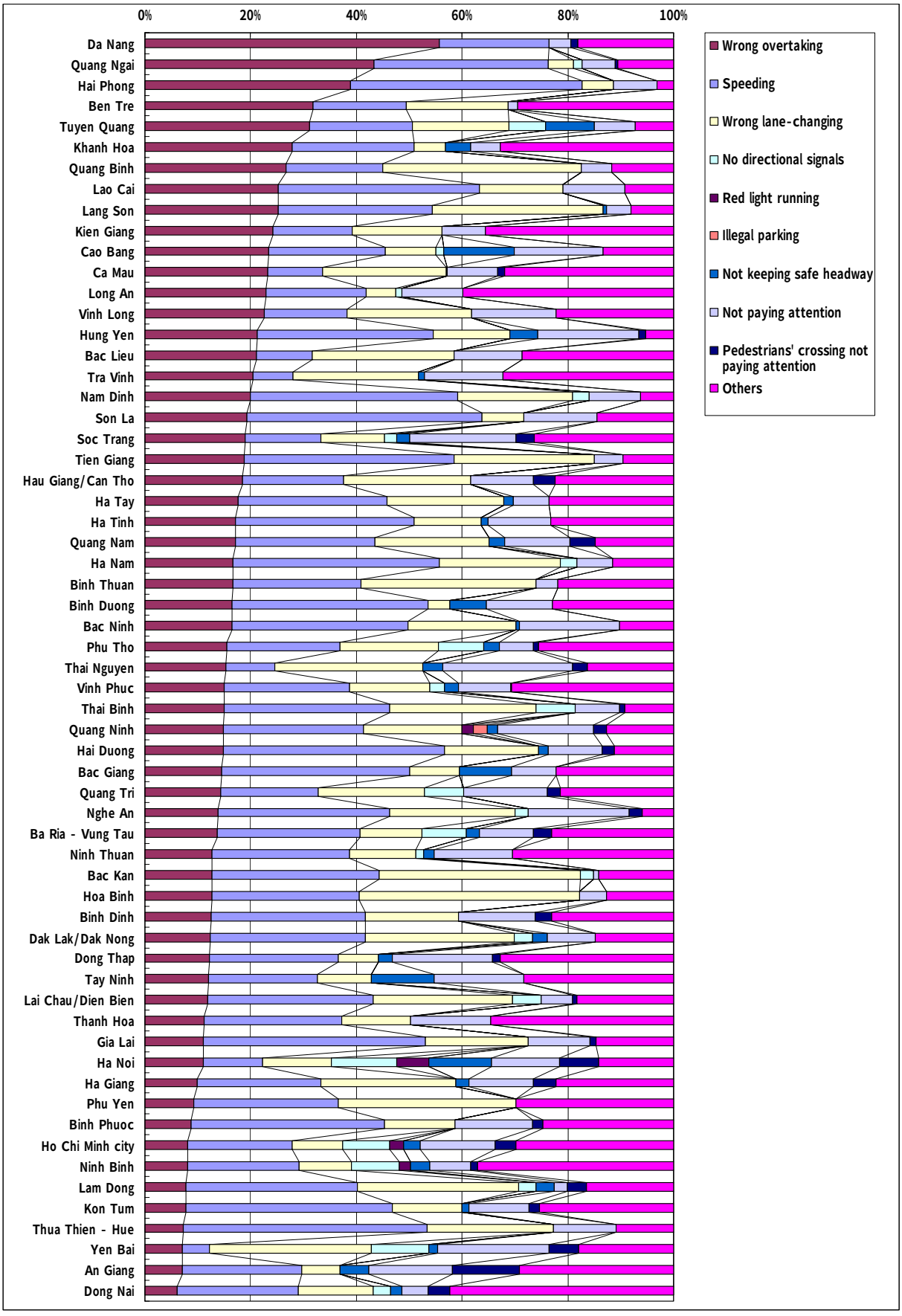
Source: JICA Study Team

Figure 2.3.17 Cities and Provinces with Highest Number of Accidents Due to Lane Changing



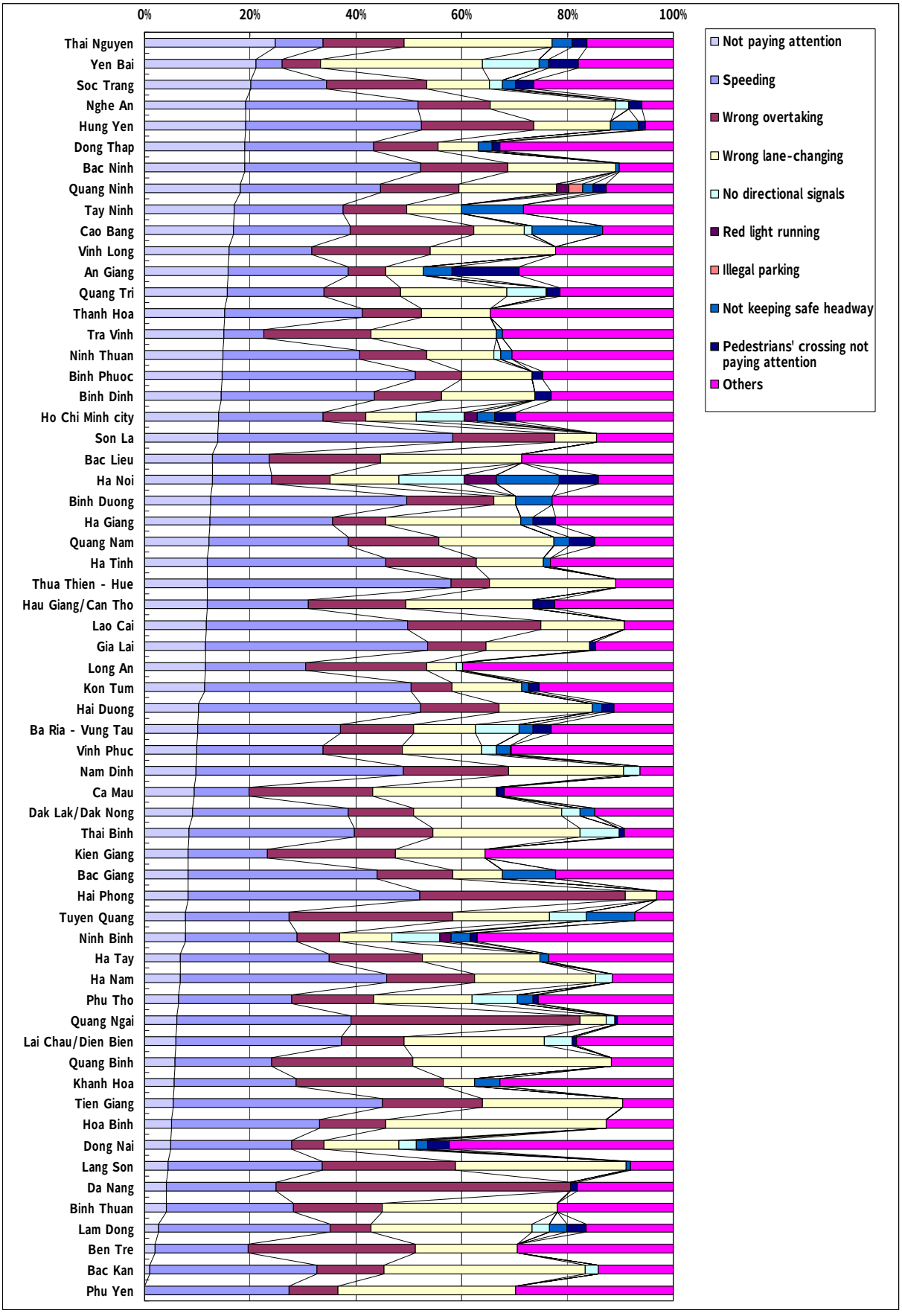
Source: JICA Study Team

Figure 2.3.18 Cities and Provinces with Highest Number of Accidents Due to Overtaking



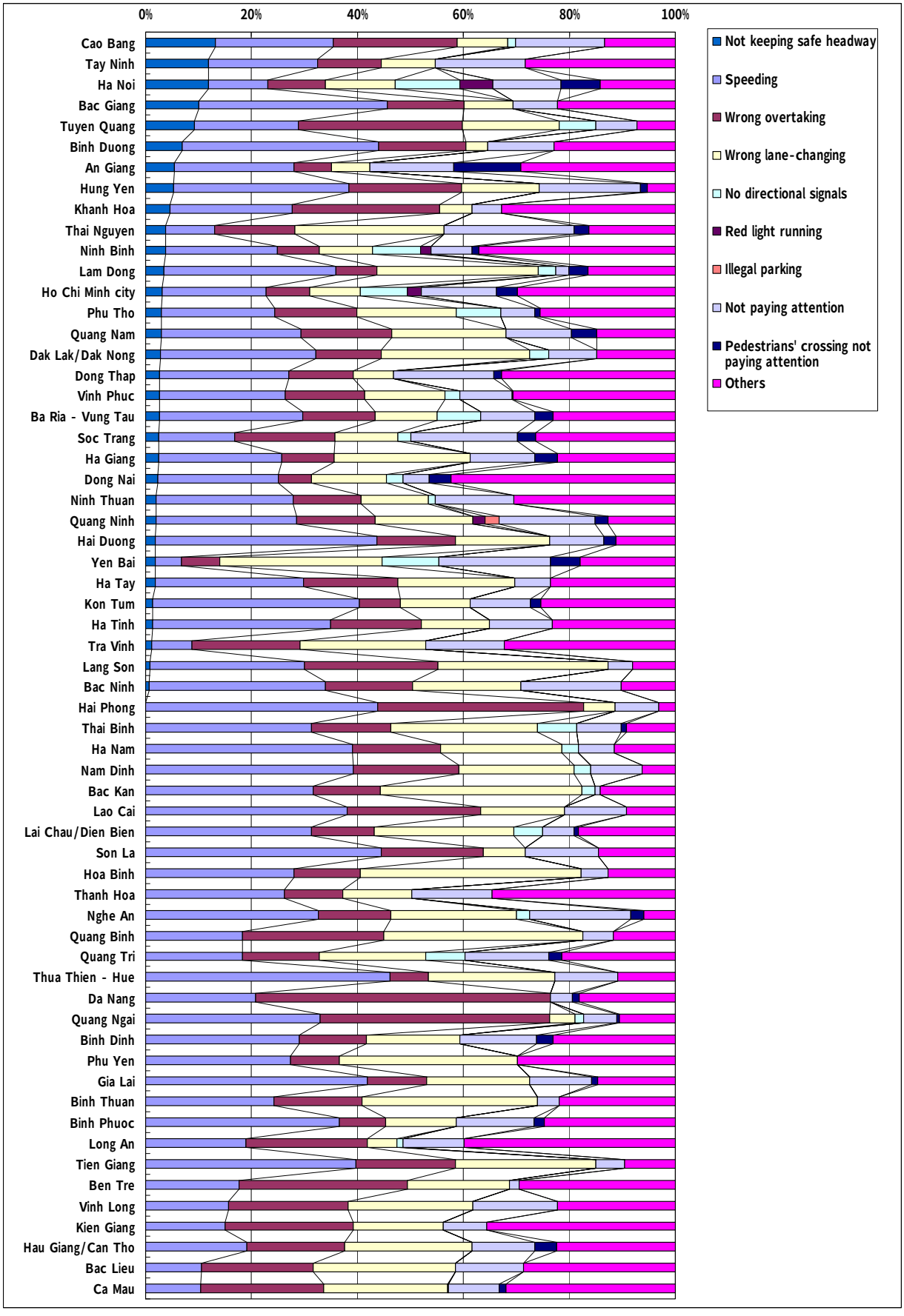
Source: JICA Study Team

Figure 2.3.19 Cities and Provinces with Highest Number of Accidents Due to Lack of Attention



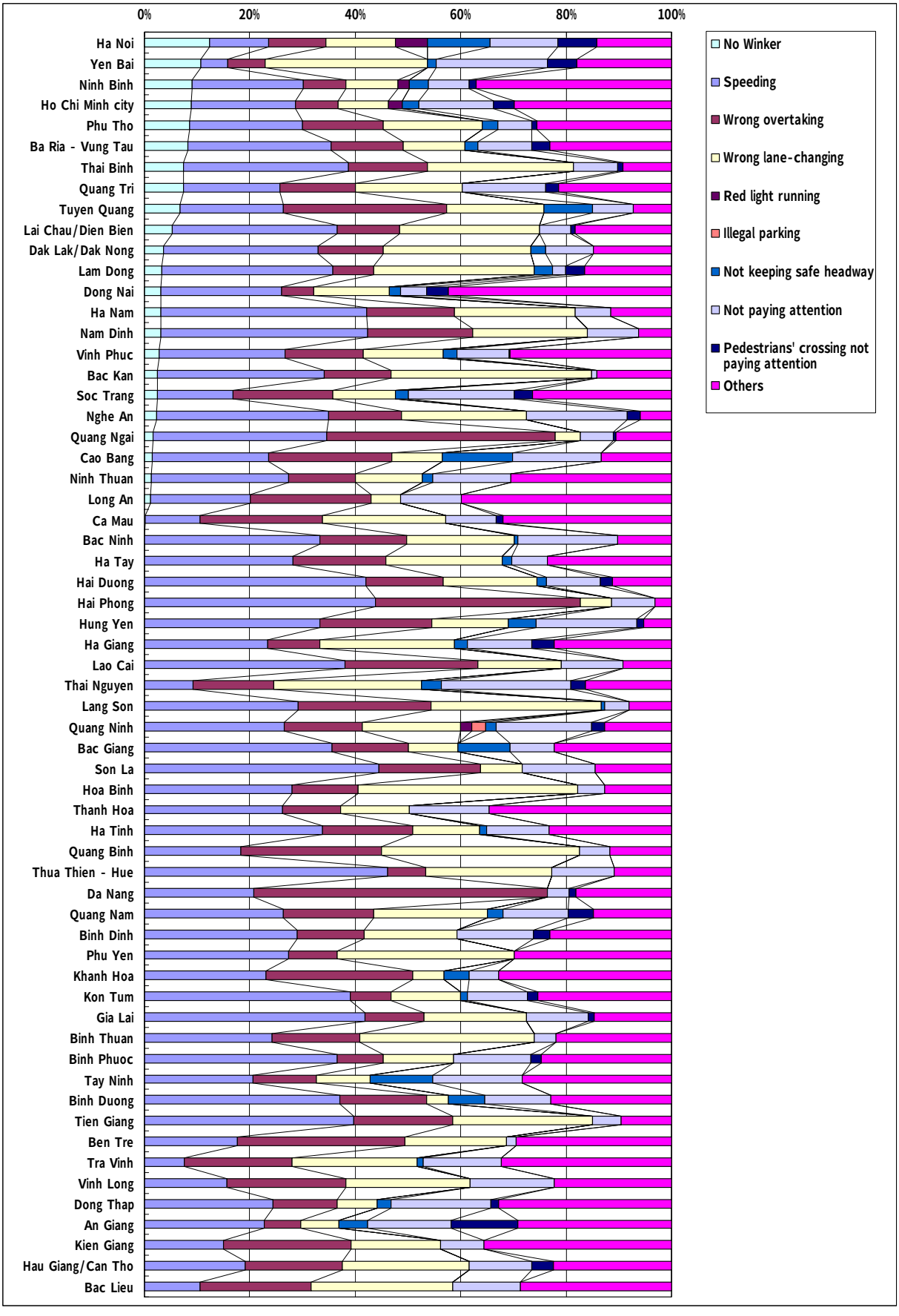
Source: JICA Study Team

Figure 2.3.20 Cities and Provinces with Highest Number of Accidents Due to Safe Headway



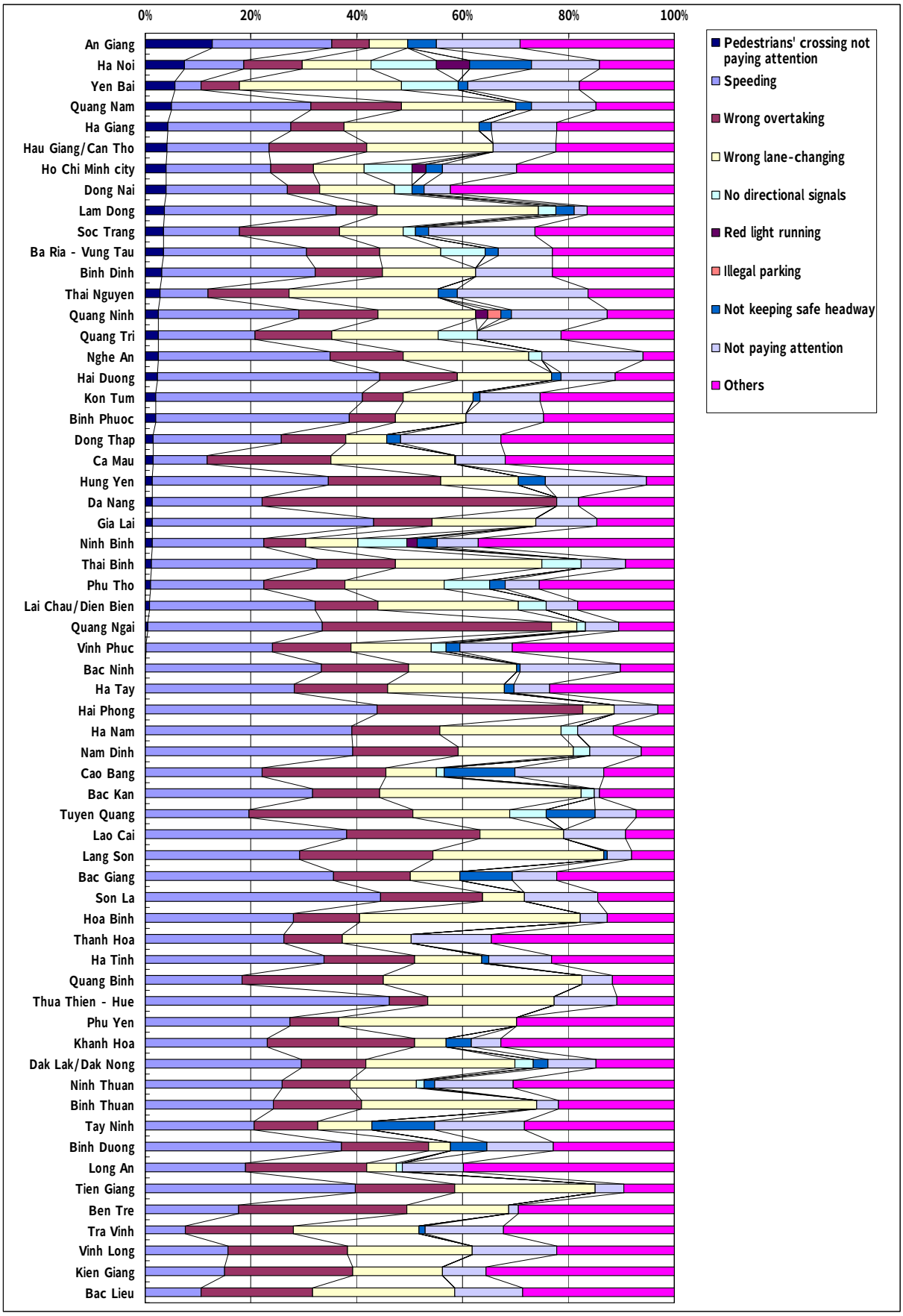
Source: JICA Study Team

Figure 2.3.21 Cities and Provinces with Highest Number of Accidents Due to Winker Violation



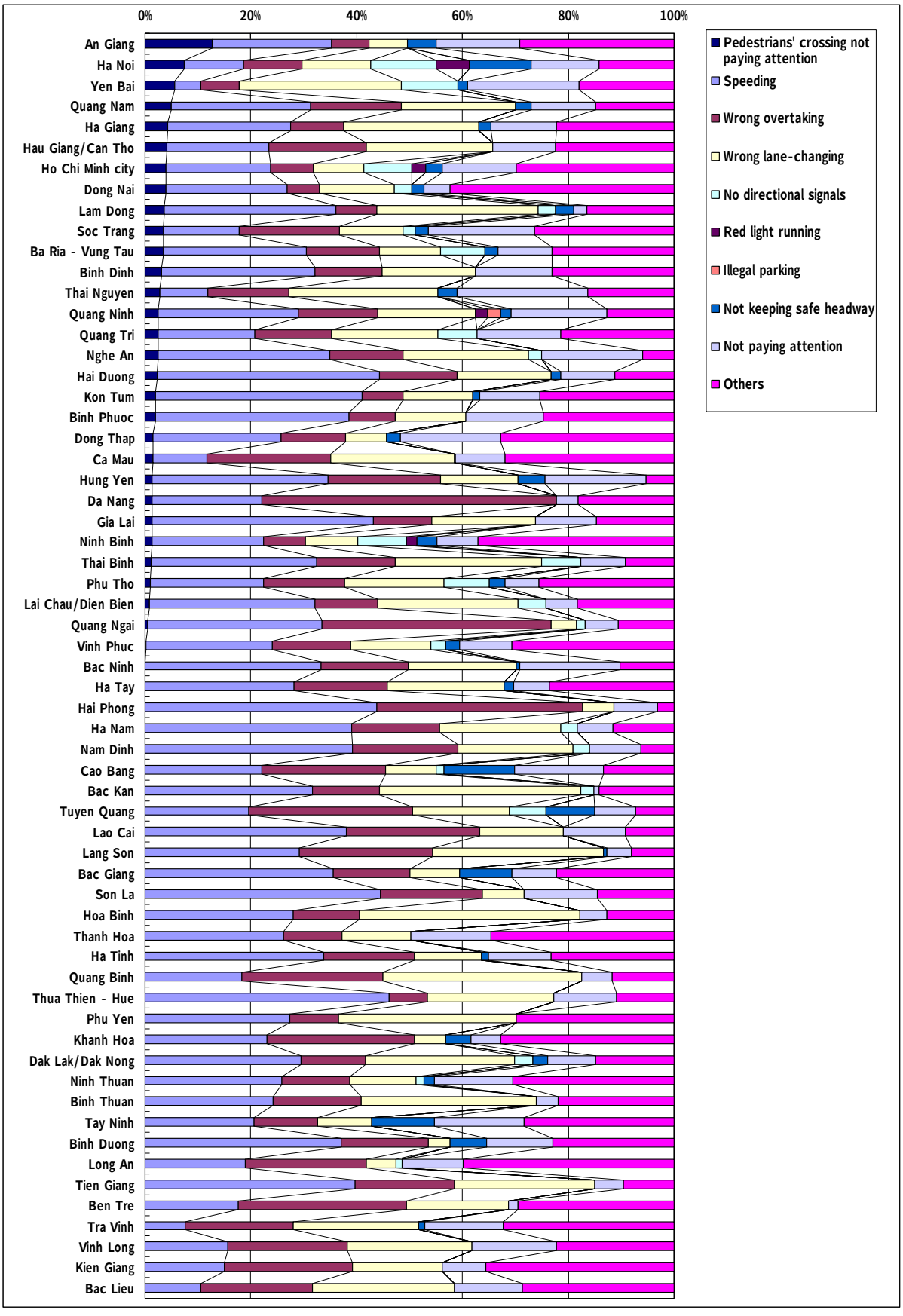
Source: JICA Study Team

Figure 2.3.22 Cities and Provinces with Highest Number of Accidents Due to Pedestrian Violation



Source: JICA Study Team

Figure 2.3.23 Cities and Provinces with Highest Number of Accidents Due to Traffic Signal Violation



Source: JICA Study Team

3 TRAFFIC SAFETY INSTITUTIONAL FRAMEWORK DEVELOPMENT POLICIES AND PLANS

3.1 Organizational Framework for Traffic Safety

1) Overall Institutional Framework

Relevant organizations and their responsibilities for traffic safety are briefly as follows:

(i) Government is responsible for supreme power execution on behalf of the National Assembly.

(ii) Ministry of Transport: The functions and responsibilities of MOT are to set strategies and policy directions, and, through its statutory agencies, to ensure the operations and regulatory functions and duties are being carried out.

(1) Transport Department is a statutory agency for road transport project portfolio and now plays the task of executive body for traffic safety of MOT.

(2) Legislation Department is responsible for setting up and monitoring transport legal documents. It plays the role of executive body for amendment of Road Traffic Law, (and Draft of Traffic Safety Law, if any).

(3) Planning and Investment Department is responsible for preparing investment plans on upgrading, rehabilitation and maintenance of transport infrastructures to improve black spots.

(4) Financial and Accounts Department is responsible for monitoring and financing the investment in upgrading, rehabilitation and maintenance of transport infrastructures.

(5) Science and Technical Department is responsible for setting up all technical standards on transport infrastructures and transport means.

(6) Sub sector Agency under MOT

The Vietnam Road Administration (VRA) and Vietnam Registration Administration are responsible for managing, monitoring and investing in transport infrastructures of its sub-sector. The VRA was established in 1993 as a subordinate agency to the MOT responsible for national road administration: from planning through construction and maintenance. Specifically, the stated responsibility of the VRA in the Decree No.7 CP/1993 is as follows:

- Formulation of road administrative policy, criteria, regulation, etc.
- Formulation of long-term strategy, 5-year planning, annual planning on national road maintenance,
- Management and supervision of road construction improvement and maintenance,
- Traffic management including traffic safety, etc.
- Establishment of criteria on vehicle loading capacity, structural standards on import/export of vehicles,

- Conduct of travel passenger/transport business
- Collection of fees from intended toll roads and operation of ferries
- Implementation of ODA, international organization-related project coordination.

While the primary function of the VRA is limited to maintenance of national roads, at present, it has been playing a major role on the improvement of traffic safety facilities development on the national roads. However, there is no special unit or team specializing on traffic safety.

In addition, VRA functions as the one of the main counterparts and sometimes the project owner of ongoing safety projects such as that of World Bank-assisted VRSP and the forthcoming JIBIC project.

(iii) Ministry of Police (General Department of Police)

Road and Railway Traffic Police Bureau is responsible for managing and monitoring road and railway traffic accidents and enforcing road and railway traffic rules and regulations.

Social Order and Administrative Management Police Bureau is responsible for dealing with pavement and roadway encroachment, illegal construction and preventing illegal motorbike races.

Criminal Police Bureau is responsible for investigating serious, very serious and extremely serious traffic accidents.

(iv) NTSC is responsible for coordinating traffic safety efforts and report the entire country's traffic safety situation to the Government.

(v) Ministry of Education and Training is responsible for educating and disseminating traffic laws and regulations in schools and universities.

(vi) Ministry of Health is responsible for giving emergency treatment, supporting and curing injuries caused by traffic accidents.

(vii) Ministry of Planning and Investment is responsible for preparing investment plans for construction of infrastructures, including transport infrastructures and transport means.

(viii) General Statistic Office is responsible for collecting, managing and monitoring all statistical data.

(ix) Ministry of Finance is responsible for financing, managing all taxes, charges, fees and penalties (including those in the transport sector).

(x) Vietnam Fatherland Front is responsible for coordinating with other organizations in promoting and disseminating traffic safety laws, regulations and institutions to all population levels so that people can better understand and follow them.

(xi) Youth Union is responsible for mobilizing youths to participate in the movement of traffic safety and order.

(xii) Ministry of Justice is a State Administrative organization on laws.

(xiii) Ministry of National Defense is responsible for ensuring safety of transport means managed by the military force.

(xiv) People's Committees in big cities such as Hanoi, Ho Chi Minh, and Danang are responsible for state administration on the transport and traffic safety in the city.

(xv) Provincial and Municipal Traffic Safety Committees are responsible for giving advice on local traffic safety to the chairmen of provinces and cities.

(xvi) TUPWS/PDOT is responsible for State administration on matters of transport infrastructures, transport means, drivers, traffic accidents, and transport inspectors.

(xvii) Local Traffic Police is responsible for enforcing traffic rules and regulations, dealing with traffic accidents, collecting traffic accidents data at local level, and making reports.

(xviii) Some other related agencies with specific responsibilities relating to the traffic safety.

2) Status of the Traffic Safety Committee in Vietnam

As already mentioned, the state agency responsible for traffic safety in Vietnam is the NTSC at the central level and the Traffic Safety Committees (TSCs) at the local levels.

The TSCs at municipal/provincial levels, referred to as Provincial Traffic Safety Committees (PTSCs) are established based on a proposal by the NTSC through its Official Letter No. 160/UBATGTQG dated 22 July 1998 and the Opinion of the Government's Organization-Personals Commission (formerly the Ministry of Internal Affairs). These are independent legal units, which have their respective seals and bank accounts.

Another kind of TSC also exists in some Districts and even at Commune/Wards. This type of TSC can be created by the local government based on necessity. Various agencies such as VRA and VIWA, hospitals (e.g. Cho Ray, Viet Duc, etc) and some transport businesses also have their own TSCs. However, these TSCs do not have a legal personality thus they do not have their own seal and bank accounts like the PTSCs. Instead, they mainly deal with their specific traffic safety concerns in their respective sectors/areas and are not covered in this Study.

(i) NTSC and Inter-agencies coordination mechanism

(1) Functions of the NTSC

Decision No. 917/1997/QD-TTg dated 29 October 1997 on the establishment of NTSC, Article 1 stipulates the "setting-up of the National Traffic Safety Committee to coordinate well the operations of the ministries, branches and localities responsible in ensuring traffic order and safety".

To play this coordinating role, Decision No. 917 affirms in Article 2 that the NTSC shall have the following tasks and powers:

(a) To advise the Prime Minister on the undertakings, policies, legal documents relating to traffic order and safety which are submitted to the Government or the Prime Minister by the ministries, branches and localities.

(b) To propose to the Prime Minister inter-branch measures to ensure traffic order and safety and organize coordination with the branches and localities in the implementation of the measures already ratified.

(c) To organize coordination mechanisms among central agencies and concerned organizations, People's Committees of the provinces and cities directly under the Central Government in the enforcement of the legal documents and regulations on road, railway, seaway, inland waterway, and airway traffic order and safety.

(d) To coordinate with the concerned agencies and organizations on how to widely popularize and disseminate among the people from all walks of life the provisions of law on traffic order and safety and how to educate them on the sense of strictly implementing such provisions.

(e) To organize coordination with the concerned State agencies and the People's Committees of the provinces and cities directly under the Central Government in inspecting the observance of the regulations on traffic order and safety.

(f) To urge branches and localities to apply appropriate measures to ensure traffic safety in areas with complex traffic conditions.

(g) To organize coordination between branches and levels in promptly overcoming consequences of serious traffic accidents.

(h) To organize coordinated operations between the traffic inspectorates in the various levels (central and local) and the People's Police forces in inspecting and supervising the implementation of the regulations on ensuring traffic order and safety throughout the country.

(i) To assess the situation on traffic order and safety in the whole country and for periodic reporting to the Prime Minister.

(j) To be entitled to establish relations and enter into cooperation with foreign countries and international organizations so as to exchange experiences and promote scientific-technological cooperation in the field of ensuring traffic order and safety.

In summary, NTSC has two main functions, that is: (i) overall coordination and organization of all traffic safety activities and (ii) monitoring of the traffic safety situations in local areas for reporting to and consideration of the Prime Minister.

Thus, the NTSC is a Coordinating State Agency and therefore does not play the role of a Traffic Safety State Management. Instead, there are several relevant Ministries with the functions and powers of a Traffic Safety State Management, which will be discussed in the succeeding sections.

(2) NTSC organization structure

Based on the organization structure shown in Figure 3.1.1, the traffic safety coordination role of the NTSC is as follows:

- The members of NTSC are concurrent leaders from related ministries: MOT, MOPS, MOET, MOH, MOF, MOJ, and MOD. This shows that the Government considers traffic safety as a comprehensive undertaking which needs to be

ensured by participations of all related agencies.

- The NTSC leaders, with the exception of the Chairman, are officers at vice-minister post or head of ministerial agency. This shows that NTSC is not an Inter-ministerial agency but instead, only an inter-ministerial coordination agency.
- To address the importance of Engineering Infrastructure and the important task in organizing traffic, MOT plays a major role in NTSC as exemplified by the following:
  - Minister of Transport is concurrently Chairman of NTSC;
  - All full-time staffs of NTSC are under management of MOT;
  - The number of regular members of the personnel of NTSC is allocated by the Government through MOT;
  - NTSC is not a budget estimating unit of level 1 as any ministry or Government belonging agency.
- The core team of the NTSC is a Standing Board with members at the level of ministerial agency head. This Board carries out regular meetings to comply with NTSC's task as an advisory board. In fact, many conclusions of this Board have been implemented by related agencies without any opinion from higher level.
- To address the importance of Enforcement in Traffic Safety, MOPS, particularly the General Department of Police, plays an important role in the NTSC's Standing Board. A vice-head of this General Department is concurrently chairman of this Board.
- The Standing Office of NTSC established by the Decision No. 16/1998/QD-UGATGTQG dated 6 February 1998 plays an executive role. Besides the administrative jobs, this Standing Office has a focal position in the NTSC with the following three specialized tasks:
  - To collect information on traffic accidents in the whole country, especially in extreme cases of traffic accidents; and to publish traffic accidents data.
  - To coordinate with all relevant agencies in the preparation, submission of proposal and advices for NTSC in relation with traffic safety policies, orientation, etc.
  - To organize the traffic safety education/campaigns. With this task alone, the Standing Office implements a lot of activities such as campaigns, traffic safety months, etc.

The Traffic Safety Projects Management Unit (TS PMU) is established by the Decision No. 305/2004/QD-UBATGTQG dated 29 November 2004. The TS PMU is tasked to manage implementation of projects of NTSC as the investor; from preparation, implementation and construction stages as stipulated by law. TS PMU is an administrative unit and its expenditure is under the total estimated cost of all projects which TS PMU are assigned to manage and other receivable resources as the provided by State regulations.

TS PMU has the following main tasks:

(1) Prepares and implements projects on behalf of the investor (NTSC).

(2) Transacts and coordinates with relevant agencies, local and international organizations to mobilize other investment capitals for traffic safety projects and manage the use of investment capitals as stipulated by law.

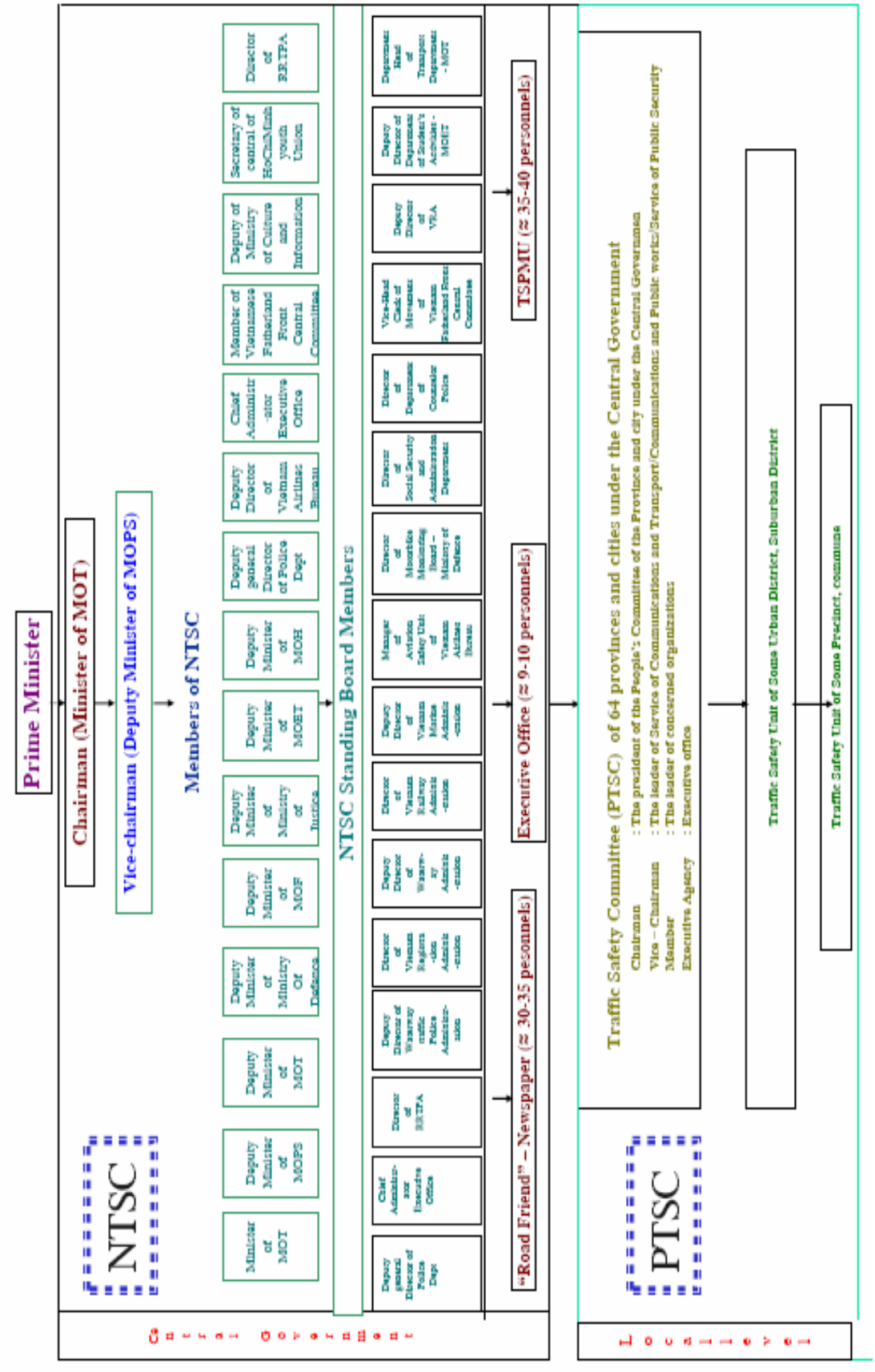
(3) Assist the Chairman of NTSC in coordinating with Ministries, Industries, local levels, and relevant sectors in the development and implementation of Traffic Safety Projects.

The TS PMU manages the implementation phase of the World Bank-funded "Vietnam Road Safety Project" (VRSP) and the preparatory phase of the JBIC-funded project to improve the Traffic Safety for National Highways No. 3, 5, 10 and 18.

Following current legal documents, a PMU is terminated with the completion of its project. Without a project, the PMU would be dissolved (Circular No. 03/2007/TT-BKH of MPI dated 12 March 2007 and Circular 02/2007/TT-BXD of Ministry of Construction dated 14 February 2007).

The NTSC has no attached agency or human resources to implement projects and various important activities on its own. Thus, the NTSC is able to undertake and organize such activities through other agencies only.

Figure 3.1.1 Organization Structure of NTSC and TSC



(3) Concurrence and Coordination Working Mechanisms

These main working mechanisms of NTSC have several advantages, as follows:

- The function of state management on traffic safety is assigned to several ministries/sectors. Thus, it can meet the demand for comprehensive traffic safety polices either in a wide-ranging scope or concrete measure is an advantage.
- Whenever necessary, the powers and resources (human, information, financial, etc) of different related agencies can be mobilized.

There are some conditions to operate this mechanism effectively:

- Each partner should be willing to coordinate and have enough power to discuss and decide on related issues whenever necessary.
- The Chair should be highly regarded among peers, has relevant experiences and the power to solve differences in opinions of partners, if any.
- Each partner should have time to devote to this undertaking even if each one is expectedly preoccupied with an assignment in his/her own agency and therefore has limitation of working time.

(4) Proposal to Strengthen NTSC's Role (ITST, WB)

In its 10 years of existence, NTSC has contributed a lot to the improvement of traffic safety in the country. But the increasing demand for more traffic safety measures brought about by rapid economic development requires NTSC to further enhance its very important role. This is the reason why there are now various proposals to strengthen the NTSC, particularly its legal framework. The following are some of said proposals:

- In December 2005, during a Seminar organized by the Party's Central Economy Commission, the Institute of Transport Science and Technology (ITST) presented a proposal to reform NTSC into the so-called Vietnam National Transportation Safety Board which will be chaired by the Prime Minister or a Vice- Prime Minister. This Board would be responsible for State Management of traffic safety and will have rights, powers, human, and technical resources to fulfill all tasks by itself. For example, the Board could conduct investigations on some serious traffic accidents based on scientific approaches and may draw its own conclusions.
- In 2007, in coordination with NTSC, a World Bank Seminar was held in Hanoi to present on proposed improvements on NTSC's functions. The proposal also indicated that the (Vice) Prime Minister should chair the NTSC.
- The MOT submitted a "Scheme to Ensure the National Traffic Safety until 2010" for the Government's approval. It included a proposal "to strengthen NTSC as well as local traffic safety committee" by "seeking the Government's approval to consolidate NTSC towards a more professional orientation" and "to establish a Traffic Safety Research Centre".

- For its part, the Study Team of this present Study regularly discussed with all relevant counterparts the following four themes, as follows: (i) Reorganization of NTSC to be under Prime Minister's Office; (ii) Establishment of a Traffic Safety Research Center (tentative); (iii) Institutionalization of abovementioned reforms; and (iv) Revision of the Road Traffic Law.

In summary, these proposals are oriented towards the reorganization of NTSC:

- under the office of the Prime Minister (that is, NTSC would be chaired concurrently by the Minister cum chairman of Government's Office), or
- under the direct leadership of (Vice) Prime Minister. In this case, NTSC would be an agency of the Government.

(ii) Provincial Traffic Safety Committees (PTSC)

Based on the above-mentioned NTSC's Official Letter No. 160/UBATGTQG dated 22 July 1998, the PTSC have been established in the whole country.[1]

(1) Functions, organization structure

Basically, PTSC's functions, organization structure and working mechanism is similar to those of NTSC, with necessary modifications for the municipal/provincial conditions.

The functions of these PTSCs have been defined in that Official Letter and can be summarized into two function groups:

- To coordinate traffic safety activities in the local areas;
- To monitor and report traffic safety situation in the local area to NTSC.

On organization structure, most of PTSC's members are leaders from TUPWS/PDOT, Provincial Police, PDET, and POH, who perform their duties concurrently. The abovementioned Official Letter proposes that PTSC can have one or two full-time staff(s). However, in all 11 surveyed cities/provinces, there are no such staff, with only very few cities/provinces having one full-time staff.

(2) Concurrence and Coordination Working Mechanisms

The PTSC has a similar working mechanism as NTSC. In the 11 cities/ provinces surveyed, PTSC representatives were interviewed and majority of them considered that coordination between concerned sectors in their respective Committees is satisfactory. For example, in the conducted survey by the Study Team in Quang Tri, it was observed that coordination between the transport sector and the Police is very good.

Unfortunately, however, the survey results showed that coordination between concerned agencies in some PTSCs is not well-established which often lead to several problems in the implementation of traffic safety activities and/or waste of

[1] It seems that Hanoi is an exception. The 197 Steering Committee of Hanoi plays the role of TSC since 1997, and Hanoi's Police are responsible for executive body. This year, HPC issued Decision No. 1120 dated March 26, 2007 to re-organize Hanoi's TSC with TUPWS as executive body. It seems that both Committees are active now in the Traffic Safety. For example, last month, the 197 Steering Committee has instructed relevant city's agencies to pay attention to traffic situation in the suburban area.

resources.

(3) Proposals to Strengthen PTSC's role

There are two proposals to strengthen PTSC's role.

First, it is proposed that PTSC be given additional tasks, as follows:

- Provide opinion/feedback on any Traffic Organizing Projects in the local areas. Normally, this is the task of the transport agency. But PTSC should also be involved in the improvement of the prepared traffic organizing plan and should coordinate participation of other related agencies to implement the approved plan.
- Conduct activities such as assessment surveys to identify road sections with high incidence of traffic accidents (potential black-spots). Such activities were actually successfully conducted by local PTSC in some cities/provinces.

The second proposal, which has the general consensus of PTSC representatives who were interviewed, refers to organizational improvements within the PTSC, as follows:

- PTSC should be redeployed to the Provincial People's Committees Office.
- PTSC should have full-time personnel dedicated to traffic safety.

3.2 Comparative Study on Traffic Safety Policies

Since the last two decades, the country's economy is improving rapidly resulting to the continuous improvement of the people's quality of living.

However, as exemplified by other developing countries, economic development usually brings with it social problems such as deteriorating traffic safety conditions. This is very much the situation in Vietnam now, where the traffic situation has become more and more serious. Since the 1990s, the Government has therefore been continuously focusing efforts on traffic safety by conducting periodic studies and evaluations on the traffic safety situation in the country which in turn becomes the basis of policy directions. A study of past Government efforts showed that, since 1992, traffic safety planning is being conducted on a 5-year implementation period.

1) Government's General Evaluation and Conclusion on the Country's Traffic Safety Situation

(i) Traffic Safety from 1992-1996: Decree No. 36/CP in 1995

Before this planning period, quality of life in Vietnam was not yet very good so the Government was then focused on economic development and improvement of people's quality of life.

After some years following the Renovation Policy, the country' economy improved. This economic development resulted in people's quality of life improving, and with it comes as well social problems such as worsening traffic conditions and safety. During this time, the Government began paying more attention on the alarming increase in the number of traffic accidents.

In 1991, there was the so-called Inter-Ministerial Central Steering Committee on Traffic Safety between the MOT and the Ministry of Internal Affair (formerly MOPS). Membership of this Committee indicated that during that period, people regarded only the MOT and the Police as the only agencies responsible for traffic safety.

Despite the varied activities being undertaken by this Committee to ensure traffic safety, the rapid economic development the country was experiencing still resulted in very complex traffic safety conditions.

The year 1995 was marked with the well-known Decree No 36/CP dated May 29, 1995 which ensure the road traffic safety and urban traffic safety order. This Decree was prepared based on the conclusion that “the increasing disorder, urban traffic congestion leads to many serious traffic accidents” (Directive No. 317/TTg by the Prime Minister dated 26 May 1995). This Directive took into consideration “the people’s attitude of neglecting traffic safety order and in violation of traffic rules” and “the inadequacy and deteriorating situation of infrastructure system” are the two main causes of such situation.

This Decree proved to have the most positive impact in the whole country when compared with all other precedent legal documents regarding traffic safety, especially in drawing the attention of people on traffic accidents. This Decree was instrumental towards the creation of the Road Traffic Law in 2001 by stipulating various regulations in several articles.

Since then, numerous projects with domestic and foreign funding were approved to upgrade and improve the transport infrastructure. In addition, a major portion of the annual state budget is now being allocated for the MOT, even greater than that allocated for the Ministry of Agriculture and Rural Development despite Vietnam being a highly agricultural country then. It was however unfortunate that together with the improvement of infrastructure, the number of traffic accidents also increased.

(ii) Traffic Safety from 1997-2001: Establishment of the National Traffic Safety Committee (NTSC)

Two years after the issuance and implementation of this Decree, the Prime Minister issued Directive No. 718/TTg dated 1 September 1997 to strengthen the implementation management of the Decree 36. The Directive affirmed that “some Ministries and provinces were at fault for not regularly coordinating, and for not continuously managing their respective traffic safety tasks” so that the “number of traffic accidents still increases”.

In this context, in 1997, the NTSC was established to coordinate all efforts for traffic safety in lieu of the Inter-ministerial Central Steering Committee on Traffic Safety. The NTSC membership is larger than the Steering Committee with the participation of not only MOT and MOPS but also other ministries such as MOH, MOET, etc. Various programs and campaigns have been implemented since its establishment.

But as already mentioned, together with the improving living conditions of the people is the rapidly increasing growth rate of the number of vehicles, especially motorcycles, which, in turn led to the increasing number of traffic accidents. Thus, as much as the Government wanted to curb this alarming increase of traffic accidents without restricting its nationwide development plan for the transport sector, it was necessary to issue a legal background for traffic safety at a higher level than that of the previously issued Decree No. 36. Thus, the National Assembly has approved the Road Traffic Law in 2001 which forms the basic legal framework for traffic management by the State.

(iii) Traffic Safety from 2002-2006: Government's Resolution No 13/2002/NQ-CP dated 19 November 2002 and the Party's Directive No. 22/CT/TW dated 24 February 2003

These documents have been playing fundamental roles in traffic safety management until now and have significantly influenced the whole country. The Vietnam leaders see traffic accidents as "crucial" (Resolution No. 13) and "getting more and more serious" (Directive No. 22), with the main causes as "weakness in the State management" and "very low level of awareness among the people".

Based on these two documents, the Government has launched various activities and has put in a lot of effort to implement traffic safety countermeasures. For the first time, after many years of consistent increase in traffic accidents, the number of traffic accidents decreased in 2003. It seemed that traffic safety situation is finally being controlled; however, it still cannot be said that the condition is stable especially since the number of fatalities still remain to be high.

(iv) Traffic Safety in 2007: Government's Resolution No 32/2007/NQ-CP dated 29 June 2007

The Government affirms that from 2006, traffic safety order is becoming more complex and that the number of traffic accidents is still increasing. Traffic accidents, particularly, road crashes, become "an extremely serious and crucial social concern", largely attributed to the following: (i) inadequacy and weakness in leadership skills of traffic safety state agencies and (ii) the low level of awareness of the people in following traffic rules and regulations.

This Resolution led to the implementation of a lot of comprehensive activities which will be discussed succeeding sections of this report.

(v) Comparative Summary

Table 3.2.1 presents a comparative summary of above-mentioned evaluations and affirmation. The table clearly shows that the Government's top officials consider traffic accidents as becoming more and more serious and a crucial concern. It is also quite evident that this unwanted social concern is directly related to the sharp increase in the number of motorized vehicles, which is a result of the country's improving economy as well as the people's living conditions.

Table 3.2.1 Comparative Summary of General Evaluation on Traffic Safety

Items	1992-1996	1997-2001	2002-2006	2007
Traffic Safety Situation				
Main Legal Document	Government's Decree 36/CP (1995)	• PM's Directive No 718/TTg (1997) • Road Traffic Law (2001)	• Government's Resolution No 13/2002 • Party's Directive No. 22/CT/TW (2003)	• Government's Resolution No 32/2007
General Evaluation on Traffic Accidents	Many serious traffic accidents	Number of traffic accidents still increased	Crucial More and more serious	An extremely serious and crucial social concern
Evaluation on main causes	• Attitude of people • Weakness of Infrastructure	Shortcomings of relevant ministries / provincial governments	• Weakness in the state management • Too low awareness of people	• Shortcomings in leadership • Low awareness of people
Socio-economic Situation				
Item	**1992**	**1997**	**2002 (2006)**	**2007 (estimated)**
Population[1]	68,456,000	74,307,000	79,727,000 (84,156,000)	About 86 Mil.
Total number of motorized vehicles[2]	1,974,261	5,244,986	10,880,401 (18,406,385)	About 20 – 21 Mil
Total length of roads (km)[3]	NA	164,620	221,558 (251,787)	About 262,000
GDP per capita	201 USD[1]	218.1 USD[1]	356 USD (725.3 USD)[4]	835 USD[4]

Sources: [1]GSO [2]MOPS [3]MOT [4] http://vietnamnet.vn/chinhtri/2007/09/739313/

2) Government's General Perspectives to Ensure Traffic Safety Order

Based on the evaluation conducted on the general situation of traffic safety, the Government formulated countermeasures addressed to specific target groups, as follows: "All-people" and "Comprehensive". It is notable that this perspective is quite similar to the more common Stakeholders and 4-E approaches.

(i) "All-people" Perspective

This is clearly evident in the traffic safety-related official documents. For example, Article 4 of the Road Traffic Law (2001) stipulates that the first principle to guarantee traffic safety is as follows: "The guarantee of road transport safety is the responsibility of all institutions, organizations, individuals, and of the whole society". Directive No. 22-CT/TW dated 24 February 2003 of the CPV-Secretariat states that: "All people should take care of transport safety order".

This perspective is quite similar to the more common "Traffic Safety Stakeholder" approach (referred to as stakeholder from hereon) which requires the participation of every related stakeholder in any traffic safety solution.

Various studies have indicated that Vietnam has a basically well-organized community groups, associations, unions, and other candidate organizations for the implementation of the traffic safety program, both in urban and rural areas. Therefore, there is a very high potential to enhance the stakeholder traffic safety

programs. Based on past numerous activities, traffic safety consciousness of the stakeholders is good. In addition, they are very much willing to join these traffic safety activities and are able to play significant roles in the said activities. However, in general, the level of awareness and knowledge of the stakeholders on traffic safety and traffic rule is still low; with the knowledge, skills and experience on comprehensive traffic safety development program and its implementation not sufficient enough. Therefore, more trainings and hands-on experience will be required by the stakeholders.

As in any project, there are various stakeholders. However, critical is to have one key player who has enough influence and skills to lead all stakeholders to fulfill all tasks. In the succeeding sections of this report, the roles of the various kinds of stakeholders in traffic safety will be discussed.

(ii) Comprehensive Perspective

This requires that each traffic safety solution must deal with all four components of any transport system and follow the 4-E (Engineering, Education, Enforcement, and Emergency) approaches.

Any road transport system must consist of four components: (i) Infrastructure, (ii) Vehicle, (iii) Road user, and (iv) Environment (natural and social, particularly the legal framework).

It seems that in various documents related to traffic safety; environment is not often considered as a component of the transport system. In addition, it is observed that in various related policies and regulations, environment does not only refer to the natural environment when it comes to transport system planning but as well as the social environment. Thus, in the above-mentioned legal documents, the Government always asks relevant agencies to determine the effectiveness of such traffic policies/regulations and made amendments when necessary. For example, the Government has amended several times the decree on the handling of administrative violations in road traffic. The Decree No. 146/2007/ND-CP dated 24 September 2007 is valid now, but before that, the following decrees were in effect before they were amended, therefore superseded:

- Decree No. 152/2005/ND-CP dated 15 December 2005
- Decree No. 15/2003/ND-CP dated 19 February 2003
- Decree No. 39/2001/ND-CP dated 13 July 2001
- Decree No. 78/1998/ND-CP dated 26 September 1998
- Decree No. 49/CP dated 26 July 2003

Another example is the Circulars on Usage of Traffic Violation Fines Funds issued by the Ministry of Finance, which has already been amended 4 times, the last one being the Circular No. 89/2007/TT-BTC dated 25 July 2007. Before that, the following circulars were in effect before they were amended, therefore superseded:

- Circular No. 78/2007/TT-BTC dated 6 July 2007
- Circular No. 47/2003/TT-BTC dated on 15 May 2003
- Circular No. 25/2003/TT-BTC dated on 28 March 2003

The 4-E approach which provides countermeasures for any traffic safety problem is very popular in traffic safety planning worldwide. In Vietnam, however, such terminology is not exactly referred to; however, the Government's present traffic safety planning in fact also addresses all 4 such components. The only problem is in the implementation wherein coordination between and among these components is not yet as institutionalized and accepted.

In several past and ongoing projects in Vietnam, great attention is given to the first 3-Es; that is, before alarming increase in road crashes occurred and emergency component is taken only in consideration after an accident. Also, it is observed that the concept "emergency" in Vietnam is wider: it deals not only with medical first-aid and treatment but also to traffic solutions during other emergency situations such as in cases of bad weather or various natural and man-made calamities.

3.3 Traffic Safety Development Plans and Projects

1) Word Bank "Vietnam Road Safety Project" (VRSP)

(i) General information

Objectives

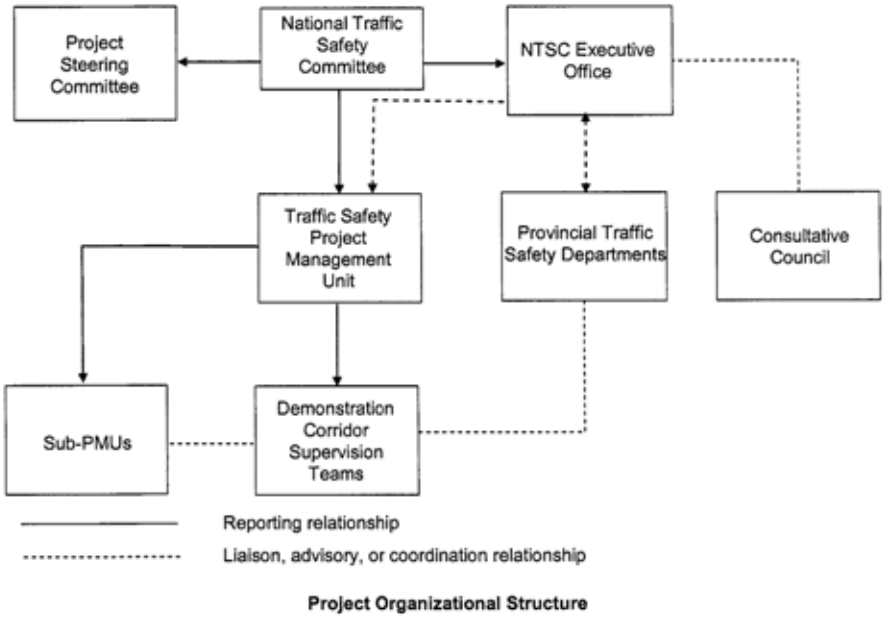
Following the 3-E approach, the project development objective is to reduce the rate of accidents, injury, and death associated with road transport through physical improvement and institutional development to strengthen the management of road transport safety.

Implementation Planning

Project implementation started last 1 July 2005 and is expected to be completed by 30 June 2009.

Figure 3.3.1 shows the VRSP project management structure.

Figure 3.3.1 VRSP Management Structure



(ii) Project Components

The project has three components:

Component A. Institutional and Capacity Building Program (USD 7.84 million). This component will provide technical assistance and project implementation support to strengthen the management and technical capacity o f the NTSC Executive Office, the newly created project management unit (TS PMU), the sub-PMUs, and corridor supervision teams. This component will also support the preparation of a performance- based national road safety strategy, including a financing plan. The following subcomponents will be supported under this component:

A.1 Capacity Building and Implementation Support (USD 5.04 million). This subcomponent will finance an integrated package of technical assistance to support capacity building and implementation across all project components and implementing agencies. The following areas will be supported: (i) management and strategy support to the NTSC and its Executive Office; (ii) implementation support to the TS PMU; (iii) technical and specialized studies to support sub-PMU teams; (iv) training; and (v) development of a targeted and fully budgeted national road safety plan.

A.2 Safeguards Implementation Support and Independent Monitoring (USD 0.10 million). This subcomponent will provide consulting services and equipment as needed to support the TS PMU with the implementation of the project Environmental Management Plan (EMP) and Resettlement Policy Framework (RPF), and employ an independent agency to undertake monitoring of compliance with project resettlement safeguards and the RPF.

A.3 NTSC equipment to support implementation (USD 0.65 million). This subcomponent will provide funds to purchase office equipment, vehicles, and other goods to ensure that the NTSC Executive Office, TS PMU, and the sub-PMUs have adequate facilities to carry out the project.

A.4 Operating Costs and Training (USD 2.05 million). Funds will be used to cover NTSC's operating costs during implementation (USD 1.5 million) and provide training related to project implementation (USD 0.55 million). These costs will be fully financed by the Government of Vietnam.

Component B. Road Safety Demonstration and Awareness Program (USD 20.89 million). This component will develop and implement comprehensive, integrated safety programs along three high-risk national road corridors. The three demonstration corridors that have been identified for inclusion under the project are: (i) National Highway 1 between Hanoi and Vinh (281 km); (ii) National Highway 1 between Ho Chi Minh City and Can Tho City (151 km) and (iii) Highway 51 from Dong Nai province to Vung Tau (80 km). If project funds allow, successful elements of the three demonstration corridors will be implemented on other highway corridors. The following subcomponents will be supported under this component:

B.1 Black spot treatment program (USD 3.75 million). This subcomponent will support treatment of nominated black spots within the three Demonstration Corridors. Sites to be treated in years 2 to 4 of the black spot program will be selected by the VRA, supported by technical assistance provided under subcomponent A1.

B.2 Resettlement (USD 0.81 million). This subcomponent will fund resettlement and land acquisition costs associated with the implementation of the black spot program within the three Demonstration Corridors.

B.3 Design and construction supervision (USD 0.14 million). This subcomponent will provide technical assistance to VRA to support design and supervision services provided by subcomponent B1 above. These services will include engineering surveys, construction drawings and preliminary designs, specifications, cost estimates, and bidding documents for black spot treatments. They will also include construction supervision services, to ensure efficient and high quality execution of the works.

*B.4 Vehicle inspection computer system upgrade (USD 1.*55 *million).* This subcomponent will support the Vietnam Register to upgrade its national vehicle inspection IT system and provide specialized vehicle inspection equipment at three primary national vehicle inspection stations (Hanoi, Ho Chi Minh City and Vinh Long). It will also support the provision of equipment in vehicle testing stations and equipment to conduct mobile vehicle inspections in the three Demonstration Corridors. This subcomponent will be supported by technical assistance provided under subcomponent A1.

B.5 Driver training and testing (USD 1.25 million). This subcomponent will support the VRA through the provision of equipment to improve the driver training centers at Chi Linh and Dong Nai provinces and related facilities, in accordance with the recommendations of the national review of driver training, testing and licensing systems that will be carried out under subcomponent A1.

B.6 Road safety audits and safety inspection (USD 0.29 million). Provides consulting services for VRA in road safety audit and black spot or black route identification and treatment: (i) developing, formalizing, and applying procedures; (ii) working with the Traffic Police to specify data and evaluation and monitoring requirements; and (iii) identifying and investigating black spots and black routes, designing treatments, and monitoring and evaluation of treatment effectiveness.

B.7 Demonstration corridor safety enforcement (USD 3.85 million). This subcomponent will support the Traffic Police through the provision of vehicles and equipment to Demonstration Corridors. The design, implementation and evaluation of the program will be supported through technical assistance and training provided under subcomponent A1.

B.8 Road user education and awareness (USD 3.17 million). This subcomponent will support a program of road user education and public awareness in the three Demonstration Corridors, using targeted social marketing techniques. The program will be coordinated with police enforcement activities under subcomponent B6, to

maximize impact on key road user behaviors. The design, implementation and evaluation of the program will be supported by technical assistance provided under subcomponent A1.

B.9 Road safety education program (USD 1.45 million). This subcomponent will support the provision of school road safety education materials, equipment and associated training for a program of pre-school and school-based road safety education in the three Demonstration Corridors. The design, implementation and evaluation of the program will be supported by technical assistance provided under subcomponent A1.

B.10 Road accident emergency treatment (USD 1.61 million). This subcomponent will support the provision of materials, equipment and training for an emergency medical services program in the three Demonstration Corridors. The design, implementation and evaluation of the program will be supported with technical assistance provided under subcomponent A1.

B.11 Operating costs (USD 2.07 million). These funds will cover operations during implementation of the Road Safety Demonstration and Awareness Program, including for NTSC, VR, VRA and the ministries of Public Security, Education and Training, and Health.

B.12 Consulting services (USD 0.96 million). This subcomponent will fund local consulting services and other costs associated with the operation of project sub-PMUs in the various project line ministries, and eligible expenses related to field supervision of the three Demonstration Corridors.

Component C. Road Safety Monitoring and Evaluation Program (USD 6.20 million). This component will support development of the National Road Accident Database System *(NRADS)* and a comprehensive program of project corridor monitoring and evaluation. The following subcomponents will be supported under this component:

C.1 National Road Accident Database System (USD 4.42 million). This subcomponent will support the building of the NRADS, including the purchase of equipment, software, and associated systems, and training. Development of the functional requirements for the system, preparation of bidding documents, evaluation of bids and project implementation will be supported with technical assistance provided under subcomponent A1.

C.2 Demonstration corridor monitoring and evaluation (USD 1.77 million). This subcomponent will support consulting services to carry out the necessary data collection and surveys in the three Demonstration Corridors, according to the agreed monitoring and valuation framework. The detailed survey design and training required for effective implementation of the monitoring and evaluation program will be supported with technical assistance provided under subcomponent A1.

(iii) Progress of Project

This is the first donor project on traffic safety. With comprehensive approach, the implementation would bring various outputs that can contribute highly to the improvement of traffic safety. It is the first phase of a proposed 15-year WB-assisted road safety strategy in Vietnam.

Unfortunately, project implementation seems to have met a number of difficulties and thus cannot follow the project implementation plan as scheduled. At present, only two small sub-components are in progress, with some others still in the bidding process and the rest remains under the planning stage.

2) ADB "National Road Action Plan"

(i) ADB-ASEAN Regional Road Safety Program

In 2004, ADB supported the 10 ASEAN nations with the implementation of a Regional Road Safety Program. Together with some international experts, each country formed a group of specialists and undertook studies in each respective country focusing on these three main topics: (i) General overview of traffic safety; (ii) Accident cost estimation and (iii) Road Safety Action Plan (2005-2010), wherein a Draft Plan was prepared.

(ii) Draft "National Road Action Plan" (2005-2010)

This Draft Action Plan is designed to stimulate discussion within each ASEAN country that will lead to the development of the respective National Road Safety Action Plan that can be published later and implemented over the next few years. In the case of Vietnam, this will be under the direction and leadership of NTSC, after approval by the Government.

The Road Safety Action Plan in Vietnam was produced as part of the ADB/ASEAN Regional Road Safety Project and follows Action Plan Guidelines published by the UN, ADB and the World Bank. The experts tried specifically to tailor to the particular needs and the operating conditions in Vietnam.

The road safety actions were selected to cover all sectors of road safety but with particular emphasis on the following five areas which, with the limited information available are likely to be the areas of greatest and quickest impact in Vietnam: (i) Motorcycle crashes, (ii) Speeding, (iii) Enforcement & education, (iv) Creation of safer road environment (black spot improvements and safety audit), and (v) Management and coordination of road safety activities.

These actions are organized into 15 sectors, as follows:

(1) Leadership and Coordination of Road Safety
(2) Road Accident Data Systems
(3) Socio-Political Organisations Involvement
(4) Safe Planning, Design and Operation of the Road Network
(5) Improvement of Blackspots
(6) Road Safety Education of School Students

(7) Driver Training, Testing and Licensing
(8) Road Safety Publicity Campaign
(9) Vehicle Safety Standards
(10) Traffic Legislation
(11) Traffic Police and Law Enforcement
(12) Emergency Medical Assistance to Traffic Accident Victims
(13) Road Accident Research and Costing
(14) Motor Cycle Accidents and Casualties Reduction
(15) Private Sector and Community Involvement

(iii) Impact of this Draft Action Plan

As already mentioned, this Draft Action Plan is aimed firstly for discussion. Until now, this Plan plays mainly as a reference in various traffic safety project planning.

3) JICA "Hanoi Traffic Safety Human Resource Development Project"

This is a 3-year technical assistance project funded by the Government of Japan through JICA, and is now in the second year of implementation.

(i) Objectives

The objective of this Project is to improve the traffic safety measures in Hanoi. It is expected that the results of this Project will have direct and indirect effects towards improving the road traffic conditions in Hanoi (as the Overall Goal). In addition, the Project is also expected to achieve a safe and orderly road traffic environment in Hanoi which properly abides traffic safety rules and regulations, and that such environment shall be replicable to other cities of the country (as the Super Goal). The following outputs are expected as the results of the Project:

(1) To establish a system for planning, implementation and evaluation of comprehensive traffic safety measures in Hanoi;
(2) To improve traffic enforcement abilities of traffic policemen of the Hanoi Traffic Police Division (HTPD);
(3) To improve traffic enforcement abilities of traffic inspectors of the Hanoi Transport & Urban Public Works Service (TUPWS);
(4) To improve traffic management abilities and road facilities management of officers of TUPWS; and
(5) To enhance traffic safety education level of officers of the Hanoi Traffic Safety Committee (HTSC).

Moreover, as an additional output, the Project is expected to encourage traffic safety activities of NGOs and residents' organizations as well as improve traffic safety awareness among citizens in Hanoi through the conduct of model projects.

(ii) Major Activities and Outputs

The following are some of the major activities conducted by the project:

Table 3.3.1 TRAHUD First Year (2006) Major Activities and Output

No	Activities/Output
1	Short-term Training Course - Curriculum/Textbook
2	Comprehensive Pilot Project in Thai Ha – Chua Boc under 3-E approach(engineering, enforcement and education)
3	Counterpart Training Japan (10 persons)

Figure 3.3.2 Thai Ha – Chua Boc Pilot Project

Before After

Table 3.3.2 TRAHUD Second Year (2007) Major Activities and Output

No	**Activities/Output**
1	Short-term Training Courses - Curriculum/Textbooks - Package 1 in August: Three separate courses for Traffic Police, TUPWS Inspectors and Engineers in August. - Package 1 in November and December: Three separate courses for Traffic Police, TUPWS Inspectors and Engineers in
2	Comprehensive Pilot Project in Dai Co Viet – Tran Khat Chan with topic “lane separation” under 3-E approach (engineering, enforcement and education)
3	Counterpart Training Japan (5 persons)
4	6 Counterpart Capacity Development Projects (see next Table) with advanced training courses

Table 3.3.3 TRAHUD Counterpart Capacity Development Projects

Title of the Pilot Project	Major Activities (Technology Transfer)
1. Traffic Police Team Capacity Development Pilot Project	- Traffic control and enforcement - Traffic Patrol - Traffic Enforcement on Speeding
2. Traffic Accident Analysis Pilot Project	- Review of Traffic Accident Report Form - Data Collection and Analysis - Monthly and Yearly Accident Report
3. Traffic Control Center Capacity Development Pilot Project	- Traffic Signal Operation - Traffic Signal Maintenance System - Traffic Monitoring
4. Traffic Safety Standing Group Capacity Development Project	- Traffic Safety Investigation system - Traffic Safety Countermeasures Development - Investigation Reports
5. Traffic Safety Inspection Capacity Development Project	- Parking Control and Management - Vehicle Safety Inspection - Inspection Report
6. Traffic Safety Propaganda Capacity Development Pilot Project	- Traffic Safety Campaign - Traffic Safety Education Pilot Projects - Publicity by Newspapers, TVs, Internets, etc

4) JBIC "Traffic Safety Improvement Project" (SAPROF)

(i) Highway No 3, 5, 10 and 18 Traffic Safety Improvement Portion

Goal and Outputs

The goal of the JBIC's Traffic Safety project is to reduce the number of traffic accidents and to mitigate the damage along national highways (NH3, NH5, NH10 and NH18) in the northern Vietnam, thereby contributing to the improvement of the living environment of residents along national highways and road users.

In order to achieve this goal, the following project outputs are expected:

- To improve traffic safety facilities: installation of traffic safety facilities such as signals, lights, center median, flyovers, improvement of intersection and shoulders, etc.
- To establish traffic safety education and dissemination program for local residents and road users for the purpose of educating them on the proper use of installed facilities.
- To improve traffic safety enforcement for local enforcers (Traffic Police, Traffic Inspector, Vietnam Road Administration, etc) for the purpose of educating them on the proper use of the installed facilities, and
- To improve abilities of the organizations in charge of traffic safety education and enforcement for the purpose of ensuring sustainable education and enforcement.

All related Proposed Comprehensive Traffic Safety Improvement Program Packages are summarized in the Table 3.3.4.

Table 3.3.4 Proposed Comprehensive Traffic Safety Improvement Program Packages

Project Type	Code	Package Name	Improvement Issues	Project Component and Activities		Coordi-nation	Executing Agency	Supporting Organization	Necessary human resource input, eqpt, etc.
Black Spot Program Packages	BP1	Intersection Traffic Movement Control Program	- Safe and organized traffic flow at intersections	Eng.	- Improvement of geometric design - Installation of traffic light, street light and monitoring camera system - Improvement of marking, sign boards, guardrail pedestrian crossing, etc.	TSPMU	Sub-PMU (VRA)	RRMU2	- Traffic light, street light and monitoring camera system - Pavement marking, sign boards, guardrail pedestrian crossing, etc.
				Edu.	- Conduct of on-site guidance and campaign		Sub-PMU (MOET)	PTSC	- Flyer, banner - TV, Newspaper, radio, etc.
				Enfo.	- Conduct of on-site guidance and enforcement of illegal movement		Sub-PMU (MOPS)	Provincial Traffic Police	- Patrol car/motorcycle - Video recorder, digital camera, two-way radio, etc.
	BP2	Traffic Flow Priority Dissemination Program	- Increase of awareness of road traffic hierarchy (distraction of priority road/traffic and non-priority road/traffic)	Eng.	- Provision of traffic sign boards and pavement marking	TSPMU	Sub-PMU (VRA)	RRMU2	- Traffic sign boards - Pavement marking
				Edu.	- Conduct of on-site guidance and campaign		Sub-PMU (MOET)	PTSC	- Flyer, banner - TV, Newspaper, radio, etc.
				Enfo.	- Conduct of on-site guidance and enforcement of illegal behavior		Sub-PMU (MOPS)	Provincial Traffic Police	- Patrol car/ motorcycle - Video recorder, digital camera, two-way radio, etc.
	BP3	Safe Road Crossing Program	- Provision of safe environment for crossing pedestrians and bicycle users	Eng.	- Pedestrian/bicycle over- or underpass at major public facilities (school, hospital, government office, etc.) - Traffic lights for crossing pedestrian and bicycle	TSPMU	Sub-PMU (VRA)	RRMU2	- Pedestrian/bicycle over- or underpass - Traffic lights for pedestrian and bicycle
				Edu.	- Guidance and campaign on usage of facilities		Sub-PMU (MOET)	PTSC	- Flyer, banner - TV, Newspaper, radio, etc.
				Enfo.	- Conduct of on-site guidance and enforcement of illegal crossing		Sub-PMU (MOPS)	Provincial Traffic Police	- Patrol car/ motorcycle - Video recorder, digital camera, two-way radio, etc.

Project Type	Code	Package Name	Improvement Issues	Project Component and Activities		Coordi-nation	Executing Agency	Supporting Organization	Necessary human resource input, eqpt, etc.
Linear Program Packages	**LP1**	**Keep Lane and Speed Program**	- Maintaining of safe traffic flow by separation of traffic flow by mode (4-wheeled/2wheeled, non-motorized vehicles and pedestrian) and by enforcement of traffic speed	Eng.	- Widening of priority lanes for motorcycle and bicycle - Introduction and maintenance of pavement marking and traffic sign boards, center median, etc. - Introduction of variable message board and monitoring camera system - Installation of bus bays	TSPMU	Sub-PMU (VRA)	VRA	- Widening of priority lanes - Pavement marking, traffic sign board, center median, etc. - Bus bays
				Edu.	- Formulation of commune leaders as speed pace maker - Conduct of activities by pace makers during commuting trips - Conduct of campaign		NTSC/ TSPMU	Provincial PC/PTSC	- Uniform and helmet for pace making teachers - TV, Newspaper, radio, banner, etc.
				Enfo.	- Patrol and enforcement of illegal traffic - Operation and maintenance of variable message board and monitoring camera system		Sub-PMU (MOPS)	Provincial Traffic Police	- Patrol car/motorcycle, - Speed gun - Maker's training for operation and maintenance of variable message board and monitoring camera system
	LP2	**Traffic Enforcement Capacity Development Program**	- Improvement of enforcement capacity of policemen - Improvement of capacity in planning, monitoring and evaluation -	Enfo.	- Conduct of training for policemen - Management of enforcement activities and equipment of Provincial Traffic Police	TSPMU	Sub-PMU (MOPS)	Provincial Traffic Police	- International training experts - Equipment for data collection and analysis - Equipment for training
	LP3	**Traffic Enforcement Strengthening Program**	- Strengthening of patrol and safety guidance	Edu.	- Conduct of supporting campaign	TSPMU	NTSC	PTSC	- TV, Newspaper, radio, banner, etc.
				Enfo.	- Conduct of patrol - Conduct of strengthened enforcement		Sub-PMU (MOPS)	Provincial Traffic Police	- Patrol car/motorcycle - Wrecker truck to carry offending

Project Type	Code	Package Name	Improvement Issues	Project Component and Activities		Coordi-nation	Executing Agency	Supporting Organization	Necessary human resource input, eqpt, etc.
			- Implementation of strengthened enforcement		activities - Maintenance of equipment				motors - Portable vehicle scale - Speed gun - Alcohol sensor - Video-recorder, digital camera - Warning lights, etc.
Corridor Program Packages	**CP1**	**Traffic Safety Leaders' Training Program**	- Improvement of teaching capacity of leaders such as school teachers - Provision of necessary and effective teaching manuals, materials and equipment	Edu.	- Conduct of training for school teachers - Preparation and distribution of teaching manuals, materials and equipment	TSPMU	Sub-PMU (MoET)	Provincial/ District DoET	- International training experts, - Teaching manuals, materials, equipment etc.
	CP2	**Community Traffic Safety Intensification Program**	- Strengthening of traffic safety education and enlightenment for road users through community	Edu.	- Conduct of training for teaching-car staff - Conduct of safety education and enlightenment activities at commune by commune using teaching-car - Provide necessary materials and equipment	TSPMU	NTSC	PTSC, DTSC	- International training experts - Teaching car with teaching materials and equipment

Current Progress

On the counterpart side, TS PMU is responsible for the project preparation phase, which is not yet completed. With some modifications in engineering part, the Feasibility Study Report prepared by TEDI is now waiting for appraisal.

(ii) Hanoi Portion

Components

The goal of the JBIC Traffic Safety Improvement Project in Hanoi portion is to reduce the number of traffic accidents, particularly the number of fatalities, and to improve traffic flows along major corridors in Hanoi urban arterial roads, thereby contributing to the improvement of living environment of the residents along the corridor and the road users.

The Project is consisted of two (2) major components, as follows:

(1) Corridor traffic safety and management facilities development: Installation of traffic safety facilities such as signals, lights, center medians, improvement of intersections and shoulders, etc.

The study area of traffic safety and management facilities development is the entire Hanoi area. In particular, a review of the present site conditions and issues are made on the 16 primary road corridors in Hanoi City identified by the HAIDEP study, as follows:

a) Lieu Giai-Tran Duy Hung
b) Giang Vo-Lang Ha (Model Project)
c) Ton Duc Thang -Nguyen Trai
d) Le Duan –Giai Phong
e) Yen Phu-Tran Quang Khai
f) La Thanh-Kham Thien
g) Huynh Thuc Khang-Chua Boc
h) Ton That Tung-Tran Khat Chan
i) Truong Chinh- Minh Khai
j) Xuan Thuy- Cau Giay
k) Pham Van Dong-An Duong Vuong
l) Thuy Khue – Hoang Hoa Tham
m) Chuong Duong -Ngo Gia Tu
n) Thang Long-Noi Bai
o) Yen Vien- Dong Anh
p) Dong Anh- Soc Son

(2) Traffic Safety Model Projects: Introduction of desirable traffic safety environment for both motor vehicles and people traffic in Hanoi towards future motorization and urbanization in the national capital city of Hanoi. The following two road sections are selected for the model projects: (1) Giang Vo-

Lang Ha and (2) Dai Co Viet-Tran Khat Chan.

The selection criteria used for this model projects implementation are (1) Primary Road Network and (2) High Traffic Demand and High Traffic Accident Risk (or where many traffic accidents occur).

Current Progress

The Government has agreed with HPC to use the remaining funds after tender of the JBIC funded "Development of Urban Transport Infrastructure in Hanoi" for this portion (Government's Official Letter No 4492/VPCP-QHQT dated 14 August 2007 to HPC).

5) General Views on Current Traffic Safety Activities

Taking into consideration the activities conducted in Vietnam over the past 20 years, the general trend of traffic safety in Vietnam is that while the rate of traffic accidents is rapidly increasing and the nature of accidents becoming more and more serious (refer to official evaluation of the Government in Chapter 2), the required traffic safety activities are those of comprehensive nature and should be implemented in a more professional and effective manner.

Following the Directive No 22/CT/TW, the Government is implementing activities which have phased implementation nature: middle- and long-term and short-term.

(i) Middle- and Long-term Activities for Traffic Safety

There are two significant actions towards achieving this, as follows: (i) scheme towards improvement and ensuring of national traffic safety condition until 2010 and (ii) strategy to ensure the national traffic safety until 2020 and vision for 2030. A task force headed by the Chairman of the NTSC Standing Board has been formed to prepare this Strategy. This task force has drafted the table of main contents for discussion with relevant agencies.

(1) Scheme towards Improvement and Ensuring of National Traffic Safety Condition until 2010

The final report of the draft Scheme has been submitted to the Government for approval since 2007. The Government has approved this Scheme with Decision No. 259/QD-TTg 4 dated March 2008. It seems however that there is a big difference between the draft and the approved Schemes for there are probably weaknesses in the draft. To address all kinds of traffic accidents (i.e. road, railway, inland waterway, sea- and airway), the draft Scheme is consisted of two main parts:

- Evaluation on current situations of traffic safety: traffic in 11 contents.
- Countermeasures to ensure traffic safety order until 2010 including the allocation of tasks and responsibilities of related ministries and agencies, and a cost estimation of about VND 334,317,585 Billion (≈ USD 21 Billion). But the Decision No 259 approved a list of projects with a total amount of VND 6,953 Billion only and requested the related agencies to prepare other projects to submit for approval later.

The proposed countermeasures are organized into 9 groups:

a) Traffic safety state management with three topics:
   - Improvement of legal framework, but there is no proposal to revise the Road Traffic Law.
   - Improvement of Traffic Safety Management System, especially the proposal to strengthen NTSC (Table 3.3.5).
   - Traffic Safety database with 4 components: Traffic accidents, vehicles, national roads, and driver permission.

b) Infrastructure, including the implementation of Traffic Safety Audit.

c) Vehicles with general inventory in the whole country

d) Driver training and management

e) Traffic organization and transport management

f) Enforcement

g) Traffic Safety campaign

h) Education in the schools

i) Emergency

The draft Scheme follows a comprehensive perspective in evaluation and in proposing countermeasures. At present, it plays a very important role in traffic safety policy making. However, this draft Scheme will be more useful and more understandable, thus convincing, to the leaders and people if the following will be clarified:

- In evaluation of current situation, a major part is reserved for description of situation, but it is better if the draft Scheme could pay more attention on the assessment of such situation, especially on what would be improved. For example, in the Organization Structure on Traffic Safety Management, it only presents a description but no comment on the existing management structure.
- All proposed measures by the draft Scheme are undoubtedly necessary, but whether these measures which will imply such enormous spending are adequate to ensure traffic safety until 2010? In particular, the draft Scheme has proposed countermeasures based on the analysis of the current situation but did not consider traffic safety requirements in the future based on forecasted traffic safety conditions. It is highly probable that the traffic accidents in the coming years will become more and more complicated.
- The “All-people” perspective as indicated in the Directive 22/CT/TW is still not clear in the draft Scheme.
- The role of two very important resources of traffic safety, the human and scientific technology application, is still not mentioned. It seems that the human resources available for traffic safety, especially the staff in Traffic Safety Agencies, should be more professional.
- The Total Cost Estimation of 334,317,585 billion VND in the draft Scheme is enormous: it is approximately 30% of GDP and 118% of total revenue for

state budget estimated for 2007 (Table 3.3.5). That is why Decision No 259 could only approve some projects with acceptable cost estimation. Normally, majority (about 80%) of the total expenditures is related to engineering components and all other components (information-education campaign, enforcement and emergency) will share the 20%. This seems as if information-education campaign and enforcement components will require the smaller budget portion; however, as already mentioned in the previous chapters, they provide a great impact both in the long- and short-term.

Table 3.3.5 Comparison of Expenditure Estimation in the Scheme with GDP and Revenue for State Budget Estimated for 2007

Item	Amount (million VND)
Estimated Expenditure until 2010 by the draft Scheme	334,317,585
Approved Expenditure by the Decision No. 259/QD-TTg dated 4 March 2009	6,953
GDP estimated for whole 2007 (*)	1,130,000,000
Total Revenue for State Budget, estimated for 2007 (*)	281,900,000

Source: (*) Ministry of Finance Website http://www.mof.gov.vn/Default.aspx?tabid=4911&ItemID=38665

(2) Strategy to Ensure National Traffic Safety until 2020 and Vision for 2030

A task force headed by the Chairman of the NTSC Standing Board has been created to prepare this Strategy. This task force has drafted the table of main contents for discussion with relevant agencies.

(ii) Current Activities for Traffic Safety: High Tide in Implementation of the Government's Resolution No 32/2007/NQ-CP

In consideration of the fact that traffic accidents in Vietnam has become an extremely serious and crucial social concern, the Government, aiming towards having a series of high impact activities, issued a very important document, Resolution No. 32/2007/NQ-CP. Dated 29 June 2007, this Resolution is considered a milestone in Vietnam's Traffic Safety wherein all current activities in the whole country is now focused on the implementation of this Resolution.

Main Contents of Resolution No 32/2007/NQ-CP

The Resolution gives 7 measure groups in information that these measures are based on the above-mentioned Scheme.

(1) "All people" and "Comprehensiveness" Perspective

While the "Comprehensiveness" perspective is consistent with that of in the Scheme, the "All-people" perspective is probably given more attention in the Resolution by stipulating:

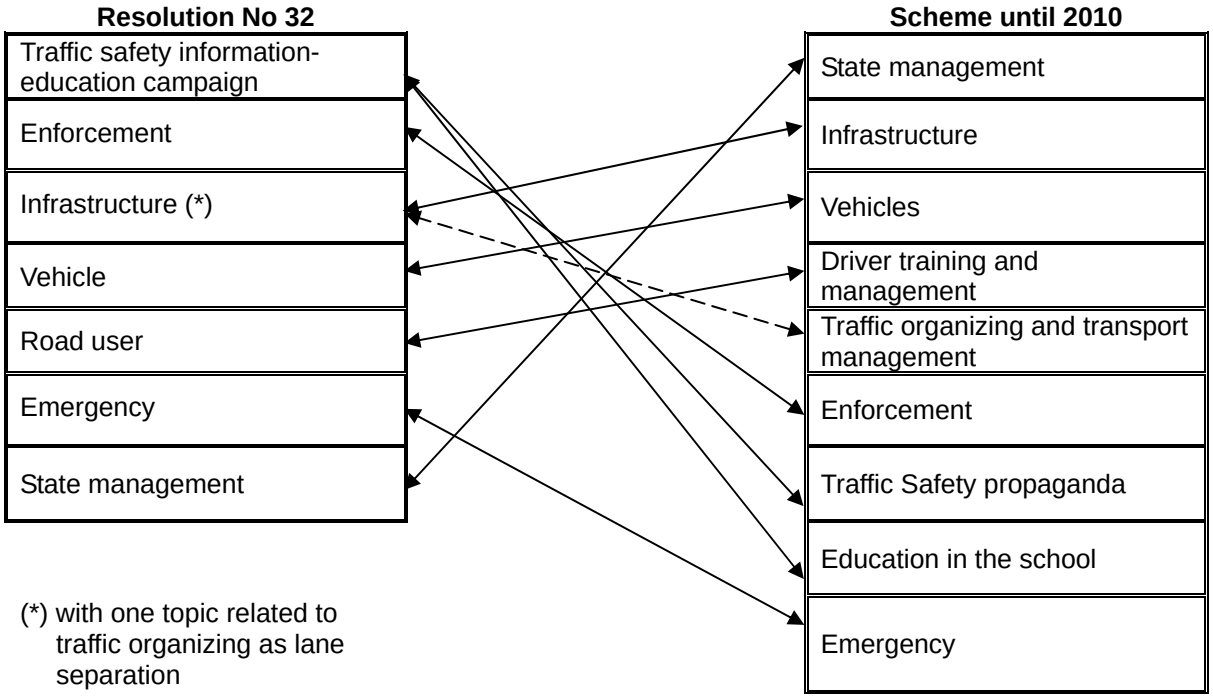
"In order to curb the growth of traffic accidents, the participation of the entire society is required; especially that of the state agencies, from central to local government at all levels, all organizations, mass organizations and all traffic participants should have responsibilities to take part in ensuring traffic safety. It

is only by such activities that legal regulations of traffic safety could enter into the life effectively"

(2) Difference in the organization of measure groups

A comparison in Figure 3.3.3 shows the difference in organization of measure groups among two documents. This arrangement shows in some limit the priority of groups. With the "All-people" perspective, Resolution No. 32 highly gives the priority to information-education campaign and enforcement.

Figure 3.3.3 Comparison on Measure Groups between Resolution No. 32 and the Scheme until 2010



(3) Selected measures should be implemented fully and seriously

One special feature of this Resolution is that the Government has chosen from the measures in each group as proposed in the Scheme those that are necessary up to present. For each such measure, the related agency is asked to manage the planning and implementation fully and seriously.

- The Resolution emphasizes that traffic safety information-education campaign is the most important measure and has directed all related agencies to pay special attention and implement regular and continuous related activities.
- In particular, the Government has instructed that all motorcycle users should wear helmet effective 15 December 2007 and all enforcement and information-education campaign task force should monitor and control the implementation of this instruction.
- On traffic safety state management, there is a difference between the instruction in this Resolution and the proposal of Scheme as shown in Table 3.3.6.

Table 3.3.6 Difference between the Instruction in this Resolution and the Proposal of Scheme on State Management

Resolution No 32	Scheme until 2010
a)…Consolidate NTSC and PTSC with the orientation to strengthen their responsibilities, rights in coordination activities and (strengthen) the professional feature b) …Consolidate the organization, improvement of state management on traffic safety of MOT, PDOT/TUPWS	To consolidate NTSC by reorganization of this agency into an agency that is responsible for Traffic Safety with more tasks and responsibilities, higher mandate and is more professional.

The proposal in the Scheme implicitly denotes that NTSC should not only be a coordination agency as it now; but instead should function as a traffic safety state management agency.

Resolution No.32 does not accept that by stipulating this function of MOT while consolidating coordination role of NTSC.

This difference does not mean the refusal of proposal in the Scheme, but instead, this proposal should be studied more carefully before any approval is given.

Movement on implementation of the government's Resolution No 2/2007/NQ-CP

All related state agencies such as NTSC, MOT, MOPS, MOET, MOH, other ministries and all cities/provinces are instructed to have a plan to implement this Resolution. These activities have been grouped into:

- the NTSC's Plan No. 272/UGATGTQG dated 18 July 2007; Traffic Safety Audit is not mentioned in the Resolution;
- MOT's Official Letter No. 4359/BGTVT-VT dated 13 July 2007;
- MOPS's Plan No. 75/KH/BCA(C11) dated 7 July 2007
- Others documents.

Basically, these activities concentrate on urgent measures to ensure traffic safety order.

3.4 Road Traffic Law and Regulation

1) The Revised Road Traffic Law (2008)

This comprehensive revision of the 2001 Road Traffic Law was approved by the National Assembly of Vietnam on 13 November 2008 and shall become effective from 1 July 2009.

(i) The Road Traffic Law (2001)

Approved by the National Assembly of Vietnam on 29 June 2001, it became effective from 1 January 2002 (from here on referred to as Law 2001). This is the first law on road transportation in Vietnam which was formulated after implementation of related ordinances, decrees, and circulars.

This Law 2001 had extensive social impacts affecting all aspects of economic life: social, national defense/security, and development of the country. After six years of implementation, it has achieved the following:

- Creating a legal corridor for adjusting the activities of road traffic, including the rules of road traffic, conditions to assure road traffic safety, means of transport and of drivers, and road transport activities;
- Creating an important part in fostering the people's awareness and obedience of traffic law, in ensuring order and safety of traffic, and in preventing environment pollution;
- Helping boost the development of the road traffic sector and the overall economy of the country; and
- Creating favorable conditions for Vietnam's road traffic sector to join in the shared regional traffic and transport activities, thereby contributing to the development of road transport and the economy of the country;

However, with the development of the economy of the country, the improvement of the Vietnamese legal system, trends of Vietnam in extensive integration with the global development, the Law 2001 has proved to have some limitations resulting in a number of problems. This necessitated its amendment and appropriate supplementation such as (1) adjusting the scope of the law; (2) concentration of alcohol content in blood and breath for motorized vehicle drivers, and motorcycles for special cases; (3) load testing of vehicle on the road; (4) percentage of land surface reserved for road in urban areas; (5) mobilization of resources outside the budget for road maintenance; (6) policies to attract investment resources to build road infrastructure; (7) adjustment on required age of driver for licensing; (8) activities and the conditions of transportation business; and (9) duties and powers of road inspectors, traffic police, other police, and commune public security forces, etc., among others.

(ii) The Revised Road Traffic Law (2008) in Comparison with Law 2001

This Revised Road Traffic Law (2008) includes eight Chapters with 89 Articles. Compared with the Law 2001, only three Articles (3.37%) basically have similar content and structure; 68 Articles have additional modifications (76.40%) and 18 new Articles (20. 23%).

Regarding the contents, it is remarkable that traffic safety is among the more important topics that the revised law now regulates more strictly as compared with the Law 2001. The following are some of the revisions:

- Chapter I. General Provisions

  This chapter regulates the scope of adjustment; objects of the Law; explanation of terms, principles of operation, policy development, roads transportation planning; advocacy, dissemination and education on the Law and behaviors that are strictly prohibited.

  Compared with Road Traffic Law 2001, this Revised Road Traffic Law (2008)

adjusts the Chapter name to include the full adjustment of the Law, and adds various regulations and guidelines in accordance with the aim to scope the overall activities of road transport.

Notably, in order to ensure traffic safety, there are some basic changes in this Chapter. There are various new concepts explained in Article 3. In particular, the concept of "land for road" is fundamentally changed. Under the revised definition, this does not only refer to the “land on which the road is built" as stipulated in Law 2001, but has also added "the two sides along the road to manage, to maintain and to protect the road". In addition, some concepts are were expanded such as the concept of "road transport motorized vehicles" with the addition of " trailers or semi-trailers that are pulled by cars, tractors" and "electric motorcycle", the concept of "non-motorized road vehicles" with the addition of "bicycle that is equipped with a motor” and “wheelchairs for the disabled ".

For behaviors that are strictly prohibited (Article 8), the Law 2008 also stipulates the more strict prohibition of alcohol usage (wine, beer, etc.) by the driver, especially prohibiting the driving of "cars, tractors, scpecialized motorcycles” if there is any alcohol concentration in her/his/their blood or breath" (the so-called “Zero-acohol”). Regarding drivers of motorcycles, the concentration of alcohol should “not exceed 50 miligrams per 100 milliliters of blood or 0.25 miligrams per 1 liter of breath." Thus, the Law prohibits the driving of cars, tractors, specialized motorcycles for drivers who had alcohol intake because they are prone to exhibiting higher level of risk behavior than other drivers. The Law does not prohibit the use of alcoholic drinks (wine, beer, etc.) for drivers of motorcycles on the road, but the law prescribes a concentration of alcohol lower than stipulated by the Law 2001 whihc is in accordance as that in 35 other countries.

- Chapter II. Rules of Road Trafic

  Compared with the Law 2001, the Revised Road Traffic Law (2008) added a number of provisions in accordance with the development of society, especially to ensure traffic safety, such as prohibitions of some road users to access expressway (pedestrian, non-motorized conveyances, motorcycles, mopeds and tractors, specialized motorcycles with design speed less than 70 km/h); specification on age of children acomppanied in motorcycles, mopeds (as under 14 years old) and those on bicycles (as under 7 years). It is worth mentioning that there were no such regularions in the Law 2001.

  Another notable regulation included in this chapter is, together with the regulation on helmet wearing for people who sit on 2- and 3-wheel motorcycles and moped with hindstrap fastened, this Revised Road Traffic Law (2008) stipulates the additional rules of helmet wearing for people who rides on bikes installed with motor, despite this kind of bicycle being classified under the non-motorized category in Article 3.

- Chapter III. Road Infrastructure

  The Revised Road Traffic Law (2008) stipulates additional regulations specific to the classifications of road and clearly defines the authority of the MOT (for Highway) and the People's Committee (for local roads) in the classification and adjustment of the road system.

  It also stipulates that on the land surface, as compared with the entire urban construction, the road fund for urban transport must be secured from 16% to 26% to meet long-term urban transport development.

  On ensuring technical requirements and traffic safety of the road, additional law regulates the Road Safety Audit; facilities to ensure traffic for pedestrians and the disabled; connections between roadways; collector road to ensure traffic safety for the national highway system; strict regulations for the use, management of road signals.

  For road maintenance and management, the revised law has clarified the concept of road maintenance, regulation of specific financial resources for road management and maintenance, especially the establishment of the Maintenance Fund to manage and maintain the national highway system and local road.

- Chapter IV. Road Vehicles

  This chapter regulates the conditions for the participation in road traffic of vehicle, issuance of driving license, conditions on the quality of technical safety, and environmental protection for the road vehicles.

  As compared with the Law 2001, this chapter of the revised law is modified in accordance with the Law of Technical Norms and Standards.

- Chapter V. Road Users

  This chapter regulates the conditions of the road users when joining road traffic, including articles on driving license, age and health of the driver, driving instructors, driver testing and licensing.

  For regulations on drivers, the revised law raises the minimum age for drivers of the following: for vehicles with 10-30 seats, from 21 to 24 years old and for vehicles with more than 30 seats, from 25 to 27 years old.

- Chapter VI. Road Transport

  As compared with the 2001 Law, the revised law distinguishes between the road transportation and support services for road transportation for the purpose of state management for two types of transport related activities.

  The Revised Road Traffic Law (2008) also has additional regulations on the management over road transport. In particular, there are more strict conditions on road transporation business, such as regulations on the installation of an equipment similar to a black-box (itinerary control equipment) on cars used in transportation business. This is regarded as a breakthrough in the application

of scientific techniques to the management of transportation business.

- Chapter VII. State Management

  Article 84, item 1 stipulates that “drawing up and directing the implementation of national programs on traffic safety” belongs to one of the contents of state management over road traffic.

  The full contents of Article 84 on State management over road traffic are as follows:

  (1) Working out planning, plans and policies on development of road transport; drawing up and directing the implementation of national programs on traffic safety.
  (2) Promulgating and organizing the implementation of legal documents on road transport, technical norms and standards.
  (3) Propagating, disseminating and educating on land road traffic legislation.
  (4) Organizing, managing, maintaining, protecting road transport infrastructures.
  (5) Registering, granting and revoking plate numbers of road vehicles; granting/revoking certificates of quality, technical safety and environmental protection of road vehicles.
  (6) Managing the training and testing of drivers; granting, renewing, revoking driving licenses and certificate on road transport legislation training.
  (7) Managing transport activities and transport supporting services; organizing of rescue activities in case of road accidents.
  (8) Organizing the research into and application of road transport sciences and technologies; training road traffic officials and technicians.
  (9) Inspecting, examining and settling complaints, accusations; handling violations of road traffic legislation.
  (10) Undertaking international cooperation on road traffic.

  All these content areas are closely interrelated with the first content area and clearly refer to traffic safety.

  As already discussed, all 4 components of each transport system should be considered comprehensively in any traffic safety measure. Table 3.4.1 summarizes these components with the scope of state management over traffic.

Table 3.4.1 Relation between 4 Traffic System Components and 10 Content Areas of State Management over Road Traffic

No	Component of Transport System	Contents in State Management over Road Traffic	Remark
1	Infrastructure	4	Content area No. 10 (international cooperation) is considered to be implicitly related to all 4 components
2	Vehicle	5	
3	Road user	3,6,7	
4	Environment (natural and social particularly legal framework, planning, etc)	1,2,5,8,9	

Source: JICA Study Team

Based on the revised law, Article 85 stipulates on responsibilities of the state management over road traffic, as follows:

(1) The Government shall exercise the unified state management over road traffic.

(2) The MOT shall be responsible before the Government for exercising State management over road traffic.

(3) The MOPS shall discharge the tasks of state management over road traffic under the provisions of this Law and relevant legislation; coordinate with the MOT in applying measures to ensure traffic order and safety.

The MOPS and the MOT shall have to coordinate in supplying data on registration of land road traffic means, data on traffic accidents and in granting, renewing as well as withdrawing driving licenses.

(4) The Ministry of National Defense shall discharge the tasks of state management over land road traffic under the provisions of this Law and relevant legislation.

(5) The ministries, ministerial-level agencies and agencies attached to the Government shall, within the scope of their tasks and powers, have to coordinate with the MOT in exercising the state management over road traffic.

(6) The People's Committees at all levels shall, within the scope of their tasks and powers, organize the implementation of the State management over land road traffic as regulated by this Law and by other relevant legislation in the local territory scope.

It is however noteworthy that NTSC was not referred in any articles of both the Law 2001 and the Revised Road Traffic Law (2008). This may probably be explained by the fact that NTSC is mainly a coordinating agency and has no state management function.

And as compared with the 2001 Law, this revised law has added a number of contents on state management over road transport as the management of transport operations and support services for transport, rescue activities in road accidents while explicity stipulating the responsibilities on state management of related government agencies.

The revised law also stipulates a number of additional duties and powers of road inspectors to enhance the role and effectiveness of road inspection, for a more timely prevention of violations of the traffic law.

Significant parts of this chapter are the mobilization of other police forces and commune police in coordination with the traffic police in patrol and control to ensure order and safety of traffic if neccessary as set by the Government's regulations. This regulation comes from practical requirements with the very complex traffic safety situations. The limitation of the traffic police resources and the rapidly deteriorating conditions of traffic flow and safety necessitates the mobilization of other forces to support traffic police.

2) Implementation of the Revised Road Traffic Law (2008)

(i) Challenges for Successful Implementation

As already mentioned, successful implementation of the law will contribute remarkably in ensuring traffic order and safety. This however is not expected to be easy since, in addition with established regulations that the people are already aware of and abiding by at present, there are various regulations that require very careful implementation planning such as the case of the helmet wearing campaign in 2007. The following are some of these various provisions:

- More stringent measures against drunk driving such as zero blood alcohol limit for drivers of automobiles, tractors, and specialized land vehicles;
- Requirement for electric bike riders to wear helmets;
- Installation of black box on cars and other vehicles used in transportation business;
- Legal alcohol limit for motorbike riders of 50mg/100ml of blood or 0.25mg/liter in breath tests; and
- If vehicle owners' employees or representatives break the law while obeying the employer's instructions, the owners will be held liable, among others

(ii) Efforts for Successful Implementation

It is expected that the Government would aspire for the successful implementation of the Law, for, as already mentioned, it is anticipated to contribute remarkably in ensuring traffic order and safety. This is a not so very task and in fact requires numerous efforts of the whole political system of Vietnam.

There are two major important tasks that should be undertaken for the successful implementation: (1) establishment of a full legal framework for implementation and (2) dissemination of the Law to every road user.

For the first task, a comprehensive review has been conducted by MOT to list all the necessary legal documents that shall specify and guide the implementation of this Revised Road Traffic Law (2008). And based on this review, it was found out that there are already 48 such legal documents (including 10 Decrees of the Government, 32 Circulars of Ministers and six legal documents by Provincial

People's Committee, of which, 27 legal documents were sponsored by MOT (8 Decrees of the Government, 19 Circulars of the Minister). It is worth mentioning that during the preparation phase of the Revised Road Traffic Law (2008), MOT had prepared seven (7) draft decrees guiding the implementation of the Law for the members of the National Assembly to consider before approval of the draft Law.

The MOT has issued Decision No. 200/QD-BGTVT dated 21 January 2009 for a program to set up all legal rules/regulations and detailed guidelines for implementation of the Law and has assigned related tasks for agencies, units of the Ministry to draft all related documents in collaboration with other Ministries and departments related construction documents guiding the implementation of the Law.

In addition, the MOT had issued official letters to the MOPS, Ministry of Health, Ministry of National Defense, and Ministry of Finance to formulate or issue relevant legal documents under their authority, trying at numerous efforts to ensure that a system of legal framework in guiding the implementation of the Law should be promulgated before its actual effectivity on 1 July 2009.

For the dissemination task, meanwhile, the MOT has issued Decision No. 201/QD-BGTVT on a program for propaganda and dissemination of the Law in 2009. MOT considers this activity as one of the key tasks this year aiming for a timely dissemination to the people of all related provisions of the Law in various formats, with particular focus on the new regulations. MOT has set the goal that, to facilitate the process of implementation of the Law, all state management agencies as well as the general population should basically have an adequate and proper understanding of all relevant regulations before the Law's effectivity this year.

3.5 Traffic Safety Budget and Allocation

1) General

The Government has expressed its increasing concern for road traffic safety as stated in its Resolution No. 32/2007/NQ-CP dated 29 June 2007 which states in particular, "…especially road traffic accidents have invoked a critical and serious social concern". Although the Government has always given priority to allocation of budget for traffic safety, the budgetary constraints all the more make it necessary for Government to have a planned budget and allocation for traffic safety.

(i) Traffic Safety Expenditures

The Traffic Safety Expenditures consist of five main contents:

- Engineering (e.g. Black spot elimination, traffic management improvement, etc.) This expenditure part takes a majority of the whole budget for traffic safety, usually 70-80 %. For example, the cost of the Plan to set up fully the road safety corridor of National Highway No. 1 is estimated at a considerable amount of 14,365 billion VND (about USD 900M).
- Emergency
- Enforcement
- Education and Promotion/Information Campaign

- Activities and routine expenditure of Traffic Safety Agencies.

(The routine expenditure comprises such expenditures as office cost, management and administration cost, stationary, security etc)

(ii) Traffic Safety Financial Resources

To meet these expenditures, there are five main Traffic Safety Financial Resources:

- State budget is the most important part and covers mainly all engineering works, all NTSC activities; a major part of traffic safety education in the schools, information campaign in the community, etc.
- Receivables from fines of Traffic Regulation Violations: This revenue is the second largest source of funds for traffic safety and it seems to be enough for Traffic Safety activities in the local areas (except engineering works).
- Sponsors: mainly for traffic safety education/information campaigns
- Insurance firms: mainly for medical treatment of traffic accident patients; in some cases for traffic safety facilities such as spherical mirrors, rescue road, etc.
- Other Social Contribution (such as from traffic accident patients or their family, people who have caused traffic accidents, etc.) mainly for medical treatment, especially in the case of very/extremely serious traffic accidents with a high numbers of fatalities and/or injuries.

(iii) Traffic Safety Budget Allocation Regulations

This allocation is regulated mainly by related Circulars of the Ministry of Finance and/or Decision of MOT in reference of expenditure kinds and budget sources. Table 3.5.1 gives a summary of traffic safety budget allocation. It is remarkable that the state budget (central and/or local) through MOT and MOET cover a majority of expenditures for engineering works and traffic safety education in the schools.

The expenditure of medical emergency is mainly covered by state budget and social contributions (insurance firms, patient and family relatives, the traffic accident offender, etc.)

Succeeding subsections will discuss in more detail the budget of NTSC and Provincial Traffic Safety Committees in which the two documents of the Ministry of Finance play a very important role: (i) Circular No 106/2004/TT-BTC dated 9 November 2004 and (ii) Circular No 89/ 2007/TT-BTC dated 25 July 2007.

Table 3.5.1 Summary of Traffic Safety Budget Allocation

No	Expenditure	Budget Source	Implementing Agency	Financial Regulation	Remarks
1	Engineering Operating road	State budget	VRA for national roads PDOT or TUPWS for local roads	Black spot: Decision No 13/ 2005/QD-BGTVT dated 2 Feb 2005 Traffic safety Audit: Decision No23/ 2007/QD-BGTVT dated 5 May 2007 Other regulation on Maintenance and Repair Fund such as Decision No. 3479 /2001/ QD-BGTVT dated 19 Oct 2001	Mainly from Maintenance and Repair Road Fund
	Ongoing road project	Project budget sources	Project owner		This budget can be from state, private, etc sources
2	Emergency	State Budget Social contribution Sponsor	MOH and medical treatment unit (hospital, first-aid stations etc.)	Insurance firms;	
3	Education in the Schools	State budget Social contribution	MOET and PDET	?	
4	Information Campaign and Education in the community	State budget Receivables from TS Violation Fines	NTSC Provincial Traffic Safety Committees	*Traffic Safety Activities at Central level:* Circular No 106/2004/TT-BTC dated 9 Nov 2004; *At local level:* Circular No 89/ 2007/TT-BTC dated 25 July 2007 *Salary and routine expenditure*: other current regulations	Including driver TS education
5	Enforcement		MOPS for traffic police MOT, VRA, PDOT or TUPWS for Transport Inspectors		
6	Activities and routine expenditure of Traffic Safety Agencies		NTSC Provincial Traffic Safety Committees		
7	Activities of Traffic Safety Committee in Business, Agencies	Own budget Sponsor Social contribution	Business Social Agencies such as Hospitals Social/Mass organizations (Vietnam Fatherland Front, Veteran, Woman Union etc)	Various related financial regulations	There are Traffic Safety Committees in various Transport Enterprises

2) Budget for NTSC

(i) General

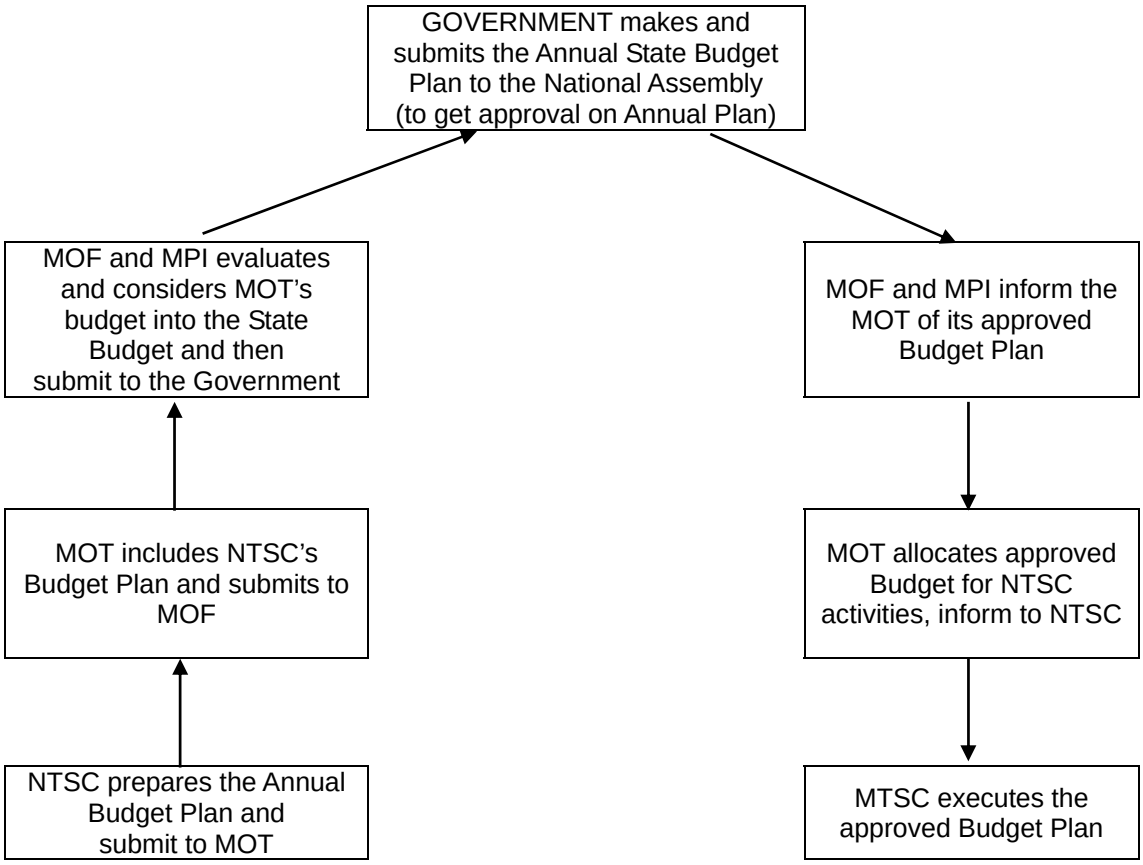
All expenditures of NTSC (including NTSC Standing Group, NTSC Office) is covered by state budget and regulated by the above-mentioned Circular No. 106/2004/TT-BTC, with the following exceptions:

- TS-PMU is a unit of NTSC but its expenditure is covered by related projects and is managed by other regulations, mainly those on Investment and Construction.
- The Newspaper “Ban Duong” (Road Friend) is a also unit of NTSC. A part of its expenditure is covered by NTSC and a part by its own activities in Public Media Regulations.

(ii) Annual Budget Planning

NTSC is still not a level 1- budget estimating unit. All financial planning steps such as budget estimation, accounting, auditing, and liquidation are under management of MOT. Figure 3.5.1 shows that NTSC’s budget estimating level is lower than MOT.

Figure 3.5.1 Organization Structure of NTSC and TSC



Source: Study Team

(iii) Expenditure Items of NTSC

Based on the functions of NTSC, Circular 106/2004/TT-BTC stipulates the following expenditure items of NTSC which are covered by the state budget:

(i) Expenses for activities of the Office of the National Traffic Safety Committee.

(ii) Expenses for ensuring national traffic safety, as follows:

a) Expenses for periodic meetings, review meeting on traffic safety

b) Rewards for individuals, units having excellent achievements in ensuring national traffic safety in accordance with decisions of the Prime Minister and the Chairman of the NTSC.

c) Expenses for information campaigns, education and dissemination of law on traffic safety, including cost for printing of teaching materials in order to introduce traffic safety regulations into schools at all levels.

d) Expenses for formulating programs, projects on traffic safety and conducting pilot application of solutions into practice.

e) Expenses for conferences, seminars, trainings, contests on traffic safety activities.

f) Expenses for international cooperation regarding traffic safety.

g) Expenses for emergency treatments for victims of serious accidents.

h) Expenses in support of training of traffic safety knowledge.

i) Expenses in support of compiling, modifying and supplementing legal documents on traffic safety

j) Expenses in support of interdisciplinary inspection of traffic safety activities.

3) Traffic Regulation Violation Fines Fund and Traffic Safety Budget in Provinces/Cities

(i) Receivables from Fines of Traffic Regulation Violations

Table 3.5.2 presents data on Fines of Traffic Violations that the Traffic Police have handled. Nationwide data from Transport Inspectors are not available; however, Table 3.5.3 presents data from Hanoi. These tables show that:

- From 2003, the number of apprehended traffic violators has increased sharply. This may be explained by the increasing activities of police and inspectors following the Instruction from the Government and secondly, by the increasing number of traffic violations.
- The total revenue from traffic violation fines can be estimated at about 35-40 million USD in consideration of all traffic violations handled by both police and inspectors. This revenue forms an important fund for traffic safety activities.

Table 3.5.2 Data on Traffic Violation Fines Handled by Police

Year	Number of Violations	Fines (billion VND)	Fines (Million USD)	*Exchange Rate: USD/VND (as of December as defined by MOF)*
2002	1,271,239	139.3	9.116	15,280
2003	3,542,065	419.6	27.054	15,510
2004	4,057,406	467.8	29.764	15,717
2005	4,432,551	607.1	38.271	15,863
2006	3,462,338	559.8	34.868	16,055

Source: RRTPB

Table 3.5.3 Data on Traffic Violations Fines in Hanoi

Year	By Police*		By Inspectors**		Fines Total (billion VND)
	Number of Violations	Fines (billion VND)	Number of Violations	Fines (billion VND)	
2003	305,289	14.5	4,695	1.4	**15.9**
2004	432,341	15.4	11,385	3.1	**18.5**
2005	315,598	12.4	13,980	4.5	**16.9**
2006	122,580	8.0	13,694	4.7	**12.7**
2007 (ten months)	251,784	14.0	13,953	4.7	**18.7**

Sources: *RRTPB ** Hanoi TUPWS Inspectors

(ii) Use of Funds from Traffic Regulation Violation Fines

As already mentioned, the Government allocates the entire fund for traffic safety activities, mainly for activities of Police, Inspectors and Local Traffic Safety Committees. This allocation is now based on Circular No. 89/2007/TT-BTC of the MOF dated 25 July 2007.[2]

Before that, it is regulated by Circulars 25/2003/TT-BTC and 47/2003/TT-BTC dated 28 March 2003 and 15 May 2003. Table 3.5.4 shows the difference in allocation of that Traffic Regulation Violations Fine Funds. This table shows that in the past, a majority of this fund is allocated to Traffic Police and now this allocation becomes even larger while the portion of PTSC and Transport Inspectors is reduced.

[2] It is noteworthy that the MOF has issued another one, the Circular No 78/2007/TT-BTC dated on 06 July 2007 to replace the two Circulars No. 25 and 47. But before the validity of this Circular, the MOF has announced the current Circular 89.

Table 3.5.4 Allocation of Traffic Violation Fines Fund (%)

No	Allocation for	Current Allocation (Circular 89/2007)	Former Allocation (Circular 25/2003)	Difference
1	Local policemen who take part directly in Traffic Safety[a]	70	30	40
2	Transport inspector[b]	10[c]	12	-02
3	Municipal/Provincial Traffic Safety Committee	10	13	-03
4	Other direct task-force in the area (district, ward, commune) such as volunteers, etc	10	10	0
5	Local State-Treasury Unit	0	2	-2
6	Car-Weighing Station	0	3[d]	-3
7	Municipal/Provincial government to use for keeping Traffic Safety in the area	0	30	-30

Notes:
[a] In addition to Traffic Police force, also includes other concerned groups such as Police for Social Order, etc.
[b] All local inspectors and central inspectors who work in the local area.
[c] This includes 2% for Car-Weighing Stations and/or Inland-water way Port Authorities, if any.
[d] If applicable. If not, this 3% goes to the Municipal/Provincial Traffic Safety Committee in addition to the 13%.

(iii) Expenditures of PTSC

During the survey period in the 11 cities/provinces, Circular 89 was just recently enforced and thus collected data are mainly related to the old Circulars.

The surveys indicated that the Traffic Violation Fine Fund basically meets the expenditure demand of relevant agencies such as PTSC, Inspectors etc.

- Danang TCS: In 2006, fund amounted to about 614 Million VND and 15 Million VND from business sponsorships.
- Haiphong: The total of funds collected from fines is estimated at about 20 Billion VND / year and about 2 Billion VND for PTSC.
- Lam Dong: in 2006, PTSC is allocated with an amount of 1,183 Million VND (among that 1,000 Million was spent for Traffic safety campaign, 193 Million VND for PTSC and other activities),and 628 Million VND as of end September 2007 (533.8 Million VND for campaign and 94.2 Million VND for others).
- Lao Cai: Total of 150 Million VND is allocated per year for PTSC.

Survey clearly shows that there are discrepancies in budget allocation for different PTSCs, with some getting only 150 Million VND while others are getting as much as 2,000 Million VND. The discrepancy in allocation may be attributed to the varying traffic violation situations in the provinces and the enforcement activities of local Policemen and transport inspectors.

The agencies report on the actual collection from fines every first and middle of the month. In general, this is a good accounting process and provides favorable conditions for these agencies in terms of budgeting of their activities.

However, there are some problems in the use of these funds which are related with

the regulations on planning and liquidation. As discussed, these funds can basically meet the general expenditure demand. However, in some areas, the funds cannot timely meet the local demand:

- The allocated budget amount, if not spent by the end of fiscal year, could not be used automatically the next year. This leads to tendency of PTSC to use all funds allocated for the present fiscal year, even for some unnecessary purposes.
- The fund is limited closed to each city/province and cannot be re-allocated for other city/province. While this regulation may be aimed at encouraging local government enforcement, however, it also leads to situations where one city/province has surplus while others are lacking in funds.
- There are a lot of discussions about the percentages defined in the Circulars. These percentages could be good for a certain time period/area but not good for other time period/area.
- All Circulars stipulates that the allocated budget from this fund should be shared not only for local transport inspectors but also for inspectors from Central Agencies, such as VRA inspectors who work in the area. In fact, as results of the surveys in cities/provinces would show, the portion for inspectors from Central Agencies is often neglected by local government for lack of details and guidance from relevant authorities.
- There is an internal logical contradiction in the usage of this fund, as follows. To increase this fund, PTSC should increase enforcement. Increasing enforcement should lead to decreased violations. And a decrease in violation will result in a decrease in fund. Several interviewees shared with the Study Team this dilemma, which, sometimes lead to an enforcement strategy wherein a quota is set for fine collections.

4 ROAD TRANSPORT INFRASTRUCTURE AND OPERATION

4.1 Road Network System in Vietnam

1) Road Classification

(i) Road Classification Outside Urban Areas

Roads in Vietnam are classified into 7 categories (Table 4.1.1) according to road function, traffic volume and administrative management.

Table 4.1.1 Road Classification Outside Urban Areas by TCVN4054:2005 (MOST)

Road Category	Functional Classification	Management Classification	Considered Traffic Volume (pcu/day)
Expressway	- Super high class highway for high speed traffic with controlled access and faster travel time. - Connecting important cities.	National Road	25,000 <
I	- Highways generally providing direct service between cites and important economic, political, cultural centers. - Partial controlled access highways	National Road	15,000–25,000
II	- Highways providing direct service between big economic, political, cultural centers. - Roads connecting them to the Category-I or Expressway.	National Road	6,000 -15,000
III	- Roads providing direct service between several towns and local economic, political, cultural centers. - Roads connecting them to the arterial network and Expressway.	National / Provincial Road	3,000 – 6,000
IV	- Roads providing direct service between resident area and local economic, political, cultural centers.	National / Provincial / District Road	500 – 3,000
V	- Roads providing local transportation	Provincial / District / Commune Road	200 – 500
VI		District / Commune Road	< 200

Source: TCVN 4054 : 2005 “Highway – Specifications for Design”

(ii) Road Classification in Urban Areas

Vietnam is experiencing rapid urbanization due to its continuous economic development. Rate of population in urban areas is increasing (Table 4.1.2) and the Development Strategy of Land Road Transport up to 2020 prepared by MOT (January 2003) has forecasted GDP growth rate up to 2010 by industry sector as follows:

- Agriculture / fishing / forestry sector : 3.0 – 4.2 %
- Manufacturing / construction sector : 8.2 – 9.0 %
- Service industry sector : 7.6 – 7.9 %

MOT also forecasted that the number of automobiles will double as compared to 2006 figures (Table 4.1.3). This means that economic activities in urban/suburban areas will further increase and that urbanization, as well as motorization, will continue to expand.

Table 4.1.2 Socio-economic Condition and Forecast

Year		1995	2000	2006	2010	2020
Population (million)		72.00	77.64	84.15	88.24	97.48
Rate (%)	Urban Area	20.7	24.2	27.1	-	-
	Rural Area	79.3	75.8	72.9	-	-
G,DP at 1994 price (billion VND)		18,223	273,666	393,031	551,700	987,540
GDP by Sector (%)	Agriculture/Fishing/Forestry	27.2	24.5	20.3	17.0	-
	Manufacturing/Construction	28.8	36.7	41.6	40.0	-
	Service	44.0	38.8	38.1	43.0	-

Source : [up to 2006] Statistical Yearbook of Vietnam 2006 (Statistical Publishing House)
[2010 & 2020] Development Strategy of Land Road Transport up to 2020 by MOT (Jan. 2003)

Table 4.1. 3 Vehicle Registration Condition and Forecast

unit: thousand vehicle

Year		1995	2001	2006	2010	2020
Motorcycle		3,578	7,792	17,865	21,000	-
Automobile	Car (≤ 9 seat)	-	118	226	310 - 440	680 – 1,150
	Bus (10 seat ≤)	-	74	77	250 - 360	650 - 770
	Truck	-	224	320	550 - 620	1,350 – 1,400
	Total :	340	414	637	1,110 – 1,420	2,680 – 3,320

Source : [up to 2006] Vietnam Road Administration
[2010 & 2020] Development Strategy of Land Road Transport to 2020 by MOT (Jan. 2003)

The urban road design specification was revised on 30 June, 2007 by MOC. Based on the new specification of "TCXDVN 104- 2007: Urban Road - Specification for Design", the urban road and street are categorized as shown in Table 4.1.4.

Table 4.1.4 Road Category by TCVN4054:2005 (MOST)

Road Category	Functional Classification	Traffic Volume (vehicle/ day)
Urban Expressway	- For transport service with uninterrupted high speed traffic. - Satisfying great volume and capacity. Linking cities, linking the central cities with industrial zones, seaports, large railway stations, satellite cities	50,000 - 70,000
Main Urban Street		
a) Primary Main Street	- For transport service with high speed traffic, entire-urban transport. - Satisfying high volume and capacity. Linking big residential centers, large concentrated industrial zones, urban class constructions.	20,000 - 50,000
b) Secondary Main Street	- For transport service in inter-areas with relatively high speed. - Connecting concentrated residential areas, industrial zones, public centers with inter-area scale.	20,000 - 30,000
Collector Road		
a) Local Road	- For transport in inner areas such as between big community buildings, between areas in a district.	10,000 - 20,000
b) Transport Way	- For commodity transport in concentrated industrial zones and linking industrial zones and seaports, railway stations and main arterial ways.	-
c) Avenue	- Large scale road ensuring the balance between traffic and spacing function. - Satisfying spacing function at the highest level of service.	-
Internal Road		
a) Internal Local Road	- For traffic within a precinct, residential areas, industrial zone, public or commercial construction area.	low
b) Pedestrian Road	- Specialized road for traffic within internal streets. - On roads parallel with main and collector roads.	-
c) Bicycle Way		

Source: TCXDVN 104 : 2007 "Urban Road – Specifications for Design" by MOC (30/Jun/2007)

2) Current Road Length

Total road network length of the whole country in 2006 is 251,787 km (Table 4.1.5) and this includes: 17,295 km of national road (6.9%), 23,138 km of provincial road (9.2%), 54,962 km of district road (21.8%), 141,442 km of commune road (56.6%,) and 8,536 km of urban road (3.4%). Compared to year 1999, total road length has increased by approximately 27,000 km, and pavement qualities have also been upgraded.

Table 4.1.6 shows length of national road in 2006 by road classification. Classification of most national roads was under grade-IV in 1999. But due to increase in investment effort by MOT, the proportion of higher than grade-III in 2006 increased by 30%. MOT's target now is to upgrade grade-V, VI roads in mountainous area to more than grade-IV; thus MOT's investment for upgrading will further increase.

Table 4.1.5 Road Length by Management Category and Pavement Type

Management Category	Year	Total Length (km)	Length by Pavement Type (km)					
			Asphalt Concrete	Cement Concrete	DBST	Gravel	Earth	Other
National Road	1999	15,520	5,354	94	5,828	3,178	-	-
	2006	17,295	7,750	344	6,447	2,854	-	-
Provincial Road	1999	18,344	829	157	5,609	7,309	-	-
	2006	23,138	3,474	701	11,030	4,816	3,073	44
District Road	1999	37,437	-	-	-	-	-	-
	2006	54,962	1,762	2,581	10,992	34,897	77,261	3,601
Commune Road	1999	134,463	-	-	-	-	-	-
	2006	141,442	1,616	18,442	9,226	34,897	77,261	-
Urban Road	1999	5,919	2,297	-	3,622	-	-	
	2006	8,536	2,465	776	2,750	976	1,568	-
Other Road	1999	5,451	-	-	-	-	-	-
	2006	6,414	-	160.4	547	2,593	2,800	-
Total :	1999	224,639	-	-	-	-	-	
	2006	251,787	16,967	23,005	40,992	62,018	104,816	3,644

Source: Vietnam Road Administration

Table 4.1 6 National Road Length by Road Classification in 2006

Road Category	Road Length (km)					
	Flat Area		Mountainous Area		Total	
I	281	(1.6%)	0	(0.0%)	281	(1.6%)
II	738	(4.3%)	79	(0.5%)	817	(4.7%)
III	3,806	(22.0%)	806	(4.9%)	4,611	(26.7%)
IV	2,680	(15.5%)	1,819	(10.5%)	4,500	(26.0%)
V	880	(5.1%)	2,296	(13.3%)	3,176	(18.4%)
VI	154	(0.9%)	302	(1.7%)	456	(2.6%)
under survey	-		-		3,453	(20.0%)
Total :	8,539	(49.4%)	5,302	(30.6%)	17,295	(100 %)

Source: Vietnam Road Administration

3) Road Maintenance System by VRA

(i) Regular Maintenance

VRA performs maintenance works on the national roads under their management in accordance with the following guidelines by MOT:

- Decision No.3479/2001/QD-BGTVT - "Norms for Regular Road Maintenance" (19 October 2001)"
- Decision No.1527/2003/QD-BGTVT – "Technical Specification for Regular Road Maintenance" (28 May 2003)

Actual road maintenance is conducted by 4 Regional Road Management Units (RRMUs) and 48 Provincial Department of Transport assigned by VRA to manage some portions of the national road. In addition, 5 Road Engineering Centres are organized under VRA which perform the regular maintenance inspections and design of works in accordance with the above guidelines.

According to “Norms for Regular Road Maintenance”, the standard site inspection frequency and standard work volume by maintenance work items are regulated pursuant to type of pavement, road width, terrain condition, traffic volume. Table 4.1.7 shows the technical standards of maintenance relating to road safety facilities.

(ii) Current Status of Road Inventory Data

According to the Science, Technology & International Cooperation Department of VRA, VRA has undertaken the following road inventory data collection:

- Up to 1994 : Road data for 6,000 km with assistance from UK
- Up to 2001 : Road data for 2,000 km with Technical Assistance from the WB
- Up to 2003 : Road data for 8,000 km with Technical Assistance from ADB
- Up to 2004 : Road data of 11,600 km by VRA

VRA manages approximately 17,000 km of national road. However, the available road inventory data that may be used for road maintenance planning using HDM-4 system is only for 12,000 km at present.

(iii) Introduction of the HDM-4 System for Road Maintenance

A WB technical assistance for road maintenance to use HDM-4 system and ROSY system (road pavement management system) was conducted in 2001. After the official decision was issued in 2003, VRA provided the required road information used on the HDM-4 form. In addition, a technical manual for data collection/damage assessment to be used for HDM-4 system was prepared by JBIC Special Assistance for Project Implementation (SAPI) in 2005.

Currently all 4 RRMUs have been licensed to use HDM-4 and ROSY system for data collection to serve their road maintenance activities. The databases of 4 RRMUs have been linked with the database in the central office. VRA has formulated a 3-year road maintenance plan from 2008 to 2010 by using an analysis result of HDM-4, and VRA is now considering the possible financial source for its implementation.

Table 4.1.7 Technical Requirement of Road Safety Facility for Maintenance Works

Safety Facility	Description of Maintenance Work
Road Sign	Maintenance of road signs include the following items: - Painting of signs (including post and the reverse of signs) once every 2-3 years. - Painting or re-pasting light reflecting layer on the signs which have been damaged. - Replacement of broken signs. - Restoration and repair of twisted signs; reinstallation of inclined signs and cleaning the signs to ensure clear visibility. - Clearing of tree branches and anything that obstructs the traffic signs.
Road Marking	- Road markings are a type of road signal to guide and control the traffic in order to improve the traffic safety and traffic mobility. - Therefore, road markings should be clearly visible and repainted twice a year. If reflective paint is used, repainting can be done once every 3-5 years.
Speed Hump	Repainting of speed hump by reflective paint: once every 3-5 years.
Reflective Stud	- Replacement of reflective studs which have been damaged. - Cleaning of studs.
Convex Mirror.	- Repainting of mirror post once every 2-3 years. - Replacement of convex lens if opaque. - Clearing any obstacles to ensure visibility.
Traffic Island	Traffic island is constructed at cross roads to: - Organize traffic flow - Organize traffic signs, lighting systems etc. Maintenance of traffic island includes: - Taking care of plants, grass - Repair of traffic signs - Repair of curb around the island, which has been damaged.
Protection Wall (Guardrail)	Maintenance of protection wall which is made of concrete or masonry includes the following items: - Painting: 4 times a year - Patching and repair of broken parts by cement concrete of grade 200 or masonry of grade 100. - Clearing of grass Maintenance of Protection wall which is made of corrugated iron sheets includes the following: - Redress and replacement of damaged parts. - Repainting of corroded parts once every 2-3 years - Cleaning of reflective studs installed on the post - Replacement of damaged “reflective eyes” - Retightening of bolts or installing new bolts when missing or damaged
Flexible Median	- Repainting of concrete posts and rails once every 2-3 years - Replacement of broken posts and damaged rails - Restoration of displaced flexible median
Fixed Median	- Repainting once every 2-3 years - Frequent cleaning of “reflective eyes” installed on top of fixed median
Stakes/ MLG Stakes	- Restoration of inclined stakes - Replacement of missing and broken stakes - Painting: once a year - Wash: 4 times a years - Clearing to make them visible
Kilometer Post	- Painting: once a year - Painting or pasting reflective paper on Km posts, which have been opaque or missed. - Replacement of broken posts - Clearing to make them visible
Water Level Post	Water level posts are installed at the following positions: - On bridge piers and abutments to define the water level and the clearance height of the bridge. - At two ends of spillway and flooded road sections to define the water level Water level posts are made of iron sheet, steel pipe or reinforced concrete Painting: once a year.
Traffic Signal System	Traffic lights are under the control of the Traffic Police. Maintenance of traffic lights is conducted in accordance with separate regulations
Lighting System	Maintenance of lighting system on roads and bridges is conducted under guidelines issued by power supply authority

Source: “Technical Specification for Regular Road Maintenance” of No.1527/2003/QD-BGTVT (28 May 2003)

4) Governmental Initiatives

The national government, MOT and NTSC, which are the government agencies responsible in formulating the traffic safety development policy for Vietnam, issued strategic traffic safety measures which are aimed to be achieved within the short-term. Traffic safety facilities improvement, illegal rail crossing reduction and traffic signal improvement are some of the identified measures towards ensuring traffic safety in road network development.

Table 4.1.8 Government Policies Related to Traffic Safety Measures in Road Network Development

Policy	Strategy
GOV: Resolution 32/2007/NQ-CP, June 2007	• Installation of vehicular lane separation facilities on necessary road sections • End to opening of illegal level crossing with railway • Elimination of 50% of existing illegal level crossings • Demolition of structures obstructing sight distance of train operation • Complete inventory and analysis of illegal connection with national highways • Elimination of 50% of illegal connections • Treatment for all illegal connections • Installation of traffic safety ancillary structures and facilities in dangerous sections • Review and classification of crossings with road and railway to establish guarded crossings • Installation of barriers in sections where roads are aligned adjacent to railway • Installation of road signage, rumble strips and other warning device at unguarded road crossing with railway • New construction of urban roads or NHs shall be required to adopt vehicular lane separation and installation of surveillance cameras (closed-circuit television)
MOT: Plan on National Traffic Safety Order Improvement until 2010, 2007	**New construction, road network upgrade and improvement** • Review constructing dedicated motorbike lanes at design stage. • Supplement adequately with secondary works to prevent traffic accidents on national roads passing through dangerous mountainous slopes. **By-pass, collector road and intersections** • The locals undertake construction of roads in coordination with and based on approved planning systems of by-passes, collector road and other intersections with the main roads. • Conduct of planning and evaluation of implementation. **Works and traffic safety equipment** • Prioritization for construction of and investment to traffic safety-related works (i.e. tunnels, flyover bridges for pedestrians and bicycle and motorcyle, etc.) on main arterial roads where traffic accidents usually occur. • Introduction of new and modern technology. • Improvement and upgrading of at-grade intersections into grade-separated junctions. • Construction of grade-separated junctions. • Planning and construction of long distance car parking stations. **Road maintenance** • Appropriate budgetary allocations for new road construction and road maintenance. • Sustainable fund sourcing for road maintenance activities to ensure availability of funds for a minimum of 70% of demand. • Revision of instruction for implementing disbursement rate of regular maintenance and model expansion by related Ministries and agencies. **By-passes crossing between road and railways** • Continuous implementation of Decision No.1244/Q§-BGTVT issued on 26

Policy	Strategy
	April 2002 by Ministry of Transport on project investment "United system of by-pass and railway routes". Repair and upgrade of by-passes which require traffic safety measures. • Coordination with local authorities into closing of illegal crossing by local roads with railways, and construction of appropriate collector roads. • Coordination of railway management company with local authorities to organize households into signing a commitment on the implementation of the railway traffic safety order. **Guardrail between railways and road** • Review and construction of by-passes guarded in all intersections between the national roads and railways; adequate installation of rigid barriers to separate national roads and railways in the road sections close to railways; completion of construction of 76,060 m of rigid barriers between railways and residential areas by 2010. • Installation of appropriate signage, speed limit signs, enforcement lines, and other warning facilities between local by-passes and railways; end to illegal by-passes widening; 50% reduction of local by- passes passing through railways by end of 2009.
NTSC: 272/UB ATGTQG, July 2007	• Regulations on lane separation for motor vehicles, motorcycles, and safety monitoring system in new construction of national highways and streets. • Statistical plan, classification, resolution of illegally connected roads to national highways. • Assessment and classification of road intersections with railway to formulate the defensive cross-road, and railing/barrier which separate national highway with railway in the routes of national highway running close with railway. • Installation of supplementary safety facilities such as signage, bumpy edges (to reduce speed) and other warning symbols along roads intersecting with railway which do not fall under criteria of road sections that require barrier or automatic warning. • Organization for lane separation of bicycles and motorcycles along roads and city routes with mixed traffic situation. • Various levels of People's Committees plan to formulate measures which can prevent opening of illegal road crossings with railway and targeting closure of approximately 50% of illegal road crossings by 2009; clearance of violating traffic works or other obstacles which reduce/ limit the vision of train's driver.

Source: JICA Study Team

5) Road Transport Network Development Plan

MOT issued the "Development Strategy for Land Road Transport up to 2020" on January 2003. And based on this development strategy, the road network system will be improved as follows:

(i) National Road

Major targets for road network development plan by MOT are summarized in Table 4.1.9.

Table 4.1.9 National Road Network Development Plan by MOT

Region	Description of Development Priority Route
North-South Axis	[Ho Chi Minh highway] - 1,700 km long from Hoa Lac to Binh Phuc intersection, is nearly parallel to the national highway 1A towards the west, consisting the National Highway namely No. 21, 15, 14B, 14 and 13. - Upgrading to reach grade-III with 2 lanes.
Northern Region	[Routes in Main Economic Area] - Completing upgraded to grade – III of national highway No. 38 and 39. - Taking measure against flood on national highways 12B, 21 and 21B. [Fan Blade Area] - Fan blade routes from Hanoi city to Northern provinces include National Highways No.2, 3, 6, 32, and 70. - Reaching grade-II at the route beginning and the standard grade IV at mountainous areas for No. 32 and 70. - Widening with 4 to 6 lanes on suburban sections from Hanoi towards in radius of 50-70 km. [Belt Route-1] - National Highway 4A, 4B, 4A, 4B, 4C, 4D and 4E, of which length 651 km from Tien Yen (Quang Ninh) to Pa So (Lai Chau), and National Highway No. 34 of 260 km long through provinces namely Lang Son, Cao Bang, Ha Giang and Lao Cai. - Completing upgrade whole route to reach grade-IV with 2 lanes (for difficult sections section: grade-V). [Belt Route-2] - National Highway No. 279 of 678 km long from Dong Dang (Quang Ninh) to Tuan Giao and Tay Trang (Lai Chau). - Upgrading whole route to reach grade-IV with 2 lanes(for difficult sections section: grade-V). [Belt Route-3] - National Highway No. 37 from Sao Do (Hai Duong) to Xom Lom (Son La), of which length is 465 km long (including 80 km long is used another national road) through such provinces as Hai Duong, Bac Giang, Thai Nguyen, Tuyen Quang, and Son La. - Completing upgrade whole route to reach grade-IV with 2 lanes (for difficult sections section: grade-V).
Central Region	- Upgrading National Highways No.8, 19, 25, 26, and 27 to reach the standard grade-III and IV up to 2010. - National Highways such as No.45, 46, 217, 14C, 14D, 14E will be mainly upgraded for road surface and widened for sections through towns by the year 2010; and upgraded to reach the standard grade-IV with 2 lanes (standard grade V for difficult sections) after 2010.
Southern Region	[Southeast Region] - Strengthening main economical centres in the south of Ho Chi Minh City – Bien Hoa – Vung Tau – Binh Duong corridor, including National Highways namely No. 51, 55, 56, 22, 22B, 13 and 20. - Completing upgrade of National Highway No.55 to grade-III in entire route. [Southeast Region] - Completing upgrading routes of National Highway No.50, 62, 30, 54, 57, 60, 61, 63, 80 and 91to reach the standard grade-III with 2-lane. - Connecting new route of N1 that is 246 km long, runs along the Vietnam-Cambodia border from Duc Hue (Long An) through 4 provinces namely Long An, Dong Thap, An Giang and Kien Giang with 2 points of crossing large rivers at Tan Chau and Chau Doc, and upgrading the whole route to reach the standard grade-IV by the year 2010. - Connecting new route of N2 that is 250 km long, runs from Chon Thanh (Binh Duong) through Cu Chi, Tan Thanh, Tam Nong to Vam Ray (Kien Giang) that is formulated a inner belt route in the Southwest region and upgrading the whole route to reach the standard grade-III by the year 2010.

Source: “Development Strategy of Land Road Transport up to 2020” by MOT, January 2003.

(ii) Provincial / District Road

Orientation of development policy for provincial/district road is as follows:

- Taking priority over upgrading the routes of important provincial road to connect with national highway, important district road to connect with provincial road, or construction of new routes in the required area.
- Upgrading to reach grade-IV road in delta area, grade-V in mountainous area and grad-III at through section of town area for provincial road.
- Achieving 100% of high grade pavement (asphalt, cement and DBST) up to 2010 for provincial road (66% in 2006), and up to 2020 for district road (28% in 2006).

(iii) Commune Road

[Target up to 2010]

- Gradually construct new roads into all plantation/forestation yards and developing interior field traffic.
- Reach satisfactory level of required technical standard.
- Ensure enough traffic capacity in all seasons.

[Target up to 2020]

- Complete the entire rural traffic network in communal level and ensuring rural traffic to connect with villages in delta area as well as mountainous area.
- Strengthen bridge construction and drainage improvement, and replace foot bridges to steel bridges.
- Ensure perfect traffic capacity in all seasons.

(iv) Urban Transportation

Orientation of development policy for urban transportation is as follows:

- Develop ring road system and urban railway system in Hanoi and Ho Chi Minh City first.
- Introduce advance traffic management/control system and install necessary equipment and devices.
- Ensure 20 to 25 km/hour of travel speed in urban area.
- Provide the public bus stop location with distance of 500m to 600m in urban central area, and 1km in suburban area.
- Provide public transportation services of 100 seats/1,000 inhabitants and 30 taxis/1,000 inhabitants, and transportation fee to use public bus should not exceed 10% of income for low income level.
- Target number of user for public transpiration service should be 50%-60% of transportation demand in large cities.

(v) Expressway Network

According to “Vietnam Expressway Master Planning Proposal: No 5104/

TR-BGTVT" dated 19 August 2005, MOT is planning to construct a new expressway network system of 6,313 km by 2020. Table 4.1.10 shows the routes of the proposed expressway network system.

At present, the following two routes are under construction managed by Vietnam Expressway Corporation: (i) Ho Chi Minh - Can Tho Section (part of LaSon – Ca Mau Expressway) and (ii) Cau Gie – Ninh Binh Section (part of Lang Son – Vinh Expressway).

And another two routes, (i) Hanoi - Thai Nguyen Expressway and (ii) Hanoi – Viet Tri – Lao Cai Expressway, are under detailed design.

Table 4.1.10 Expressway Network up to 2020

Route	Length km)
(a) North to South Expressway Axis (3,621 km)	
- North to South (eastern wing) Expressway	
Lang Son – Vinh	380
La Son - Ca Mau	1,373
- Western wing North to South Expressway	
Doan Hung- La Son	877
Ngoc Hoi- Chon Thanh- Rach Gia	991
b) Northern Expressway Network (1,074 km)	
Hanoi- Haiphong,	105
Hanoi- Viet Tri- Lao Cai	344
Hanoi- Thai Nguyen	65
Lang- Hoa Lac- Hoa Binh	80
Ninh Binh- Haiphong- Quang Ninh	160
c) Regional Central and Highland Expressway Network (524 km)	
Vinh- Huong Son	51
Dong Ha- Lao Bao	80
Danang- Ha Nha- Ngoc Hoi,	233
Quy Nhon- Pleiku	160
d) Southern Regional Expressway Network (1,094 km)	
Bien Hoa- Vung Tau	90
Dau Giay - Da Lat	189
Ho Chi Minh city- Thu Dau Mot- Chon Thanh	90
Ben Luc- Nhon Trach- Long Thanh	80
Chau Doc- Can Tho- Soc Trang	200
Ha Tien- Rach Gia- Bac Lieu	225
My Tho- Ben Tre- Tra Vinh- Soc Trang	300
Total :	6,313

Source: Vietnam Expressway Corporation

(vi) Governmental Initiatives

Responsible agencies towards the establishment of traffic safety development policy such as GOV, MOT and NTSC have issued strategic traffic safety measures which are aimed to be achieved within the short term. In the strategic traffic safety measures, collector road network planning is designated as the measure related to the desirable safety environment.

Table 4.1.11 Government Policy Related to Desirable Safety Environment

Policy	Strategy
GOV: Resolution 32/2007/NQ-CP, June 2007	- Planning Collector roads network plan
MOT: Plan on National Traffic Safety Order Improvement until 2010, 2007	By-pass, collector road and intersections - The locals carry out construction, discussion and approval of planning systems of by-passes, collector road and other intersections with the main roads.
NTSC: 272/UB ATGTQG, July 2007	- Planning the collector road system outside safe corridor of national highway system and agreement with Ministry of Transport at the connection routes to national highway system

Source: JICA Study Team

6) Problems and Issues

(i) Problems

(1) Current Road Network System

The total length of the country's road network in 2006 is 251,787 km which includes 17,295 km of national road (6.9%), 23,138 km of provincial road (9.2%), 54,962 km of district road (21.8%), 141,442 km of commune road (56.6%), and 8,536 km of urban road (3.4%). Compared with that of total road length in 1999, it has increased by approximately 27,000 km and pavement quality has also been upgraded (Table 4.1.12).

Table 4.1.12 Road Length by Management Category and Pavement Type

Management Category	Year	Total Length (km)	Length by Pavement Type (km)					
			Asphalt Concrete	Cement Concrete	DBST	Gravel	Earth	Other
National Road	1999	15,520	5,354	94	5,828	3,178	-	-
	2006	17,295	7,750	344	6,447	2,854	-	-
Provincial Road	1999	18,344	829	157	5,609	7,309	-	-
	2006	23,138	3,474	701	11,030	4,816	3,073	44
District Road	1999	37,437	-	-	-	-	-	-
	2006	54,962	1,762	2,581	10,992	34,897	77,261	3,601
Commune Road	1999	134,463	-	-	-	-	-	-
	2006	141,442	1,616	18,442	9,226	34,897	77,261	-
Urban Road	1999	5,919	2,297	-	3,622	-	-	
	2006	8,536	2,465	776	2,750	976	1,568	-
Other Road	1999	5,451	-	-	-	-	-	-
	2006	6,414	-	160.4	547	2,593	2,800	-
Total :	1999	224,639	-	-	-	-	-	
	2006	251,787	16,967	23,005	40,992	62,018	104,816	3,644

Source: Vietnam Road Administration

Table 4.1.13 shows the length of national road in 2006 by road classification. Classification of most national roads was under grade-IV in 1999. But due to increase in investment effort by MOT, the proportion of higher than grade-III in 2006 increased by 30%. MOT's target now is to upgrade grades-V and VI roads in mountainous areas to grade-IV and higher. This will therefore further increase MOT's investment for road upgrading.

Table 4.1.13 National Road Length by Road Classification in 2006

Road Category	Road Length (km)					
	Flat Area		Mountainous Area		Total	
I	281	(1.6%)	0	(0.0%)	281	(1.6%)
II	738	(4.3%)	79	(0.5%)	817	(4.7%)
III	3,806	(22.0%)	806	(4.9%)	4,611	(26.7%)
IV	2,680	(15.5%)	1,819	(10.5%)	4,500	(26.0%)
V	880	(5.1%)	2,296	(13.3%)	3,176	(18.4%)
VI	154	(0.9%)	302	(1.7%)	456	(2.6%)
being surveyed	-		-		3,453	(20.0%)
Total :	8,539	(49.4%)	5,302	(30.6%)	17,295	(100.0%)

Source: Vietnam Road Administration

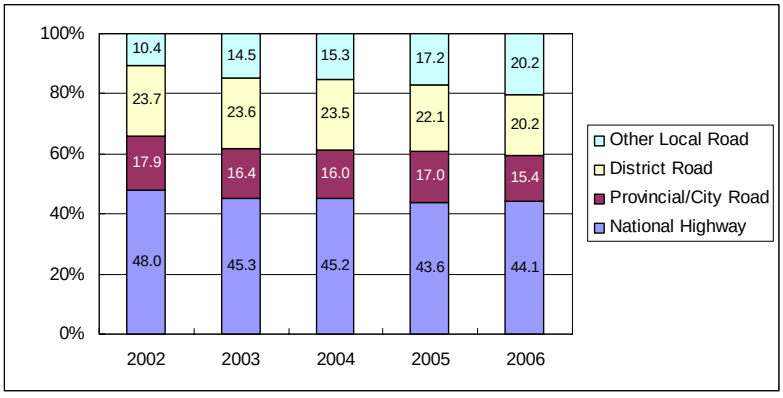
As already mentioned, despite relatively small percentage of national highways and provincial roads from total road length of entire country, the number of traffic accidents in these road sections are significantly high at 44.1% and 15.4% of total in 2006. In addition, data from provinces show high incidences of traffic accident fatalities occurring not only in cities but also along provincial and local roads.

There are still many unpaved road sections in Vietnam which are highly likely to be black spots sections. As of year 2006, gravel pavement and unpaved road sections on national highways and provincial roads are about 26%. Including DBST which is a type of unstable pavement, paved sections is about 43%.

(2) Road Network Development Plan

As shown in Figure 4.1.1, accidents on national highway and provincial/city roads account for 60% of all traffic accidents in 2006 while accidents on district roads and other local roads increased from 34% in 2002 to 40% in 2006.

Figure 4.1.1 Traffic Accidents by Road Classification (2002-2006)



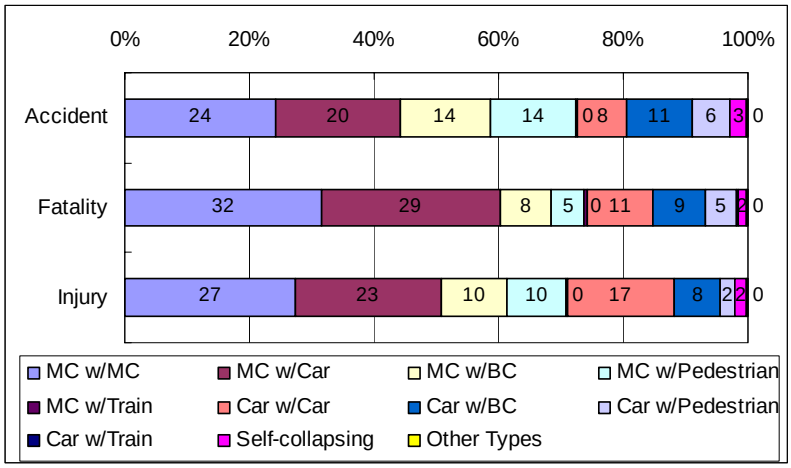
Source: Road and Rail Transport Division, MOPS

- The number of traffic accidents on district roads and the other local roads where residential and commercial areas are usually located has increased; hence, it seems that hierarchical road network development as well as through traffic control has not been fully implemented.
- Figure 4.1.2 illustrates traffic accidents by collision type, as follows: collision between cars accounted for 8%; motorcycles 24%; car and motorcycle 20%; motorcycle and bicycle 14%; motorcycle and pedestrian 14%; car and bicycle 11%; and car and pedestrian 6%.

Among the accidents, total accidents which involved vulnerable road users accounted for 45%: 25% involved bicycles and 20% pedestrians.

- Share of vulnerable road users'-related collision is 40% from total number of accidents. This may be attributed to lack of safe facilities which can accommodate and segregate the vulnerable road users such as pedestrians and bicycles from other traffic participants.

Figure 4.1.2 Traffic Accidents by Collision Type (2001)



Source: People's Police Academy (Sampled Data Analysis)

(ii) Issues

(1) Current Road Network System

(a) Promotion of smooth and comfortable road traffic, and road accident prevention measures on general roads

- Road safety facilities and traffic control facilities development
- Development of road facilities and traffic control facilities to enhance smooth traffic
- Development of facilities to increase driver's level of comfort
- Development of safety facilities to prevent railway crossing accident

(b) Promotion of road accident prevention measures on expressways

- Development of safety facilities to prevent accidents due to uncharacteristic traffic behaviors on expressways
- Introduction of advanced traffic control system for expressways

(c) Development of efficient road maintenance system and satisfactory implementation

- Improvement of road maintenance method
- Facilitation of comprehensive road maintenance management system
- Development of accident prevention measures during road construction

(d) Road Network Development Plan

(e) Road network development with appropriate road function sharing

- Systematic development of arterial roads, sub-arterial roads and

collector roads according to local characteristics

- Reducing transit traffic volume by systematic road network development

(f) Enhancement of traffic control to respond to local characteristics and the road function

- To minimize traffic noise in residential and commercial areas of black spots
- To promote traffic control according to function and roles of each road

(g) Development of safe pedestrian space

- To ensure safety of pedestrians and to promote separate traffic
- To ensure safety on school zones of kindergartens and primary schools

(h) To separate car traffic from light vehicles and to develop facilities for the light vehicles

- To ensure safety of bicycle riders and to promote separate traffic

(i) Capacity development on planning and implementation of traffic safety environment improvement

- Capacity development on planning and implementation of local government
- To ensure financial sources for traffic safety environment improvement in local government.

4.2 Design Standard/Guideline for Road Safety Facilities

1) Related Design Standard/Guideline for Traffic Safety

The key technical specification and guideline for road design in Vietnam is “22 TCN-273-01: Specification for Road Design/Guideline for Road Design”. This specification was formulated in 2001 with reference to “A Policy on Geometric Design Specification for Highways and Streets 1994” by ASSHTO, “the Design Highway Standard of ASEAN-99 (Draft)”, “Highway Design Standard of Vietnam TCVN 4054-85, TCVN 4054-98,TCVN5729-1997”, and others.

After publication of 22 TCN-273-01, modifications on specifications have been issued from time to time, in accordance to variations of road development circumstances or social requirements.

In relation to urban road design, the MOC has issued a new specification of “TCXDVN 104- 2007: Urban Road - Specification for Design” dated 30 June 2007 to replace “TCXD 104-83: Technical Requirement for Designing Urban Roads, Highways and Squares”. As per the Decision No. 22/2007/QD-BXD dated 30 June 2007, this specification has been enforced for application in the planning/design of new construction, rehabilitation and upgrading of urban roads and streets in the city.

The design specifications/guidelines in Vietnam related to traffic safety design are summarized in Table 4.2.1.

Table 4.2. 1 Traffic Safety-Related Road Design Specifications/Guidelines

Code No.	Name of Specification/Guideline	Description
22 TCN-273-01	Specification/Guideline for Road Design	- Key road design specification including geometric, intersection, pavement, safety facility, etc.
TCVN 4054–05	Highways - Specifications for Design	- To supplement and to modify with 22TCN-273-01.
TCXDVN 104-07	Urban Roads - Specifications for Design	-To modify and replace TCXD 104-83. -To apply for planning / design of new construction, rehabilitation and upgrading.
TCVN 5729-07	Expressway - Specifications for Design	- Draft is completed and new specification will be replaced with TCVN 5729-97after approval. - To supplement 22TCN-273-01 toward coming expressway network development.
22 TCN 237-01	Road Signage Regulation	- To regulate all of traffic signs and road marking including expressway traffic sign. - Including kilometer post, reflection road nail, convex mirrors, corrugated iron separators.
22 TCN 211-06	Design Procedures on Flexible Pavement	- Modify and replace 22 TCN 211-93 - Regulate pavement flatness by road category
TCXDVN 259	Design Specification for Artificial Illumination System of Urban Streets, Roads and Squares	
TCXDVN 362	Planning on Trees Planting for Public Use in Urban Areas - Design Specification	

Source: JICA Study Team

2) Major Description of Traffic Safety in Specification/Guideline

(i) Traffic Constraint Condition by Road Category

The roads located outside the urban areas are designed based on the design specification of TCVN 4054–05. And based on this specification, grade-I and grade-II roads are basically required to provide side-road along main road and the connection with side road is restricted with minimum distance as indicated in Table 4.2.2. On the other hand, for urban roads, the guidelines on traffic control such as road connection, access control, passing vehicle restriction turning control are provided in TCXDVN 104-07 (Table 4.2.3).

Table 4.2.2 Required Traffic Constraint Condition by Road Category (TCVN 4054-05)

Condition Item	Road Category					
	I	II	III	IV	V	VI
Provision of service road	- Required		- Not required			
Separate Lane for Non-motorized Vehicle	- On service road		- On paved shoulder separated by line marking	- Not required - Passing at paved shoulder		- Passing at general road
Lane Separation by Median	- Separate by median		- 2 lane road: without median - 4 lane road: divided by lane marking (continuous line)			
U-Turn Point on Roadway	- Location before bridge and tunnel - Median width > 4.5 m : 1.0 km interval, Median width < 4.5 m : 4.0 km interval		- No constraint			
Road Connection	Distance of connecting points with service road: at least 5 km		- No constraint			

Source: TCVN 4054 : 2005 “Highway – Specifications for Design”

Table 4.2.3 Requirement of Road Traffic Controlling Condition in Urban Area

Road Category	Traffic Controlling Item			
	Road Connection	Access Control	Vehicle Control	Turning Priority
Urban Expressway	Expressway, Main street, Transport way	Uninterrupted/ unintersected traffic	All types of car and motorbike (controlled)	Not allowed
Main Urban Street				
a) Primary main street	Expressway, Main street, Transport way	Un-interrupted traffic except for signalized intersections	All types of vehicle - Separating the road, bicycle lane	Not allowed except for large scale residential areas
b) Secondary main street				
Collector Road				
a) Local road	Main road, Collector road Internal road	Un-continuous traffic	All types of vehicle	Allowed
b) Transport way	Expressway Main road Collector road		Only for truck and passenger car	Not allowed
c) Avenue	Main road Collector road Internal road		All types of vehicles except for trucks	Allowed
Internal road				
a) Internal local road	Collector road Internal road	Interrupted traffic	Car, service car and 2-wheel vehicle	Prioritized
b) Pedestrian road	Internal road		Only pedestrian	
c) Bicycle way			Only bicycle	

Source: TCXDVN 104 : 2007 “Urban Road – Specifications for Design” by MOC (30 June 2007)

(ii) Design Speed and Cross Section Element Requirement by Road Category

The criteria concerning the design speed and road crossing element in rural areas and urban roads are shown in Table 4.2.4 and Table 4.2.5, respectively.

Table 4.2.4 Design Speed and Required Cross Section by Road Category in Rural Areas (TCVN 4054-05)

Item		Road Category					
		I	II	III	IV	V	VI
Design Speed (km/h)	Flat	120	100	80	60	40	20
	Mountainous	-	-	60	40	30	20
No. of Lane	Flat	6	4	2	2	2	1
	Mountainous	-	-	2	2	1	
Lane width (m)	Flat	3.75	3.75	3.50	3.50	2.75	3.50
	Mountainous	-	-	3.00	2.75	3.50	
Median Width (m)		3.00	1.50	-	-	-	-
Paved Shoulder Width (m)	Flat	3.50(3.00)	3.00(2.50)	2.50(2.00)	1.00(0.50)		1.50
	Mountainous	-	-	1.50(1.00)	1.00(0.50)	1.50(1.00)	1.25

Note : Paved shoulder width in Bracket may be used at locations where site condition is difficult to provide.

Source : TCVN 4054 : 2005 “Highway – Specifications for Design”

Table 4.2.5 Design Speed and Required Cross Section in Urban Areas

[Design Speed by Road Category]

Terrain / City Category		Flat				Mountainous			
		I	II & III	IV	V	I	II & III	IV	V
Urban Expressway		100, 80	-	-	-	70, 60	-	-	-
Urban Main Str.	Arterial	80, 70		-	-	70, 60			
	Minor	70, 60			-	60, 50			
Collector Street		60, 50				50, 40			
Internal Road		40, 30, 20				30, 20			

[Required Width of Lane, Shoulder Edge/Safety Strip by Road Category & Design Speed]

Item			Design Speed (km/h)							
			100	80	70	60	50	40	30	20
Lane Width (m)	Urban Expressway		3.75			3.50	-	-	-	-
	Urban Main Street	Arterial	-	3.75		3.50	-	-	-	-
		Minor	-	-	3.50			-	-	-
	Collector Street		-	-	-	3.50		3.25	-	-
	Internal Road		-	-	-	-	-	3.25	3.00 (2.75)	
Shoulder Width (m)			2.5-3.0	2.0-3.0	2.0-2.5	1.5-2.5	0.75-1.0	0.5	0.5	0.3
Edge Strip / Safety Strip Width (m)		Condition-I	1.00	0.75	0.75	0.50	0.25	-	-	-
		Condition-II	0.75	0.50	0.50	0.25	-	-	-	-

[Required Width of Media and Pedestrian/Plantation/Utility Space by Road Category]

Road Category		Min. Number of Lanes	Minimum Space Width by Site Condition (m)					
			Median			Pedestrian / Plant Box / Utility		
			I	II	III	I	II	III
Urban Expressway		4	4.0	3.5	3.0	-	-	
Urban Main Street	Arterial	6	3.0	2.5	2.0	7.5	5.0	4.0
	Minor	4	2.5	2.0	1.5			
Collector Street		2	2.0	1.5	1.0	5.0	4.0	3.0
Internal Road		1	-	-	-	4.0	3.0	2.0 (1.0)

Source : TCXDVN 104 : 2007 “Urban Road – Specifications for Design” by MOC (30/Jun/2007)

TCVN 4054-05 provides for the design speed and requirements of lane number and lane/median/paved shoulder width as per road grade, and every grade is classified with terrain condition of flat and mountainous condition. Criteria of grade-I and grade-II roads in mountainous areas is not given in Table 4.2.4; thus it should

probably be considered for future road development investment budget. Actually, road improvement and upgrading of roads in mountainous/highland areas is one of the major items in national road network development.

For urban road, design speeds are provided to be divided flat area and mountainous area, and the requirements of road cross-section element are given by road category and design speed.

(iii) Intersection

Standard daily traffic volumes on main road and connecting roads are located outside the urban area given for criteria of intersection type selection in TCVN4054-05 as shown in Table 4.2.6. TCVN4054-05 classifies the criteria of “simple intersection”, “canalized intersection” and “other measure” that may be referred to grade separation intersection such as flyover, bridge or underpass. However, there is no mention on installation of signal control system at intersections.

The urban road specification provides a matrix table which shows orientation to select intersection type in accordance with main road category and connected road category as shown in Table 4.2.7. The intersection, that is, the main street connected with another main street/collector street, and collector street connected with collector street, have controlled traffic flow by channelized type, roundabout type and signal system. For planning and design of channelized intersection, standard traffic volumes at peak hours are given to provide right-turning/left-turning lane. It is also mentioned that signal control system is introduced when left-turning is allowed.

Table 4.2.6 Intersection Classification of Highway by TCVN4054:05

Traffic Volume on Main Road (pcu/day)	Traffic Volume of Connected Road (pcu / day)			
	Simple Intersection	Channelized Intersection		Other Measure
		Providing Right-turning Lane	Providing Left-turning Lane	
≤ 1,000	≤ 500	500 < V2 ≤ 1,000	-	-
≤ 2,000	≤ 500	500 < V2 ≤ 2,000	-	-
≤ 3,000	≤ 450	450 < V2 ≤ 1,000	1,000 < V2 ≤ 1,700	1,700 <
≤ 4,000	≤ 250	V2 ≤ 250	250 < V2 ≤ 1,200	1,200 <
≤ 5,000	-	-	≤ 700	700 <
5,000 <	-	-	≤ 400	400 <

Source: TCVN 4054 : 2005 “Highway – Specifications for Design”

Table 4.2.7 Technical Standard of Intersection in Urban Areas

[Intersection Type by Road Category]

Main Road \ Sub-Road	Urban Expressway	Urban Main Street	Collector Street	Internal Road
Urban Expressway	Type-a	Type-a	Type-c	Type-d
Urban Main Street	-	Type-e	Type-e	Type-f
Collector Street	-	-	Type-e	Type-g
Internal Road	-	-	-	Type-g

[Description of Intersection Type]

Intersection Type	Description
Type-a	- Interchange
Type-b	- Interchange with fully or partial ramp
Type-c	- Direct change and restricting connection
Type-d	- Direct change without special case to be required connection
Type-e	- At-grade intersection of channelized type, roundabout type and signal control type. - Grade intersection may be considered on the following conditions: ・Low traffic capacity due to slow travelling. ・Serious traffic accidents affect socio-economic development. ・Construction cost of at-grade intersection is higher than grade-intersection.
Type-f	- Connection may be made only on special case; at-grade channelized intersection type to provide slow/fast lane is used to avoid crossing conflict on main road.
Type-g	- Simple type at-grade intersection - Widened intersection with signal control is used as a result of traffic study.

[Criteria of Channelized Intersection / Widened Intersection]

Providing Right-turning Lane	- Vehicle rate of right-turning is high if more than 10% of total volume (or more than 30 vehicles/hour). - Turning right direction is given priority at intersection.
Providing Left-turning Lane	- Due to high volume and high speed, it is easy situation to cause heavy traffic congestion and traffic accident. - Median space is wide enough to provide left-turning lane. - Vehicle rate of left-turning is high if more than 10% of total volume (or more than 30 vehicles/hour). - Intersection is controlled by signal system with phased control for left turn.

Source: TCXDVN 104 : 2007 “Urban Road – Specifications for Design” by MOC (30/Jun/2007)

(iv) Traffic Safety Consideration for Bicycle-users and Pedestrian

In the urban road specification, traffic safety considerations for pedestrian and bicycle-users are as follows:

[Bicycle Path in Urban Area]

- When bicycle path is identified as early as the road planning/design stage, road markings are required to designate a bicycle path on the road surface, except for roads with traffic speed of more than 70 km/h.
- Number of bicycle lanes in one direction shall be determined by the following formula:

$$n = N / P \quad \text{(lane)}$$

Where, N : bicycle traffic volume during peak hour (bicycle / hour)
P : capacity of one bicycle lane (1,500 / hour / lane)

Width of bicycle lane per direction shall be determined by the following formula:

$B = 1.0 \times n + 0.5$ (m)

- Minimum width is 3.0m to accommodate automobiles when need arises such as emergency cases or during road repair and upgrading.
- Pavement structure design of bicycle lane should meet requirements of car and public service car, if necessary.

[Pedestrian Path and Crossing]

- Required spaces to be provided on road side for pedestrian traffic, plant boxes and utility installation by road categories as shown in Table 4.2.5.
- Inhabited areas, industrial zone or cultural/sports center in the city where there is big demand for pedestrian traffic necessitates very specific calculations to determine the position for pedestrian pavement or pedestrian path.
- Width of pedestrian pavement/pedestrian path shall be determined by pedestrian traffic, as follows:

$n = N / P$ (lane)

Where, N : pedestrian volume during peak hour (pedestrian/hour)
P : capacity of one pedestrian lane (1,000/hour/lane)

Width of pedestrian lane per direction shall be determined by the following formula:

$B = n \times b$ (m)

Where, b : width of one pedestrian lane
General location : b = 0.75 m to 0.80 m (with one suitcase)
at station, terminal area : b = 1.00 m to 1.20 m (with tow suitcases)

- For pedestrian road crossing, options are as follows: (i) common at-grade, (ii) at-grade with signal controlling and (iii) grade separated (pedestrian flyover or underpass). Choice on what type of pedestrian road crossing will be used is based on pedestrian and traffic volume during peak hour, as shown in Table 4.2.8.

Table 4.2.8 Criteria for Pedestrian Crossing Options

Pedestrian Volume at Peak Hour (person / hour)	Traffic Volume at Peak Hour (vehicle / hour / direction)	Crossing Option
< 50	< 1,000	Common at-grade intersection
50 – 100	1,000 – 2,000	At-grade intersection with signal control
100 <	2,000 <	Grade Intersection (pedestrian bridge, underpass)

Source: TCXDVN 104: 2007 “Urban Road – Specifications for Design” by MOC (30/Jun/2007)

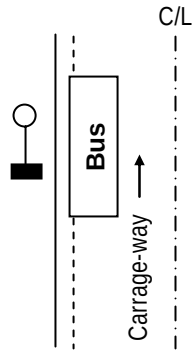
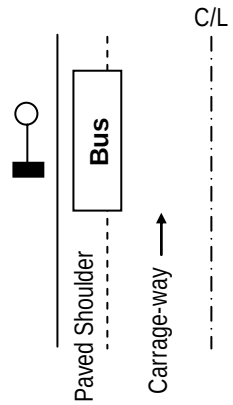
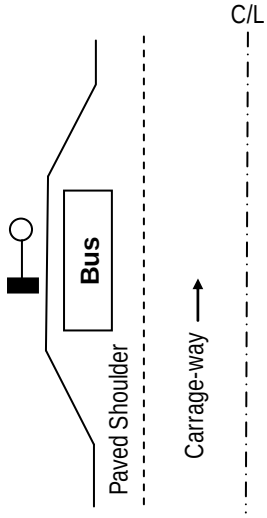
In the highway design standard TCVN 4054-05 and 22 TCN-273-01 which focus on roads in the rural areas and those outside the urban areas, separate lane for the non-motor vehicle is provided on the side-road in the case of grade-I or grade-II road. However, specifications which address pedestrian safety, such as sidewalk provision and road crossing safety measure, are not found.

(v) Bus Stop Facility

The Highway Design Specification of TCVN 4054-05 provides criteria for bus-stop facilities on roadway for (i) simple stop type, (ii) stop at paved shoulder type and (iii) bus-bay facility type, as shown in Table 4.2.9. Based on the descriptions, the bus-bay facility is provided an auxiliary lane to separate carriageway and is basically installed on highways with design speed of more than 80 km/hour. This suggests that the bus-stop on more than grade-III road (on flat area) is designed as bus-bay type.

Table 4.2.9 Design Criteria of Bus-Stop Facility on Highway

[Type of Bus-stop Facility]

Type-I : Simple Stop	Type-II : Stop at Paved Shoulder	Type-III : Providing Bus-bay Facility
		

[Adopting Criteria by Bus-stop Type]

<table>
<tr><th>Bus-Stop Type</th><th>Description</th></tr>
<tr><td>Type-I</td><td>- Average time of bus stopping per hour is less than the following table in accordance with traffic volume of roadway.
<table>
<tr><td>Traffic Volume (pcu / day)</td><td>1,000</td><td>2,000</td><td>3,000</td><td>4,000</td><td>5,000</td></tr>
<tr><td>Average Number of Bus Stopping
(time / hour / direction)</td><td>5.0</td><td>2.8</td><td>1.6</td><td>1.2</td><td>1.0</td></tr>
</table></td></tr>
<tr><td>Type-II</td><td>- Average time of bus stopping per hour is higher than that on the above table.
- Should have more than 3.0 m of width.
- Width of paved shoulder is 2.0m to 3.0m and traffic volume of 2-wheel vehicle is more than 50 (vehicle / hour / direction).
- More than 15m of distance from pedestrian zebra crossing should be ensured.</td></tr>
<tr><td>Type-III</td><td>- To provide on road of design speed that is more than 80 (km / hour).</td></tr>
</table>

Source: TCVN 4054 : 2005 “Highway – Specifications for Design”

In urban area, the following descriptions are specified:

- On main roads in city centers, an isolated stop from the main street is encouraged (if possible).
- On main streets (except for above case), avenues, district and local roads which have high bus traffic volume (more than 5 minute interval of bus passing), it is necessary to provide a bus-bay facility.
- Bus-stops are located on the right side of traffic direction, with distance of 300

m to 700m from each other. No bus stop will be located on curves with radius less than normal minimum radius of horizontal curve.

- Bus-stop may be located before or after an intersection. Distance from intersection should consider the following factors: accelerating section, observation time (if located before intersection), braking section (if located after intersection), and effect of bus-stop on function of road intersection.
- Bus stop location after intersection should be at least 50m from crossing center. If located before an intersection, it should be at least 40m and 60m from crossing center for roads with design speed of less than 60 km/hour and more than 60 km/hour, respectively.
- Bus-stop must be located at least 10m from the pedestrian zebra crossing.

(vi) Rest / Parking Space along Roadway

The Highway Design Specification of TCVN 4054-05 recommends that the rest and parking facility are provided along the highway which has design speed of more than 60 km/hour (Table 4.2.10).

Table 4.2.10 Recommendation for Provision of Rest/Parking Space in TCVN 4054-05

Facility Size	Description
Small Space	- Recommended area : 3,000 m^2 - Interval of Location : 15km – 30km - Recommended facilities : parking facility, toilet, rest area, restaurant, etc.
Large Space	- Recommended area : 5,000 m^2 - Interval of Location : 60km – 100km - Recommended facilities : parking facility including truck and bus, toilet, rest area, restaurant, medical station, gasoline station, vehicle maintenance station, commercial shopping facility, etc.

Source: TCVN 4054 : 2005 “Highway – Specifications for Design”

(vii) Specific Criteria for Traffic Safety Measure on Expressway Design

Since the expressway network development is one of the key issues in road network system development in Vietnam, the Study Team recommends the following supplemental criteria to ensure necessary consideration for traffic safety:

- To provide installation criteria and technical requirement for emergency telephone system, traffic surveillance system such as CCTV and vehicle speed measurement device.
- To provide installation criteria and technical requirement for weather observation equipment for traffic control.
- Also, to ensure effective traffic control, installation of vehicle detectors that can count traffic volume and interactive message boards that can provide “real-time” traffic information to drivers.
- Criteria of rest/parking space in TCVN 4054-05 may be applied to Expressway.

3) Problems and Issues

(i) Problems

The design standard for road facilities in Vietnam, 22TCN-273-01, was issued in 2001 based on AASHTO of the United States. This was followed by the issuance of

TCVN4054-05 defining inter-urban highway design and TCXDVN104-07 for intra-urban road design in 2005 and 2007, respectively. The 22TCN-273-01 was also issued to address expanding motorization and thus it was aimed at systematically developing the national road network based on a unified standard as an important pillar of economic development. However, because of various geographic conditions, land use, urban structure, road management policy and financial sources, it has become more and more difficult to strictly follow the AASHTO standard, which actually targets developed countries with matured motorization such as the United States. A wide permissible range of AASHTO caused anomalies of quality and function of roads in planning under various conditions within the country.

A number of road traffic accidents may seem to have occurred due to mismatch between standardized road facilities and vehicle driving characteristics, particularly in several locations. Table 4.2.11 shows examples of accident features occurring on national highways in Vietnam.

The limitation of the existing design standards established based on an assessment of actual traffic accident situation and a review of the safety aspects.

(1) Cross section

The access and traffic methods are indicated according to the road class and related standards such as lane width, shoulder width and median width are provided to suit each function for both intra- and inter-urban roads. However, those for safety facilities such as sidewalk on inter-urban highways are not indicated.

(2) Sight distance

The sight distance standard for stopping and passing on a two-lane road and a crossing is indicated. However, the presumption is that of a car driver's eyes. But since motorcycles are the major mode of transportation in Vietnam at present, a standard that takes into consideration the motorcycle riders' is also required.

(3) Curves and Super-elevation

The standards for a radius and length of horizontal curves and vertical curves in accordance with design speed and the guideline of combination of horizontal and vertical curves are indicated. A super elevation of curves for design standard is also indicated. However, sections applied exceptions to reduce construction cost which, again, are not based on motorcycle mode of transport perspective.

(4) Speed limit

The design speed is indicated according to classification of the road standard and areas. The actual situation however is that the speed limit is set according to type of vehicle such as a large-sized car, a cargo truck, a bus, a passenger car, and a motorcycle. It tends to allow higher speed for ordinary cars. But since traffic accidents are becoming more serious, the speed limit must be reviewed. In addition, passing lane facilities are not yet adequate to respond to such speed limitation and this result in a large number of traffic accidents on straight

road sections of the national highways.

Table 4.2.11 Summary of Road Traffic Accident and Countermeasures on Various National Highways

	Road Traffic Accident	Countermeasures
NH12 (Lai Chau Province)	• All of black spots are identified on curve section in mountainous terrain condition, and major accident causes were due to driver's loss of control at curve section.	• The locations of road are small radius curve section and narrow carriageway width, so that DOT proposed to improve sight distance by cutting slope and to widen carriageway width as black spot treatment. • In addition to countermeasures for black spot treatment by DOT, road painting of rumble strip to aim speed reduction, installing warning sign post and installing curve miller seem to be recommended as other alternative for black spot treatment.
NH37	• Black spots reported from Bac Giang Province are caused by wrong lane with over-speeding, and black spots in Thai Nguyen Province and Son La Province are located curve section. • Paved width (carriageway + paved shoulder) on entire section are narrow compared with the requirement by TCVN 4054 : 2005 "Highway – Specifications for Design". • Accidents occurred at curve section to be close railway line due to speeding. • Accidents occurred at curve section of steep slope topography condition (short sight distance).	• Improving sight distance by cutting trees along the road. • Installing warning sign posts at accident section. • Improving sight distance by widening. • Widening curve section by cutting slope or filling embankment with retaining wall.
NH279	• Narrow carriageway of 3.5 m width on black spot of Dien Bien Province may be attributed as one factor that causes higher accident occurrence rate. • Caused by over speeding and careless driving. • Accidents occurred at curve section of steep slope topography condition (short sight distance).	• Installing warning sign posts. • Widening road section and installing lighting system. • Widening curve section by cutting slope or filling embankment with retaining wall.
NH48 (Nghe An Province)	• Caused by over speeding at continuous curve section and narrow carriageway. • Caused by over speeding at narrow carriageway and not insufficient sight distance for driver. Accidents occurred at curve section of insufficient sight distance.	• Installing warning sign posts and improving small radios curve. • Installing warning sign posts and improving small radios curve. • Widening curve section by cutting slope.
NH3 (JBIC SAPROF)	• Among 51 locations of black spot, 34 locations is narrow roadway of 7.0 m width carriageway that is not provided the paved shoulder. • 18 locations of black spot are generated on the curve section. In particular, black spots are continuous on the curve section between Km48 and Km 68 in Thai Nguyen Province of which roadway is narrow without paved shoulder.	

Source: JICA Study Team

(5) Road signs and markings

The standards for road signs and marking are generally indicated. From traffic safety perspective, visibility factor in terms of size and location is not enough. Instead, very important to consider is clarity of sign to make it easily understandable for the minorities in mountainous areas and the children, as well as for people from neighboring countries coming through an international highway.

(6) Drainage

The guideline for drainage facility is indicated according to design flow. However, those for shapes and safety mitigation are not sufficient. In addition, standard cross section has not been well developed.

(7) Medians and barriers

The standard for installation of median according to the road classification is indicated in the design standard. However, the target section and its geometry at U-turn points are not clearly stated. Regarding roads under Class III which are not specified in TCVN4054-05, a large number of traffic accidents has occurred because the standard is not suitable for the actual traffic situation in some sections. Barriers are indicated to install shoulders and a median, but structural problems such as durability might be concern.

(8) Lighting

The standard for lighting facility indicates minimum illuminations according to the road classification and traffic volume. However, the arrangement such as installation at crossings is not clearly specified.

(9) Bus stops and lay-bys

Regarding bus stops and lay-bys, a guideline for the location is provided and an application standard for three types of structure. Among those, one type applies to lay-bys, but it should be installed only for the section of 80km/h speed limit. Considering traffic volume, parking needs and passengers getting on and off in the commercial areas, the lay-bys type should be applied extensively.

(10) Intersections

The design standard for a cross section indicates guidelines to select types according to traffic volume and road classification including type of traffic lights control, but arrangement and phasing are not prepared well.

(11) Pedestrian facilities

Regarding a side walk and pedestrian crossing facilities, the installation standard is indicated according to volume of pedestrians and traffic at peak time. However, it is applied only for TCXDVN104 (intra-urban road) and no clear standard for intra-urban highways and rural roads.

(12) Bicycle

Regarding bike lanes, width is indicated according to bicycle traffic volume for urban roads with under 70km/ speed limit. It also indicates minimum 3.0m width to respond mixed traffic with motorcycles. The bike lane is to be installed by

painting designated lanes if necessary and it can be paved according to standard. However, bicycles are also commonly used for goods transportation. It should be reviewed considering necessary width for such users.

(ii) Issues

- Review of design standard considering traffic and local characteristics
- Review of design standard considering motorcycle traffic, bicycle and pedestrians
- Review of design standard considering variety of financial sources of urban and local governments and traffic safety level
- Promotion of design standard and its applicable application
- Unifying the design standards and preparation of instruction manuals
- Preparation of standard drawings
- Scientific support for design standard preparation
- Establishment of a research and development institution to support design standard preparation and institutional development

4.3 Current Efforts on Black Spot Treatment

1) Black Spot Treatment

(i) Regulation by MOT

The regulation of black spot treatment was issued from MOT by the Decision No.13/2005/QD-BGTVT dated 2 February 2005, as summarized in Table 4.3.1.

Table 4.3.1 Major Content of Black Spot Treatment by MOT

Item	Content
Definition of Black Spot	Black spot is a dangerous position, either a road section or an road intersection, where traffic accidents often occur.
Criteria of Determination	Determination of black spot is based on the frequency of and degree of loss due to an accident situation that occurs in one year: 1) 2 serious accidents (causing fatality), or 2) 3 accidents or more, in which there is 1 serious accident, or 3) 4 accidents or more resulting only to injuries.
Responsible Agency of Implementation	- VRA is responsible for guiding implementation of black spot treatment. - for National Road : VRA or Provincial Transport Department / Provincial Transport and Public Works (if assigned for management) - for Local Roads : Provincial Transport Department / Provincial Transport and Public Works - for BOT Road : Owner - for road undergoing repairs or rehabilitation: Project owner / investor
Implementation Procedure	Step-1 : Determining and primary classifying priority order Step-2 : Initial site inspection Step-3 : Collecting additional data and conducting analysis Step-4 : Conducting second site inspection for determining cause Step-5 : Selecting overcoming solutions Step-6 : Responsibility of black spot organization Step-7 : Realizing treatment of black spot Step-8 : Monitoring and evaluating result of treatment

Source: Decision No.13/2005/QD-BGTVT by MOT (2 February 2005)

(ii) Black Spot Identification

After MOT's issuance of it's directive for black spot treatment, VRA regularly conducted black spot identification and has taken measures for black sport treatment. Such actions are performed by RRMUs and the provincial departments of transport, which are consigned for operational management of national roads.

According to VRA, 31 locations on 8 national roads in 2005, and 69 locations on 14 national roads in 2006 were reported to be identified as black spot. Location, terrain condition, number of lanes, and countermeasures to be recommended by road management authorities, are provided in Volume 4 (Appendices).

On the other hand, a Special Assistance for Project Formulation (SAPROF Study) by JBIC for Traffic Safety Improvement Project was conducted in 2006. The SAPROF Study conducted pilot analysis and project implementation for the 4 national roads of NH-3 (0 km to 67 km), NH-5 (0 km to 106 km), NH-10 (0 km to 137 km) and NH-18 (0 km to NH-18).

In the SAPROF Study, the accident data on the pilot road sections of the 4 national roads were collected from the provincial traffic police. Black spot identification was performed in accordance with MOT's criteria based on Decision No.13/2005/ QD-BGTVT. Table 4.3.2 shows the number of location to be identified as "black spot" in SAPROF Study.

Table 4.3.2 Number of Black spot Location on NH-3, NH-5, NH-10, NH-18 (2002 to 2005) by JBIC SAPROF Study

Road No. \ Year		2002	2003	2004	2005
NH-3	(0+000 ~ 67+025)	26	21	10	12
NH-5	(0+000 ~ 106+000)	24	29	18	20
NH-10	(0+000 ~ 137+140)	-	-	20	12
NH-18	(0+000 ~ 160+000)	-	27	18	14

Source: SAPROF Study Report: Traffic Safety Improvement Project in Vietnam (October 2006)

Comparing the black spot identified by VRA and SAPROF Study, black spots identified by SAPROF Study on NH-3, NH-5 and NH-10 were not included in the VRA list and only 6 locations were reported on NH-18. Discrepancies between results of VRA and SAPROF Study may be attributed to the following:

- Insufficient traffic accident information exchange system between RRMU or Provincial Department of Transport and Provincial Traffic Police.
- Vagueness of definition on the road sections or positions to be counted and the number of accidents in black spot identification.

(iii) Traffic Accident Black Spot Analysis

After issuance of the Decision No.13/2005/QD-BGTVT dated 2 February 2005 for regulation of black spot treatment, the road management authorities of VRA and the Provincial Department of Transports were conducted black spot identification according to the criteria in the Decision and black spots treatment examination. The Study Team conducted to questionnaire survey and data collection survey to the road management authorities regarding to black spot.

In this paragraph, features and characters of black spot will be discussed to select the typical routes and sections based on the data collection from the road management authorities;

(1) Grade V and Grade VI Road

(a) National Highway No.12 (in Lai Chau Province)

National Highway No.12 (NH-12) runs from Lai Chau town to Pa Nam Cum (China border) through Lai Chau parallel to Na river, length of which is 140 km. NH-12 has 2-lane carriageway (pavement width: 6.0 m) up to Km30+000 and 1-lane carriageway (pavement width: 3.5 to 4.5 m) up to end.

Lai Chau Province Department of Transport (DOT) reported 6 locations of black spots on NH-12 as shown in Table 4.3.3. According to DOT and Provincial Traffic Police, accident conditions are summarized as follows:

- All of black spots are identified on curve section in mountainous terrain condition, and major accident causes were due to driver lost his control at curve section as shown in Figure 4.3.1.
- Among 6 locations of black spot, any accidents involving fatality were not reported from Provincial Traffic Police.
- Base on the traffic survey by DOT, traffic volume on NH-12 are counted only 50 (pcu, 16-hour). This few traffic conditions are supposed to contribute not cause serious accidents involving fatality.
- The locations of road are small radius curve section and narrow carriageway width, so that DOT proposed to improve sight distance by cutting slope and to widen carriageway width as black spot treatment.

Table 4.3.3 Black Spots on National Highway No.12 in Lai Chau Province

Location (Km post)	Number of Accident				Paved Width (m)	Traffic Volume (pcu:16 hour)	Grade
	Year	Accident	Fatality	Injured			
23+300 ~ 23+500	2005	3	0	4	6.0 (2-lane)	54	IV
	2006	4	0	5			
	2007	2	0	3			
24+100 ~ 24+170	2005	3	0	2			
	2006	4	0	5			
	2007	2	0	2			
30+700 ~ 30+730	2005	2	0	3	4.0 (1-lane)		V
	2006	3	0	5			
	2007	1	0	1			
42+450 ~ 42+750	2005	4	0	3	4.5 (1-lane)	56	
	2006	3	0	1			
	2007	1	0	2			
45+200 ~ 45+400	2005	2	0	1	4.5 (1-lane)		
	2006	3	0	3			
	2007	1	0	2			
46+750 ~ 46+980	2005	4	0	5	3.5 (1-lane)		
	2006	3	0	2			
	2007	2	0	1			

Note : Number of accident in 2007 is between January 2007 and September 2007
Source: Provincial Department of Transport and Provincial Traffic Police

In addition to countermeasures for black spot treatment by DOT, road painting of rumble strip to aim speed reduction, installing warning sign post and installing curve miller seem to be recommended as other alternative for black spot treatment.

Figure 4.3.1 Black Spot Condition on NH-12 in Lai Chau Province

Location / Accident Cause	Condition Photo
Km23+300 ~ Km23+500 Major Accident Cause : - Driver lost his control when driving too fast to curve road. - Short sight distance due to small radius curve. Countermeasure Proposal : - Widening on curve section.	
Km30+700 ~ Km30+730 Major Accident Cause : - Driver lost his control when driving too fast. - Short sight distance due to small radius curve. Countermeasure Proposal : - Cutting slope to improve sight distance.	
Km46+750 ~ Km46+980 Major Accident Cause : - Driver lost his control when driving to curve road. - Short sight distance due to small radius curve. Countermeasure Proposal : - Widening on curve section.	

Source: Provincial Department of Transport

(b) National Highway No.37

National Highway No.37 (NH-12) runs through 6 provinces (Hai Doung, Bac Giang, Thai Nguyen, Tuyen Quang, Yen Bai and Son La) to start from NH-18 on Sao Do town in Hai Doung Province and to connect to NH-6 in Son La Province, and total length is 464 km. Among the 6 provinces, data of black spot in 3 provinces are collected and the said locations are shown in

Table 4.3.4, and black spot on NH-37 may be described as follows:

- Black spots reported from Bac Giang Province are caused by wrong lane with over-speeding, and black spots in Thai Nguyen Province and Son La Province are located in curve section.
- Road classification of NH-37 is categorized in Grade-IV and Grade-V. In accordance with TCVN 4054: 2005 “Highway – Specifications for Design”, the standard traffic volume for Grade-IV road is less than 3,000 (pcu/day), and less than 500 (pcu/day) is for Grade-V road. However, based on the traffic counting survey conducted by DOT and VRA, current traffic volume on Bac Giang Province and Thai Nguyen Province are supposed to exceed the said standard volume as shown in Table 4.3.5.

Table 4.3.4 Location of Black Spots Reported by DOT on NH-37

Province	Location (Km post)	Number of Accident (2006)			Paved Width (m)	Terrain	Grade
		Accident	Fatality	Injured			
Bac Giang	21+400 ~ 23+400	3	1	1	5.0 (2-lane)	Flat	V
	77+500 ~ 79+100	5	1	6			
Thai Nguyen	156+400	3	2	2	5.5 (2-lane)	Flat	IV
Son La	374+000	3	2	0	3.5 (1-lane)	Mountain	V
	414+400	2	2	2			
	415+540	4	0	5			
	416+800	4	0	6			

Sources: [Black spot record] Provincial Department of Transport
[Carriageway width] Vietnam Road Administration

Table 4.3.5 Proposal of Black Spot Treatment by DOT on NH-37

Location	Cause of Accident	Countermeasure Proposal
Km21+400 ~ 23+400 Km77+500 ~ 79+100 (Bac Giang)	Accidents mainly occurred due to speeding and running wrong lane.	- Improving sight distance by cutting trees along road. - Installing warning sign posts at accident section.
Km156+400 (Thai Nguyen)	Accidents occurred at curve section to be close railway line due to speeding.	Improving sight distance by widening.
Km374+000, Km414+400 Km415+540, Km416+800 (Son La)	Accidents occurred at curve section of steep slope topography condition (short sight distance).	Widening curve section by cutting slope or filling embankment with retaining wall.

Source: Provincial Department of Transport

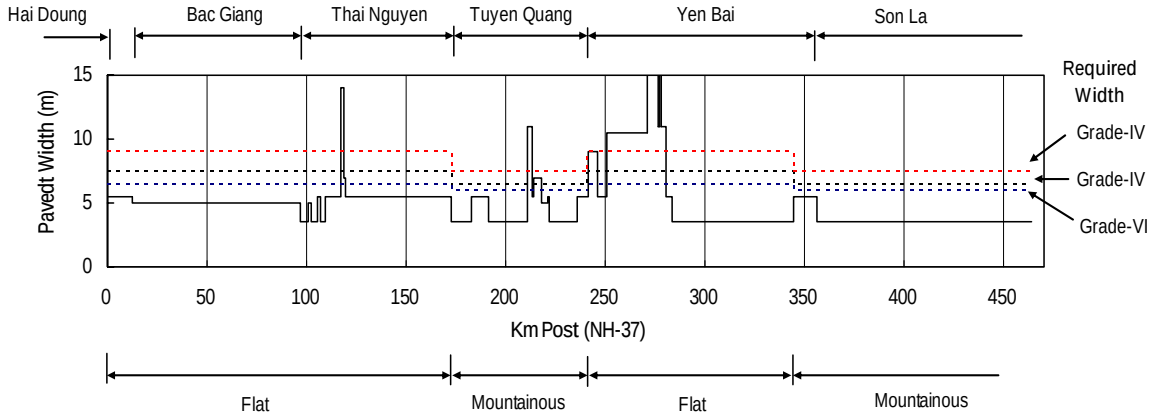
Table 4.3.6 Traffic Volume on NH-37

Province	Location (Km post)	Car/Light Truck / Mini Bus	Medium / Heavy Truck	Large Bus	Motor-cycle	Bicycle / Other	Traffic Volume (pcu:24-hour)
Hai Duong	5+370	402	241	89	8,706	1,063	4,512
Bac Giang	un-know	1,718			6,430	6,382	(4,248)
Tuyen Quang	un-know	1,387			8,449	5,108	(5,850)
Son La	un-know	250			140	142	(486)

Note 1) : [pcu by vehicle type] car/light truck/mini-bus (1.0), medium/heavy truck, large bus (2.0), motorcycle (0.3), bicycle/other (0.2)
Note 2) : Vaue in ( ) under “Traffic Volume (pcu:24-hour)” column are calculated to assume mix rate of vehicles based on vehicle registrant number in province.
Source: [Bac Giang, Tuyen Quang, Son La] PDOT [Hai Duong] VRA

- Figure 4.3.2 shows the paved width (carriageway + paved shoulder) on entire section to formulate from national road inventory database by VRA. This figure indicates that the current paved width is entirely narrow to compare with requirement by TCVN 4054: 2005 “Highway – Specifications for Design”.

Figure 4.3.2 Paved Width of NH-37 (Km 0+000 ~ Km464+000)



Source: National Road inventory database of Vietnam Road Administration

(c) National Highway No.279

National Highway No.279 (NH-279) connected 8 provinces in North East and North West Region, that are Quang Ninh, Bac Giang, Lang Son, Bac Kan, Tuyne Quang, Ha Giang, Lao Cai, Son La and Dien Bien, and of which terrain condition is entirely mountainous. Among the said 9 provinces, Bac Giang, Dien Bien and Sonla Province reported 5 locations of black spots as shown in Table 4.3.7, and black spot on NH-279 may be described as follows:

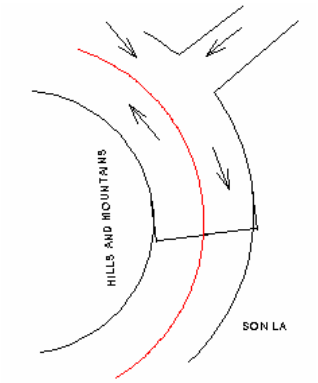
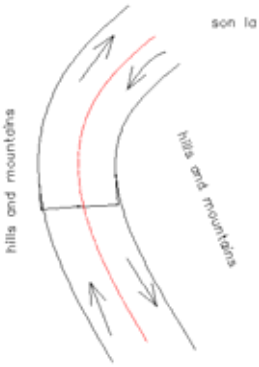
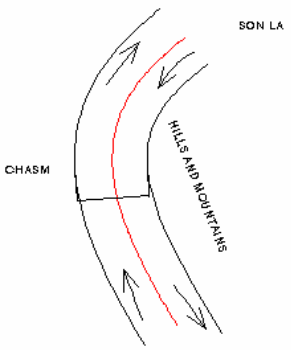
- Bac Giang Province and Dien Bien Province reported 1 location of black spot, and road lengths of NH-279 in both provinces are 69 km and 116 km respectively.
- Comparing number of accident between the provinces based on the accident record in 2006, accident occurrence rate in Bac Giang is 2.8 accidents/km while accident occurrence rate in Dien Bien is 8.7 accidents/km, that is, approximately three times than that of Bac Giang.
- Traffic volumes and number of lane on Bac Giang Province and Dien Bien Province are counted as 1,625 (pcu/day) on 2-lane (5.5 m width) and 771 (pcu/day) on 1-lane (3.5 m width) respectively as shown in Table 4.3.8.
- Narrow carriageway of 3.5 m width on black spot of Dien Bien Province may be supposed one of cause to generate higher accident occurring rate.
- 3 locations of black spot in Son La Province are all on curve section as shown in Figure 4.3.3, and the surface conditions of pavement are rough.

Table 4.3.7 Location of Black Spots Reported by DOT on NH-279

Province	Location (Km post)	Number of Accident (2006)			Paved Width (m)	Terrain	Grade
		Accident	Fatality	Injure			
Bac Giang	65+500 ~ 66+200	2	3	0	5.5 (2-lane)	Mountain	IV
Dien Bien	83+000 ~ 84+600	14	7	11	3.5 (1-lane)	Mountain	V
Son La	223+000	5	2	18	5.5 (2-lane)	Mountain	IV
	229+260	5	2	19			
	229+945	5	2	15			

Source: [Blackspot record] Provincial Department of Transport
[Carriageway width] Vietnam Road Administration

Figure 4.3.3 Black Spot Condition on NH-279 in Son La Province

Location / Site Condition	Condition Photo
Km223+000 	
Km229+260 	
Km229+945 	

Source: Provincial Department of Transport

Table 4.3.8 Proposal of Black Spot Treatment by DOT on NH-279

Location	Cause of Accident	Countermeasure Proposal
Km65+500 ~ 66+200 (Bac Gian)	Caused by over speeding and careless driving.	Installing warning sign posts.
Km83+000 ~ 84+600 (Dien Bien)	Due to narrow carriageway and without lighting system.	Widening road section and installing lighting system.
Km223+000, Km229+260 Km229+500 (Son La)	Accidents occurred at curve section of steep slope topography condition (short sight distance).	Widening curve section by cutting slope or filling embankment with retaining wall.

Source: Provincial Department of Transport

Table 4.3.9 Traffic Volume on NH-279

Province	Location (Km post)	Car/Light Truck / Mini Bus	Medium / Heavy Truck	Large Bus	Motor-cycle	Bicycle / Other	Traffic Volume (pcu:24-hour)
Bac Gian	un-know	66			1,059	472	(1,625)
Dien Bien	38+000	135	87	33	776	816	771
Son La	un-know	41			45	24	(86)

Note 1) : [pcu by vehicle type] car/light truck/mini-bus (1.0), medium/heavy truck, large bus (2.0), motorcycle (0.3), bicycle/other (0.2)

Note 2) : Numeric of () in row of "Traffic Volume (pcu:24-hour)" are calculated to assume mix rate of vehicles based on vehicle registrant number in province.

Source: Provincial Department of Transport

(d) National Highway No.48 (in Nghe An Province)

National Highway No.48 (NH-48) runs in Nghe An Province from east to west, to start from Yen Ly on National Highway No.1 and to end to Kim Son town. Total length is 122 km and terrain condition is entirely flat.

DOT of Nghe An province reported 3 locations of black spot on NH-48, that were on curve section as shown in Table 4.3.10. DOT also proposed to improving small radios curve and to install warning sign post on black spots (Table 4.3.11).

Table 4.3.10 Location of Black Spots Reported by DOT on NH-48

Province	Location (Km post)	Number of Accident (2006)			Paved Width (m)	Terrain	Grade
		Accident	Fatality	Injure			
Nghe An	29+500 ~ 29+700	3	6	3	5.0 (2-lane)	Flat	IV
	85+000 ~ 85+700	4	4	3	3.5 (1-lane)	Flat	V
	96+050 ~ 96+150	4	4	7	3.5 (1-lane)	Flat	V

Source: [Black spot record] Provincial Department of Transport
[Carriageway width] Vietnam Road Administration

Table 4.3.11 Proposal of Black Spot Treatment by DOT on NH-48

Location	Cause of Accident	Countermeasure Proposal
Km29+500 ~ 29+700	Caused by over speeding at continuous curve section and narrow carriageway.	Installing warning sign posts and improving small radios curve.
Km83+000 ~ 84+600	Caused by over speeding at narrow carriageway and not insufficient sight distance for driver.	Installing warning sign posts and improving small radios curve.
Km96+050 ~ 96+150	Accidents occurred at curve section of insufficient sight distance.	Widening curve section by cutting slope.

Source: Provincial Department of Transport

According to traffic survey by DOT, current traffic volume are supposed to be proximately 2,500 pcu per day as shown in Table 4.3.12, that is within the range of Grade-IV road. Grade-IV road is required 2-lane carriageway (3.5 m x 2) and 1.0 m width of paved shoulder on both side, of which total paved width comes 9.0 m, however, actual paved width only 5.0 m or 3.5 m.

Table 4.3.12 Traffic Volume on NH-48

Province	Location (Km post)	Automobile	Motorcycle	Bicycle /Other	Supposed Traffic Volume (pcu:24-hour)
Nghe An	Un-know	726	2,964	2,148	(2,538)

Note : Numeric of () in row of "Traffic Volume (pcu:24-hour)" are calculated to assume mix rate of vehicles based on vehicle registrant number in province.

Source: Provincial Department of Transport

(2) Grade III Road

(a) National Highway No.9 (in Quang Tri Province)

National Highway No.9 (NH-9) runs in Quang Tri Province from east to west, to start from Dong Ha town on National Highway No.1 and to end to Lao Bao (Loa border gate), of which total length is 84 km. DOT of Quang Tri Province reported the following 2 location of black spots:

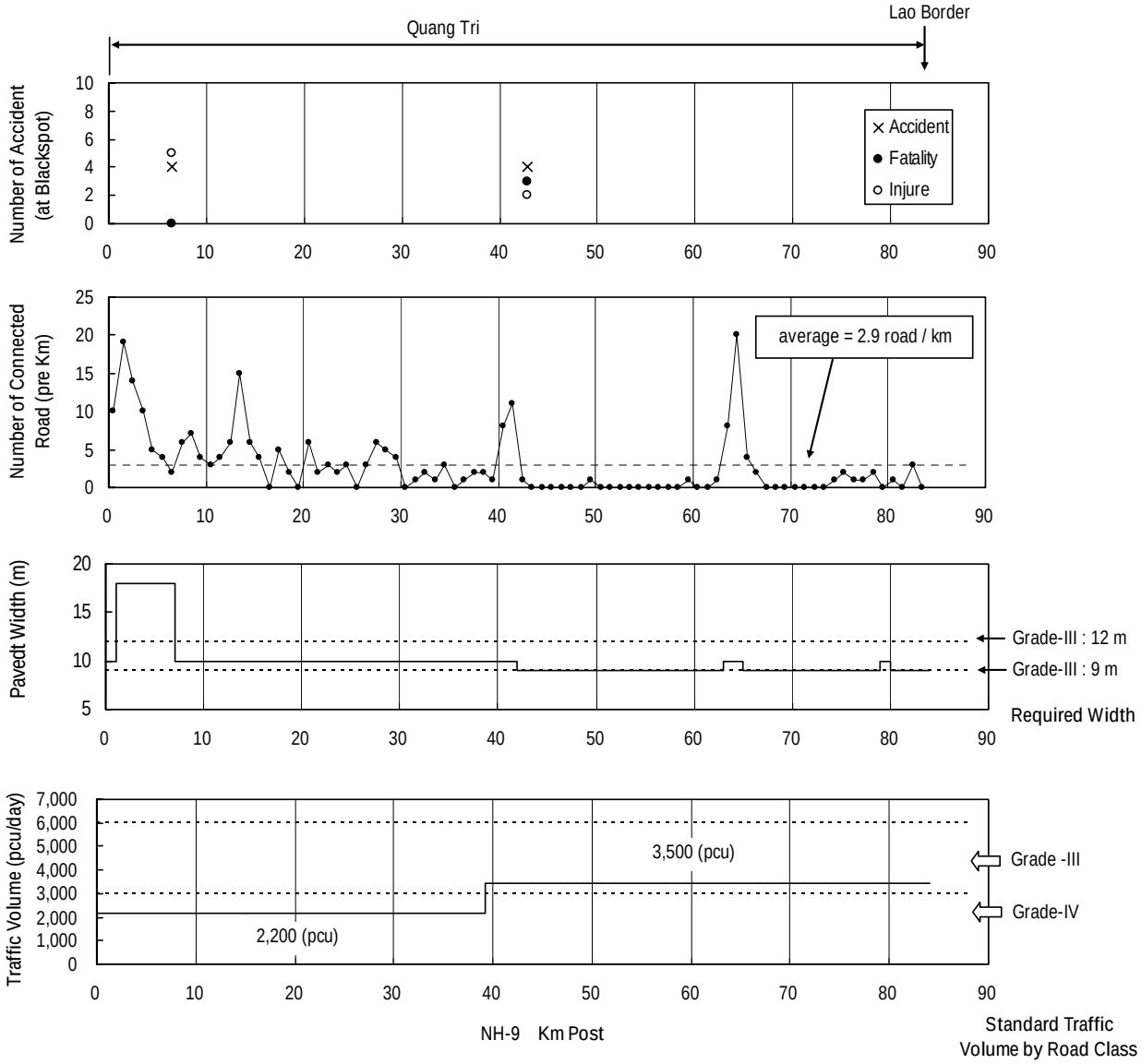
- Km 6+000 ~ Km 7+000 (in Dong Ha town)
- Km42+793 ~ Km43+871 (Xem Bridge, Sa La Bridge)

DOT of Quang Tri Province proposed to install warning traffic sign post, lane marking road stud and ramble strip to reduce speed.

Figure 4.3.4 indicates number of accident on black spot, number of roads to be connected per km, paved width (carriageway + paved shoulder), and current traffic volume on NH-9. From this figure, the following feature may be described:

- Number of connected roads on black spot is 2 roads per km on Km 6+000 ~ Km 7+000, and 1 road per km on Km42+793 ~ Km43+871, that are lower than average number on NH-9.
- Number of lane is basically 2-lane, except Km 1+000 to Km 7+000 in Dong Ha town (4-lane). Existing NH-9 is classified as Grade-III road, and Grade-III road is required 2.5 m with of paved shoulder on both sides. However, width of paved shoulder is only 1.5 m or 1.0 m on the exiting roadway.
- Current traffic volume on NH-9 is recorded to be approximately from 2,200 (pcu/day) to 3,500 (pcu/day), which is border range between Grade-IV and Grade-III road.

Figure 4.3.4 Black Spot Location, Connected Road, Paved Width and Traffic Volume on NH-19



Source: [Accident record] Provincial Traffic Police
[Paved width, number of connection road, traffic volume] Provincial Department of Transport

(b) National Highway No.1 Quang Tri Province Section

National Highway No.1 (NH-1) runs through Quang Tri Province from Km717+000 to Km792+360, of which length is 75.36 km. DOT of Quang Tri Province reported 6 locations of black spot and proposed countermeasure as shown in Table 4.3.13.

Table 4.3.13 Location of Black Spots and Proposal of Black Spot Treatment by DOT on NH-1 of Quang Tri Province Section

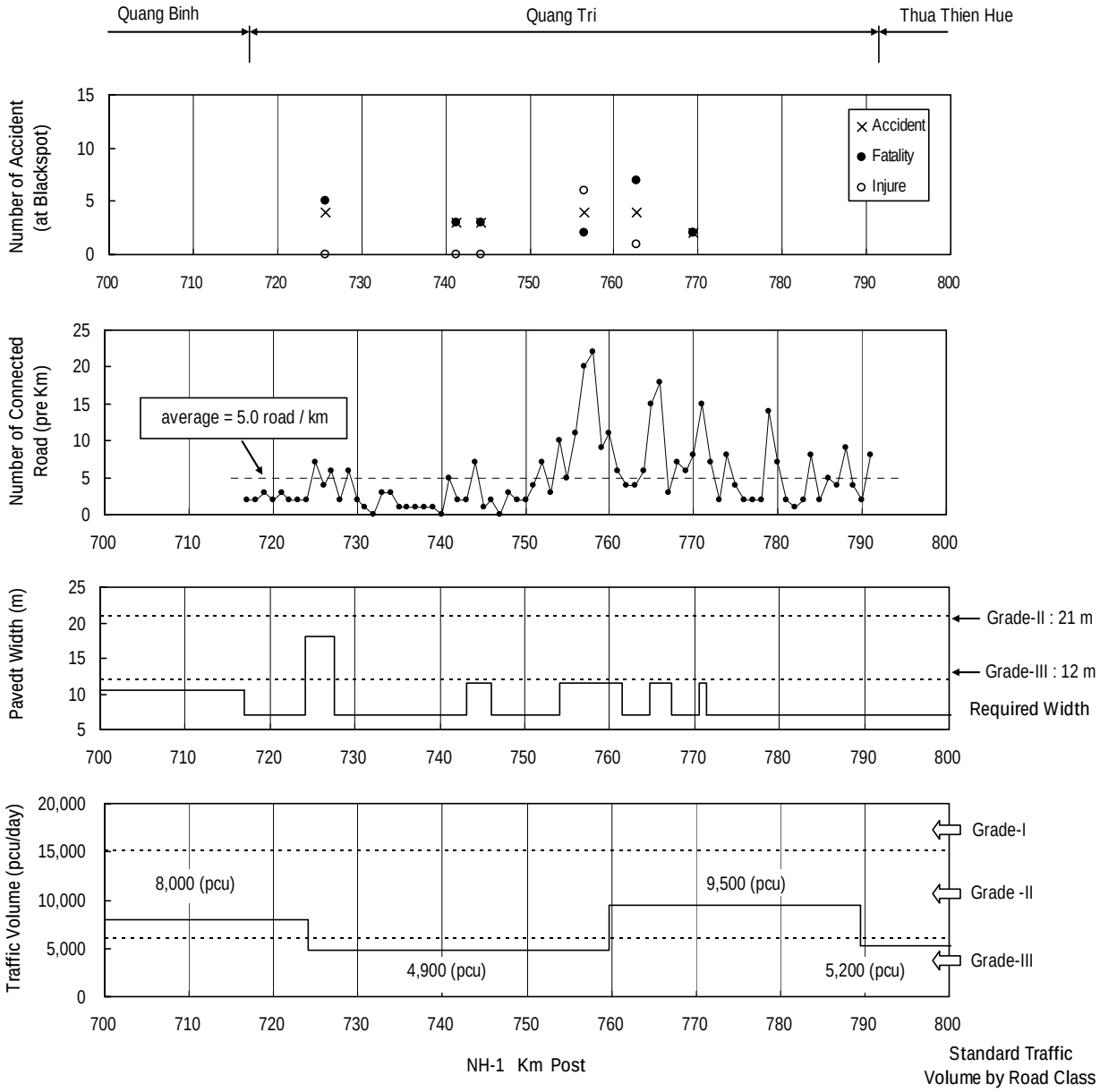
Location / Number of Accident in 2006	Main Cause of Accident	Countermeasure Proposal
Km725+700 ~ 725+900 (Accident : 2, Fatality : 0, Injure : 1)	Driver was careless and lost his control, and car crushed into the medial.	Installation of speed humps with 7 mm of thickness, paint the making lanes 1.5 width 2 mm of thickness.
Km741+100 ~ 741+400 (Accident : 6, Fatality : 0, Injure : 3)	Driver was careless and lost his control, crushed into the side ditch and side slope.	Installation of stakes with 12 x 12 x 120 cm; paint the making lanes 1.1; 1.5 with 2 mm of thickness, manhole cover.
Km744+900 ~ 745+300 (Accident : 6, Fatality : 1, Injure : 5)	Driver was careless and lost his control, crushed into the side ditch.	Installation of signs No 225. Upgrading manhole cover.
Km756+800 (Accident : 2, Fatality : 0, Injure : 0)	Driver was careless and lost his control, crushed into opposite vehicle.	Installation of speed humps with 7 mm of thickness, paint the marking lane1.1; 1.5 with 2 mm of thickness.
Km762+400 ~ 762+900 (Accident : 5, Fatality : 4, Injure : 2)	Driver was careless and lost his control, crushed into opposite vehicle.	Clearance of the medial. Installation of stake.
Km769+400 ~ 770+000 (Accident : 4, Fatality : 1, Injure : 1)	Driver was careless and lost his control, crushed into opposite vehicle.	Install the speed humps with 5.5 mm of thickness, road studs, paint the marking lanes 1.5 with 1.5 m of thickness.

Source: Provincial Department of Transport

Figure 4.3.5 indicates number of accident on black spot, number of roads to be connected pr km, paved width (carriageway + paved shoulder), current traffic volume on NH-1 of Quang Tri Province section. From this figure, the following feature may be described:

- Number of lane is basically 2-lane, except Km724+200 to Km727+600 in Ho Xa town (4-lane). Grade-III road is required 2.5 m with of paved shoulder on the both sides, however, 58,5 km long of road section is not provided paved shoulder, of which width is only 7.0 m, Among the 6 locations, the black spot sections of Km741+100 ~ Km741+400, Km762+400 ~ Km762+900 and Km769+400 ~ Km770+000 are without paved shoulder.
- Also among 6 locations, 4 locations of Km725+700 ~ Km725+900, Km744+900 ~ Km745+300, Km756+800 and Km769+400 ~ Km770+000 are connected roads more than average number of NH-1 Quang Tri Province Section, that are 7 roads, 7 roads, 11 roads and 6 roads respectively.
- Current traffic volumes on the objective section are counted form approximately from 4,900 (pcu/day) to 9,500 (pcu/day) that are upper level of Grade-III road to moderate level of Grade-II road.

Figure 4.3.5 Black Spot Location, Connected Road, Paved Width and Traffic Volume on NH-1 in Quang Tri Province (Km 717+000 to Km792+360)



Source: [Accident record] Provincial Traffic Police
[Paved width, number of connection road, traffic volume] Provincial Department of Transport

(c) National Road No.1 Ninh Thuan to Dong Nai Section and Tien Giang to Ca Mau Section

[For Ninh Thuan Province to Dong Nai Province Section]

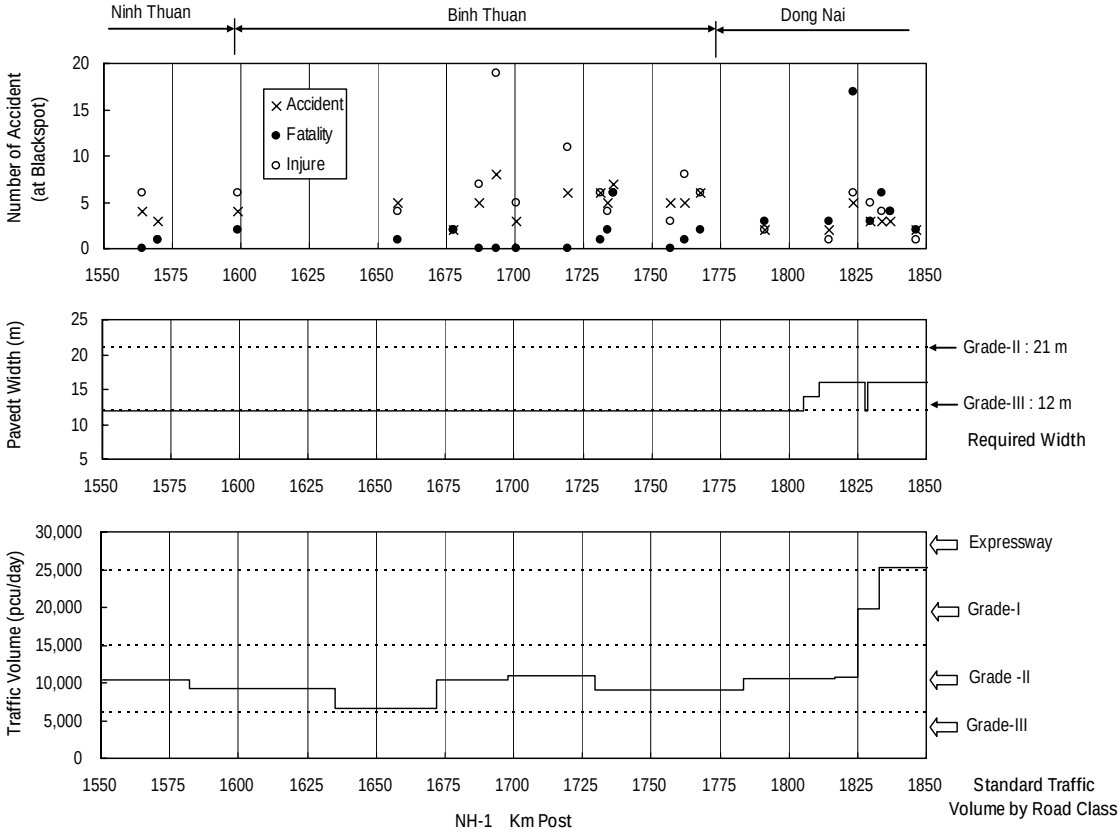
Figure 4.3.6 shows number of accident at black spot location, paved width (carriageway + paved shoulder), current traffic volume on NH-1 of Ninh Thuan Province to Dong Nai Province Section (Km1550+000 to Km1850+000). From this figure, the following feature may be described;

- Up to Km1805+500 on Dong Nai Province, road pavement width satisfies Grade-III road in accordance with design specification. After Km1805+500, NH-1 has 4-lane carriageway; however, the paved shoulder width is only 1.0 m against 2.5 m of requirement by design

specification.

- As indicated in Figure 4.3.6 and Table 4.3.14, current traffic volumes on entire section exceed the standard volume of upper limit of Grade-III road. Especially, at location of Km 1832+800, the traffic volume reaches level of expressway to require to consider construction (25,000 pcu/day). Actually, the frequency of black spot on the section between Km1852+000 and Km1850+000 is higher, where traffic volume are supposed to be 19,800 (pcu/day) to 25,200 (pcu/day).

Figure 4.3.6 Black Spot Location, Paved Width and Traffic Volume on NH-1 in Ninh Thuan Province to Dong Nai Province Section (Km1550 to Km1850)



Source: Vietnam Road Administration

Table 4.3.14 Traffic Volume on NH-1 Ninh Thuan - Dong Nai Section

Province	Location (Km post)	Car/Light Truck / Mini Bus	Medium / Heavy Truck	Large Bus	Motor-cycle	Bicycle / Other	Traffic Volume (pcu:24-hour)
Ninh Thuan	1551+300	2,453	2,236	836	4,978	985	10,422
Binh Thuan	1613+500	2,540	1,794	946	3,154	409	9,161
	1657+000	1,904	1,089	554	3,287	2,227	6,670
	1687+000	2,623	2,351	1,042	2,716	474	10,416
	1709+000	3,711	1,983	998	4,048	569	11,035
	1750+000	3,464	1,341	1,007	1,541	989	9,000
Dong Nai	1816+800	2,837	1,911	728	5,620	2,999	10,498
	1817+200	2,670	2,199	686	5,756	2,694	10,801
	1832+200	2,453	2,236	1,713	12,251	985	19,835
	1832+800	2,540	1,794	2,022	15,356	409	25,246

Note 1) : [pcu by vehicle type] car/light truck/mini-bus (1.0), medium/heavy truck, large bus (2.0), motorcycle (0.3), bicycle/other (0.2)

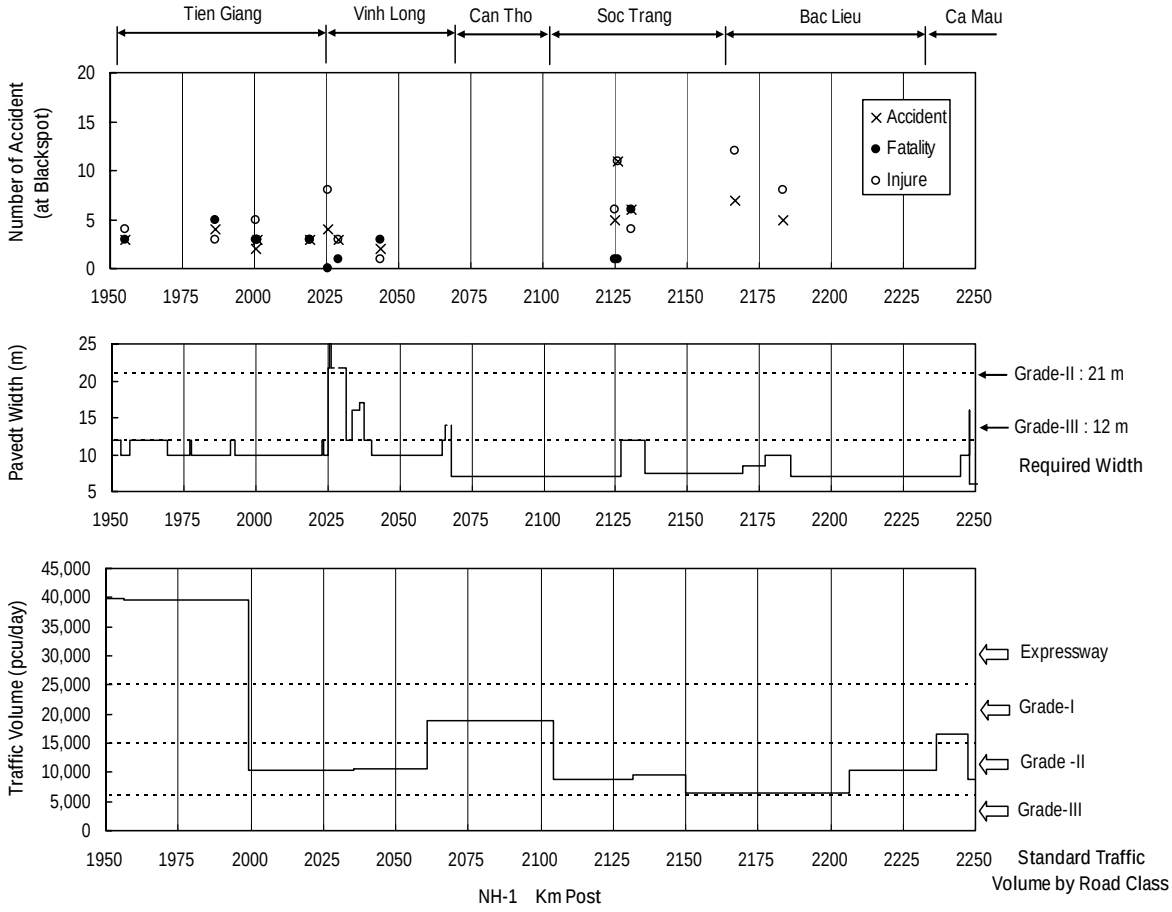
Source: Vietnam Road Administration

[For Tien Giang Province to Ca Mau Province Section]

Figure 4.3.7 show number of accident at black spot location, paved width, current traffic volume on NH-1 of Tien Giang Province to Ca Mau Province Section (Km1950+000 to Km2250+000). From this figure, the following feature may be described:

- Except before and after section of My Thuan Bridge and ferry port on Hau River, the objected NH-1 section has basically 2-lane carriageway of Grade-III. Up to My Thuan Bridge, NH-1 have 1.5 m or 2.5 m width of paved shoulder, however, after Hau River, many sections of NH-1 is not provided the paved shoulder, of which paved width is only 7.0 m.
- As indicated in Figure 4.3.7 and Table 4.3.15, current traffic volumes on entire section exceed the standard volume of upper limit of Grade-III road. Especially, at location of Km 1967+000 in Tien Giang province, the traffic volume to be counted considerably exceed the standard limit volume of Grade-I road.
- Up to My Thuan Bridge, the construction of widening to 4-lane road is almost completed. Therefore, this widening seems to contribute to the reduction of traffic accident.

Figure 4.3.7 Black Spot Location, Paved Width and Traffic Volume on NH-1 in Tien Giang Province to Ca Mau Province Section (Km1950 to Km2250)



Source: Vietnam Road Administration

Table 4.3.15 Traffic Volume on NH-1 Ninh Thuan - Dong Nai Section

Province	Location (Km post)	Car/Light Truck / Mini Bus	Medium / Heavy Truck	Large Bus	Motor-cycle	Bicycle / Other	Traffic Volume (pcu:24-hour)
Long An	1945+000	10,185	5,141	2,732	44,484	2,467	39,774
Tien Giang	1967+000	9,841	5,124	2,597	45,716	305	39,491
Vinh Long	2031+100	3,052	905	1,261	9,783	316	10,380
	2040+100	2,988	896	1,234	10,737	2,725	10,532
Can Tho	2081+700	5,396	1,171	899	28,983	705	18,780
Soc Trang	2127+000	3,129	1,009	160	10,360	670	8,716
	2137+000	3,126	909	160	14,052	1,926	9,614
	2163+000	2,278	415	87	9,502	1,881	6,541
Bac Lieu	2178+000	2,251	416	86	9,355	1,680	6,463
	2185+000	2,246	399	80	9,451	1,873	6,397
	2228+000	2,497	675	124	19,798	1,426	10,431
Ca Mau	2245+000	2,040	477	74	43,833	1,402	16,581
	2250+000	1,310	416	28	20,618	-	8,664

Source: Vietnam Road Administration

(3) Detailed Black Spot Analysis (NH-3 and NH-18)

ALMEC Corporation and Nippon Koei Co., Ltd. Joint Venture conducted the Special Assistance for Project Formulation (the SAPROF Study) by JBIC for Traffic Safety Improvement Project conducted in 2006. The SAPROF study conducted an assessment of four the (4) national roads National highway No.3 (Km 0+000 to Km67+000), No.5 (Km 0+000 to Km106+000), No.10 (km 0+000 to Km137+000) and No.18 (Km 0+000 to Km160+000). In the SAPROF Study, accident data of objective routes between 2002 and 2005 was collected from the provincial traffic polices and accident analysis was conducted.

In the succeeding discussion, black spot analysis from National Highway No.3 and No.8 will be discussed using the accident data from the SAPROF Study.

(a) National Highway No.3 (Km 0+000 to Km67+000)

National Highway No.3 (NH-3) runs through 4 provinces (Hanoi, Thai Nguyen, Bac Kan and Cao Bang) to start from old NH-1 on Yen Vien town and to end on China border of Ta Lung town in Cao Bang Province, and total length is 344 km.

In the SAPROF Study, the objective length was 67 km from the beginning to Thai Nguyen town. Table 4.3.16 shows accident record between 2002 and 2005. Industrialization along NH-3 has brought the serious problem of traffic accident. As shown in the below table, the average accident occurring rates from 2002 to 2005 are 2.32 accidents, 1.04 fatalities and 3.12 injures per km even the accident number is trending to decrease by yeas.

Thai Nguyen Province has 183 km long of national highways, 265 km long of provincial roads, 124 km long of urban roads and 3,900 km long of other roads such as district roads and commune roads. Table 4.3.17 shows total number of accident in Thai Nguyen province and percentage of accident which occurred along NH-3 from Km34+000 to Km67+000 (33 km). The table shows that, between 2002 to 2005, about 14.7% to 27.1% of

accidents occurred, resulting in 21.9% to 28.1% fatalities and 14.7% to 33.3% injuries on the said 33 km section of NH-3.

Table 4.3.16 Accident Record between 2002 and 2005 on NH-3 (Km 0 ~ Km 67)

Province	Year	Number of Accident			Rate of Accident (per km)		
		Accident	Fatality	Injury	Accident	Fatality	Injury
Hanoi (Km 0 ~ 34)	2002	91	37	101	2.68	1.09	2.97
	2003	78	30	136	2.29	0.88	4.00
	2004	57	21	90	1.68	0.62	2.65
	2005	55	25	85	1.62	0.74	2.50
	Average:	*70*	*28*	*103*	*2.07*	*0.83*	*3.03*
Thai Nguyen (Km 34 ~ 67)	2002	113	50	142	3.42	1.52	4.30
	2003	83	40	113	2.52	1.21	3.42
	2004	82	42	99	2.48	1.27	3.00
	2005	63	33	70	1.91	1.00	2.12
	Average:	*85*	*41*	*106*	*2.58*	*1.25*	*3.21*
Objective Route (Km 34 ~ 67)	2002	204	87	243	3.04	1.30	3.63
	2003	161	70	249	2.40	1.04	3.72
	2004	139	63	189	2.07	0.94	2.82
	2005	118	58	155	1.76	0.87	2.31
	Average:	*156*	*70*	*209*	*2.32*	*1.04*	*3.12*

Source: Provincial Traffic Police

Table 4.3.17 Number of Accident in Thai Nguyen Province and Percentage of NH-3 between Km 34 and Km 67

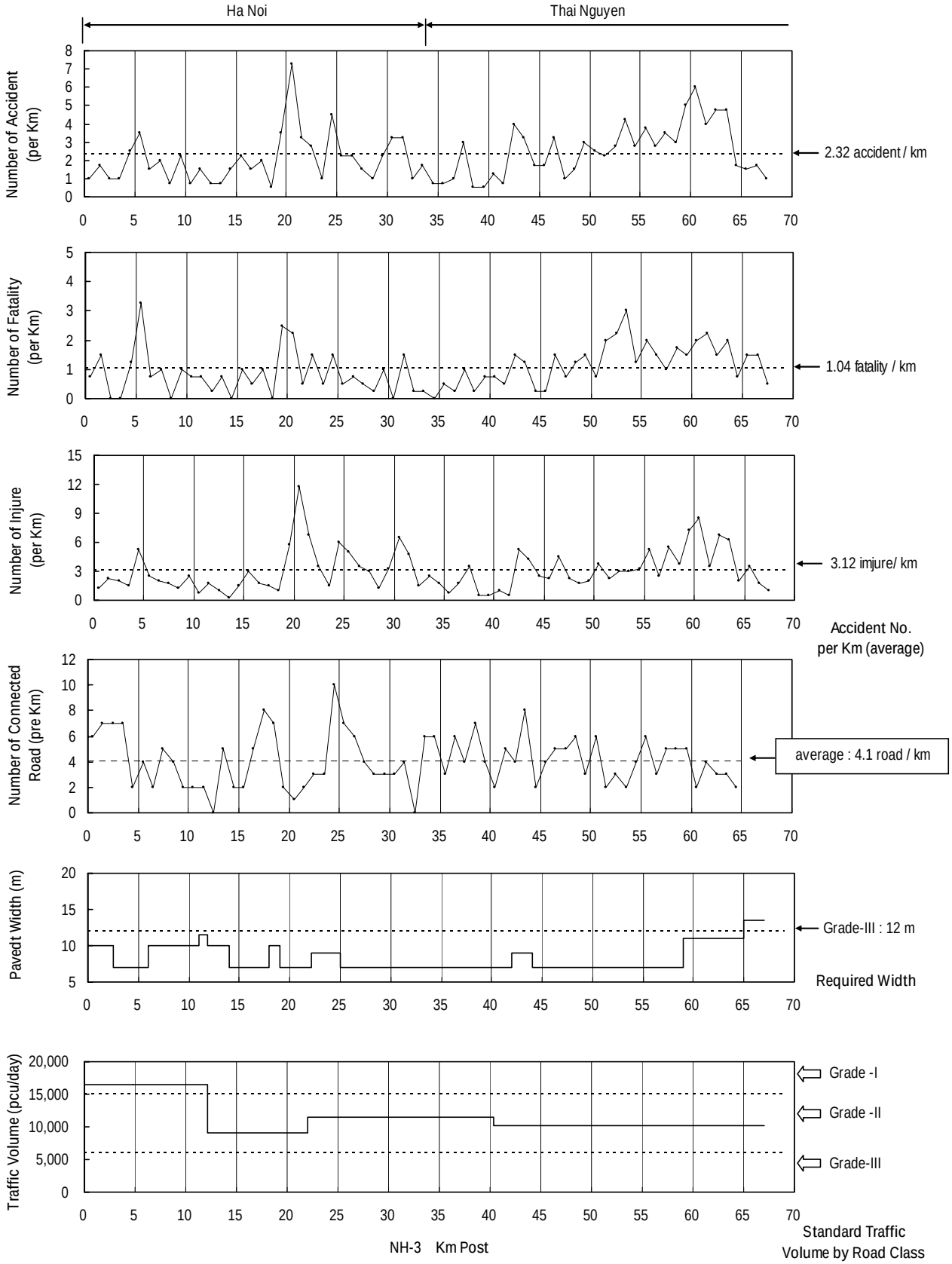
Year	Total Number of Accident in Thai Nguyen Province			Percentage of NH-3 : Km 34 ~ Km 67 (%)		
	Accident	Fatality	Injury	Accident	Fatality	Injury
2002	767	178	964	14.7	28.1	14.7
2003	508	153	594	16.3	26.1	19.0
2004	303	183	297	27.1	23.0	33.3
2005	260	151	249	24.2	21.9	28.1
2005	246	157	232	-	-	-

Source: Road and Railway Police Administration of MOPS

Figure 4.3.8 shows the average accident, fatality and injury rates per km between 2002 and 2005, number of roads to be connected per km, paved width (carriageway + paved shoulder), traffic volume on NH-3 of Km 0 to Km 67. Furthermore, this figure indicates the following:

- Number of lane is basically 2-lane, except Km65+000 to Km67+000 in the central area of Thai Nguyen town. Grade-III road requires 2.5 m width of paved shoulder on both sides. VRA is making efforts to provide this paved shoulder; however, 42.6 km long of road section still do not have paved shoulder at present with only 7.0 m of width.
- Traffic volumes on the objective section are counted or assumed form approximately from 9,100 (pcu/day) to 16,500 (pcu/day) that are exceeded the level of Grade-III road. Especially, the beginning section of NH-3 is supposed to achieve level of Grade-I (15,000 pcu).

Figure 4.3.8 Accident Rate per km, Connected Road, Paved Width and Traffic Volume on NH-3 from Hanoi to Thai Nguyen (Km 0+000 to Km67+000)



Source: [Accident record] Provincial Traffic Police
[Paved width, number of connection road, traffic volume] Provincial Department of Transport

Table 4.3.18 Traffic Volume on NH-3 Hanoi – Thai Nguyen (Km 0 to Km 67)

By SAPROF Study (2006 June, 14 hour : 6:00am - 20:00 pm)

Province	Location (Km post)	Car/Light Truck / Mini Bus	Medium / Heavy Truck	Large Bus	Motor-cycle	Bicycle/ Other	Traffic Volume (pcu)	
							14-hour	24-hour
Hanoi	4+800	3,687	2,325	967	11,827	1,016	14,022	(16,497)
	24+700	2,780	689	329	15,445	1,920	9,834	(11,569)
Thai Nguyen	56+000	2,127	656	398	12,675	2,982	8,634	(10,158)

By VRA (2007 May)

Province	Location (Km post)	Car/Light Truck Mini Bus	Medium/ Heavy Truck	Large Bus	Motor-cycle	Bicycle/ Other	Traffic Volume (pcu:24-hour)
Hanoi	19+400	2,343	1,495	788	4,872	3,421	9,055
Thai Nguyen	144+000	672	373	184	1,095	72	2,131

Note 1) : [pcu by vehicle type] car/light truck/mini-bus (1.0), medium/heavy truck, large bus (2.0), motorcycle (0.3), bicycle/other (0.2)

Note 2) : Numeric of () in row of "Traffic Volume (pcu)" by SAPROF Study are assumed from 14-hour pcu.

Source: SAPROF Study for Traffic Safety Improvement Project (October 2006) and VRA

The SAPROF Study conducted black spot identification on NH-3 wherein 51 black spot locations were identified in accordance with the criteria of Decision No.13/2005/QD-BGTVT by MOT. The black spots surveyed were analyzed under the SAPROF Study based on road condition items, as follows: (i) horizontal alignment, (ii) width of paved shoulder, (iii) number of road per km to be connected with NH-3, and (iv) roadside condition (town area, residential area and rural area).

Table 4.3.19 shows a summary of black spots conditions of NH-3 from Hanoi to Thai Nguyen. The condition in photos and the number of accidents for each black spot are compiled in Volume 4 (Appendices). The table shows that:

- Among the 51 black spot locations, 34 locations are narrow roadways of 7.0 m width carriageway which does not have paved shoulder.
- 18 black spot locations are generated on the curve section; in particular, black spots are continuous on the curve section between Km48 and Km 68 in Thai Nguyen Province wherein there is narrow roadway without paved shoulders.
- Average number of connected road with NH-3 is 4.1 roads per km. 21 locations of black spots are connected road (mainly commune/district road) more than average number of road on the study section.
- 16 black spots are located in town area (Dong Anh, Soc Son, Trung Da, Trung Thanh, Pho Yen, Thai Ngyuen), which may suggests that almost every major town section along NH-3 up to Thai Nguyen town has black spot.

Table 4.3.19 Road Condition of Blackspots on NH-3 (Km 0 to Km 67)

No	Location	Horizontal Alignment		Paved Shoulder	Number of Connected Roads (per km)	Road Side Condition		
		Straight	Curve			Town	Residential	Rural
1	Km 1+400 ~ Km 1+900		R = unknown	1.5 m	6.0 road		X	
2	Km 3+500 ~ Km 4+200		R=280m	None	4.3 road		X	
3	Km 4+700 ~ Km 4+850 (Intersection)	X		None	-			X
4	Km 4+850 ~ Km 5+800	X		None	3.2 road			X
5	Km 5+800 ~ Km 6+700	X		1.5 m	2.2 road			X
6	Km 7+400 ~ Km 7+700		R=200m	1.5 m	10.0 road			X
7	Km 9+900 ~ Km10+200	X		1.5 m + 3.0 m	6.7 road	X		
8	Km11+100 ~ Km11+855	X		1.5 m + 3.0 m	2.6 road	X		
9	Km14+500 ~ Km15+000	X		None	2.0 road			X
10	Km15+415 ~ Km16+000	X		None	3.4 road			X
11	Km17+400 ~ Km17+700		R=200m	None	6.7 road			X
12	Km19+200 ~ Km19+605	X		None	0 road		X	
13	Km19+605 ~ Km20+000	X		None	7.6 road			X
14	Km20+000 ~ Km20+500	X		None	0 road			X
15	Km20+500 ~ Km20+900	X		None	2.5 road			X
16	Km21+500 ~ Km22+000	X		None	6.0 road			X
17	Km22+000 ~ Km22+500	X		None	2.0 road			X
18	Km22+500 ~ Km23+000	X		None	2.0 road			X
19	Km24+100 ~ Km24+670	X		1.5 m	8.8 road	X		
20	Km24+670 ~ Km24+820	X		1.5 m	13.3 road	X		
21	Km25+310 ~ Km26+000	X		None	10.1 road			X
22	Km26+000 ~ Km26+500		R = unknown	None	14.0 road			X
23	Km26+500 ~ Km27+000	X		None	0 road			X
24	Km29+000 ~ Km29+500	X		None	4.0 road		X	
25	Km29+500 ~ Km30+100	X		None	1.6 road			X
26	Km30+350 ~ Km30+600		R=800m	None	4.0 road			X
27	Km31+175 ~ Km31+500	X		None	6.2 road	X		
28	Km37+550 ~ Km37+800	X		None	4.0 road	X		
29	Km39+900 ~ Km40+500	X		None	1.6 road		X	
30	Km42+000 ~ Km42+500	X		1.0 m	0 road	X		
31	Km42+850 ~ Km43+100	X		1.0 m	8.0 road	X		
32	Km45+500 ~ Km46+000	X		None	2.0 road		X	
33	Km48+900 ~ Km49+000		R=800m	None	10.0 road			X
34	Km50+800 ~ Km51+000		R=260m	None	5.0 road			X
35	Km51+700 ~ Km52+000		R=250m	None	3.3 road			X
36	Km52+575 ~ Km52+800		R=120m	None	4.4 road			X
37	Km52+800 ~ Km53+050		R=110m	None	0 road			X
38	Km53+950 ~ Km54+100		R=130m	None	6.7 road			X
39	Km54+900 ~ Km55+150		R=250m	None	4.0 road		X	
40	Km55+950 ~ Km56+200		R=400m	None	4.0 road		X	
41	Km57+850 ~ Km58+000		R=170m	None	6.7 road		X	
42	Km58+000 ~ Km58+500	X		None	2.0 road		X	
43	Km58+850 ~ Km59+000	X		None	0 road		X	
44	Km59+000 ~ Km59+500	X		2.0 m	4.0 road	X		
45	Km59+700 ~ Km60+025	X		2.0 m	6.2 road	X		
46	Km60+175 ~ Km60+600		R=147m	2.0 m	7.0 road	X		
47	Km60+600 ~ Km61+000	X		2.0 m	0 road	X		
48	Km61+825 ~ Km62+300		R=400m	2.0 m	4.2 road	X		
49	Km62+900 ~ Km63+100		R=80m	2.0 m	5.0 road	X		
50	Km63+850 ~ Km64+200	X		2.0 m	2.8 road	X		
51	Km64+500 ~ Km65+000	X		2.0 m	4.0 road	X		

Source: JICA Study Team

(b) National Highway No.18 ((Km 0+000 to Km160+000)

National Highway No.18 (NH-18) has total length of 342 km and is the route connecting Noi Bai in Hanoi and Mong Cai, the eastern border between Qunag Ninh province and China, traversing the province of Bac Ninh and Hai Duong. For the SAPROF Study, focus was on the section between Bac Ninh (intersection with NH-1) and Cua Ong in Quang Ninh Province (160 km).

Table 4.3.20 shows accident record between 2002 and 2005 (accident data in year-2002 of Bac Ninh and Quang Ninh were not available). Industrialization along NH-18, the New Cai Lang Port and tourism development of Ha Long Bay area may be contributing factors to both regional development as well as the problem of traffic accidents. Table 4.3.21 shows that the average accident occurrence rates from 2002 to 2005 are 0.79 accidents, 0.71 fatalities and 0.54 injures per km.

Table 4.3.20 Accident Record between 2002 and 2005 on NH-18 (Km 0 ~ Km160)

Province	Year	Number of Accident			Rate of Accident (per km)		
		Accident	Fatality	Injury	Accident	Fatality	Injury
Bac Ninh (Km 0 ~ 26)	2002	-	-	-	-	-	-
	2003	6	4	2	0.23	0.15	0.08
	2004	13	15	2	0.50	0.58	0.08
	2005	6	8	13	0.23	0.31	0.50
	Average:	*8*	*9*	*6*	*0.32*	*0.35*	*0.22*
Hani Doung (Km 26~ 47)	2002	40	12	49	1.90	0.57	2.33
	2003	41	19	44	1.95	0.90	2.10
	2004	39	16	47	1.86	0.76	2.24
	2005	36	22	42	1.71	1.05	2.00
	Average:	*39*	*17*	*46*	*1.86*	*0.82*	*2.17*
Quang Ninh (Km 47 ~ 160)	2002	-	-	-	-	-	-
	2003	102	107	52	0.90	0.95	0.46
	2004	61	62	28	0.54	0.55	0.25
	2005	75	86	28	0.66	0.76	0.25
	Average:	*79*	*85*	*36*	*0.70*	*0.75*	*0.32*
Objective Route (Km 0 ~ 160)	2003	149	130	98	0.93	0.81	0.61
	2004	113	93	77	0.71	0.58	0.48
	2005	117	116	83	0.73	0.73	0.52
	Average:	*126*	*113*	*86*	*0.79*	*0.71*	*0.54*

Source: Provincial Traffic Police

Table 4.3.21 Number of Accidents in Quang Ninh Province and Percentage in NH-18 between Km 47 and Km 160 (113 km)

Year	Total Number of Accident in Thai Nguyen Province			Percentage of NH-18 : Km 47~ Km 160 (%)		
	Accident	Fatality	Injure	Accident	Fatality	Injure
2002	374	282	294	-	-	-
2003	467	161	635	21.8	66.5	8.2
2004	132	142	56	46.2	43.7	50.0
2005	142	163	58	52.8	52.8	48.2
2005	214	242	91	-	-	-

Source: Road and Railway Police Administration of MOPS

Quang Ninh Province has 396 km long of national highways, 139 km long of provincial roads, 23 km long of urban roads and 497 km long of district/ commune roads. Table 4.3.22 shows total number of accidents in Quang Ninh province and the percentage of accidents which occurred along NH-18 from Km47+000 to Km160+000 (113 km). In addition, this table shows that 21.8% to 52.8% of accidents have occurred on the said 113 km section of NH-3 between 2003 and 2005, resulting in 43.7% to 52.8% of fatalities and 8.2% to 50.0% of injuries. It is therefore important to highlight that almost half of fatalities caused by traffic accidents in Quang Ninh Province have occurred on the 113 km section of NH-18.

Table 4.3.22 Traffic Volume on NH-18 Bac Ninh – Quang Ninh (Km 0 to Km 160)

By SAPROF Study (2006 June, 14 hour : 6:00am - 20:00 pm)

Province	Location (Km post)	Car/Light Truck / Mini Bus	Medium / Heavy Truck	Large Bus	Motor-cycle	Bicycle / Other	Traffic Volume (pcu)	
							14-hour	24-hour
Bac Ninh	15+000	2,071	1,447	264	4,845	1,394	7,225	(8,500)
Hai Doung	37+500	2,410	349	399	13,353	3,435	8,599	(10,116)
Quang Ninh	53+000	2,064	643	1,033	13,066	3,722	10,080	(11,859)
	77+200	4,002	911	1,080	13,155	2,926	12,516	(14,724)

By VRA (2007 May)

Province	Location (Km post)	Car/Light Truck / Mini Bus	Medium / Heavy Truck	Large Bus	Motor-cycle	Bicycle / Other	Traffic Volume (pcu:24-hour)
Hai Doung	26+000	2,034	662	388	8,240	1,960	7,400
Quang Ninh	58+000	1,868	948	195	(5,889)	(841)	(5,115)
	90+600	3,689	2,236	692	(15,871)	(2,267)	(15,130)
	109+180	2,359	1,771	681	(11,261)	(1,609)	(10,993)
	125+000	8,400	1,590	1,015	(16,640)	(2,773)	(19,333)
	140+900	2,528	4,307	1,834	(12,723)	(2,121)	(18,677)
	150+000	2,692	4,918	1,855	(14,384)	(2,397)	(21,281)
	156+000	2,595	5,391	1,893	(14,966)	(2,494)	(22,348)
	207+000	1,049	733	283	(2,061)	(412)	(3,774)

Note 1) : [pcu by vehicle type] car/light truck/mini-bus (1.0), medium/heavy truck, large bus (2.0), motorcycle (0.3), bicycle/other (0.2)

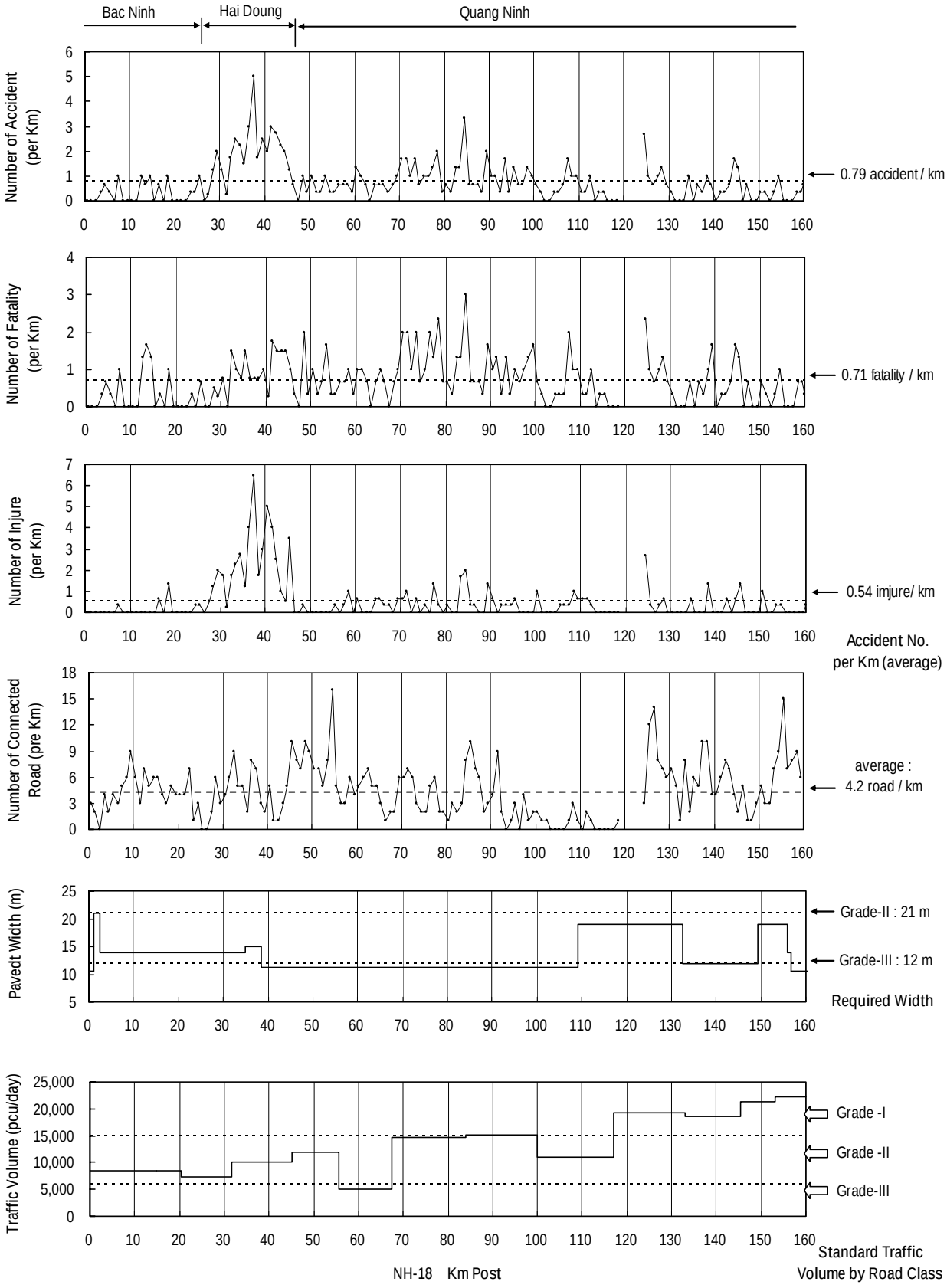
Note 2) : Numeric of () in row of “Traffic Volume (pcu)” by SAPROF Study, and “Motorcycle” / ”Bicycle/Other” by VRA are assumed.

Source: SAPROF Study for Traffic Safety Improvement Project (October 2007) and Vietnam Road Administration

Figure 4.3.9 shows the average occurrence rate per km of accident, fatality and injury from 2002 to 2005, as well as the number of roads to be connected per km, paved width (carriageway + paved shoulder), traffic volume on NH-18 of Km 0 to Km 160. In addition, Figure 4.3.9 also indicates the following:

- The study section of NH-18 has 2-lane and 4-lane carriageway. Bay Chay – Ha Long section (Km109+200 to Km132+400) and Cam Pha section (Km149+400 to Km156+000) both have improved 4-lane Grade-II road, and other 2-lane sections which were improved as Grade-III road. In general, the road cross sections of the study sections satisfy the technical requirement of design specification.

Figure 4.3.9 Accident Rate per km, Connected Road, Paved Width and Traffic Volume on NH-18 (Km 0+000 to Km160+000)



Source: [Accident record] Provincial Traffic Police
[Paved width, number of connection road, traffic volume] Provincial Department of Transport

- Accident and injury occurrence rate per km in Hai Doung Province seem higher than the other two provinces. This may be attributed to the differing criteria of accident reporting by respective provincial traffic police departments.
- Traffic volumes on the study sections range approximately from 5,100 (pcu/day) to 22,300 (pcu/day) as shown in Table 4.3.20. It should be noted that the traffic volume at Km77+200 and Km90+600 in Quang Ninh Province has reached the upper limit for a Grade-II road (15,000 pcu). In addition, to compound this congested condition, the exiting road class is a 2-lane Grade-III road, and after Bay Chay Bridge (around Km120), the current traffic volume is supposed to have reached the level of a Grade-I road.

Within the 160 km of NH-18, 49 black spot locations were identified by the SAPROF Study. Table 4.3.23 shows a summary of black spot conditions in the study section. More detailed information are compiled in Volume 4 (Appendices). More specifically, Table 4.3.23 indicates the following:

- Among 49 black spot locations, 23 locations (47% in total) are on the curve section while 7 locations are on the 4-lane section between Bay Chay and Ha Long.
- Average number of connected road with NH-3 is 4.2 roads per km. There are 27 black spot locations on connecting roads, more than the average number of road on the study section.
- A total of 16 black spots are located in the town area (Pho Lai, Sao Do, Mao Khe, Uong Bi, Duong Ngang, Ha Long) and 20 locations are in the residential areas, which is approximately 70% of the total black spot locations.
- Among the 7 locations on the 4-lane section between Bay Chay and Ha Long, 3 locations are on curve alignment, 4 locations are on crossroads, and 4 locations are located in Ha Long town area.

Table 4.3.23 Road Condition of Black Spots on NH-18 (Km 0 to Km 160)

No	Location	Horizontal Alignment		No. of Lane	Paved Shoulder	No. of Connected Roads (per km)	Roadside Condition		
		Straight	Curve				Town	Residential	Rural
1	Km 4+300 ~ Km 5+000	X		2	3.5 m	1.4 road		X	
2	Km 7+050 ~ Km 7+500	X		2	3.5 m	2.2 road		X	
3	Km14+000 ~ Km14+300	X		2	3.5 m	3.3 road		X	
4	Km18+000 ~ Km18+500	X		2	3.5 m	6.0 road			X
5	Km28+000 ~ Km28+550	X		2	3.5 m	3.6 road	X		
6	Km32+500 ~ Km33+000		R=1,000m	2	3.5 m	6.0 road	X		
7	Km33+000 ~ Km33+300		R=500m	2	3.5 m	6.7 road		X	
8	Km35+450 ~ Km36+200	X		2	2.0 m	5.3 road	X		
9	Km36+500 ~ Km37+000	X		2	2.0 m	6.0 road	X		
10	Km37+535 ~ Km37+725	X		2	2.0 m	10.5 road	X		
11	Km37+725 ~ Km38+200	X		2	2.5 m	4.2 road			X
12	Km41+000 ~ Km41+300		R=400m	2	2.5 m	10.0 road			X
13	Km41+300 ~ Km41+700		R=400m	2	2.0 m	0 road			X
14	Km42+500 ~ Km42+700		R=200m	2	2.0 m	5.0 road			X
15	Km43+500 ~ Km44+000	X		2	2.0 m	2.0 road			X
16	Km44+500 ~ Km45+150	X		2	2.0 m	4.6 road			X
17	Km45+150 ~ Km45+450		R=300m	2	2.0 m	6.7 road			X
18	Km45+450 ~ Km45+950		R=500m	2	2.0 m	14.0 road			X
19	Km61+000 ~ Km61+675	X		2	2.0 m	5.9 road	X		
20	Km70+550 ~ Km70+900	X		2	2.0 m	2.2 road		X	
21	Km70+900 ~ Km71+250		R=400m	2	2.0 m	11.4 road		X	
22	Km71+250 ~ Km72+000	X		2	2.0 m	4.0 road		X	
23	Km72+250 ~ Km73+000	X		2	2.0 m	2.7 road		X	
24	Km73+000 ~ Km73+500	X		2	2.0 m	2.0 road		X	
25	Km76+500 ~ Km77+125		R=400m	2	2.0 m	4.8 road		X	
26	Km77+650 ~ Km78+150	X		2	2.0 m	4.0 road	X		
27	Km83+050 ~ Km83+350	X		2	2.0 m	6.7 road	X		
28	Km83+650 ~ Km83+900		R=100m	2	2.0 m	0 road	X		
29	Km83+900 ~ Km84+500	X		2	2.0 m	6.0 road	X		
30	Km87+000 ~ Km87+700	X		2	2.0 m	8.6 road		X	
31	Km89+050 ~ Km89+625		R=500m	2	2.0 m	5.2 road	X		
32	Km93+050 ~ Km93+300		R=250m	2	2.0 m	0 road			X
33	Km99+700 ~ Km100+150		R=350m	2	2.0 m	2.2 road		X	
34	Km107+000 ~ Km107+300		R=350m	2	2.0 m	3.3 road			X
35	Km107+500 ~ Km108+025		R=500m	4	2.5 m	0 road			X
36	Km108+950 ~ Km109+350	X		4	2.5 m	5.0 road			X
37	Km111+815 ~ Km112+450	X		4	2.5 m	1.6 road			X
38	Km125+000 ~ Km125+500	X		4	2.5 m	8.0 road	X		
39	Km126+000 ~ Km126+500	X		4	2.5 m	6.0 road	X		
40	Km128+000 ~ Km128+500		R=150m	4	2.5 m	8.0 road	X		
41	Km128+000 ~ Km128+500		R=300m	4	2.5 m	2.0 road	X		
42	Km133+800 ~ Km134+500		R=250m	2	2.5 m	6.0 road		X	
43	Km138+000 ~ Km138+500		R=250m	2	2.5 m	14.0 road		X	
44	Km139+000 ~ Km139+500	X		2	2.5 m	6.0 road		X	
45	Km143+000 ~ Km143+500		R=250m	2	2.5 m	12.0 road		X	
46	Km143+500 ~ Km144+145		R=250m	2	2.5 m	3.1 road		X	
47	Km144+295 ~ Km145+100		R=495m	2	2.5 m	2.5 road		X	
48	Km145+000 ~ Km145+500		R=355m	2	2.5 m	4.0 road		X	
49	Km145+000 ~ Km145+500	X		2	2.5 m	2.0 road		X	

Source: JICA Study Team

(iv) Problems and Issues

The implementation process of the black spot improvement as earlier discussed was studied. The following are some of the problems and issues identified:

(1) Problems

(a) Development of a traffic accident database

- Data on the black spots on the National Highway is prepared by RRMU and PDOT. It includes only information on the road condition and outline and detail of the accidents are not recorded. The data management is still being developed, data formats are not yet improved and a database has not been established. Also, traffic police accident data on black spots are not shared with other concerned agencies.

(b) Establishment of a local hazardous location improvement program

- Since Decision No.13/2005/QD-BGTVT stipulates that black spot improvement implementation depends on respective road management authorities, progress on improvement varies among authorities. This may also be due to lack of practical guideline on black spot improvement system and inadequate human and financial resources.

(c) Accident diagnosis to identify accident black spots

- Not very clear definition of black spot as applied on the road sections or positions to be counted and the number of accidents in black spot identification.
- Lack of experienced accident investigation engineers.

(d) Plan and design of countermeasures

- When planning traffic safety mitigation measure, analysis of relationship between accidents and road facility and categorization of accidents and appropriate measures accordingly are required. However, the institution that should solely implement the scientific study does not exist yet; thus, a guideline for traffic safety mitigation measure is not yet prepared and thus, black spot improvement depends on respective authority's decision.
- The road management authority and the traffic police do not have an effective system of cooperation to discuss traffic safety mitigation.

(e) Implementation of the countermeasures

- Progress of the black spot improvement depends on implementation of traffic safety measures and financial resources for road operation and maintenance. It is especially delayed in the rural areas and safety mitigation for special consideration sections such as school zones has not been properly addressed.

(f) Monitoring the effectiveness of countermeasures

- As monitoring system to follow up the black spot improvement is not well prepared, feedback system is not established to assess its effectiveness as well as stakeholders' opinions.

(2) Issues

(a) Need for legislation to designate executing agencies with clear delineation of respective obligations and responsibilities and to further promote understanding among stakeholders.

(b) Development of the black spot improvement system

- Definition or criteria of the black spot and guideline to identify it
- Upgrading of the black spot improvement system
- Development of cost-effective measures both in terms of time and resources and to ensure stable and sustainable financial resources

(c) Training and technical upgrading system for black spot improvement engineers

(d) Utilization of the black spot improvement database, development of supporting tools and establishment of the executing agency

(e) Follow-up on the results of post-monitoring of the black spot improvement

2) Traffic Safety Audit

(i) Regulation by MOT

MOT has issued Traffic Safety Audit through the Decision No.23/2007/QD-BGTVT dated 7 May 2007. Outline of safety audit is summarized in Table 4.3.24.

(ii) Road Safety Audit Practice in VRSP-1

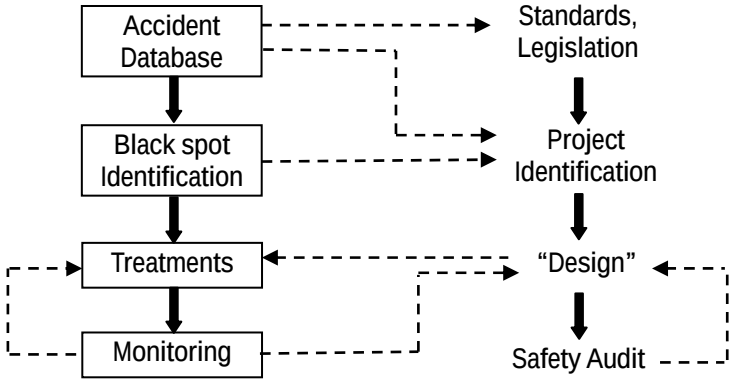
In the WB-assisted VRSP-1, a pilot traffic safety audit is scheduled to be conducted. VRSP-1 will consist of nine components and the “Preparation of Vietnam Road Safety Project Phase-1 Review of Components Final Report” (March 2004) recommended the establishment of an integrated Road Safety Management System (RSMS) as illustrated in Figure 4.3.10. And the road safety audit to be conducted under VRSP-1 will be performed as a key component of the RSMS.

Table 4.3.24 Outline of Road Traffic Safety Audit by MOT

Item	Content
Implementation Stage	One or similar of the following stage: (1) Investment report (pre-F/S) preparation stage, (2) F/S report preparation stage, (3) Detailed design stage, (4) Construction stage, (5) Operation stage
Audit Group	Independent consultant or person from design consulting group, supervision consultant, contractor, and project owner.
Responsible Agency of Implementation	New construction / upgrading / improvement project : Project owner After operation : Road management agency
Audit Procedure	Step-1 : Decision to conduct safety audit by responsible authority Step-2 : Selection of audit organization Step-3 : Supplying related documents to audit organization to study Step-4 : Site survey by audit organization Step-5 : Preparation of safety audit report Step-6 : Evaluation of the audit report Step-7 : (New construction / Upgrading / Improvement Project) Modifying design or adjusting construction and final certification for completion of safety audit, (After operation) To allocate budget for modification / improvement works
Audit cost	New construction / upgrading / improvement project : To be included in investment budget After operation : Road management agency : To be allocated from annual maintenance budget

Source: Decision No,23/2007/QD-BGTVT by MOT (07/May/2007)

Figure 4.3.10 Concept of Integrated Road Safety Management System under VRSP-1



Source: "Preparation of Vietnam Road Safety Project Phase-1 Review of Components Final Report" (March 2004)

The National Road Accident Database will provide detailed knowledge on the safety performance of roads, of which information will facilitate the developments of standards and guidelines for safer infrastructure as well as aiding the identification of high-risk location and those which are referred to as "black spots". The development, implementation and monitoring of black spot treatments will result in better informed design decision which are independently examined trough the process of safety audit. The road safety audit will be conducted through the following tasks:

Update Existing Manual for Road Safety Audit: The safety audit manual prepared under the Vietnam Road Safety Study (December 1999) will be developed specifically to suit the condition in Vietnam.

Preparation Material for promotional Workshops: In discussion with VRA and other agencies, identify completed projects that could have benefited from safety audit and in particular, those that have since required remedial work or have developed into black spots. The collected information will be used as basis to construct a set of example of real projects that would have benefited from safety audit.

Identification of Future Audit Projects: Discussion with VRA and other concerned agencies to identify all current and proposed future projects that are likely to impact on road safety. Develop a complete list of all these projects together with a brief description of project type and progress to date (pre-F/S, F/S, D/D, construction and completed). Using this data, establish a provisional audit program.

Refresher 1 Audits: Giving preference to those who took part in the previous audit training, arrange a series of audits undertaken by each with leadership from an international road safety auditor. Each auditor should have taken part in at least 4 audits.

Promotional Workshops: Hold a series of Promotional Workshops to introduce key decision makers to concept and value of road safety audit. Real example from the task of "*Update Existing Manual for Road Safety Audit*" and "*Identification of Future Audit Projects*" will be basis of these workshops, that should focus key decision makers rather than on engineering stuff.

Procedures Workshops: This workshop should review "*Refresher 1 Audit*" and

identify which aspects worked well and which did not, and include comments from the auditors, client and designer. On this basis, details of the audit procedures will be reviewed and suggestions will be made to refine these where necessary.

Refresher 2 Audits: The refined procedure will then be used on a second set of refresher audits. As with the previous set of refresher audits, these audits will be undertaken with leadership from an international road safety auditor and each auditor should have taken part in at least 4 audits.

Practitioners Workshops: Having refined and tested the safety audit procedures for use in Vietnam, these workshops, led by the first generation auditors will be the first step in training the next generation of auditors. The workshops will give formal training on procedural aspects of road safety audits and reporting, as well as allow participants to undertake practice mini audits.

Training Second Generation: To provide practical training in safety audit, those who have attended a Practitioners Workshop may be invited to accompany an experienced audit team as an observer for at least two audits before being accepted as an audit team member. Having been an audit team member on at least 8 audits, a Team member may be considered to lead an audit team

The above activities are proposed to be implemented in the schedule shown in Table 4.3.25.

Table 4.3.25 Proposed Implementation Schedule of Safety Audit by VRSP-1

Year / Key Activity	1st Year				2nd Year				3rd Year				4th Year			
Update Existing Manual	■	■	■	■												
Preparation Material for promotional Workshops	■	■	■	■												
Identification Future Audit Projects	■	■	■	■												
Refresher 1 Audits		■	■	■												
Promotional Workshops		■	■	■												
Procedures Workshop		■	■	■												
Refresher 2 Audits					■	■	■	■								
Practitioners Workshops						■	■	■		■	■	■		■	■	■
Training Second Generation							■	■	■	■	■	■	■	■	■	■

Source: "Preparation of Vietnam Road Safety Project Phase-1 Review of Components Final Report" (March 2004)

(iii) Problems and Issues

(1) Problems

Since RSA is relatively new in Vietnam, there has been no evaluation yet of its effectiveness as well as issues in its implementation. Based however on reports from relevant authorities, the following issues are worth mentioning:

(a) Existing RSA guideline (Decision No.23/2007/QD-BGTVT)

- Relevant authorities and agencies are not adequately aware of their respective responsibilities as well as coordinative mechanisms in the implementation of the RSA since this Decision is not yet well understood particularly by local authorities.

- There are no clear and definite criteria or guidelines in the identification of road development project for audit by RSA. Instead, decision is left with the project owner. And since the central government and respective local governments have varying implementation guidelines, effectiveness and efficiency of RSA to decrease traffic accident casualties may be affected.
- Since licensing system for RSA auditor has not been established yet, an experienced road engineer usually becomes the auditor. However, responsibility and scope of work of an auditor is not clearly defined. In addition, there is a lack of the number of qualified human resources. Thus, to enhance the RSA system, the RSA auditor should have a certain level of competence and responsibility.
- While cost of RSA implementation is mentioned by the Directive, source of funding is not identified. Thus, it might be difficult for local authorities to properly and effectively implement the RSA given the present financial constraints faced by local governments.
- The present RSA checklist being used nationwide by the road management authority is standardized without consideration of respective characteristics of geography, climate and culture in each area. In addition, it does not appropriately respond to the unique characteristics of transportation sector in Vietnam, which is dominated by motorcycles, as well as the people's traffic behavior.
- There is no mention of management and monitoring system and the competent authority for RSA implementation. Therefore, the status of implementation and follow-up of the auditing results might vary among different locations. In addition, effectiveness might not be monitored in some areas.

(b) Others

- Technical support to analyze traffic accidents, and efficiency and cost-effectiveness of RSA implementation are not yet established well. In addition, there is still no institute that is exclusively conducting its analysis.
- Scientific traffic accident analysis and measurements are not being efficiently conducted due to the limitation of traffic accident database and insufficient road inventory data.

(2) Issues

The following issues to be tackled to solve the above problems.

(a) Enhancement of legislations regarding obligation and responsibility of relevant authorities, and education on and expansion of RSA.

(b) Suggested contents of revised RSA system:

- Established guideline of selection of target road and traffic development plans

- Improvement of safety control method including revision of the audit checklist
- Approval and licensing/accrediting system for auditing organizations
- Estimated time and costs required, and sustainable financial sources
- Utilization of the auditing results
- Guaranteed legal support

(c) Establishment of licensing/accrediting system and human resource development mechanism for the auditors.

(d) Utilization of database supporting the auditing, development of the supporting tools and establishment of the responsible agency.

(e) Scientific traffic accident analysis, evaluation of the effectiveness of RSA implementation and cost-effectiveness, and feedback mechanism for the results to be appropriately utilized.

(f) Post auditing monitoring to follow up the results and establish the responsible agency.

3) Current Traffic Facilities Development

(i) Current Situation

A recently completed World Bank-assisted project, “Vietnam Urban Transport Improvement Project”, conducted an expansion and updating of the traffic signal system in Vietnam. The project covered a total of 78 locations in Hanoi. Among them, 47 intersections have been provided with new signals, and eight intersections have been installed with pedestrian crossing signals with pushbuttons. Signal poles and bulbs have been replaced at the remaining 23 intersections. Moreover, central equipment has been installed at the existing control center and newly installed signals have been connected to it through the communication lines owned by the Traffic Police.

(ii) Problems and Issues

(1) Problems

(a) Traffic Control Facility

The presence of traffic control facilities is still limited along the city road network. While traffic signals are found in some intersections in city center areas, traffic signal functions are not appropriate to address the unique traffic characteristics in Vietnam. In addition, operation maintenance of the traffic signal is not satisfactory. Moreover, due to functional constraint of existing traffic signal system, area-wide traffic control efficiency in the cities has not improved.

(b) Parking Facility and Parking Regulation

The pedestrians’ comfort in sidewalk use has rapidly deteriorated during the past decade due to rapid increase of motorcycle usage. This also led to compromise of pedestrians’ safety because most of the time, they are forced to walk on the carriageway since sidewalks have been converted to

parking lots.

This situation can further be aggravated with the expected increase of 4-wheel motorized vehicles in the near future. At present, traffic flow problems already arise in inner collector roads due to parked vehicles on roadsides. This may not pose a problem at present especially for wider roads which have properly marked parking spaces. But once car use further increases, such parking measures may not be able to accommodate future parking demand.

(2) Issues

(a) Promotion of upgrading and efficient traffic signal system development

- Strengthening of applicability for diversified traffic and traffic accident prevention

(b) Development of parking space and strengthening of enforcement for illegal parking

- Development of flexible parking regulations
- Promotion of parking development plan

(c) Improvement of traffic demand control

- Promotion of public transport usage
- Promotion of time-based traffic control measures (i.e. number coding, etc.) to mitigate congestion during peak hours

4.4 Existing Situation on Encroachment Violation

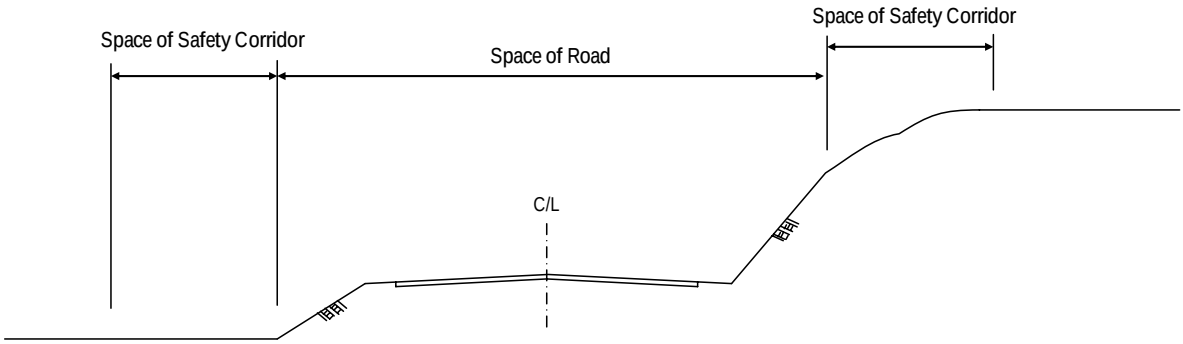
1) Legal Framework of Road Safety Corridor

Allocating space as a safety corridor on each roadside was originally prescribed in Decree No. 203 in 1982. After passing several discussions on the national assembly, the Traffic Law regulated (No.26/2001/QH10 dated 20 June 2001) the safety corridor in Article 29, which describes that the road space shall be ensured to include the space for safety corridor which is aimed at protecting road traffic infrastructure. This was followed by the Decree No.186/2004/ND-CP: Prescribing the Management and Protection of Road Traffic Infrastructures which was issued on 5 November 2004.

(i) Required Width of Safety Corridor Space

The space for safety corridor is aimed at ensuring traffic safety and protecting road infrastructure, and this space should be measured from the road embankment or slope edge as shown in Figure 4.4.1.

Figure 4.4.1 Space of Safety Corridor



For road sections outside urban areas, the required width is determined in accordance with road category as shown in Table 4.4.1. On the other hand, for urban roads, the road safety corridor limit shall be the width measuring from the road edge to the road construction boundaries under the planning approved by the concerned authorities.

Table 4.4.1 Required Width of Safety Corridor by Road Category

Road Category	Expressway	I	II	III	IV	V	under V
Wide of Safety Corridor (m)	20			15	10		5

Source: "Decree No.186/2004/ND-CP: Prescribing the Management and Protection of Road Traffic Infrastructures" (05/November/2004)

(ii) Land Utilization within Safety Corridor Space

Construction of structures or use of land for other purpose within the designated safety corridor space should not be allowed except for the following uses:

(1) Planting of food crops, subsidiary food crops, fruit trees and/or timber trees or for aquaculture, provided the following guidelines are complied with:

- For road embankments, they must be planted at least 1m from foot path for food crops and subsidiary food crops and at least 2m for fruit trees and timber trees.
- For dug roads, they must be planted at least 6m from the top edge of the road talus or the outer edge of the top ditch.
- Only fruit trees and timber trees, which have deep main roots and do not affect visibility of persons joining road traffic, are allowed to be planted. Particularly in road sections close to road forks, crossroads, intersections with railways and at positions to the smaller radius of road bends where the visibility is blocked, only low trees which cannot affect the visibility are allowed to be planted.
- Ponds and lakes for aquaculture must be away from the edge of the foot path for a distance being at least equal to the height difference between the edge of the base of embanked road and the pond or lake beds. The water level in ponds or lakes must not be higher than the road base foot.
- Irrigation ditches must be away from the foot of road embankments road talus for a distance being at least equal to the depth of the ditches and the

water level in the ditches must not be higher than the road base foot, except during flooding.

(2) During development of industrial parks, economic zones, residential areas, and trade and service centers, the system of access roads outside the road safety corridors must be constructed and linked with the existing system of loop roads before linking with main roads.

(3) In cases where newly constructed access roads are allowed to directly link with the existing main roads, the linking points must be approved by concerned government agencies in charge of road management from project formulation until the design stage to ensure compliance with technical and safety standards.

(4) Billboards installed in road safety corridors must be approved by road management agencies concerned and must not affect the traffic safety.

(5) Gas stations must be constructed outside the road safety corridors based on plans approved by concerned agencies as well as written approval regarding locations and designs of gas station drive-in and drive-out ways connecting to the road safety corridors, including designs of points linking with the existing roads and ensuring technical standards and safety of the currently utilized road sections.

However, since a lot of local authorities do not match their land use plan on the safety corridor of both road sides, the industrial, commercial and residential zones are usually constructed very close to the roads, which in turn lead to traffic safety-related problems.

2) Land Acquisition Survey on NH-1 by VRA

In 2006, VRA conducted a detailed condition/inventory survey on the safety corridor space along 2,300 km long of NH-1. The results of the survey are summarized as follows:

(i) Current Land Acquisition Status

The road classification of NHA which runs outside urban area is mainly Grade-III, which requires a safety corridor of 15m wide on both sides. However, due to budgetary constraints for construction investment and improvement, it was focused on clearance within construction boundary, which means that distance off the road edge ranges from 3 to 5m, with some sections having 7m while others have only 1 to 2m.

Based on the results of the survey of 372.4 km of road length, the current land acquisition status regarding safety corridor of 15m wide is as follows:

- less than 7m : 34.8%
- 7 m to 15m : 35.9%
- more than 15m : 29.4%.

In total, approximately 70% of road sections do not meet the road safety corridor standard. In addition, the number of locations to connect with cross roads is

counted as 3.3 locations per kilometer.

(ii) Required Land Acquisition for Safety Corridor

Table 4.4.2 shows the required land acquisition to ensure the safety corridor on entire NH-1. Approximately 45 million m^2 of land is required to be acquired, including land area of 8 million m^2 with illegal settlers.

Table 4.4.2 Required Land Acquisition for Safety Corridor on NH-1 (2,300 km)

Land Acquisition (m^2)				Asset Compensation (m^2)	
Total	Legal Land	Illegal Land		House and Other Structure	Other Item
		illegally occupied	by improper procedure		
45,424,142	36,927,771	8,081,894	321,395	6,894,660	16,540,630
Estimated Cost for Clearance and Compensation :				14.366 billion VND	

Source: Survey Result by VRA (December2006)

According to VRA, the number of violations, especially land transgression for illegal house building within road safety corridor and illegal road to be connected with the national roads are increasing. Based on the survey by the end of 2005, there were 5,666 encroachments on road safety corridor along NH-1 which includes 194 industrial zones, 2,101 residential areas, 1,008 gas stations.

Furthermore, MOT/VRA expressed the following views as to possible causes leading to violations on the traffic safety corridor:

- Lack of awareness of existing laws by residents living along the roads and ineffective information campaign for Road Traffic Law.
- Construction of many urban areas, industrial zones, trading and services areas that are not in accordance with the master plan.
- Illegal occupation of land on the traffic safety corridor.
- Improper compensation for acquisition of land for road.
- Lack of coordination among state agencies in planning the constructions along national roads.
- Undetermined resolution of violations committed on the road traffic safety corridor.

3) MOT's Plan to Restore Road Traffic Safety Corridor

According to MOT, the following action plan is considered to restore the traffic safety corridor on the national roads.

(i) Approach of Restoration Plan

The main objectives of restoring safety corridor are as follows:

- To improve awareness of the population on the traffic safety corridor and management of traffic safety corridor; to restore order and discipline in maintaining the traffic safety corridor, and
- To restore and maintain the traffic safety corridor; complete the construction of frontage roads, roads connecting to national roads and support facilities for protecting the traffic safety corridor.

To realize the above objectives, the following action plan will be implemented with the following 5 approaches:

(1) Information campaign, dissemination and education of laws on traffic safety.

(2) Investments on improvement, upgrading, construction of side roads in line with the current guidelines; construction of fence to segregate road from railway at the sections where road runs parallel with railway.

(3) Application of coercive measures to clear illegal structures and constructions on the traffic safety corridor; to demolish illegal connections to main roads.

(4) Planning of access roads to economic zones, commercial and residential areas, locations to connect to national roads; planning of fencing system and frontage roads.

(5) Recommendations to amend, modify and supplement the legal provisions to ensure appropriateness of management requirements in the restoration of the traffic safety corridor.

(ii) Schedule of Restoration Plan

The restoration plan will be implemented and divided according to the following 3 stages:

Stage-1: Pilot Implementation on NH-1 (up to 2nd Quarter of 2008)

As a pilot implementation, the sections on NH-1, which have been compensated for 5 m to 7 m land of safety corridor space, will be selected from the following road sections:

- Hanoi – Ninh Binh section
- Vinh – Hue section
- Danang – Nha Trang section
- Ninh Thuan – Ho Chi Minh City

RRMUs will actively cooperate with local authorities to verify compensated areas and illegal encroachments for clearance.

RRMUs will provide compensation package to owners of structures encroaching within road safety corridor and demolish and remove structures.

The clearance of safety corridor space on the pilot section of NH-1 will be completed, and RRMU will prepare the review report including the lessons that may be utilized for the implementation of "Restoration Plan Stage-2" up to the 2nd quarter of 2008.

MOT estimates that implementation cost of stage-1 is 14 billion VND.

Stage-2: Nationwide Action Plan Formulation (from 2nd Quarter of 2008 to 2010)

RRMUs shall conduct a nationwide inventory survey and cooperate with the local authorities.

Local authorities will prepare the cost estimates for clearance compensation package within road safety corridor and submit estimation to MOT, which will in turn

formulate budget allocation and implementation plan.

Also, the local authorities will modify their respective land use master plans to connect the national road, and the plan will be submitted to MOT for approval.

Stage-3: Implementation of Clearing Operations (from 2010 to 2020)

Authorized agencies will perform compensation and clearance operations. After executing land acquisition, the safety corridor border will be managed by local authorities.

4) Problems and Issues

(i) Problems

In Vietnam, illegal encroachments and delay of construction on national highways, provincial and city roads are common problems. However, the magnitude of this problem is yet to be determined. According to the survey results of VRA on a particular section on NH-1 (370km), 70% of the sites did not have appropriate land width. However, this condition may not be assumed applicable to the whole country.

According to cost and land size estimation for compensation during relocation of illegal settlers from safety corridor on 2,300km of NH-1, approximately 45 million m^2 of land is required to be acquired, including land area of 8 million m^2 with illegal dwellers (Table 4.4.3). This means that a large amount will be required to compensate even the relocation of illegal dwellers.

Table 4.4.3 Required Land Acquisition for Safety Corridor on NH-1 (2,300 km)

Land Acquisition (m^2)				Asset Compensation (m^2)	
Total	Legal Land	Illegal Land		House and Other Structure	Other Item
		illegally occupied	by improper procedure		
45,424,142	36,927,771	8,081,894	321,395	6,894,660	16,540,630
Estimated Cost for Clearance and Compensation :				14.366 billion VND	

Source: Survey Result by VRA (December2006)

(ii) Issues

The following issues may be attributed to the abovementioned land acquisition-related problems.

- Establishment of integrated database on status of land acquisition and illegal dwellers in cooperation with the road management authorities and the local governments.
- Establishment of improvement plan including estimation of compensation costs and relocation plan based on the above database.
- Preparation of measures for consensus building on compensation package for relocation of illegal dwellers.
- Application of coercive measures to clear illegal structures and constructions on the traffic safety corridor.
- Investments on improvement, upgrading, construction of side roads in line with the current guidelines.

- Planning of access roads to economic zones, commercial and residential areas, locations to connect to national roads.
- Recommendations to amend, modify and supplement the legal provisions to ensure appropriateness of management requirements in the restoration of the traffic safety corridor.

4.5 Existing Conditions at Railway Crossings

1) Current Safety Facility at Railway Crossings

According to the National Railway Company, there are 1,464 locations of railway crossing managed by the company. In addition, the company confirms there are more than 4,252 unauthorized crossing points that are mainly used by residents along the railway, as shown in Table 4.5.1.

From the other inventory data of the company, there are 120 crossing points with national roads, 89 with provincial roads and 164 with district roads. More than 70% of these crossing points managed by the company are railway crossing with commune roads as shown in Table 4.5.2.

Table 4.5.1 Total Number of Railway Crossing Point by Safety Measure Type

Type of Railway Crossing Facility	Number of Location	
Only Warning Sign Post without Barrier/ Gate	610	(41.6%)
Only Automatic Warning Signal without Barrier/ Gate	305	(20.8%)
Manual Lifting Barrier	317	(21.7%)
Manual Crossing Gate	206	(14.1%)
Only Observed by Guards	3	(0.2%)
Authorized Opening for Resident	23	(1.6%)
Total Location :	1,464	(100.0%)
Unauthorized Opening for People Crossing	4,252	

Source: Department of Infrastructure, National Railway Company

Table 4.5.2 Total Number of Railway Crossing Point by Crossing Road Category

Road Type of Crossed Road at Railway Crossing	Number of Location	
National Road	120	(9.0 %)
(National Road No.1)	(31)	
Provincial Road	89	(6.7%)
District Road	164	(12.3%)
Commune Road / Regal Crossing for Resident People	960	(72.0%)
Total Location :	1,333	(100.0%)

Source: Department of Infrastructure, National Railway Company

As a safety measure to be taken by the company, the safety facilities to be installed at the railway crossings are as follows: (i) crossing gate, (ii) lifting barrier, (iii) automatic warning signal, and (iv) warning sign post (Figure 4.5.1). The crossing gate and lifting barrier are installed at the higher traffic road such as national road, provincial road and district road as well as private road as entrance to large factories or industrial zones. These are manually operated by a designated guard who is standing at crossing point.

Figure 4.5.1 Safety Measurement at Railway Crossing

Type of Facility	Illustration	Cross Road Condition
Manual Crossing Gate		Higher Traffic Road - Mainly more than 2-lane road : national road, provincial road, district road - Entrance of large factory, industrial zone
Manual Lifting Barrier		Slightly Higher Traffic Road - Mainly 1-lane road
Automatic Warning Signal		Low Traffic Road - Mainly commune road

Source: JICA Study Team

From the inventory data collected from the Railway Company, the current conditions at railway crossings are summarized as follows:

- Approximately 35% locations have taken safety measure by gate or lifting barrier to ensure stopping of crossing vehicles when a train is passing at national road, provincial road and district road.
- For a few traffic locations, mostly in the commune roads, safety measures are warning sign post or automatic warning signals which account to approximately 60%.
- The Railway Company has ongoing investment efforts to replace warning sign

posts to automatic warning signals, in order to increase the safety condition.

- The Railway Company is faced with the very serious problem of the existing large number of unauthorized crossings that is almost 3 times the number of authorized crossing locations managed by the company. Enforcement against unauthorized crossings should be strengthened to maintain the safety not only of the passing train but as well as that of the vehicles/pedestrians crossing. Thus, it is also very important that level of awareness of and traffic safety activities for the local residents be increased.

2) Traffic Accident at Railway Crossing

Table 4.5.3 shows the traffic accident record at railway crossing collected by the National Railway Company between 2004 and 2007. This table indicates the following:

- Most accidents occur at the unauthorized crossing points: 66.7% to 85.9% of the total number of accidents; 57.0% to 78.0% of the total number of fatality and 60.7% to 88.6% of the total number of injury.
- Accidents at location to be installed crossing gate or lifting barrier, are recorded relatively few number to comparison with at the other type of crossing; warning sign post and automatic signal. This may suggest that the management l to cross the railway line on the higher traffic roads (national road, provincial road and district road) is properly performed due to certainty of manual operation for crossing gate or lifting barrier.

Table 4.5.3 Number of Traffic Accidents at Railway Crossing by Safety Measure 2004-2007

Crossing Facility \ Year		2004		2005		2006		2007	
At Only Warning Sign Post Crossing	Accident No.	56	(22.2%)	44	(19.7%)	7	(3.6%)	15	(6.7%)
	Fatality No.	22	(28.6%)	33	(38.4%)	3	(6.0%)	9	(1.1%)
	Injury No.	43	(22.1%)	33	(18.8%)	7	(4.0%)	16	(6.8%)
At Only Automatic Warning System Crossing	Accident No.	16	(6.3%)	12	(5.4%)	11	(5.7%)	21	(9.4%)
	Fatality No.	8	(10.4%)	3	(3.4%)	5	(10.0%)	11	(13.6%)
	Injury No.	12	(6.2%)	20	(11.1%)	11	(6.3%)	50	(21.1%)
Gate or Lifting Barrier Crossing	Accident No.	12	(4.7%)	7	(3.1%)	9	(4.6%)	15	(6.7%)
	Fatality No.	3	(3.9%)	1	(1.2%)	3	(6.0%)	14	(17.2%)
	Injury No.	2	(1.0%)	8	(4.4%)	2	(1.1%)	27	(11.4%)
At Unauthorized Crossing	Accident No.	168	(66.7%)	160	(71.7%)	165	(85.9%)	173	(77.2%)
	Fatality No.	44	(57.1%)	49	(57.0%)	39	(78.0%)	47	(58.0%)
	Injury No.	137	(70.6%)	121	(66.5%)	156	(88.6%)	144	(60.7%)
Total	Accident No.	252		223		192		224	
	Fatality No.	77		86		50		81	
	Injury No.	194		182		176		237	

Source: Department of Safety, National Railway Company

Table 4.5.4 shows the other accident record at railway crossing by railway line. Approximately 75% of accident occurs on Hanoi – Ho Chi Minh Line and the accidents mainly occur at unauthorized crossing points.

Table 4.5.4 Number of Traffic Accident at Railway Crossing by Railway Line (May 2006-July 2007)

Type of Crossing / Railway Line Name	Warning Sign	Automatic Warning System	Manual Crossing Gate	Illegal Crossing	Total
BH – VD Line	0	0	0	6	6
Dong Anh -Quan Touri Line	1	0	0	4	5
Hanoi-HCM Line	20	30	33	221	305
Gio Lam-Haiphong Line	10	0	1	34	45
Hanoi-Don Dang Line	6	0	0	12	18
Kep-Ha Long Line	1	0	0	6	7
PL-PH Line	0	0	0	1	1
Yen Vien-Lao Cai Line	2	0	1	22	25
Total :	40	0	35	306	411

Source: Department of Infrastructure, National Railway Company

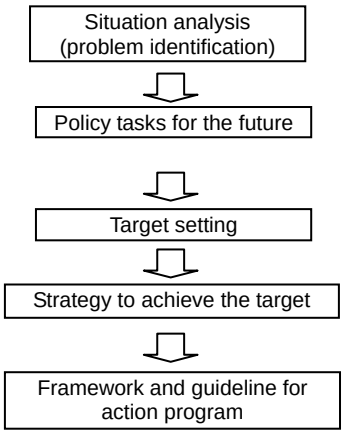
4.6 Existing Problems and Issues

1) Methodology

To respond to the goal and targets of the integrated traffic safety policy, the comprehensive traffic safety measures for road and transportation sector up to 2020 were analyzed.

Steps for strategy building for this sector are illustrated in Figure 4.6.1. Based on the results of situation analysis, policy tasks for the future were formulated. And based on the issues raised, “the target”, “the strategy” and “the comprehensive measure including institutional development” were further studied. A 5-year action program guideline will also be prepared together with the master plan.

Figure 4.6.1 Examination Flow



2) Identified Issues

From the traffic safety perspective, problems and issues in road and traffic sector were discussed. These were identified taking into account the current road situation, traffic and traffic safety policy, facilities (hardware), institution, system and financial and human resources (software). Table 4.6.1 summarizes the identified problems.

Table 4.6.2 summarizes issues in traffic safety which corresponds to the above problems. These were identified after careful consideration of the national policy on transportation sector and forecasted change in road traffic and socioeconomic situation up to 2020.

Table 4.6.1 Summary of Traffic Safety Problems on Road Infrastructure Sector

Categories	Problems
Road Facilities	・ In some sections, the site is not enough to install sufficient shoulder and sidewalks. ・ Facilities ensuring pedestrians' safety such as sidewalks and crossing facilities are not adequate. ・ Facilities ensuring safety of bicycle are not adequate. ・ Lack of measures to address illegal use of railroad crossings. ・ Safety facilities at railroad crossings and railway site near the road are not sufficient. ・ Measures to cope with illegal residents in road sites are not enough. ・ In urban areas, traffic management including traffic lights is not sufficient. ・ As control of on-street parking is not sufficient, there are many illegal parking on roadways as well as sidewalks. ・ Regulation of vehicle type, lane and traffic flow is not sufficient. ・ Number of traffic signs is not enough and the location of signs are not highly visible. ・ Number of rest areas on inter-urban road is not enough. ・ Trunk road network and systematic road network are not sufficiently developed. ・ Maintenance of national highways and mountainous roads is not sufficient. ・ Many road sections are dangerous as those do not meet the structure design standard. ・ Management of traffic safety corridor is not sufficient. ・ Many traffic accidents have happened even on the new roads such as NH5. ・ Not adequate measures for mixed traffic and traffic safety in public transportation. ・ In rural areas, measures for mixed traffic, speeding and night traffic safety are required.
Traffic Safety Measures	・ Traffic safety audit system was installed but the contents and its implementation are not sufficient. ・ Effective mitigation for section with a high incidence of traffic accidents is not well developed and implemented.
Organization/Institution/ Finance	・ Budgets for road construction, operation and maintenance are not enough. ・ Budget for traffic safety mitigation measures is not enough. ・ Delay in drafting and implementation of legislations concerning enhancement of road traffic safety. ・ Awareness and capacity of concerned government agencies and local authorities on traffic safety mitigation measures are not sufficient, especially in local government and frontlines. ・ Traffic safety mitigation measures in rural areas are less sufficient than urban areas. ・ Cooperation between central and local governments is not enough with regard to traffic safety policy. ・ Nationwide traffic safety mitigation measure is not consistent and sustainable.

Source: JICA Study Team

Table 4.6.2 Summary of Identified Issues on Road Infrastructure Sector

Categories	Issues
Road Facilities	・ Securing adequate ROW ・ Development of pedestrian facilities ・ Development of bicycle facilities ・ Strengthening of illegal railway crossing dismantlement efforts ・ Improvement of safety facility at railway crossing and boundary between road and railway ・ Strengthening of encroachment ・ Improvement of traffic control management in urban area ・ Improvement of parking management ・ Strengthening of traffic flow regulation ・ Improvement of traffic sign installation and visibility ・ Development of rest facility for inter-city road ・ Development of arterial road network and systematic road network ・ Improvement of road maintenance for national road and provincial road ・ Improvement of hazardous road section ・ Improvement of traffic safety corridor management ・ Countermeasure for traffic accidents in planned and newly constructed roads ・ Countermeasure for mix traffic and safety security of public transport ・ Countermeasure for traffic safety for rural area
Traffic Safety Measures	・ Improvement of Road Safety Audit system ・ Improvement of Black Spot Treatment measures
Organization / Institution/ Finance	・ Securing of fund for road construction and maintenance ・ Securing of fund for traffic safety measures ・ Establishment of institutional support for strengthening of traffic safety activities ・ Development of capacity and awareness of concerned agencies especially local governments ・ Strengthening of traffic safety on rural area ・ Formulation of strong coordination between central and local government ・ Unification of policy and implementation for traffic safety activities for the whole of Vietnam

Source: JICA Study Team

(i) Consistency with National Economic Development Policy

The government of Vietnam considers road network development as a very important policy to promote economic development. Arterial roads network and expressway networks connecting major cities and industrial zones have been developed to respond to increasing traffic volume mainly by large-sized vehicles carrying huge amount of goods. In addition, systematic road network development and public transportation improvement are also assumed as urgent issues to improve road traffic environment and to decrease traffic jam and accidents in urban areas.

(ii) Changing Characteristics of Motorization

The continuing increase in economic development as well as the increase in national income is expected to further promote motorization. At present, 90% of vehicle transportation is motorcycle and the registered number is expected to continuously increase in the future. In addition, 4-wheeled vehicles are likely to

increase rapidly with the launch of the automobile industry in Vietnam as well as the progress of free trade with the neighboring countries. And due to growing demand in logistics of the industrial sector, there is also an expected increase in the number of large-sized vehicle. Thus, such drastic changes in characteristics of motorization should be taken into account when promoting road network development in the future.

(iii) Socioeconomic Situation

While socioeconomic gap between urban areas and rural areas is increasing, the government is taking various measures such as devolution of financial resources to local government to promote financial self-reliance and industrial development in rural areas. However, as expected, urban areas are getting highly-dense as well resulting in the decrease in local government's tax revenue and insufficient financial and human resources for public sector development. At the same time, rural areas are left with an ageing population due to urban migration of the working-age population.

3) Current Efforts of the Government of Vietnam

(i) Governmental Initiative

Starting late 1990s, the Government of Vietnam has been addressing traffic safety issues to mitigate the rapidly increasing number of traffic accident victims. In July 2007, Resolution 32/2007/NQ-CP was issued calling for the implementation of comprehensive traffic safety measures. Table 4.6.3 shows the major mitigations/ measures, implementation schedule up to 2010 and concerned executing agencies. To respond to this resolution, the concerned agencies identified their respective targets and work plans.

(ii) Target

In addition to the development of traffic safety policy based on Resolution 32/2007/NQ-CP, MOT has also set a short term target of decreasing the number of traffic accident-related deaths to 5% to 7% from 2007 to 2010 (Table 4.6.4).

As the number of deaths caused by traffic accidents in Vietnam has been decreasing since 2002, the above target is almost the same level with that of other countries. However, since the population and the number of vehicle registration and traffic demand is increasing and motorization is expanding to the rural areas, taking sufficient mitigation measures for traffic safety might be necessary.

Table 4.6.3 National Traffic Safety Improvement Strategies

Responsible Organization	Traffic Safety Improvement Strategies	Target
Provinces and Cities (District PC) (MOT)	・ Management of eviction of all compensated encroachers along road right of way ・ (Demolition, enforcing imposed measures and removal of illegal structure on road right of way) ・ Formulation of Collector roads network plan ・ (Network planning for planned collector roads will be in accordance with national highway network) ・ Installation of vehicle lane separators on required section ・ Prevention of opening of illegal level crossing with railway ・ Elimination of 50% of existing illegal level crossings ・ Demolition of structures obstructing sight distance of train operation	30/3/2009 - 2008 2010 - 2009 -
MOT	・ Conduct of a full inventory and analysis of illegal road connections with national highways ・ Elimination of 50% of illegal road connections ・ Addressing all illegal road connections ・ Accomplishing treatment of black spots identified before 30/11/2007 ・ Addressing black spots within 90days of completion of their profile documents ・ Installation of traffic safety ancillary structures and facilities in dangerous sections ・ Review and classification of crossings with road and railway to establish guarded crossings ・ Installation of barriers in sections where roads are aligned adjacent to railway ・ Installation of road signage, rumble strips and other warning device at unguarded road crossing with railway ・ New construction of urban roads or NHs must include the installation of vehicle lane separators and surveillance cameras (closed-circuit television) ・ Development and submission of a proposal on improvement of organizational structure and improved effectiveness of state governance on traffic safety in MOT and DoT (TUPWS)	30/3/2009 - 2011 30/11/2007 - 6/2008 - 2010 - - 2007
Ministries/ Agencies/ Central province/ cities	・ Development of action plans and continuous observance of 22-CT/TW, countermeasures prescribed in 13/2002/NQ-CP and 32/2007/NQ-CP	-
Provincial PC	・ Take on an active implementation role and cooperate with ministries during implementation period	-
NTSC	・ Monitor and encourage provinces and localities to implement the proposals on Traffic Safety Countermeasure up to 2010 and other government resolutions ・ Organize quarterly coordination meetings with ministries and provinces and report on performance achievements to the prime minister	- -

Source: JICA Study Team

Table 4.6.4 Traffic Safety Goals and Objectives in other Countries

Country	Major Goals and Objectives	Target Period
EU	40% fatality and serious injury reduction 10% injury (except serious) reduction	2002 - 2010
UK	40% fatality and serious injury reduction	2010 / Ave.'94-'98
Denmark	50% fatality reduction	2000 - 2012
Netherlands	50% fatality reduction	2010 / Ave.'86-'98
Sweden	50% fatality reduction	1998 - 2007
Finland	65% fatality reduction	Up to 2005
Poland	20% fatality reduction	Up to 2001
Canada	30% fatality and serious injury reduction	Ave. 2008-2010 / Ave.'96-'01
Australia	40% fatality reduction	2000 - 2010
Japan	20% fatality reduction	2006 - 2010
Vietnam	**5%-7% fatality reduction**	**2007 - 2010**

Source: Plan on National Traffic Safety Order Improvement until 2010, MOT

4) Examination of Planning Issues on Engineering Sector

(i) Desirable Road Safety Environment Development

As socio-economic and motorization conditions reflect the existing road environment, road facilities should therefore be developed in accordance with socio-economic needs and respond to motorization conditions.

The rate of motorization in Vietnam is rapidly increasing and, accordingly, various problems have resulted in the road and traffic sector. This condition must be considered an urgent and priority concern in the National Plan to keep to a minimum the possible negative socio-economic effects of traffic accidents. The desirable road safety environment therefore has to be realized immediately to address this.

Meanwhile, the existing road development has prioritized the convenience of car transportation, expansion of road network, construction of facilities to serve mass and rapid transportation. However, safety of car transportation, pedestrians, bicycle riders, and quality of life in surrounding residential areas has not been fully considered. As a result, traffic accidents involving cars and motorcycles have been increasing; there is an increased risk on pedestrians due to inadequate pedestrian and crossing facilities; cases of bicycle running on roadway leading to accidents; and worsening living environment due to increase in volume of cars passing through residential areas to avoid traffic congestions.

In this section, traffic safety mitigation measures with a combination of hardware (e,g, road network and facility development, etc.) and software (e.g. traffic control, etc.) shall be proposed. The proposed measures shall be based on the basic strategy which is aimed at prioritizing safety of vulnerable road users and living spaces and in the establishment of a road network with appropriate control between pedestrians, bicycles and cars, as well as among different types and characteristics of cars.

- Road network development with appropriate road function sharing
  - Systematic development of arterial roads, sub-arterial roads and collector roads according to local characteristics
  - Reducing transit traffic volume by systematic road network development
- Enhancement of traffic control to respond to local characteristics and the road function
  - To minimize traffic noise in residential and commercial areas of black spots
  - To promote traffic control according to function and roles of each road
- Development of safe pedestrian space
  - To ensure safety of pedestrians and to promote separate traffic
  - To ensure safety on school zones of kindergartens and primary schools
- To separate car traffic from light vehicles and to develop facilities for the light vehicles
  - To ensure safety of bicycle riders and to promote separate traffic

- Capacity development on planning and implementation of traffic safety environment improvement
  - Capacity development on planning and implementation of local government
  - To ensure financial sources for traffic safety environment improvement in local government

(ii) Traffic Safety Corridor Development

A road is utilized for various purposes as an essential infrastructure for socioeconomic activities, both on and underground, for public and private facilities. For example, vehicle and pedestrian lanes, and secondary facilities are installed on the ground. On the other hand, the lifelines such as water supply and sewerage system, electricity, telecommunication services, use the underground.

Roads above ground should be constructed on appropriate lands according to ground level and purpose. In Vietnam, the road has to be developed in accordance with the government declaration or regulation on land expropriation based on the level of the road to be constructed. However, in actual situation, sufficient lands cannot be acquired in many sections. Although enough lands could be acquired, illegal structures such as buildings and parking areas disturb pedestrians and traffic on the road which affect traffic flow and safety. Aside from lack of control over road encroachers, this situation is attributed to the increasing land prices and difficulty of land acquisition due to lack of funds for road development. To address these problems require huge investments both on funds and time.

This subsection discusses on proposed measures which are deemed effective when implemented in close cooperation with the Government of Vietnam.

- Establishment of integrated database on status of land acquisition and illegal dwellers in cooperation with the road management authorities and the local governments.
- Establishment of improvement plan including estimation of compensation costs and relocation plan based on the above database.
- Preparation of measures for consensus building on compensation package for relocation of illegal dwellers
- Application of coercive measures to clear illegal structures and constructions on the traffic safety corridor.
- Investments on improvement, upgrading, construction of side roads in line with the current guidelines.
- Planning of access roads to economic zones, commercial and residential areas, locations to connect to national roads.
- Recommendations to amend, modify and supplement the legal provisions to ensure appropriateness of management requirements in the restoration of the traffic safety corridor.

(iii) Black Spot Improvement

Another important responsibility of the government is to ensure a safe living

environment for the people. Since the number of traffic accidents and its casualties has rapidly been increasing in Vietnam, the Government of Vietnam has started strengthening measures for traffic accident alleviation. Measure of the black spots improvement is designated as political traffic accident alleviation measure in Decision No. 13/2005/QB-BGTVT issued in 2005 by MOT and responsible agencies have implemented it in accordance with the instruction stipulated in Decision No. 13/2005/QB-BGTVT.

Black spot improvement is regarded to be low-cost as well as an effective countermeasure to alleviate road traffic accident. Road accident costs often strain the country's resources and past experiences show that one of the most cost-effective ways to use fund resources in the road or transport sector is to apply the fund to the identification of hazardous locations and the design of appropriate countermeasures.

Black spot improvement starts with the identification of hazardous locations through the careful analysis of accident data, studying sites, and designing appropriate counter measures. The effectiveness of this approach can be maximized by a planned program of countermeasures based on accident reduction targets of road authorities.

While black spot improvement has commenced in Vietnam, it is very much still under trial and error. The definition of "black spot" is not commonly shared yet among stakeholders resulting to misunderstanding of what a black spot is among concerned authorities. The black spot improvement system is not yet completed due to the following reasons: (i) traffic accident database of the traffic police is not shared; (ii) road inventory data is not being properly maintained and thus, identification of black spot becomes difficult and (iii) a guideline and a manual have not been developed yet to plan concrete mitigation measures. Based on this situation, an efficient and effective system should be established immediately.

It is proposed that the Government of Vietnam adopt the black spot improvement system which is usually conducted through the below process, and which, when implemented accordingly, ensures an effective system:

- Development of a comprehensive accident database
- Establishment of a local hazardous location improvement program
- Accident diagnosis to identify accident black spots
- Plan and design of countermeasures
- Implementation of the countermeasures
- Monitoring the effectiveness of countermeasures
- Need for legislation to designate executing agencies with clear delineation of respective obligations and responsibilities and to further promote understanding among stakeholders.
- Development of the black spot improvement system
  - Definition or criteria of the black spot and guideline to identify it
  - Upgrading of the black spot improvement system

- Development of cost-effective measures both in terms of time and resources and to ensure stable and sustainable financial resources

- Training and technical upgrading system for the black spot improvement engineers
- Utilization of the black spot improvement database, development of supporting tools and establishment of the executing agency
- Follow-up on the results of post monitoring of the black spot improvement

(iv) Improvement of Road Traffic Safety Audit System

Under the current road traffic safety policy in Vietnam, each of the relevant agency implement their respective traffic safety facility improvement projects in accordance with the guidelines issued by the Government, although there may be partial collaboration between the road management authority and traffic police, or between central government and local government.

The guideline and the manual for road management officer at the front line are not adequate to carry out concrete action to prevent traffic accident. Laws or regulations such as 22 TCN-273-01, TCXDVN 104-07 and TCVN 5729-07 are only concerned with the road structure. Therefore, risk management which includes other contributing factors such as natural condition of the connected sections and human factors depend on the road design engineer.

It is not uncommon for every country to be faced with situations of inadequate regulations regarding safety in the road structure design standard. To address this issue, the Road Safety Audit System (RSA) was introduced in the United Kingdom in the early 1990's. RSA is intended to assess the potential risks of roads and develop recommendations for possible countermeasures. This system has become very popular to other countries as an excellent new traffic safety system.

Table 4.6.5 Present Situation of RSA Introduction

Regions	Operated	Under Consideration
Europe	England, Denmark, Norway, Germany	France, Finland, Netherlands, Sweden, Greece, Portugal, Spain, Czech Republic
Oceania	New Zealand, Australia	
Asia	Singapore, Malaysia, Hong Kong, Thailand, Bangladesh, **Vietnam**	South Korea, Philippines
North America	US, Canada	
Africa	South Africa	

Source: JICA Study Team

MOT introduced RSA in its Decision No.23/2007/QD-BGTVT dated 7 May 2007 to reduce traffic accident casualties and fatalities. However, it is not yet effectively implemented because the guideline and manual are not yet fully developed, there is not enough number of qualified and experienced auditors, and the relevant system is yet to be established.

Meanwhile, a great number of road developments including expressway network are planned and shall require large budgetary allocations. Sound implementation of RSA from initial planning stage may ensure practical adjustment of the plan at the early stage. Compared with making the adjustment after the plan is fixed or the construction work is started, amendment of the plan at an earlier stage can be simpler and more cost-effective, which in turn, results to decrease in the total life-cycle cost of the road or the road network.

Considering the above situation, concrete implementation plan of RSA is suggested in the following section. It includes a review of the auditing process, method and manual of RSA, and the consideration of efficient operation to increase effectiveness of traffic accident prevention by RSA.

- Enhancement of legislations regarding obligation and responsibility of relevant authorities, and education on and expansion of RSA.
- Suggested contents of revised RSA system:
  - Established guideline of selection of target road and traffic development plans
  - Improvement of safety control method including revision of the audit checklist
  - Approval and licensing/accrediting system for auditing organizations
  - Estimated time and costs required, and sustainable financial sources
  - Utilization of the auditing results
  - Guaranteed legal support
- Establishment of licensing/accrediting system and human resource development mechanism for the auditors.
- Utilization of database supporting the auditing, development of the supporting tools and establishment of the responsible agency.
- Scientific traffic accident analysis, evaluation of the effectiveness of RSA implementation and cost-effectiveness, and feedback mechanism for the results to be appropriately utilized.
- Post auditing monitoring to follow up the results and establish the responsible agency.

(v) Safe Road Network Development

To ensure traffic safety on the entire road network, various road safety measures are necessary, particularly on road sections with high incidence of accident occurrence. Specific traffic safety measures, such as installation of traffic safety facilities, are necessary to ensure safety of vulnerable road users, provide a safe living environment and improve traffic safety in urban areas.

Roads in Vietnam consist of national highways, provincial road, district road, commune road, urban road, and other road with total road length of 251,787km as of 2006. Although share of national and provincial roads from total is only about 7% and 9%, respectively, the share of traffic accidents occurring on these roads is 44.1% on national roads and 15.4% on provincial roads (2006). These figures show that traffic accidents occur more frequently on arterial roads than any other roads

classified as lower categories. In addition, although rate of motorization is lower on provincial roads, number of traffic accident fatalities per 10,000 population is not necessarily lower compared with those from urban cities.

Further, based on statistics, 89% of the accidents occur on straight road section, which may be attributed to illegal overtaking and speeding. It is therefore necessary that, as a basic traffic safety measure, traffic safety facilities such as median and barrier be installed on black spot sections to segregate traffic flows. Also, accidents occurring at intersections (both signalized and non-controlled intersections) indicate that only 2% of these accidents occur at signalized intersections. Thus, installation of traffic signals also proved to be a very effective countermeasure in preventing traffic accidents at intersections.

Effective traffic safety measures should therefore be proposed for arterial roads, national highways and provincial roads. In addition, the expressways are also examined aimed at formulating varying and appropriate traffic safety measures on the roads. Moreover, measures for road maintenance system improvement are also examined to be able to formulate recommendations on how to maintain soundness of road facilities and its functions for traffic safety.

- Promotion of smooth and comfortable road traffic, and road accident prevention measures on general roads
  - Road safety facilities and traffic control facilities development
  - Development of road facilities and traffic control facilities to enhance smooth traffic
  - Development of facilities to increase driver's level of comfort
  - Development of safety facilities to prevent railway crossing accident
- Promotion of road accident prevention measures on expressways
  - Development of safety facilities to prevent accidents due to uncharacteristic traffic behaviors on expressways
  - Introduction of advanced traffic control system for expressways
- Development of efficient road maintenance system and satisfactory implementation
  - Improvement of road maintenance method
  - Facilitation of comprehensive road maintenance management system
  - Development of accident prevention measures during road construction

(vi) Urban Traffic Control and Management Development

The rapid increase in motorization in Vietnam has resulted in average motorcycle ownership ratio in the southeast region (which includes Ho Chi Minh City) into 0.4 vehicles per person. This has expectedly led to a deteriorating urban traffic situation such as traffic congestions and accidents due to very rapid incremental increase of vehicle traffic volume especially in the urban areas.

Traffic safety in urban traffic is closely related with the following urban traffic issues:

- infrastructural issues, e.g. bottleneck intersections improvement

- traffic control issues, e.g. traffic signal system improvement
- traffic regulations issues, e.g. parking management
- traffic demand control issues, facilitation of bus usage and staggered working hour

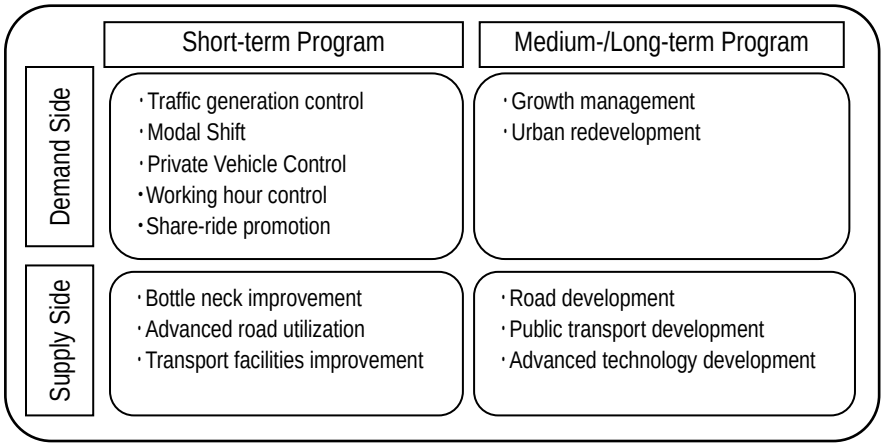
However, as illustrated from best practices in other developed countries, proper implementation of appropriate countermeasures for above urban traffic issues can greatly contribute to traffic safety improvement.

Major urban traffic problems in Vietnam are frequent accidents at un-signalized intersections, low public transport usage, lack of parking space and illegal parking due to inadequate parking regulations.

On the other hand, to address these issues, road authorities in each city in Vietnam have been implementing their respective countermeasures such as traffic safety facilities improvement, traffic management improvement such as parking development, traffic sign and road marking installation, and traffic signal improvement, among others. However, since chronic traffic congestions and frequent traffic accidents have become more and more an everyday situation in the urban areas, strengthening and immediate implementation of appropriate countermeasures in the urban areas is necessary.

Therefore, concrete traffic safety measures for urban traffic safety improvement are proposed based on urban traffic issues examined in this section.

Figure 4.6.2 Overall Countermeasures for Urban Traffic Environment



Source: JICA Study Team

- Promotion of upgrading and efficient traffic signal system development
  - Strengthening of applicability for diversified traffic and traffic accident prevention
- Development of parking space and strengthening of enforcement for illegal parking
  - Development of flexible parking regulations
  - Promotion of parking development plan
- Improvement of traffic demand control
  - Promotion of public transport usage

- Promotion of time-based traffic control measures (i.e. number coding, etc.) to mitigate congestion during peak hours

(vii) Design Standard and Guideline for Safety Facilities Development

Design standards and guidelines play important role on comprehensive traffic safety improvement by engineering component that is, planning, design, construction, maintenance, black spots treatments, etc.

Development of the road design standards and guidelines has been implemented to respond to increasing and varying design demand resulting from diversification and advancement and of road and road facilities development in Vietnam.

However, further improvement of the road design standards and guidelines is necessary taking into consideration the changing traffic characteristics such as rapidly increasing number of traffic accidents, increasing number and diversifying kinds of vehicles, changing traffic behaviors, and the huge road network development demand. And the most important factor that should be taken into consideration is the incorporation of “safety” perspective into the design standard and guidelines for planning and design of a safe road environment since the many components of the design process can influence the level of road safety.

This subsection will therefore make an assessment of the necessary improvement measures for the design standards and guidelines, as well as propose necessary research and development initiatives and human resource development supporting measures.

- Review of design standard considering traffic and local characteristics
- Review of design standard considering motorcycle traffic, bicycle and pedestrians
- Review of design standard considering variety of financial sources of urban and local governments and traffic safety level
- Promotion of design standard and its applicable application
- Unifying the design standards and preparation of instruction manuals
- Preparation of standard drawings
- Scientific support for design standard preparation
- Establishment of a research and development institution to support design standard preparation and institutional development.