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Ministry of Transport, Socialist Republic of Vietnam (MOT)
Transport Development and Strategy Institute (TDSI)

**THE STUDY ON THE
NATIONAL TRANSPORT DEVELOPMENT STRATEGY
IN THE SOCIALIST REPUBLIC OF VIETNAM
(VITRANSS)**

**Technical Report No. 1
TRANSPORT SURVEY
AND DATABASE**

July 2000

**ALMEC CORPORATION
PACIFIC CONSULTANTS INTERNATIONAL**

PREFACE

During the period of the Study on the National Transport Development Strategy in Vietnam (VITRANSS), various technical papers have been prepared by different Study Team members in various occasions to facilitate the discussions with counterpart team, concerning subsector agencies and to document major findings and outputs produced in the process of the Study. These papers have been organized into a series of technical reports (See Table A below) which intend to provide more detailed background information for descriptions and discussions made on key study components and issues. These technical reports are working documents of the Study which, however, will be useful for further reference, by the counterpart team and related subsector agencies.

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List of Technical Reports

No. 1	Transport Surveys and Database
No. 2	Main Commodities Analysis and Freight Transport
No. 3	Transport Cost and Pricing in Vietnam
No. 4	Transport Sector Institutions
No. 5	Road and Road Transport
No. 6	Railway
No. 7	Inland Waterway
No. 8	Port and Shipping
No. 9	Air Transport
No. 10	Rural Transport and Cross Border Transport
No. 11	Environment
No. 12	Transport Sector Funding

Technical Report No. 1 TRANSPORT SURVEYS AND DATABASE

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Glossary

GDP	Gross Domestic Products
GIS	Geographic Information System
JICA STRADA	JICA System for Transport Demand Analysis
MOT	Ministry of Transportation
NCPFP	National Committee for Population and Family Planning
NTSR	National Transportation Sector Review
OD	Origin-destination
TDSI	Transport Development and Strategy Institute
VITRANSS	Vietnam National Transport Strategy Study

1 INTRODUCTION

1.1 Survey Background

1) Availability of Existing Data

As shown in Table 1.1.1, there exists various transport data on road, railway and sea transport. However, supplemental traffic surveys and/or data collection is needed to update the transport database.

For river and air transport, the scarcity of existing data requires a considerable number of field surveys to obtain the actual situation of traffic and transport. It is, however, relatively easy to obtain the needed statistical data.

Table 1.1.1
 Major Existing Transport Data Sources

Mode	Agency	Existing Data Source	Remarks
Road	VRA/MOT	<ul style="list-style-type: none"> National Transport Sector Review, UNDP (42 stations, February & August 1991) Master Plan Study on Transport Development in North Vietnam, JICA (34 stations, August 1993) Transport Master Plan for the Central Region of Vietnam, French Protocol (28 stations, September 1997 and January 1998) 	<ul style="list-style-type: none"> Passenger and cargo OD data for limited areas and in different years Needs to conduct OD interview survey to update/supplement data
Railway	VNR/MOT	<ul style="list-style-type: none"> Feasibility Study on the Rehabilitation and Development of the Railway in Vietnam, JICA 	<ul style="list-style-type: none"> Passenger/cargo OD by type available Needs to collect updated data from VR
Inland Waterway	VIWA/MOT	<ul style="list-style-type: none"> National Transport Sector Review, UNDP Master Plan Study on Transport Development in North Vietnam, JICA Master Plan Study on Coastal Shipping Rehabilitation and Development Project in Vietnam, JICA 	<ul style="list-style-type: none"> Traffic data available only for 7 major river ports Needs to conduct OD interview survey
Sea	Vinamarine/MOT	<ul style="list-style-type: none"> Master Plan Study on Coastal Shipping Rehabilitation and Development Project in Vietnam, JICA Study on Port Development Plan in the Key Area of the Central Region in the Socialist Republic of Vietnam, JICA 	<ul style="list-style-type: none"> No coastal shipping passengers 1995 OD by cargo type available Needs to update based on present port traffic
Air	CAAV	<ul style="list-style-type: none"> Feasibility Study on New Development Plan of Hanoi International Airport in the Socialist Republic of Vietnam, JICA 	<ul style="list-style-type: none"> Data available only for Hanoi and national total Needs to collect updated data from CAAV
Pipeline	Petro Vietnam	<ul style="list-style-type: none"> Dung Quat Refinery Development Plan 	<ul style="list-style-type: none"> Needs to collect updated data from Petro Vietnam

2) Seasonal Fluctuation of Traffic Volume

In Vietnam, the modal share of inland water transport is large, particularly for cargo transport in the Red River and the Mekong River Delta areas. However, due to the large difference in precipitation between the rainy and dry seasons, the type and size of riverboats, as well as the type of cargo, may change significantly by period of the year.

Its influence on land transport may also be significant. Hence, it is imperative to conduct field surveys both during the dry and rainy seasons to understand the real traffic situation in Vietnam.

1.2 Survey Objectives

In the VITRANSS, the primary objectives to conduct transport surveys are 1) to prepare the current interprovincial passenger/cargo origin-destination (OD) matrices by mode and 2) to grasp the transport industry in Vietnam. For this purpose, the following various transport surveys were conducted.

- 1) Road Traffic Survey
- 2) River Traffic Survey
- 3) Supplemental Road/River Traffic Survey
- 4) Passenger/Driver Interview Survey at Transport Terminals
- 5) Transport Industry Survey

1.3 Basic Considerations in the Conduct of Transport Surveys

- 1) Classification of Transported Cargo

In general, transport mode varies depending on the cargo's durability, packing type, market price, etc. Although major cargoes transported in Vietnam at present are mostly agricultural, transport of mining and industrial cargoes will become more significant in the future.

From the standpoint of transport planning, it is necessary to identify the suitable transport mode for specific cargo item in relation to production, consumption and transport. In the initial stages of data compilation, therefore, cargo classification should be consistent with the mode of transport that is and will be used in Vietnam. Table 1.3.1 shows the tentative cargo classification to be used in the Study.

Table 1.3.1
 Classification of Transported Cargoes

Classification	Mode of Transport			
	Water	Road	Railway	Air
1. Agricultural	• General Cargo Vessel	• General Truck	• General Cargo Train	Small volume of high-value items only
2. Construction/ Mining Materials	• General Cargo Vessel • Bulk Vessel	• General Truck	• General Cargo Train • Exclusive Train	
3. Petroleum Products	• Oil Tanker	• Exclusive Truck	• Exclusive Train	
4. Cement	• Cement Tanker • General Cargo Vessel	• General Truck • Exclusive Truck	• General Cargo Train • Exclusive Train	
5. Bulk Cargo	• Bulk Vessel			
6. Other General Cargo	• General Cargo Vessel • Container Vessel	• General Truck • Container Trailer	• General Cargo Train • Container Train	

2) Zoning System

In gathering socio-economic data, the surveys will be using VITRANSS zoning system which is based on Vietnam's 61 provinces.

1.4 Outline of Transport Surveys

Transport surveys conducted in the VITRANSS are summarized in Table 1.4.1.

Table 1.4.1
 Outline of Transport Surveys

Survey	Objectives	Coverage	Method	Implementation
Road Traffic Survey	<ul style="list-style-type: none"> • Current traffic volume • Travel characteristics of passengers and cargoes 	<ul style="list-style-type: none"> • 39 on-road stations (20 in the north, 6 in the central and 13 in the south) 	<ul style="list-style-type: none"> • 3-day vehicle traffic count • 1 day (14 hr) OD interview at roadside 	<ul style="list-style-type: none"> • Field survey: Mar 25-27 (north), Apr 13-15 (south) • Data obtained May 15
River Traffic Survey	<ul style="list-style-type: none"> • Current vessel traffic volume • Travel characteristics of river vessels in Red River and Mekong River deltas 	<ul style="list-style-type: none"> • 40 stations at river sections (20 in Red River Delta and 20 in Mekong River Delta) 	<ul style="list-style-type: none"> • 2-day (24 or 14 hr/day) vessel traffic count • 1 day (14 hr) OD interview at 15 selected stn. (9 in the north and 6 in the south) 	<ul style="list-style-type: none"> • Field survey Apr 19-20 (north), Apr 26-27 (south) • Data obtained Jun 20
Supplemental Road/River Traffic Survey	<ul style="list-style-type: none"> • Current road/river traffic volume during rainy season 	<p><i>Road Traffic</i></p> <ul style="list-style-type: none"> • 18 selected on-road stations (8 in the north and 10 in the south) <p><i>River Traffic</i></p> <ul style="list-style-type: none"> • 6 river sections (3 in the north and 3 in the south) 	<p><i>Road Traffic</i></p> <ul style="list-style-type: none"> • 1 day (14 hr) traffic count • 3-day (24 hr) traffic count at 3 stn. in the south <p><i>River Traffic</i></p> <ul style="list-style-type: none"> • 1 day (14 hr) vessel traffic count 	<ul style="list-style-type: none"> • Field Survey Sep 8 for road, Sep 10 for river • Data obtained Sep 24
Passenger/Driver Interview Survey at Transport Terminals	<ul style="list-style-type: none"> • Characteristics of passengers and cargoes 	<ul style="list-style-type: none"> • Selected major transport terminals of rail, bus, air, and truck 	<ul style="list-style-type: none"> • Direct interview with passengers and truck drivers 	<ul style="list-style-type: none"> • Field survey May 10-21 • Data obtained Jun 11
Transport Industry Survey	<ul style="list-style-type: none"> • Characteristics of transport industry (operation, finance, management, labor force, etc.) 	<ul style="list-style-type: none"> • Bus operators • Truck operators • Coastal shipping operators • Inland waterway transport operators 	<ul style="list-style-type: none"> • Preparation of operators' list • Distribution of questionnaire to sampled operators 	<ul style="list-style-type: none"> • Questionnaires were sent in July 1999 • Answered questionnaire were returned from 11 bus, 10 truck, 7 shipping and 12 inland waterway operators as of Sept. 1999

2 DESCRIPTION OF TRANSPORT SURVEYS

2.1 Road Traffic Survey

This survey aims to determine the road vehicle trips crossing the zone boundary and to calibrate the OD matrices. In order to obtain traffic data, two kinds of field surveys – the traffic count and OD interview – were conducted on major roads connecting the zones in the study area.

2.1.1 Survey Coverage

Survey Stations: The locations of survey stations are shown in Figure 2.1.1 and Table 2.1.1. There are 39 stations, 20 in the northern region, six in the central region and 13 in the southern region. The locations were chosen since they cover the traffic crossing the boundaries of Vietnam's eight regions and major cities such as Ho Chi Minh, Hanoi, Haiphong, and Danang. The number of stations in the central region was minimized due to an earlier study, entitled "Transport Master Plan for the Central Region of Vietnam" (BECEOM, 1998), the results of which can be used for the VITRANSS.

Survey Duration: The surveys were conducted on weekdays, with the following duration:

- 1) Traffic Count: 3 days/station (72 hours)
- 2) OD interview: 1 day/station (14 hours from 6 am to 8 pm on the second day of the traffic count)

Vehicle Classification: Vehicles were grouped based on the existing 10 classifications used in other studies as follows:

- 1) Car
- 2) Minibus
- 3) Large Bus
- 4) Pick-up & 4-Wheel Truck
- 5) 2-Axle 6-Wheel Truck
- 6) 3-Axle Truck
- 7) Truck with 4 and more Axles
- 8) Motorcycle
- 9) Bicycle
- 10) Others

2.1.2 Survey Method

Traffic Count Survey: The hourly vehicular traffic volume by vehicle type and direction was counted using the tally method.

OD Interview Survey: The roadside OD interview was conducted for 14 hours on the second day of the traffic count survey. Drivers were interviewed with the assistance of policemen. The following information were obtained from them: 1) origin and destination of trip, 2) seating capacity and occupancy of cars and buses and 3) loading capacity/load factor/cargo type for trucks, etc.

Although the instruction was to interview as many vehicles as possible, the sample rate was still determined by the supervisor to ensure that the survey itself would not create a queue at the survey station.

2.1.3 Assignment and Required Number of Surveyors

The basic assignment of surveyors at stations is by a shift of eight hours as shown below.

Figure 2.1.2
Assignment of Surveyors

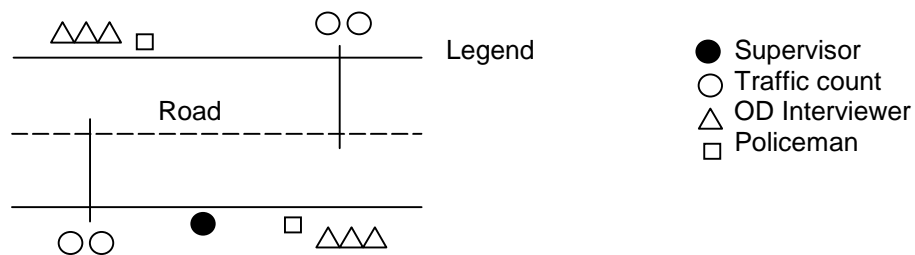


Figure 2.1.1
Locations of Road Traffic Survey Stations

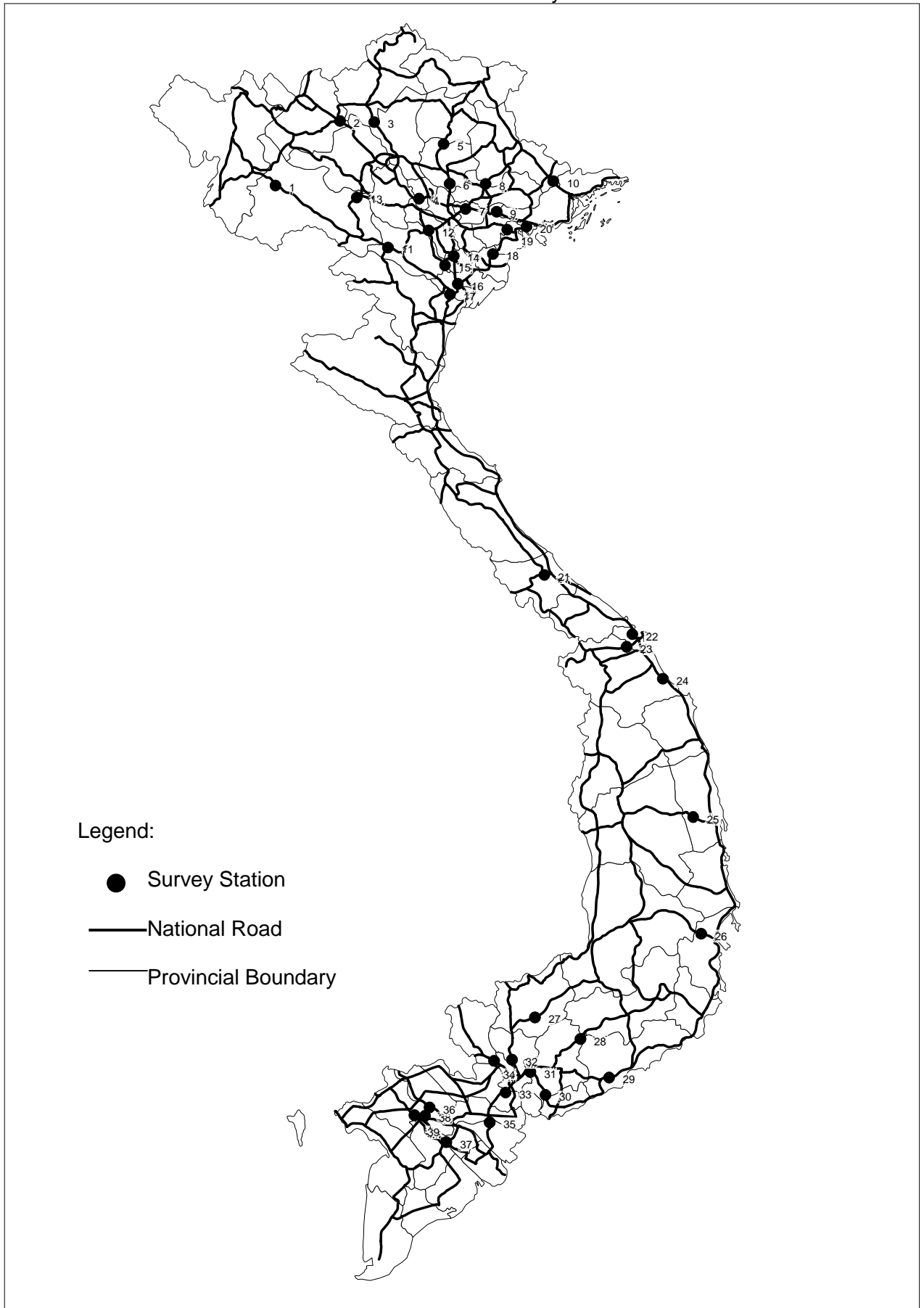


Table 2.1.1
 List of Road Traffic Survey Stations

No.	Road No.	Location	Province	Survey Date
1	6	North of Thuan Chau	Son La	Count: Mar 25-27 Interview: Mar 26
2	70	South Bao Yen	Lao Cai	
3	2	North of Ham Yen (Tan Yen)	Tuyen Quang	
4	2	South of Viet Tri Bridge	Vinh Phuc	
5	3	Dong Phu (South of Cho Moi)	Thai Nguyen	
6	3	South of Pho Yen (Ba Hang)	Thai Nguyen	
7	1	South of Dap Cau	Bac Ninh	
8	1	North of Kep	Bac Giang	
9	18	East of Sao Do (Chi Linh)	Hai Duong	
10	4B	East of Dinh Lap	Lang Son	
11	6	North East of Tong Dau	Hoa Binh	
12	6	East of Xuan Mai	Ha Tay	
13	37	Thuong Bang La	Yen Bai	
14	1	South of Dong Van	Ha Nam	
15	21	North of Lac Thuy (Chi Ne)	Hoa Binh	
16	1	North of Ninh Binh town	Ninh Binh	
17	1	North of Bim Son	Thanh Hoa	
18	10	South of Nghin bridge	Thai Binh	
19	5	East of Du Nghia	Hai Phong	
20	10	West of Yen Hung (Quang Yen)	Quang Ninh	
21	9	West of Dong Ha	Quang Tri	Count: Apr 13-15 Interview: Apr 14
22	1	Lang Co	Thua Thien Hue	
23	14B	East of Dai Loc (Ai Nghia)	Quang Nam	
24	1	North of Tam Ky	Quang Nam	
25	19	East of An Khe pass (Phu Phong)	Binh Dinh	
26	26	East of Phuong Hoang pass	Khanh Hoa	
27	14	North of Dong Xoai	Binh Phuoc	
28	20	South of Ma Da Gui	Dong Nai	
29	1	South of Ham Thuan Nam	Binh Thuan	
30	51	North of Phu My (Tan Thanh)	Ba Ria Vung Tau	
31	1	North of Dong Nai bridge	Dong Nai	
32	13	South of Thu Dau Mot	Binh Duong	
33	1	Noth of Tan An	Long An	
34	22	East of Trang Bang	Tay Ninh	
35	60	South of Rach Mieu ferry	Ben Tre	
36	30	East of Cao Lanh	Dong Thap	
37	1	North of Can Tho Ferry	Vinh Long	
38	80	South of Thach Hung(Lap Vo)	Dong Thap	
39	91	West of Long Xuyen	An Giang	

2.2 River Traffic Survey

This survey aimed to determine the trips of river vessels crossing the zone boundary and to calibrate the OD matrices of inland waterway. In order to obtain river traffic data, traffic count and OD interview were conducted at river sections in the deltas.

2.2.1 Survey Coverage

Survey Stations: Forty (40) stations (20 in Red River Delta and 20 in Mekong River Delta) were selected for traffic count survey, 15 of which (9 in Red River Delta and 6 in Mekong River Delta) were selected for OD interview survey as shown in Figure 2.2.1 and Table 2.2.1. Most stations are located at road bridges or ferry terminals where surveyors can easily view the river.

Survey Duration: The surveys were conducted on weekdays, with the following duration:

- 1) Traffic count: 2 days/station (1 day: 24 or 14 hr)
- 2) OD interview: 1day/station (14 hr)

Vessel Classification: River vessels were classified into the following seven types:

- 1) Sea-going Vessel
- 2) Ship and Self-propelled Barge
- 3) Oil Tanker
- 4) Tow Barge
- 5) Push Barge
- 6) Passenger Ship
- 7) Non-motorized Boat

2.2.2 Survey Method

Traffic Count Survey: The hourly traffic volume by vessel type and direction is counted using the tally method.

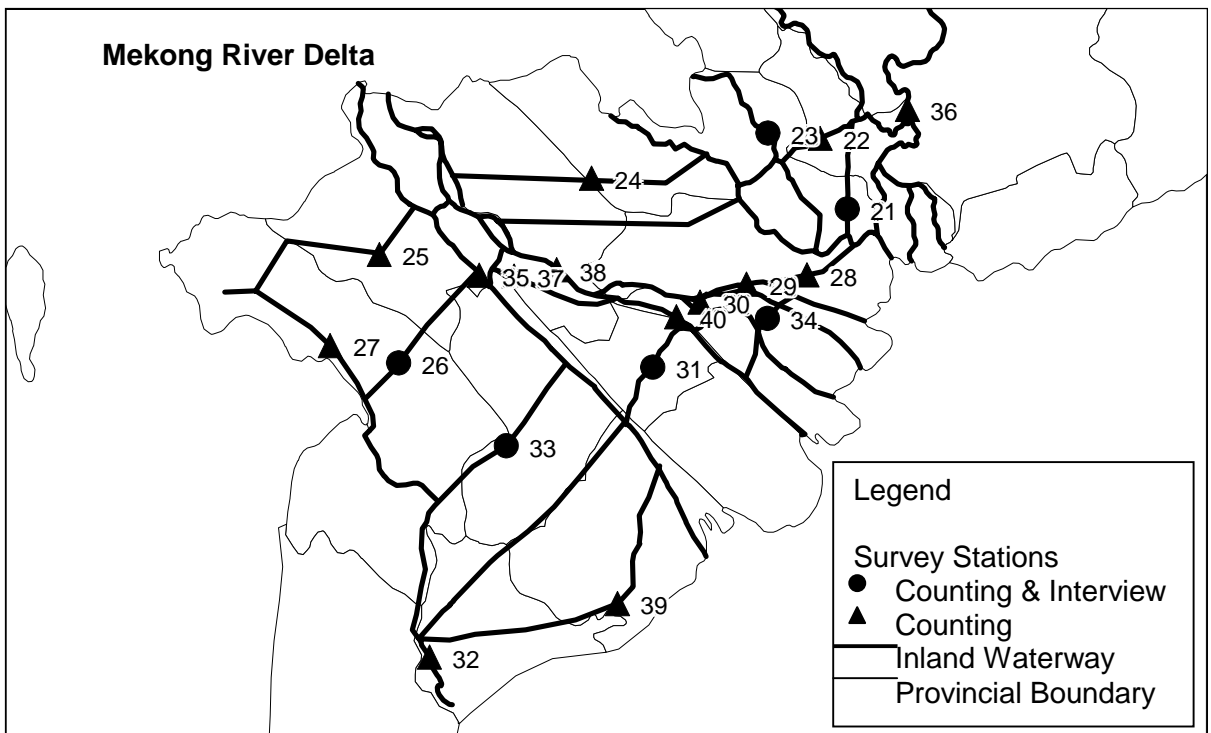
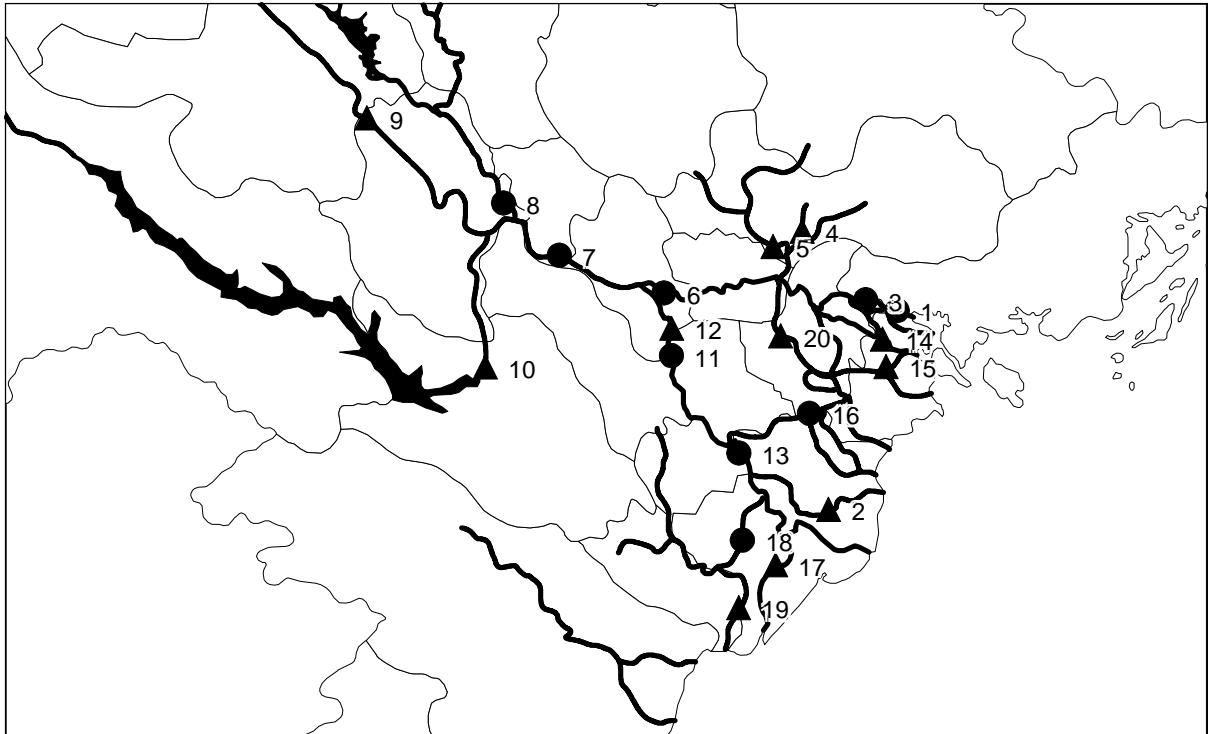
OD Interview Survey: The vessel OD interview was conducted by random sampling for 14 hours on the second day of the traffic count survey. The captains of sampled vessels were interviewed on board with the assistance of river police using high-speed boat. The following information were obtained from them using the survey form: 1) trip origin and destination, 2) seating capacity/occupancy for passenger ship, 3) loading capacity/load factor/cargo type for cargo vessel, etc.

Interviewers were instructed to interview as many river vessels as possible, without creating traffic congestion at the survey station.

Table 2.2.1
 List of River Traffic Survey Stations

No.	Station Name	River/Canal Name	Traffic Count		OD Interview	
			Hr	Date	Hr	Date
A. Red River Delta						
1	Yen Hung	Chanh	24	Apr19-20	14	Apr 20
2	Thai Binh	Tra Ly	14		-	
3	Ben Trieu	Kinh Thay	24		14	
4	Bac Ginag	Thuong	14		-	
5	Yen Tap	Cau	14		-	
6	Duong Ha	Duong	24		14	
7	Son Tay	Hong	24		14	
8	Viet Tri	Lo	24		14	
9	Co Tiet	Hong	14		-	
10	Khanh Chuc	Da	14		-	
11	Khuyen Luong	Hong	24		14	
12	Hanoi	Hong	24		-	
13	Phu Nha	Hong	24		14	
14	Ben Kien	Cam	24		-	
15	Noi Thanh	Ha Ly-Lach Tray	24		-	
16	Ninh Giang	Luoc	24		14	
17	Lac Quan	Ninh Co	24		-	
18	Do Quan	Nam Dinh	24		14	
19	Kim Dai	Cua Day	24		-	
20	Cong Cau	Thai Binh	14		-	
B. Mekong River Delta						
21	Phuoc Dong	Can Giuoc-Nuoc Ma	24	Apr26-27	14	Apr 27
22	Binh Duc	Vam Co Dong	14		-	
23	Ben Luc	Cho Dem-Ben Luc	24		14	
24	An Long	Thap Muoi so 1	14		-	
25	Chau Phu	Ba The	14		-	
26	Tan Hiep	Rach Soi	24		14	
27	Hon Dat	Rach Gia-Ha Tien	24		-	
28	Cho Gao	Cho Gao	24		-	
29	Song Tien	Tien	14		-	
30	Cho Lach	Cho Lach	24		-	
31	Tam Binh	Mang Thit	24		14	
32	Ca Mau	Ganh Hao	24		-	
33	Vin Thanh	Xa No	24		14	
34	Ben Tre	Ben Tre	14		14	
35	Long Xuyen	Hau	14		-	
36	Bien Hoa	Dong Nai	24		-	
37	Lap Vo	Sa Dec-Lap Vo	24		-	
38	Cao Lanh	Tien	14		-	
39	Bac Lieu	Ca Mau-Bac Lieu	24		-	
40	Vinh Thai	Co Chien	14		-	

Figure 2.2.1
 Location for River Traffic Survey



2.3 Supplemental Road and River Traffic Surveys

2.3.1 Objective

Supplemental road and river traffic surveys had to be conducted during the rainy season to capture the seasonal fluctuation of traffic flows between the two seasons. Since it was assumed that the pattern of origin and destination of passengers and cargoes by mode would not change with the season, only traffic count survey was conducted for one day at selected survey stations.

2.3.2 Survey Coverage

Survey Stations: The stations were chosen from among those selected for the survey done during the dry season. These were 18 for road and six for river as shown in Table 2.3.1 and 2.3.2. Figure 2.3.1 and 2.3.2 show their locations.

Survey Duration: The survey was conducted on weekdays with this duration:

- 1) Road Traffic Survey: 1 day/station (14 hr.)
(3 days/station, 24 hr: Station No.27, No.29 and No.37)
- 2) River Traffic Survey: 1 day/station (14 hr.)

Vehicle Classification: The vehicle classifications used in the survey done during the dry season were applied.

Table 2.3.1
 Locations of Road Traffic Survey Stations

No.	Road No	Location	Province	Survey Date
4	2	South of Viet Tri Bridge	Vinh Phuc	Sep 8 (14 hrs)
5	3	Dong Phu (South of Cho Moi)	Thai Nguyen	Sep 8 (14 hrs)
6	3	South of Pho Yen (Ba Hang)	Thai Nguyen	Sep 8 (14 hrs)
7	1	South of Dap Cau	Bac Ninh	Sep 8 (14 hrs)
11	6	North East of Tong Dau	Hoa Binh	Sep 8 (14 hrs)
14	1	South of Dong Van	Ha Nam	Sep 8 (14 hrs)
17	1	North of Bim Son	Thanh Hoa	Sep 8 (14 hrs)
19	5	East of Du Nghia	Hai Phong	Sep 8 (14 hrs)
27	14	North of Dong Xoai	Binh Phuoc	Sep 8-10 (24 hrs)
28	20	South of Ma Da Gui	Dong Nai	Sep 8 (14 hrs)
29	1	South of Ham Thuan Nam	Binh Thuan	Sep 8-10 (24 hrs)
30	51	North of Phu My (Tan Thanh)	Ba Ria Vung Tau	Sep 8 (14 hrs)
31	1	North of Dong Nai bridge	Dong Nai	Sep 8 (14 hrs)
32	13	South of Thu Dau Mot	Binh Duong	Sep 8 (14 hrs)
33	1	Noth of Tan An	Long An	Sep 8 (14 hrs)
34	22	East of Trang Bang	Tay Ninh	Sep 8 (14 hrs)
37	1	North of Can Tho Ferry	Vinh Long	Sep 8-10 (24 hrs)
39	91	West of Long Xuyen	An Giang	Sep 8 (14 hrs)

Table 2.3.2
 Locations of River Traffic Survey Stations

No.	Station Name	River/Canal Name	Survey Date
A. Red River Delta			
3	Ben Trieu	Kinh Thay	Sep 10 (14 hrs)
6	Duong Ha	Duong	Sep 10 (14 hrs)
13	Phu Nha	Hong	Sep 10 (14 hrs)
B. Mekong River Delta			
21	Phuoc Dong	Can Giuoc-Nuoc Ma	Sep 10 (14 hrs)
28	Cho Gao	Cho Gao	Sep 10 (14 hrs)
37	Lap Vo	Sa Dec-Lap Vo	Sep 10 (14 hrs)

2.3.3 Survey Method

The survey method for both road and river traffic surveys was the same as those implemented for surveys done during the dry season.

2.4 Passenger and Driver Interview Survey

This was conducted at major mode interchanges in Vietnam, i.e. airports, railway stations, bus terminals and truck terminals (ports and railway stations) to gather information and perception of public transport passengers and truck drivers on trips to terminals. The data would be used in projecting demand forecast, particularly in determining the modal split, and in planning terminal facilities.

2.4.1 Survey Coverage

Survey Stations: Major transport terminals consisting of 10 railway stations, 10 bus terminals, seven airports, and truck terminals (five railway stations and five ports) were selected as shown in Table 2.4.1.

Number of Samples: The required number was at least 200 from each terminal.

2.4.2 Survey Method

Direct interview was done in major terminals such as airport, railway, bus and truck (port and railway station), while air passenger interview was conducted at the departure terminal. The forms were modified to fit with the current transport situation in Vietnam upon consultation with Vietnamese counterparts. The following information were obtained from this survey:

Air/Railway/Bus Passengers

- 1) Personal information
- 2) OD
- 3) Trip purpose
- 4) Reason for using the mode
- 5) Opinion on terminal facility
- 6) Willingness-to-pay, etc.

Truck Drivers

- 1) Vehicle information
- 2) Type of cargo
- 3) Volume of cargo
- 4) OD
- 5) Opinion on terminal facility
- 6) Willingness-to-pay, etc.

Table 2.4.1
 List of Passenger/Driver Interview Survey Stations

Terminal	Station Name	Survey Date	No. of Samples	Terminal	Station Name	Survey Date	No. of Samples
Railway Station	Long Bien (Hanoi)	May 13	200	Airport	Noi Bai Int'l (Hanoi)	May 18	202
	Hanoi	May 13	201		Noi Bai Domestic (Hanoi)	May 18	200
	Haiphong	May 13	207		Tan Son Nhat Int'l (HCM)	May 27	218
	Viet Tri (Phu Tho)	May 13	203		Tan Son Nhat Domestic (HCM)	May 27	201
	Kep (Bac Giang)	May 15	209		Da Nang	May 20	201
	Vinh (Nghe An)	May 14	202		Nha Trang	May 26	195
	Hue	May 15	203		Hue	May 17	165
	Da Nang	May 19	196				
	Nha Trang	May 26	209				
	Hoa Hung (HCM)	May 27	201				
	TOTAL		2,031		TOTAL		1,382
Bus Terminal	Gia Lam (Ha Noi)	May 14	200	Truck Terminal	Hai Phong Port	May 15	201
	Giap Bat (Ha Noi)	May 15	208		Sai Gon Port	May 25	205
	Hai Phong	May 15	213		Cua Lo Port (Nghe An)	May 15	170
	East Terminal (HCM)	May 26	202		Da Nang Port	May 15	103
	West Terminal (HCM)	May 24	199		Quy Nhon Port	May 24	255
	Vinh (Nghe An)	May 14	200		Viet Tri Sta. (Phu Tho)	May 15	73
	Hue	May 16	200		Yen Vien Sta. (Hanoi)	May 15	78
	Da Nang	May 23	199		Van Dien Sta. (Hanoi)	May 14	109
	Buon Ma Thuot (Dac Lac)	May 26	202		Da Nang Sta.	May 21	114
	Can Tho	May 28	203		Song Than Sta. (HCM)	May 25	210
	TOTAL		2,026		TOTAL		1,518

2.5 Transport Industry Survey

2.5.1 Objective

To strengthen the national transport system in Vietnam, a government policy supporting transport operators is of utmost importance. It is also necessary to understand the operational and financial condition of the transport industry. However, information and statistics are limited. The survey, therefore, was undertaken with the following objectives:

- 1) To further look into the management and financial conditions of transport operators: organization, owned/operating vehicles/vessels, operational indicators, number of employees, financial performance, etc.

- 2) To analyze the labor force of transport operators such as demand/supply, qualification, training, wage, etc.

2.5.2 Survey Coverage

In Vietnam, the transport industry is composed of air carriers, rail operators, shipping operators (sea/inland waterway), truck operators, and bus operators. Railway and air transport are operated by state-owned companies. Hence, there is easy access to information on their operations and finances. However, the number of shipping companies, including inland water transport, and land transport operators are many and their organizational, operational and financial conditions are difficult to grasp.

For this survey, the number of interviewed operator-respondents was about 50 from each mode. A questionnaire survey was conducted among shipping and truck/bus operators.

2.5.3 Survey Items

The following items were obtained from shipping companies and truck/bus operators.

- 1) Composition of stockholders (central government, local government, private sector, foreign etc.)
- 2) Condition and number of owned vehicles/vessels by type
- 3) Service type and fare system
- 4) Area coverage
- 5) Number of employees, site workers and license holders
- 6) Financial condition
- 7) Experiences on traffic/marine accidents and indemnification
- 8) Expectation of government's policy on transport industry

2.5.4 Survey Method

The survey was conducted through the following steps:

- 1) Preparing questionnaire forms in collaboration with Vietnamese counterpart.
- 2) Preparing long lists of operators of sea, inland water transport, truck and bus in cooperation with Vietnamese counterparts. Then, sample operators are selected.
- 3) Sending questionnaire forms to selected operators by mail with a request letter from TDSI-MOT. After the deadline passed the operators were called to follow up the submission of the completed questionnaire.
- 4) Encoding the data from the returned questionnaire into a computer database file.

3 SURVEY RESULTS AND ANALYSIS

3.1 Road Traffic Condition

3.1.1 Traffic Volume by Station

The road traffic survey was carried out in 39 stations, covering the northern, central and southern regions of Vietnam. It required a three-day traffic count and one day (14-hour) OD interview survey. Table 3.1.1 shows the aggregate traffic volume by vehicle type and station (see Appendix 3-A for details). The average traffic composition by vehicle type is 19% cars, 30% buses and 51% trucks. Stations on National Highway No. 1 and on boundary stations of HCMC have the highest traffic volume, at more than 10,000 daily. The next highest was recorded on boundary stations of Hanoi.

Table 3.1.1
 Road Traffic Volume by Station

(24 hours, both directions)

Stn. No.	Road No.	Location	Province	Car	Bus	Truck	Total	Motor-cycle	Bicycle
1	6	North of Thuan Chau	Son La	52	54	89	194	641	326
2	70	South Bao Yen	Lao Cai	77	69	130	276	772	713
3	2	North of Ham Yen (Tan Yen)	Tuyen Quang	72	178	237	487	2,142	3,050
4	2	South of Viet Tri Bridge	Vinh Phuc	812	862	1,985	3,660	3,405	2,731
5	3	Dong Phu (South of Cho Moi)	Thai Nguyen	146	172	245	563	860	1,363
6	3	South of Pho Yen (Ba Hang)	Thai Nguyen	488	559	1,137	2,184	2,762	2,628
7	1	South of Dap Cau	Bac Ninh	1,224	1,255	1,827	4,306	4,843	2,820
8	1	North of Kep	Bac Giang	504	669	1,020	2,193	1,888	2,878
9	18	East of Sao Do (Chi Linh)	Hai Duong	517	735	1,398	2,650	3,126	3,915
10	4B	East of Dinh Lap	Lang Son	10	15	41	66	673	1,185
11	6	North East of Tong Dau	Hoa Binh	87	164	335	587	324	99
12	6	East of Xuan Mai	Ha Tay	487	471	994	1,951	2,993	3,064
13	37	Thuong Bang La	Yen Bai	11	6	32	50	464	486
14	1	South of Dong Van	Ha Nam	1,340	1,773	3,245	6,357	4,343	2,578
15	21	North of Lac Thuy (Chi Ne)	Hoa Binh	34	12	120	166	1,339	3,408
16	1	North of Ninh Binh town	Ninh Binh	904	1,010	2,177	4,091	3,225	2,994
17	1	North of Bim Son	Thanh Hoa	851	993	2,581	4,425	3,552	4,463
18	10	South of Nghin bridge	Thai Binh	95	160	291	545	1,963	1,792
19	5	East of Du Nghia	Hai Phong	1,099	854	2,087	4,041	3,895	2,743
20	10	West of Yen Hung (Quang Yen)	Quang Ninh	141	185	143	469	912	511
21	9	West of Dong Ha	Quang Tri	114	262	427	804	1,090	674
22	1	Lang Co	Thua Thien Hue	238	562	1,439	2,239	989	953
23	14B	East of Dai Loc (Ai Nghia)	Quang Nam	15	98	149	263	2,080	3,369
24	1	North of Tam Ky	Quang Nam	405	791	1,926	3,121	3,195	1,717
25	19	East of An Khe pass (Phu Phong)	Binh Dinh	167	537	938	1,642	746	339
26	26	East of Phuong Hoang pass	Khanh Hoa	59	139	745	943	1,458	1,640
27	14	North of Dong Xoai	Binh Phuoc	148	285	736	1,170	2,774	1,203
28	20	South of Ma Da Gui	Dong Nai	149	802	1,181	2,132	2,333	1,971
29	1	South of Ham Thuan Nam	Binh Thuan	310	987	1,972	3,270	2,020	995
30	51	North of Phu My (Tan Thanh)	Ba Ria Vung Tau	957	1,373	1,935	4,265	5,473	2,228
31	1	North of Dong Nai bridge	Dong Nai	3,906	6,341	10,937	21,183	31,131	2,819
32	13	South of Thu Dau Mot	Binh Duong	1,507	2,126	3,187	6,820	15,467	2,523
33	1	Noth of Tan An	Long An	1,976	4,062	5,645	11,683	14,005	1,902
34	22	East of Trang Bang	Tay Ninh	758	857	1,669	3,284	6,336	2,317
35	60	South of Rach Mieu ferry	Ben Tre	187	346	399	932	11,806	9,995
36	30	East of Cao Lanh	Dong Thap	276	628	482	1,387	8,062	3,249
37	1	North of Can Tho Ferry	Vinh Long	440	1123	1,069	2,632	2,945	1,438
38	80	South of Thach Hung(Lap Vo)	Dong Thap	238	645	1,244	2,128	4,925	6,253
39	91	West of Long Xuyen	An Giang	354	1,177	734	2,265	14,763	11,906

Source: VITRANSS Road Traffic Survey, Mar.-Apr., 1999

3.1.2 Passenger Transport

Some findings on passenger transport rate obtained from the roadside interview survey are roughly summarized below. The sampling rate varies by station, ranging from 6% to 100%.

Vehicle Composition: Traffic composition by vehicle type captured from roadside interview survey is classified and shown in Table 3.1.2. The composition of car is highest in the north. By contrast, minibus is most significant in the south and large bus in the central region.

Table 3.1.2
 Traffic Composition by Vehicle Type, 1999

	Car	Minibus	Large Bus
North	35.9	27.3	36.8
Central	27.1	28.4	49.9
South	24.8	43.1	32.1
TOTAL	28.7	34.9	36.4

Source: VITRANSS Roadside Interview Survey, Mar.-Apr., 1999

Average Occupancy: The average passenger load by vehicle type is shown in Table 3.1.3. The car has an average passenger load of 3.5 and this is almost the same in all regions. The average passenger load of the minibus is highest in the central region and that of the large bus in the south.

Table 3.1.3
 Average Passenger Load, 1999

	Car	Bus		
		Minibus	Large Bus	Subtotal
North	3.5	9.1	27.7	19.8
Central	3.6	10.2	25.1	19.7
South	3.6	9.5	30.6	18.5
TOTAL	3.5	9.4	28.4	19.1

Source: VITRANSS Roadside Interview Survey, Mar.-Apr., 1999.

Vehicle Ownership: Vehicle ownership varies by region. In northern and central regions, most cars are state-owned, accounting for about 63%. In contrast, most cars are private-owned in the south, accounting for about 70%. The percentage of private-owned minibus and large bus is more remarkable in the south, amounting to 78% and 65%, respectively. In northern and central regions, buses are largely owned and operated by the state.

Table 3.1.4
 Vehicle Ownership, 1999

	Car			Mini Bus			Large Bus		
	State	JV	Private	State	JV	Private	State	JV	Private
North	63.0	3.5	33.4	28.7	3.3	68.0	49.9	5.0	45.1
Central	62.8	4.4	32.8	23.2	7.5	69.2	32.8	10.0	57.1
South	24.0	6.1	69.9	10.0	4.6	85.4	9.0	4.5	86.5
Total	47.2	4.6	48.1	17.2	4.5	78.2	29.7	5.8	64.5

Note: JV – joint venture
 Source: VITRANSS Roadside Interview Survey, March- April 1999

3.1.3 Freight Transport

Some findings on freight transport obtained from the roadside interview survey are summarized below.

Vehicle Composition: Based on the roadside interview survey, the share of pickup usage is substantially high in the south, accounting for 34% of total trucks. On the other hand, trucks with three and four or more axles are marginally used, at around 2% only. The composition of vehicle usage is similar between northern and central regions, with a high preference for 2-axle trucks (see Table 3.1.5).

Table 3.1.5
 Vehicle Type, 1999

	Pick-up	2-Axle Truck	3-Axle Truck	4 or more Axle Truck
North	19.6	65.5	10.7	4.2
Central	7.6	68.9	16.7	6.7
South	33.7	54.3	1.5	1.5
TOTAL	23.2	61.6	8.1	3.6

Source: VITRANSS Roadside Interview Survey, Mar. – Apr., 1999.

Vehicle Ownership: Vehicle ownership by truck type is shown in Table 3.1.6-3.1.10. Compared to other regions, the south has a substantial share of private-owned vehicle, amounting to about 88% of all trucks. In addition, it was found that as vehicle capacity becomes larger, the share of state-owned vehicle becomes higher. For instance, the share of state-owned vehicle increases from 11% of pickup to 40% of 4-axle truck.

Table 3.1.6
 Vehicle Ownership of Pickup, 1999

	Private	State	Others	Total
North	861 (81.8)	162 (15.4)	29 (2.8)	1,052 (100)
Central	137 (80.6)	26 (15.3)	7 (4.1)	170 (100)
South	1,541 (89.3)	133 (7.7)	52 (3.0)	1,726 (100)
TOTAL	2,539 (86.1)	321 (10.9)	88 (3.0)	2,946 (100)

Note: Figures in parentheses indicate % share.
 Source: VITRANSS Roadside Interview Survey, March-April, 1999.

Table 3.1.7
 Vehicle Ownership of 2-Axle Truck, 1999

	Private	State	Others	Total
North	2,409 (68.5)	1,032 (29.3)	76 (2.2)	3,517 (100)
Central	1,073 (69.6)	386 (25.0)	82 (5.3)	1,541 (100)
South	2,492 (89.6)	211 (7.6)	77 (2.8)	2,960 (100)
TOTAL	5,974 (76.2)	1,629 (20.8)	235 (3.0)	7,838 (100)

Note: Figures in parentheses indicate % share.
 Source: VITRANSS Roadside Interview Survey, March-April 1999.

Table 3.1.8
 Vehicle Ownership of 3-Axle Truck, 1999

	Private	State	Others	Total
North	275 (47.7)	282 (49.0)	19 (3.3)	576 (100)
Central	206 (54.9)	147 (39.2)	22 (5.9)	375 (100)
South	56 (70.9)	18 (22.8)	5 (6.3)	79 (100)
TOTAL	537 (52.1)	447 (43.4)	46 (4.5)	1,030 (100)

Note: Figures in parentheses indicate % share.
 Source: VITRANSS Roadside Interview Survey, March-April 1999.

Table 3.1.9
 Vehicle Ownership of 4-Axle Truck, 1999

	Private	State	Others	Total
North	114 (50.0)	96 (42.1)	18 (7.9)	228 (100)
Central	74 (49.7)	62 (41.6)	13 (8.7)	149 (100)
South	56 (70.9)	18 (22.8)	5 (6.3)	79 (100)
TOTAL	244 (53.5)	176 (38.6)	36 (7.9)	456 (100)

Note: Figures in parentheses indicate % share.
 Source: VITRANSS Roadside Interview Survey, March – April 1999.

Table 3.1.10
 Vehicle Ownership of All Trucks, 1999

	Private	State	Others	Total
North	3,659 (68.1)	1,572 (29.3)	142 (2.6)	5,373 (100)
Central	1,490 (66.7)	621 (27.8)	124 (5.5)	2,235 (100)
South	4,531 (88.4)	438 (8.5)	154 (3.0)	5,123 (100)
TOTAL	9,680 (76.0)	2,631 (20.7)	420 (3.3)	12,731 (100)

Note: Figures in parentheses indicate % share.
 Source: VITRANSS Roadside Interview Survey, March-April 1999.

Average Load: The average load, varying by vehicle type from 1.9 to 16.4, is 5.7 tons for all trucks (see Table 3.1.11), excluding empty ones. If these are included, the average load becomes 4.0 tons/truck.

Table 3.1.11
 Average Load of Trucks, 1999

	Pickup	2-Axle Truck	3-Axle Truck	4 or more Axle Truck	Total (ton/truck)
North	1.5	5.2	10.4	15.0	5.5
Central	1.7	5.8	11.0	15.9	7.0
South	2.1	5.9	10.7	21.1	5.3
TOTAL	1.9	5.6	10.7	16.4	5.7

Source: VITRANSS Roadside Interview Survey, March-April 1999.

Packing by Commodity: Generally, packing type varies by commodity. For instance, items of steel, construction materials and coal are packed in bulk, while paddy rice, other food crops, cement, fertilizer, and industrial crops are in bags or parcels (see Table 3.1.12). The share of packing type averages 39% for bulk, 45% for bag/parcel, four percent for container, and 13% for other types.

Table 3.1.12
 Packing Type by Commodity, 1999

	Bulk (%)	Bag/Parcel (%)	Container (%)	Others (%)
Paddy/Other Food Crops	27.6	68.2	0.4	3.8
Sugarcane, Sugar	34.8	40.9	1.6	22.7
Wood/Forest Products	57.3	6.5	1.5	34.7
Steel	74.6	10.8	0.0	14.6
Construction Materials	84.4	9.0	0.1	6.5
Cement	12.0	84.9	1.5	1.6
Fertilizer	9.2	86.7	0.4	3.6
Coal	95.7	3.5	0.0	0.7
Petroleum Products	5.0	14.5	27.8	52.7
Industrial Crops	13.4	85.8	0.5	0.2
Manufacturing Goods	28.0	49.2	8.3	14.5
Fishery Products	19.6	61.2	7.3	11.9
Animal Meat and Others	29.8	49.6	1.0	19.6
TOTAL	38.8	44.6	3.8	12.7

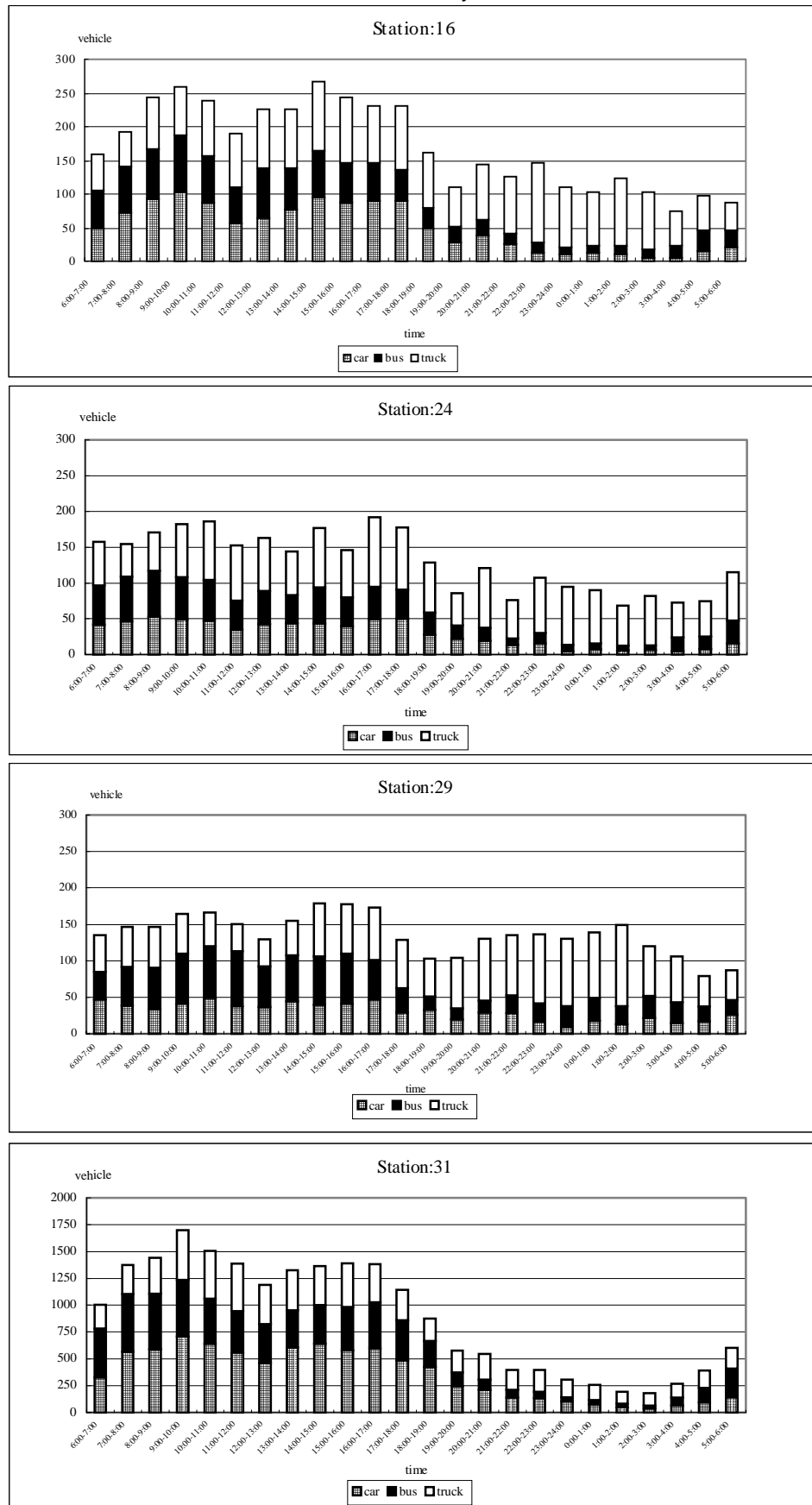
Source: VITRANSS Roadside Interview Survey, March-April 1999.

3.1.4 Traffic Distribution by Time

As mentioned earlier, roadside traffic count was conducted in 39 survey stations, four of which were chosen to look into traffic distribution by time period. They are composed of station number 16 (north), 24 (central) and 29 and 31 (south), all located along National Highway No.1. In particular, Station No. 31 is very close to HCMC while the rest are a little far from any significant city. Traffic distribution by time period is shown in Figure 3.1.1 and characterized as follows.

- A number of trucks prefer to make interprovincial trips at night, resulting in another peak period at night, besides the two peak periods in the morning and evening. Thus, peak rate is comparatively low. This phenomenon is more obvious at stations far from the main cities.
- However, Station No. 31, which was very close to HCMC, had a wide gap of traffic between day and night and different distribution pattern from other stations, because roads around the main city are largely used for passenger movement.

Figure 3.1.1
 Traffic Distribution by Time Period



3.2 Inland Waterway Traffic Condition

3.2.1 Traffic Volume by Station

Inland waterway traffic survey was undertaken in 40 stations, where interview survey was done in only 15 stations. Although, the detailed result of survey by station is attached in Appendix 3B, the aggregate traffic volume by vessel type and station is shown in Table 3.2.1. The dominant type is the self-propelled ship and barge, accounting for 88% of the total. The higher vessel traffic volume is at stations in the Mekong Delta.

Table 3.2.1
 Vessel Traffic Volume by Station

(24 hours, both directions)

Sta. No.	Sea-going Vessel	Self-propelled Ship & Barge	Oil Tanker	Tow Barge Tanker	Push Barge Tanker	Passenger Ship	Nonmotorized Boat	Total No. of Vessels
1	-	191	1	1	5	2	3	203
2	2	89	-	5	4	-	-	100
3	-	432	1	9	21	-	1	463
4	-	42	-	-	-	-	-	42
5	-	82	1	-	-	-	-	83
6	-	80	2	7	3	-	-	91
7	-	265	1	4	9	-	13	291
8	-	378	-	9	4	1	4	395
9	-	25	-	-	-	-	6	31
10	-	66	-	-	1	4	5	76
11	-	57	-	1	2	-	1	60
12	-	130	-	2	3	-	9	144
13	-	203	-	3	4	-	-	209
14	2	267	2	3	10	2	-	285
15	-	228	3	2	3	-	-	234
16	-	145	-	4	2	-	-	150
17	1	69	-	-	-	-	3	72
18	-	162	-	2	3	-	-	167
19	4	128	-	-	1	4	1	136
20	-	176	-	-	2	-	-	178
21	-	328	23	18	48	9	1	426
22	-	378	1	2	1	2	56	441
23	2	345	2	36	109	6	66	565
24	-	576	-	-	-	7	19	603
25	11	815	2	-	-	5	6	838
26	-	1,113	7	10	5	-	12	1,146
27	2	776	4	9	1	7	22	819
28	-	999	34	18	44	13	2	1,109
29	1	793	24	17	53	41	2	930
30	-	636	12	7	12	21	1	687
31	-	361	8	3	4	39	23	438
32	-	1,945	38	4	-	296	209	2,491
33	-	1,160	3	1	-	23	66	1,252
34	-	613	1	1	1	59	7	681
35	-	1,440	3	2	1	15	21	1,482
36	4	377	4	56	145	-	-	585
37	-	651	7	8	6	3	23	696
38	5	497	13	8	1	18	274	814
39	-	152	3	3	-	5	1	162
40	-	377	1	3	1	1	2	384

Source: VITRANSS Inland Waterway Traffic Count Survey, April-May 1999.

3.2.2 Passenger Transport

The findings on passenger transport obtained from the interview survey are summarized below.

The average number of passengers carried by passenger vessel is 20 in the north and 16 in the south (see Table 3.2.2). In addition, most passenger vessels belong to the private sector (see Table 3.2.3). The load factor, which is calculated by dividing passenger vessel capacity (seats) by passengers, is shown in Table 3.2.4. Note, however, that sample size is too small to represent all passenger vessels, especially in the north.

Table 3.2.2
 Passengers Carried by Passenger Vessels, 1999

	Private	State	Others	Total
North	20	-	-	20
South	16	-	13	16
TOTAL	16	-	13	16

Source: VITRANSS Inland Waterway Interview Survey, April-May 1999.

Table 3.2.3
 Passenger Vessel Ownership, 1999

	Private	State	Others	Total
North	1 (100.0)	0 (0.0)	0 (0.0)	1 (100)
South	74 (98.7)	0 (0.0)	1 (1.3)	75 (100)
TOTAL	75 (98.7)	0 (0.0)	1 (1.3)	76 (100)

Note: Figures in parentheses indicate % share.

Source: VITRANSS Inland Waterway Interview Survey, April-May 1999.

Table 3.2.4
 Average Load Factor, 1999

	Private	State	Others	Total
North	100.0	-	-	100.0
South	43.9	-	27.1	43.9
TOTAL	44.3	-	27.1	44.4

Source: VITRANSS Inland Waterway Interview Survey, April-May, 1999.

3.2.3 Freight Transport

The findings on freight transport obtained from the interview survey are summarized below.

Vessel Type: As shown in Table 3.2.5, the majority of vessels are self-propelled ships, with a share of 84%.

Table 3.2.5
 Vessel Type, 1999

	Sea-going Vessel	Self-propelled Ship	Oil Tanker	Tow Barge	Push Barge	Nonmotorized Boat	Passenger Vessel
North	0.0	89.9	0.4	4.4	5.1	0.0	0.2
South	1.1	80.3	2.1	2.7	5.5	0.2	8.1
TOTAL	0.7	83.7	1.5	3.3	5.3	0.1	5.3

Source: VITRANSS Inland Waterway Interview Survey, April-May, 1999.

Vessel Ownership: Most vessels are owned and operated by the private sector regardless of region, and its share comes to about 90% (See Table 3.2.6).

Table 3.2.6
 Vessel Ownership, 1999

	Private	State	Others	Total
North	423 (85.6)	67 (13.6)	4 (0.6)	494 (100)
South	791 (93.2)	54 (6.4)	4 (0.5)	849 (100)
TOTAL	1,214 (90.4)	121 (9.0)	8 (0.6)	1,343 (100)

Note: Figures in parentheses indicate % share

Source: VITRANSS Inland Waterway Interview Survey, April-May 1999.

Registered Vessel Capacity: Although most vessels belong to the private sector, state-owned vessels have about six times the capacity of private-owned vessels (see Table 3.2.7). Therefore, most cargoes are transported by state-owned vessels. Reportedly, about 90% of total cargoes are carried by state-owned vessels in terms of ton-km.

Table 3.2.7
 Registered Vessel Capacity, 1999

	Private	State	Others	Total
North	79.2	381.7	252.5	19.6
South	60.5	428.5	239.8	246.1
TOTAL	67.1	402.6	246.1	96.9

Note: Including barge capacity.

Source: VITRANSS Inland Waterway Interview Survey, April-May 1999.

Average Load: As shown in Table 3.2.8, the tow barge has the highest loading volume at 310 tons, while average load is only 67 tons for all others vessels.

Table 3.2.8
 Average Load, 1999

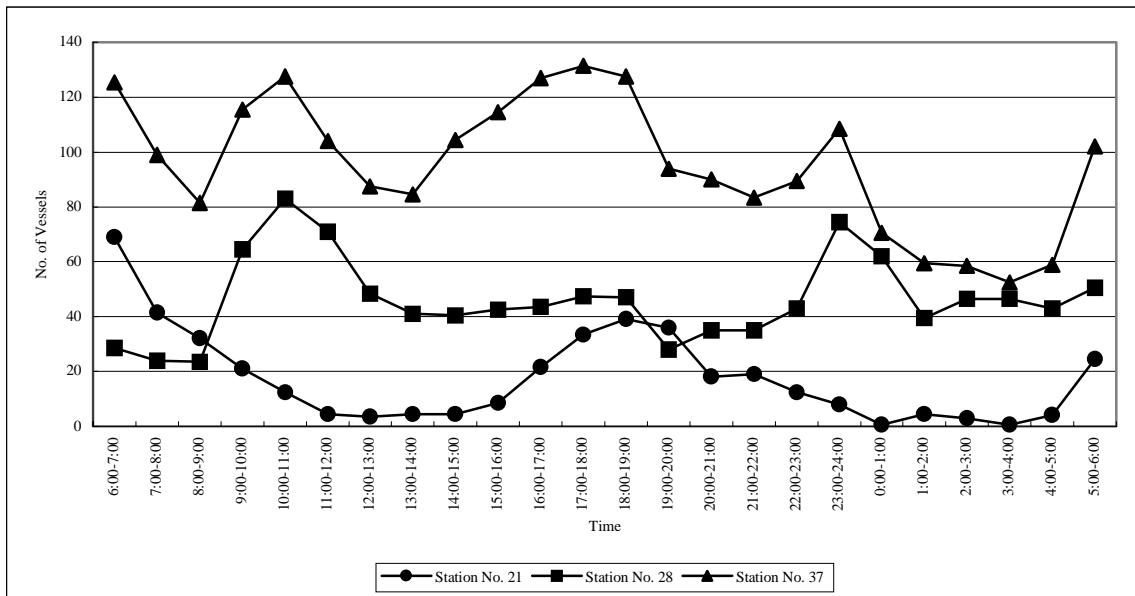
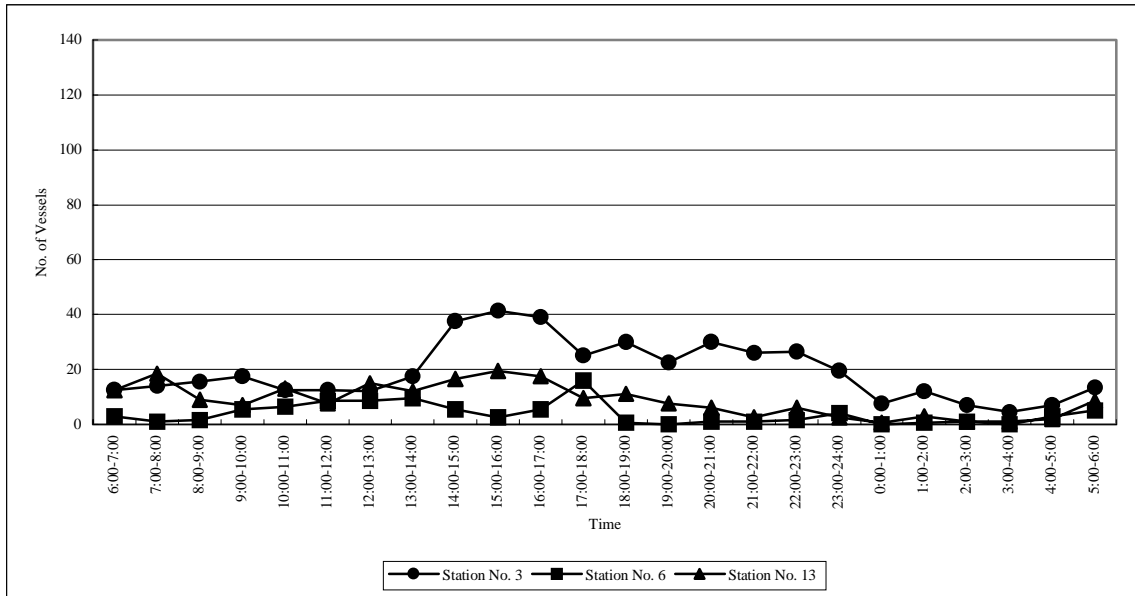
	Sea-going Vessel	Self-propelled Ship	Oil Tanker	Tow Barge	Push Barge	Nonmotorized Boat	Subtotal
North	0.0	60.5	200.0	293.7	500.0	0.0	93.7
South	61.2	34.7	172.2	324.0	158.6	2.8	53.9
TOTAL	61.2	44.4	174.9	309.8	270.9	2.8	68.5

Source: VITRANSS Inland Waterway Interview Survey, April-May, 1999.

3.2.4 Traffic Distribution by Time

Unlike the traffic distribution of road transport, that of inland waterway is generally irregular. Six stations, three each in the north (No. 3, 6 and 13) and south (No. 21, 28 and 37) showed that the number of vessels are substantially large in the south, at 3-5 times more than those in the north. It is interesting to note that unlike in the north, there is a morning peak in the south because vessels play an important role in carrying passengers in their daily activities. Note too that vessel movement included not only interprovincial but also intraprovincial movement.

Figure 3.2.1
 Traffic Distribution by Time Period



3.3 Seasonal Differences in Road/River Traffic Conditions

Traffic count survey for both road and inland waterway was conducted in September 1999 by the VITRANSS in some selected places to assess traffic volume during the rainy season. Although the detailed data obtained from the rainy season survey are presented in Appendix D, Table 3.3.1 and 3.3.2 summarize the results in comparison with those from the dry-season survey.

3.3.1 Road Traffic

As a whole, road traffic seems to be stable in terms of number of vehicles, number of passengers and tons of goods carried. Although, there were evidences that traffic on rural unpaved roads decreases in the rainy season by about 10-20%, it may be concluded that traffic on major paved roads does not fluctuate largely between the dry and the rainy season. However, this should be further investigated by periodically conducting traffic counts at a number of stations in various places of the country.

3.3.2 River Traffic

With regard to inland waterway traffic, no large differences were seen between the dry and the rainy season, too. Although, the number of passengers seems to decrease considerably in the rainy season, its absolute number and the number of stations are too few to extract meaningful findings.

3.3.3 Adjustment of Present OD Tables

It is clear that there is no common trend between the traffic counts of both road and inland waterway. Some stations showed smaller traffic in the rainy season than in the dry season while others showed the opposite.

Based on the above-stated analysis, it can be decided not to make an adjustment on the present OD tables which were created based on the results of the dry-season traffic survey on both road and inland waterway.

Table 3.3.1
Comparison of Road Traffic Volume between Dry and Rainy Seasons

(24 hours, both directions)

Stn. No.	Season	No. of Vehicles				No. of Passengers			Vol. of Tons by Truck
		Car	Bus	Truck	Total	Car	Bus	Total	
4	Dry	812	862	1,985	3,660	2,843	16,464	19,307	7,941
	Rainy	811	434	1,798	3,043	2,837	8,292	11,129	7,192
	Rainy/Dry	1.0	0.5	0.9	0.8	1.0	0.5	0.6	0.9
5	Dry	146	172	245	563	510	3,279	3,789	981
	Rainy	115	240	201	556	402	4,587	4,988	804
	Rainy/Dry	0.8	1.4	0.8	1.0	0.8	1.4	1.3	0.8
6	Dry	488	559	1,137	2,184	1,707	10,671	12,377	4,549
	Rainy	668	567	1,227	2,462	2,338	10,829	13,167	4,906
	Rainy/Dry	1.4	1.0	1.1	1.1	1.4	1.0	1.1	1.1
7	Dry	1,224	1,255	1,827	4,306	4,284	23,977	28,261	7,308
	Rainy	1,326	956	2,388	4,670	4,642	18,259	22,901	9,551
	Rainy/Dry	1.1	0.8	1.3	1.1	1.1	0.8	0.8	1.3
11	Dry	87	164	335	587	306	3,139	3,444	1,340
	Rainy	69	126	325	520	241	2,407	2,648	1,301
	Rainy/Dry	0.8	0.8	1.0	0.9	0.8	0.8	0.8	1.0
14	Dry	1,340	1,773	3,245	6,357	4,690	33,858	38,548	12,979
	Rainy	1,445	1,331	3,087	5,863	5,057	25,430	30,487	12,348
	Rainy/Dry	1.1	0.8	1.0	0.9	1.1	0.8	0.8	1.0
17	Dry	851	993	2,581	4,425	2,977	18,966	21,944	10,324
	Rainy	733	766	1,890	3,389	2,566	14,636	17,202	7,559
	Rainy/Dry	0.9	0.8	0.7	0.8	0.9	0.8	0.8	0.7
19	Dry	1,099	854	2,087	4,041	3,847	16,318	20,164	8,349
	Rainy	1,084	768	2,224	4,075	3,793	14,661	18,453	8,896
	Rainy/Dry	1.0	0.9	1.1	1.0	1.0	0.9	0.9	1.1
27	Dry	148	285	736	1,170	518	5,450	5,968	2,945
	Rainy	176	273	706	1,155	616	5,214	5,830	2,824
	Rainy/Dry	1.2	1.0	1.0	1.0	1.2	1.0	1.0	1.0
28	Dry	149	802	1,181	2,132	522	15,312	15,833	4,724
	Rainy	197	802	915	1,914	689	15,323	16,012	3,661
	Rainy/Dry	1.3	1.0	0.8	0.9	1.3	1.0	1.0	0.8
29	Dry	310	987	1,972	3,270	1,086	18,858	19,944	7,889
	Rainy	531	1,214	3,962	5,707	1,857	23,181	25,038	15,849
	Rainy/Dry	1.7	1.2	2.0	1.7	1.7	1.2	1.3	2.0
30	Dry	957	1,373	1,935	4,265	3,348	26,224	29,573	7,740
	Rainy	966	1,692	3,083	5,741	3,382	32,313	35,696	12,332
	Rainy/Dry	1.0	1.2	1.6	1.3	1.0	1.2	1.2	1.6
32	Dry	1,507	2,126	3,187	6,820	5,273	40,613	45,886	12,747
	Rainy	1,528	1,880	4,102	7,510	5,348	35,905	41,254	16,407
	Rainy/Dry	1.0	0.9	1.3	1.1	1.0	0.9	0.9	1.3
33	Dry	1,976	4,062	5,645	11,683	6,916	77,584	84,500	22,579
	Rainy	1,866	3,770	5,885	11,522	6,532	72,013	78,545	23,540
	Rainy/Dry	0.9	0.9	1.0	1.0	0.9	0.9	0.9	1.0
34	Dry	758	857	1,669	3,284	2,652	16,375	19,027	6,675
	Rainy	575	757	1,661	2,992	2,013	14,453	16,466	6,643
	Rainy/Dry	0.8	0.9	1.0	0.9	0.8	0.9	0.9	1.0
37	Dry	440	1,123	1,069	2,632	1,540	21,443	22,983	4,277
	Rainy	412	932	1,005	2,349	1,443	17,801	19,244	4,019
	Rainy/Dry	0.9	0.8	0.9	0.9	0.9	0.8	0.8	0.9
39	Dry	354	1,177	734	2,265	1,240	22,474	23,715	2,937
	Rainy	190	425	602	1,217	666	8,124	8,790	2,407
	Rainy/Dry	0.5	0.4	0.8	0.5	0.5	0.4	0.4	0.8
18	Dry	12,645	19,424	31,571	63,641	44,259	371,005	415,263	126,285
	Rainy	12,692	16,933	35,060	64,686	44,423	323,429	367,852	140,240
	TOTAL	1.0	0.9	1.1	1.0	1.0	0.9	0.9	1.1

Table 3.3.2
 Comparison of River Traffic Volume between Dry and Rainy Seasons

(24 hours, both directions)

Stn. No.	Season	Sea-going Vessel	Self-propelled Ship & Barge	Oil Tanker	Tow Barge Tanker	Push Barge Tanker	Passenger Ship	Non-motorized Boat	Total No. of Vessels	Total Vol. of Tons	Total No. of Pax
3	Dry	0	432	1	9	21	0	1	463	39,129	0
	Rainy	0	432	0	17	26	0	4	480	44,163	0
	Rainy/Dry	-	1.0	0.0	1.8	1.3	-	4.4	1.0	1.1	-
6	Dry	0	80	2	7	3	0	0	91	8,618	0
	Rainy	0	66	8	6	7	0	3	91	10,966	0
	Rainy/Dry	-	0.8	3.9	0.9	2.4	-	-	1.0	1.3	-
13	Dry	0	203	0	3	4	0	0	209	14,985	0
	Rainy	0	80	2	3	12	0	2	99	11,881	0
	Rainy/Dry	-	0.4	-	1.2	2.9	-	-	0.5	0.8	-
21	Dry	0	328	23	18	48	9	1	426	28,709	144
	Rainy	0	413	26	21	48	7	9	524	33,365	106
	Rainy/Dry	-	1.3	1.1	1.2	1.0	0.7	17.6	1.2	1.2	0.7
28	Dry	0	999	34	18	44	13	2	1,109	53,173	200
	Rainy	2	710	37	23	22	6	2	801	41,959	88
	Rainy/Dry	-	0.7	1.1	1.3	0.5	0.4	1.5	0.7	0.8	0.4
37	Dry	0	651	7	8	6	3	23	696	27,076	40
	Rainy	0	572	3	2	1	3	46	628	21,244	53
	Rainy/Dry	-	0.9	0.5	0.2	0.3	1.3	2.0	0.9	0.8	1.3
6 stn.	Dry	0	2,692	66	61	125	24	26	2,994	171,689	384
TOTAL	Rainy	2	2,274	76	71	117	15	67	2,623	163,578	248
	Rainy/Dry	-	0.8	1.1	1.2	0.9	0.6	2.6	0.9	1.0	0.6

Source: VITRANSS Inland Waterway Traffic Survey (Dry: April 1999, Rainy: September 1999)

Note: 1) Average occupancy per cargo vessel (tons): sea-going vessel (-0.0, 61.2), self-propelled ship & barge (60.5, 34.7), oil tanker (200.0, 172.2), tow barge (293.6, 324.0), push barge (500.0, 158.6), non-motorized boat (0.0, 2.8) in the north and south, respectively

2) Average occupancy per passenger vessel (pax): 20 and 16 in the north and south, respectively.

3.4 Perception of Passengers/Drivers on Transport Terminals

3.4.1 Passenger Movement

Users' Characteristics: Passengers interviewed at each passenger terminal were simply aggregated by sex, age and occupation. Below are the results of the analysis.

- More interprovincial trips are made by males than by females, accounting for 60% of total trips regardless of terminal type (see Table 3.4.1). This means that the social visibility of males is still higher than that of female in Vietnam.
- There is an astonishing fare gap between air and other transport modes, making transport preference an indication of social position in terms of income, age and occupation. Results show that usage of air transport increases in proportion to age (see Table 3.4.2). In addition, air transport is preferred by governmental officials, professionals and technicians who are expected to have comparatively high incomes (see Table 3.4.3).
- Air should be regarded as a mode for the privileged class while rail and bus are for the masses. In fact, age and occupation are similarly distributed among railway station and bus terminal users (see Table 3.4.2 and 3.4.3).

Table 3.4.1
 Terminal Users by Gender

(Passengers)			
	Male	Female	Total
Railway Station	1,211 (59.6)	820 (40.4)	2,031 (100)
Bus Terminal	1,151 (56.8)	875 (43.2)	2,026 (100)
Airport	818 (59.2)	564 (40.8)	1,382 (100)
TOTAL	3,180 (58.5)	2,259 (41.5)	5,439 (100)

Note: Figures in parentheses indicate % share
 Source: VITRANSS Terminal Interview survey, May 1999

Table 3.4.2
 Terminal Users by Age

(Passengers)							
	Below 19	20~29	30~39	40~49	50~59	Above 60	Total
Railway Station	102 (5.0)	641 (31.6)	498 (24.5)	397 (19.5)	212 (10.4)	181 (8.9)	2,031 (100)
Bus Terminal	114 (5.6)	666 (32.9)	509 (25.1)	479 (23.6)	152 (7.5)	106 (5.2)	2,026 (100)
Airport	23 (1.7)	262 (19.0)	377 (27.3)	436 (31.5)	202 (14.6)	82 (5.9)	1,382 (100)
TOTAL	239 (4.4)	1569 (28.6)	384 (25.4)	312 (10.4)	566 (10.4)	369 (16.8)	5,439 (100)

Note: Figures in parentheses indicate % share
 Source: VITRANSS Terminal Interview survey, May 1999

Table 3.4.3
 Terminal Users by Occupation

(Passengers)							
	Government Officials	Professionals/ Technicians	Clerical Workers	Workers/ Laborers	Students	Others	Total
Railway Station	150 (9.4)	290 (14.3)	152 (7.5)	891 (43.9)	308 (15.2)	240 (11.8)	2,031 (100)
Bus Terminal	46 (2.3)	141 (7.0)	80 (3.9)	1,255 (61.9)	249 (12.3)	255 (12.6)	2,026 (100)
Airport	302 (21.9)	400 (28.9)	162 (11.7)	240 (17.4)	92 (6.7)	186 (13.5)	1,382 (100)
TOTAL	498 (9.2)	831 (15.3)	394 (9.2)	1,386 (43.9)	649 (11.9)	681 (12.5)	5,439 (100)

Note: Figures in parentheses indicate % share
 Source: VITRANSS Terminal Interview Survey, May 1999

Key Problems: Key problems were asked of terminal users and summarized in Table 3.4.4. In railway stations, the following items were pointed out as key problems: poor access (18.1%), poor waiting facility (17.2%) and overcrowding (14.3%). Linkage with feeder modes and improvement of station facility should be imperatively worked out. In bus terminals, on the other hand, users complain of overcrowding (25.0%), poor waiting facility (19.1%) and dirty environment (19.0%) were taken as key problems in bus terminal. To solve these problems, terminal facilities must be improved. In airports, the most significant problem pointed out was poor access (30.5%), followed by overcrowding (18.9%) and poor waiting facility (11.9%).

Table 3.4.4
 Key Problem of Passenger Terminals

	Railway Station	Bus Terminal	Airport
Poor Access	18.1	9.3	30.5
Overcrowding	14.3	25.0	18.9
Poor Pedestrian Facilities	10.8	10.6	5.4
Dirty Environment	6.4	19.0	7.8
Poor Safety	5.4	2.3	1.8
Poor Waiting Facility	17.2	19.1	11.9
Undisciplined Drivers	0.4	0.6	1.0
Others	27.4	14.1	22.6
TOTAL	100.0	100.0	100.0

Source: VITRANSS Terminal Interview Survey, May 1999.

Assessment: Figure 3.4.1 shows passengers attitude toward transport terminals. In general, the issues of trip frequency and travel comfort ranked low, while safety, usually a key problem in other developing countries, is not serious in Vietnam.

Interprovincial Movement: According to the terminal survey, most passengers make intraprovincial trips to access passenger terminals from origin or egress to final destination from passenger terminal (see Table 3.4.5). For instance, about 85% of total passengers travel to a province to reach a passenger terminal, and about 94% of total passengers terminate their trip within a province where passenger terminal exists.

Table 3.4.5
 Share of Intra/Interprovincial Passengers, 1999

Terminal	Origin→Terminal		Terminal→Destination	
	Intraprovince	Interprovince	Intraprovince	Interprovince
Railway Station	84.0	16.0	90.1	9.9
Bus Station	83.0	17.0	96.6	3.4
Airport	87.0	13.0	94.9	5.1
TOTAL	84.0	16.0	93.7	6.3

Source: VITRANSS Terminal Interview Survey, May 1999.

Figure 3.4.1
 Assessment of Passenger Terminals



Feeder Mode: Table 3.4.6 shows the share of access and egress mode from and to a passenger terminal. Many passengers use bus and motorcycle to access a railway station and bus terminal. On the other hand, the usage of car and taxi to reach the airport is very significant and amounts to about 50%.

Table 3.4.6
 The Share of Access/egress Mode, 1999

(%)

	Access Mode					Egress Mode				
	Motor-cycle	Car/Taxi	Bus	Others	N.A.	Motor-cycle	Car/Taxi	Bus	Others	N.A.
Railway Station	32.7	9.0	43.2	13.9	1.2	25.4	10.9	58.2	3.5	2.0
Bus Terminal	16.7	0.9	69.0	8.2	5.3	16.2	2.9	27.9	8.8	44.1
Airport	7.0	40.3	46.2	4.8	1.6	0.0	52.1	39.4	0.0	8.5
TOTAL	20.7	12.6	54.2	9.6	2.9	18.2	17.9	48.2	3.8	11.8

Source: VITRANSS Terminal Interview Survey, May 1999

3.4.2 Truck Movement

Vehicle Type Interview: The types of vehicle used was aggregated as shown in Table 3.4.7. Generally speaking, trucks with large capacity are actively used in ports.

Table 3.4.7
 Share by Vehicle Type, 1999

(Vehicles)

	4-wheel Truck	2-axle 6-wheel Truck	3-axle Truck	4 or more	Trailer	Others	Total
Port	24 (2.5)	463 (49.0)	202 (21.4)	166 (17.6)	88 (9.3)	2 (0.2)	945 (100)
Railway Station	70 (12.2)	366 (63.9)	62 (10.8)	60 (10.5)	12 (2.1)	3 (0.5)	573 (100)
TOTAL	94 (6.2)	829 (54.6)	246 (17.4)	226 (14.9)	100 (6.6)	5 (0.3)	1518 (100)

Note: Figures in parentheses indicate % share

Source: VITRANSS Terminal Interview Survey, May 1999

Vehicle Ownership: In railway stations, most vehicles belong to private individuals. However, the share of trucks belonging to provincial government and private company is comparatively high at seaport stations (see Table 3.4.8).

Table 3.4.8
 Vehicle Ownership, 1999

(Vehicles)

	State	Provincial	Private Company	Individual	Joint Venture	Others	Total
Port	56 (5.9)	146 (18.6)	235 (24.9)	313 (33.1)	14 (1.5)	151 (16.0)	945 (100)
Railway Station	69 (12.0)	13 (2.3)	64 (11.2)	362 (63.2)	44 (8.6)	16 (2.8)	573 (100)
TOTAL	125 (8.2)	189 (12.5)	299 (19.7)	675 (44.5)	63 (4.2)	167 (11.0)	4,561 (100)

Note: Figures in parentheses indicate % share
 Source: VITRANSS Terminal Interview Survey, May 1991.

Interprovincial Movement: As shown in Table 3.4.9, about 35% of total trucks arriving at a truck terminal conduct interprovincial movement (see Table 3.4.10 and 3.4.11).

Table 3.4.9
 Share of Intra/Interprovincial Movement of Total Freight

(%)

	Intraprovince	Interprovince
Port	61	39
Railway Station	78	22
TOTAL	65	35

Source: VITRANSS Terminal Interview Survey, May 1999.

Table 3.4.10
Number of Samples and Tonnage Surveyed by Port Terminal Survey

Commodity	Hai Phong Port				Saigon Port				Cua Lo Port				Danang Port				Quy Nhon Port			
	Intra- province	Terminal →Dest.	Origin→ Terminal	Total	Intra- province	Terminal →Dest.	Origin→ Terminal	Total	Intra- province	Terminal →Dest.	Origin → Terminal	Total	Intra- province	Terminal →Dest.	Origin → Terminal	Total	Intra- province	Terminal →Dest.	Origin → Terminal	Total
1. Paddy and Other Food Crops	18 148.0	49 632.5	1 5.0	68 785.5	3 24.0	1 10.0	8 64.0	12 98.0	32 209.1	5 42.0	1 5.7	38 256.8			1 15.0	3 67.0				0 0.0
2. Sugarcane – Sugar				0 0.0				0 0.0				0 0.0				0 0.0				0 0.0
3. Wood & Forestry Products				0 0.0	1 11.0			1 11.0	8 124.0		17 253.0	25 377.0				0 0.0			1 15.0	1 15.0
4. Steel	39 663.0	19 513.0		58 1176.0	11 131.0	3 34.0	2 14.0	16 179.0				0 0.0				0 0.0	4 71.5	1 6.0	2 31.0	7 108.5
5. Sand, Stone, Iron Ore, Others				0 0.0	6 63.0			6 63.0	7 44.5			7 44.5				0 0.0	1 14.0			1 14.0
6. Cement				0 0.0	8 78.0	7 107.0		15 185.0				0 0.0	14 107.5			14 107.5	60 687.5	23 236.0	2 26.5	85 950.0
7. Fertilizer		1 12.0		1 12.0	28 279.5	46 436.0	4 50.0	78 765.5	36 195.2	2 20.0	1 10.0	39 225.2				0 0.0	76 962.0	13 138.0	2 16.5	91 1116.5
8. Coal				0 0.0				0 0.0	14 92.0			14 92.0				0 0.0				0 0.0
9. Petroleum	4 44.5			4 44.5				0 0.0	16 120.5	12 102.0		28 222.5	3 18.6	8 88.3		11 106.9	6 66.0	6 69.0		12 135.0
10. Industrial Crops				0 0.0				0 0.0				0 0.0				0 0.0				0 0.0
11. Manufacturing Goods	7 104.0	18 206.0	2 30.0	27 340.0	43 299.6	26 196.6	1 8.0	70 504	8 35.0	1 5.0	2 18.0	11 58.0	39 506.3	14 149.1		53 655.4	9 83.5		10 96.0	19 179.5
12. Fishery products				0 0.0				0 0.0				0 0.0	4 81.6			4 81.6				0 0.0
13. Animal meat & Others			1 50	1 5.0	1 20.0			1 20.0				0 0.0				0 0.0				0 0.0
TOTAL	68 959.5	87 1363.5	4 40.0	159 2363.0	101 906.1	83 783.6	15 136.0	199 1825.7	121 820.3	20 169.0	21 286.7	162 1276.0	60 714.0	24 289.4	1 15.0	85 1018.4	156 1884.5	43 449.0	17 185.0	216 2518.5

Source: VITRANSS Terminal Interview Survey, May 1999

Table 3.4.11
Number of Samples and Tonnage Surveyed by Railway Station Survey

Commodity	Viet Tri Station				Yen Vien Station				Van Dien Station				Danang Station				Song Than Station				
	Intra- province	Terminal →Dest.	Origin→ Terminal	Total	Intra- province	Terminal →Dest.	Origin→ Terminal	Total	Intra- province	Terminal →Dest.	Origin → Terminal	Total	Intra- province	Terminal →Dest.	Origin → Terminal	Total	Intra- province	Terminal →Dest.	Origin → Terminal	Total	
1. Paddy and Other Food Crops	38 324.0			38 242.0				0 0.0	4 20.0			4 20.0	82 418.0				82 418.0		1 10.0		1 10.0
2. Sugarcane – Sugar	35 245.0			35 245.0				0 0.0				0 0.0					0 0.0				0 0.0
3. Wood & Forestry Products				0 0.0				0 0.0				0 0.0					0 0.0				0 0.0
4. Steel				0 0.0	1 10.0	1 5.0		2 15.0				0 0.0					0 0.0				0 0.0
5. Sand, Stone, Iron Ore, Others				0 0.0	2 17.0			2 17.0				0 0.0					0 0.0			1 3.0	1 3.0
6. Cement				0 0.0	13 64.0	3 17.0		16 81.0	3 8.1			3 8.1					0 0.0				0 0.0
7. Fertilizer				0 0.0				0 0.0				0 0.0	6 36.0				6 36.0	2 11.5			2 11.5
8. Coal				0 0.0				0 0.0				0 0.0	1 6.0				1 6.0				0 0.0
9. Petroleum				0 0.0				0 0.0				0 0.0					0 0.0				0 0.0
10. Industrial Crops				0 0.0				0 0.0				0 0.0					0 0.0				0 0.0
11. Manufacturing Goods				0 0.0	30 151.0	9 63.0		39 214.0	77 126.5	7 38.5	3 21.2	87 186.2	14 55.7				14 55.7	8 32.5	4 19.0	5 28.5	17 80.0
12. Fishery products				0 0.0	6 12.0	1 2.0		7 14.0	4 10.0	2 1.4		6 11.4					0 0.0				0 0.0
13. Animal meat & Others				0 0.0				0 0.0				0 0.0					0 0.0				0 0.0
TOTAL	73 587.0	0 0.0	0 0.0	73 587.0	52 254.0	14 87.0	0 0.0	66 341.0	88 164.6	9 39.9	3 21.2	100 225.7	103 515.7	0 0.0	0 0.0		103 515.7	10 44.0	5 29.0	6 31.5	21 104.5

Source: VITRANSS Terminal Interview Survey, May 1999

3.5 Transport Industry Survey

As of end of October 1999, 11 bus operators, 10 trucking companies, seven shipping companies and 12 inland water transport companies returned the questionnaire. However, the questionnaires were not completely filled out. Therefore, data on the operational and financial aspects of the transport industry are incomplete. In this report, operators' profile and some key problems identified by operators are analyzed.

3.5.1 Profile of Operators

The profiles of bus, trucking, shipping, and inland water transport companies are shown in Table 3.5.1 - 3.5.4 and summarized as follows:

Bus Operators: The bus companies which answered the questionnaire include eight state-owned, two joint-venture and one private. Most of their employees are drivers and assistants. On average, bus operators own 37 large and 11 minibuses with an average total seating capacity of 1,900. Buses are relatively old with average vehicle age of seven years.

Trucking Companies: The trucking companies which answered the questionnaire are all state-owned enterprises. The number of staff is ranging widely between 50 and 500. Like other transport companies, the number of drivers is dominant, sharing more than half the total of employees. The average number of owned vehicles range widely between 15 and 300. Their average total capacity is about 560 tons. Vehicle age is very old and a lot of vehicles built in the 1970s and 1980s are still utilized.

Shipping Companies: There are seven shipping companies which replied to the questionnaire. Most of them were established recently and employing many seamen. Most of their owned vessels are secondhand, ranging between 10-20 years old.

Inland Waterway Transport Operators: There are nine state-owned and one cooperative and two private legal entities. Th cooperative is managing a large number of staff and vessels. Their owned vessels are also old but relatively younger than those of shipping companies.

3.5.2 Major Problems Identified by Transport Operators

Problems related to operational and financial aspects of the business were identified by operators as shown in Table 3.5.5 - 3.5.7.

Bus Operators: Identified as serious problems for bus operators are the (K) severe competition from other buses and (L) difficult financing for new vehicles.

(B) Road conditions, such as surface, are also critical for operators. On the other hand, getting (H) operating permit/license and (I) operating permit/license charge are identified as minor problems.

Trucking Companies: Serious problems for trucking companies include (J) competition from other transporters and (F) tolls and other road charge. (K) Financing new vehicles and (N) qualification standards for truck driver is rather serious than other problems.

Inland Waterway Transport Operators: (K) Financing new vessels, (J) competition from other transporters and (F) waterway/port charge are serious problems for inland waterway transport operators. (A) Standard of waterways (width/depth) and (L) purchasing fuel, parts etc. are also rather serious.

Table 3.5.1
Profile of Bus Operators

No.	Bus Operator	Province	Year Established	Legal Status	No. of Staff				No. of Buses			Total No. of Seats	Average Built Year of Units
					Drivers/ Assistants	Maintenance	Other	Total	Large	Mini	Other		
1	Tuyen Quang Automobile Transport Joint-Stock Company	Tuyen Quang	1998	SOE (equitized)	40	2	-	42	40	2	-	1730	1991
2	Automobile Transport Company	Ha Giang	1989	SOE (non-equitized)	47	11	20	78	28	15	-	1596	-
3	Automobile Transport Company No.10	Thai Nguyen	1983	SOE (non-equitized)	4	-	-	4	0	4	-	96	1997
4	Ba Ria-Vung Tau Automobile Transport Company	Ba Ria Vung Tau	1981/1992	SOE (non-equitized)	44	5	16	65	18	4	-	1161	1985
5	Cao Bang Automobile Transport Company	Cao Bang	1993	SOE (non-equitized)	81	17	-	98	31	3	1	1592	1982
6	Lai Chau Automobile Company	Lai Chau	1994	SOE (non-equitized)	69	36	21	126	28	24	-	1763	1995
7	Passenger Transport Company No.14	Hanoi	-	SOE (non-equitized)	22	60	60	142	90	38	-	5010	1992
8	Quang Ngai Automobile Transport Company	Quang Ngai	1978	SOE (non-equitized)	4	-	-	4	4	0	-	192	1993
9	Ha Tay Passenger Automobile Joint-Stock Company	Ha Tay	1969	Joint Stock	161	65	-	226	80	11	1	3496	1992
10	Phu Tho Automobile Joint-Stock Company	Phu Tho	1998	Joint Stock	75	17	1	93	75	17	1	3575	1993
11	Tien Thanh Passenger Transport Co. Ltd.	Binh Dinh	1993	Private legal entity	11	7	-	18	11	7	-	667	1996

Source: VITRANSS Transport Industry Survey, 1999

Table 3.5.2
Profile of Trucking Companies

No.	Trucking Company	Province	Year Established	Legal Status	No. of Staff				No. of Vehicles					Total Pay-Load (ton)	Average Mfg. Year of vehicles
					Drivers/ Assistants	Maintenance	Other	Total	Truck	Drawbar Trailer	Tractor	Semi-Trailer	Other		
1	Automobile Transport Company No.1	Hai Phong	-	SOE (non-equitized)	73	57	102	232	52	-	-	-	-	468	1984
2	Automobile Transport Company No.2	Hanoi	1960	SOE (non-equitized)	120	30	60	210	111	-	-	-	-	631	1987
3	Automobile Transport Company No.3	Hanoi	1983	SOE (non-equitized)	168	112	102	382	152	-	-	-	3	972	1985
4	Automobile Transport Company No.4	Ninh Binh	1983	SOE (non-equitized)	103	98	58	259	96	-	-	-	-	657	1985
5	Automobile Transport Company No.6	Da Nang	-	SOE (non-equitized)	408	26	76	510	301	27	-	-	3	-	-
6	Automobile Transport Company No.8	Hanoi	1993	SOE (non-equitized)	-	-	-	0	106	26	-	-	-	829	1982
7	Bac Giang Cargo Transport Company	Bac Giang	1988	SOE (non-equitized)	34	10	12	56	14	-	-	-	-	72	1989
8	Cam Ranh Automobile Transport Company	Khanh Hoa	1978	SOE (non-equitized)	44	9	28	81	52	-	-	-	1	318	1995
9	Can Tho Automobile Transport Company	Can Tho	1977	SOE (non-equitized)	-	-	-	0	20	6	-	-	2	-	-
10	Quang Ninh Automobile Transport Company	Quang Ninh	1987	SOE (non-equitized)	120	30	32	182	60	-	-	-	3	-	-

Source: VITRANSS Transport Industry Survey, 1999

Table 3.5.3
Profile of Shipping Companies

No.	Shipping Company	Province	Year Established	Legal Status	No. of Staff				No. of vessels				Total DWT	Average Mfg. Year of Vessels
					Seaman	Office	Other	Total	Owned	Co-owned	Chartered	Total		
1	International Labor Cooperation Company (INLACO Saigon)	HCM	1995		473	295	-	768	3	-	-	3	10148	1977
2	Oil and Material Transport Company	HCM	-		111	92	-	203	9	-	-	9	42588	1984
3	Quy Nhon Sea Transport Co. Ltd.	Binh Dinh	1993		48	8	52	108	7	-	-	7	1858	1987
4	Transport Service Company II (VITRANSTIMEX)	Da Nang	1992		42	9	10	61	2	-	-	2	2878	1985
5	Vietnam Ocean Shipping Agency (VOSA)	HCM	1957		-	-	-	820	-	-	-	0	-	-
6	Vietnam Ocean Shipping Company (VOSCO)	Hai Phong	1993		-	-	-	0	-	-	-	0	-	-
7	Vietnam Sea Transport and Chartering Company	HCM	1993		904	76	402	1382	10	-	-	10	136578	1979

Source: VITRANSS Transport Industry Survey, 1999

Table 3.5.4
Profile of Inland Waterway Transport Operators

No.	Trucking Company	Province	Year Established	Legal Status	No. of Staff				No. of vessels			Total DWT	Average Mfg. Year of Vessels
					Crew	Maintenance	Other	Total	Owned	Rented	Shared		
1	Dong Nai Road and Waterway Transport Company	Dong Nai	1996	SOE (non-equitized)	26	3	2	31	7	-	-	1700	1984
2	Ha Tay River Transport Company	Ha Tay	1992	SOE (non-equitized)	45	5	158	208	9	-	1	1170	1984
3	Inland Waterway Loading and Transport Company	Ninh Binh	1974	SOE (non-equitized)	105	-	-	105	9	-	-	6950	1990
4	Phu Tho River Transport Company	Phu Tho	1968	SOE (non-equitized)	-	-	-	0	5	-	-	3300	1994
5	River Transport Company No.2	Ninh Binh	-	SOE (non-equitized)	565	393	-	958	42	-	-	33200	-
6	River Transport Company No.4	Hai Phong	1993	SOE (non-equitized)	-	-	-	0	50	-	-	20000	-
7	Saigon River Transport Company	HCM	-	SOE (non-equitized)	65	-	25	90	9	-	-	2400	1980
8	Thai Binh Sea-River Transport Company	Thai Binh	1960	SOE (non-equitized)	-	-	-	0	34	-	-	9250	1984
9	Vinh Long Sea-River Transport Company	Vinh Long	1996	SOE (non-equitized)	31	-	-	31	9	-	-	2640	1984
10	Rach Gam Inland Waterway Transport Cooperative	Tien Giang	1979	Cooperative	443	15	12	470	192	-	-	64000	1991
11	Saigon - Cuu Long Co. Ltd.	HCM	1999	Private Legal Entity	15	-	7	22	3	-	-	-	-
12	Song Cau Water Transport Company	Bac Ninh	1998	Private Legal Entity	80	12	30	122	16	-	-	-	1994

Source: VITRANSS Transport Industry Survey, 1999

Table 3.5.5
 Major Problems of Bus Operators

Company	Problems																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1											3	3						
2	3	3			1	1					3	3	1	1	2	1	1	1
3																		
4	3	3	1	3	3	3	3			3	3	3	3	3	1	1	1	
5	2	1	2			2	2	2	2	3	3	3	2	3	2	3	2	
6		1																
7	2	2	2	3	3	2	3	1	1	2	3	3	2	2	2	3	2	
8	1	3	2	2	2	1	3	2	1	1	3	3	2	3	3	3	1	
9	2	2	1		2	3	3	1	1	1	3	2	1	2	1			
10	3	3	3			3	3			3	3	3	3	1	3		3	
11	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1
TOTAL	18	20	13	10	13	17	19	8	7	15	26	25	16	16	15	12	11	2

Source: VITRANSS Transport Industry Survey, 1999

Note: Figures indicate: 1 Minor, 2 Moderate and 3 Serious

- | | |
|---------------------------------------|--------------------------------------|
| A: Standard of roads (width/layout) | J: Government fares control |
| B: Conditions of roads (poor surface) | K: Competition from other buses |
| C: Traffic conditions/congestion | L: Financing new vehicles |
| D: Bus station/terminal facilities | M: Purchasing fuel, spare parts etc. |
| E: Bus station services and charges | N: Quality of maintenance services |
| F: Parking facilities | O: Standard of bus driver |
| G: Tolls and other road charges | P: Not enough traffic |
| H: Getting operating permit/license | Q: Police enforcement measures |
| I: Operating permit/license charges | R: Others |

Table 3.5.6
 Major Problems of Trucking Companies

Company	Problems																
	a	B	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
1																	
2	1	1	1	3	3	3	1	1	3	3	3	1	1	3	1	1	
3	3	3	3		2	1	2	3	3	3							
4																	
5	2	2	2	3		2	1	1	2	1		3		2			
6	1	1	1	2	1	2	1	1	1	3	3	2	1	2	1	2	
7																	
8	3	3		2		3	2			3	3	2	3	3		3	
9					1	3	2	2	3	3	3	2	1	3			
10	3	3	2	2	2	3	1	1	1	3	3	3	2	2	3	3	
TOTAL	13	13	9	12	9	17	10	9	13	19	15	13	8	15	5	9	0

Source: VITRANSS Transport Industry Survey, 1999

Note: Figures indicate: 1 Minor, 2 Moderate and 3 Serious

- | | |
|---------------------------------------|--|
| A: Standard of roads (width/layout) | J: Competition from other transporters |
| B: Conditions of roads (poor surface) | K: Financing new vehicles |
| C: Traffic conditions/congestion | L: Purchasing fuel, spare parts etc. |
| D: Loading facilities/service | M: Quality of maintenance services |
| E: Parking facilities | N: Standard of truck driver |
| F: Tolls and other road charges | O: Not enough traffic |
| G: Getting operating permit/license | P: Police enforcement measures |
| H: Operating permit/license charges | Q: Others |
| I: Government tariff control | |

Table 3.5.7
 Major Problems of Inland Waterway Transport Operators

Company	Problems																
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
1	2							2		3	3	2		2			3
2	2	2	1	1		2	3	3		3	3	3	1	2		1	3
3	2	2	3				2	2		3		2	2	1		3	
4	2	2				2				3	2						
5	1	1				3											
6	2	2	2	1		3	2	2		3	2	2	2	2			
7	2	2	3	2	3	3	2	2	3	3	3	3	2	3	3	2	3
8	3		2	1	1	3	1	1	3		3	2	2	1	1	3	
9	2	2	2	3	2	2	2	2		3	3	3	1	2		2	2
10	2		1	2		3	1	3	1	2	3	2	2	2	2	3	
11	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
12	2	2	2			2		2			3	2	2	2			
TOTAL	23	17	18	12	8	25	15	21	9	25	27	23	16	19	8	16	13

Source: VITRANSS Transport Industry Survey, 1999

Note: Figures indicate: 1 Minor, 2 Moderate and 3 Serious

A: Standard of waterways (width/depth)

B: Conditions of waterways

C: Navigation conditions /congestion

D: Port/terminal facilities /service

E: Mooring facilities

F: Waterway/port charges

G: Getting operating permit/license

H: Operating permit/license charges

I: Government fare/tariff controls

J: Competition from other transporters

K: Financing new vessels

L: Purchasing fuel, spare parts etc.

M: Quality of maintenance services

N: Standard of crew/other staff

O: Not enough traffic

P: Police enforcement measures

Q: Others

4 DATABASE

4.1 General

A reliable database is an essential input to national transport development. Without a test of adequate database and analytical tools, which can handle large amounts of different data, transport planning cannot be done scientifically and efficiently. The lack of proper database for common use by different projects or for different planning purposes always makes sound decision-making difficult, and tends to invite arbitrary political intervention. In Vietnam, no nationwide transport planning hasn't been undertaken since the NTSR¹ and database is imperatively needed for the scientific, efficient transport planning. Therefore, the VITRANSS intends to review existing database and to develop a suitable one with its management system.

In order that the VITRANSS database can be effectively utilized by various agencies and planning bodies and be properly managed over the year, the following have to be duly considered:

- a) Items and coverage of data should meet the needs of relevant agencies or actual planning
- b) Access and use of the database should be easy, with a simple and clear structure, easy data search and retrieval, direct access through computer network.

4.2 Coverage and Category of Database

Coverage

The VITRANSS database consists of major results of the field surveys and interview surveys conducted in the early stage of VITRANSS and related data obtained from secondary sources and provided by related agencies.

Data Category by Extent of Processing

Each data can be categorized from the point of data processing. The first category is a group of unprocessed or less processed data such as traffic count. Those raw data will be useful for a person with some specified or particular intention of analysis.

The secondary category is a group of processed data such as various kinds of OD matrices and a computerized transport network for simulation work.

¹ The NTSR (National Transport Sector Review, 1990-1992) was a first comprehensive transport master plan based on a scientific approach done in 1990-1992.

The last one is a group of forecast data, which includes future demographic data, future OD matrices and future networks and projects proposed in the VITRANSS. The data in this category will need a careful treatment when they are made open to the public because every forecast is made inevitably based on several assumptions or preconditions. Therefore, open use of the forecast data will need further examination in order to avoid misunderstanding and misuse.

An example of data classification into three categories is shown in Table 4.2.1.

Table 4.2.1
 VITRANSS Database Classified by Data Processing Extent

Category	Primary Data (Original Data)	Secondary Data (Processed Data)	Tertiary Data (Forecast Data)
Socio-economic Data	<ul style="list-style-type: none"> • Population and GDP • Employment/industrial Output 		<ul style="list-style-type: none"> • Future Population and GDP data
Traffic and Transport Demand Data	<ul style="list-style-type: none"> • Traffic Count Data(Road/River) • OD Interview • Traffic Volume Data provided from related agencies. 	<ul style="list-style-type: none"> • Present OD Matrix 	<ul style="list-style-type: none"> • Future OD Matrix
Transport Network Data	<ul style="list-style-type: none"> • Road Inventory Data • Route Data(Road, River, Rail, Coastal Shipping and Air) 	<ul style="list-style-type: none"> • Present Network Data 	<ul style="list-style-type: none"> • Future Network Data
Other Transport Related Data	<ul style="list-style-type: none"> • Questionnaire Survey Data for 61 Provinces • Transport Industry Survey Data • Transport Terminal Survey Data • Transport Survey in Rural Area 		

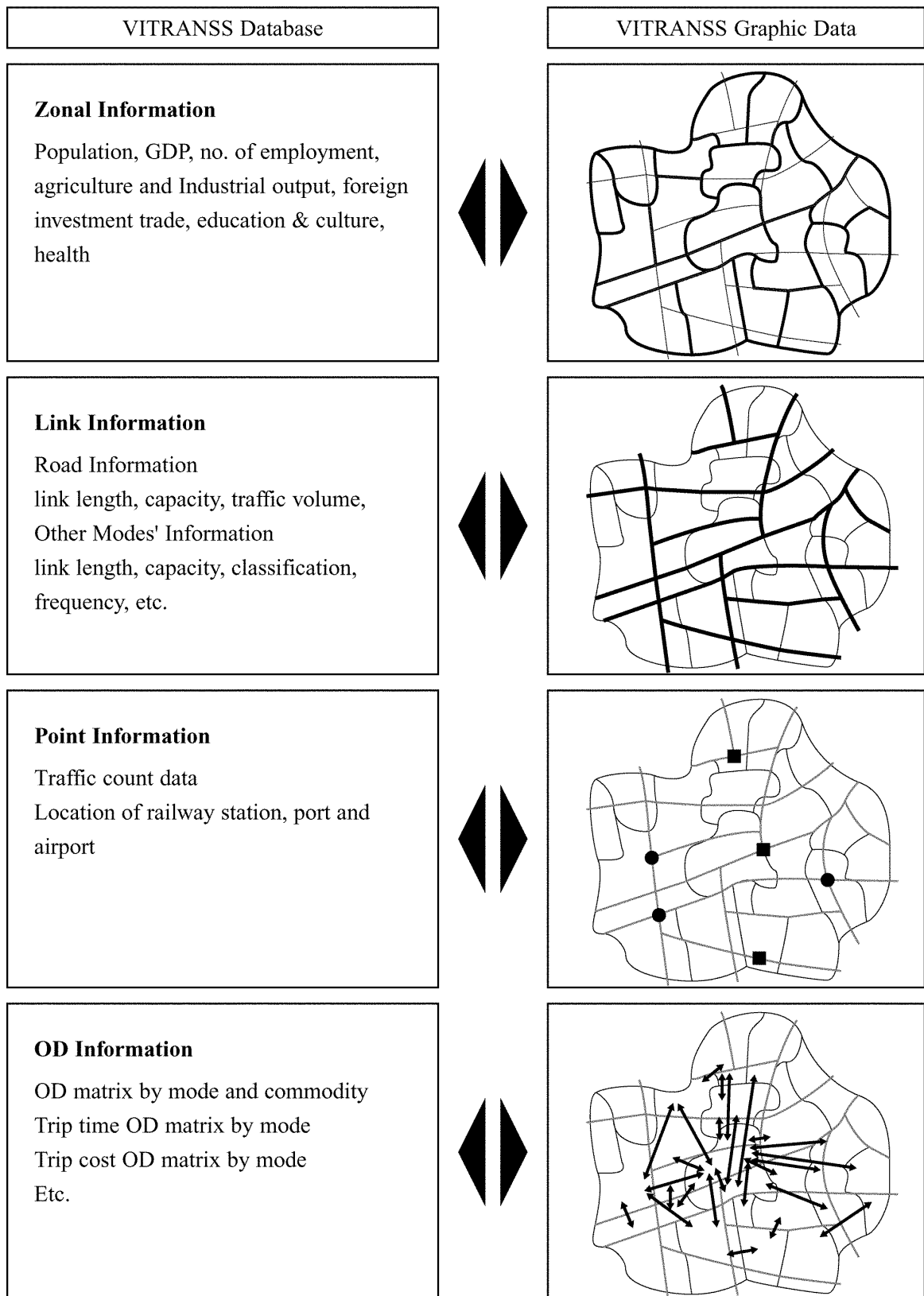
Data Category by Correspondent Figure

Most of data can be plotted on a map in a form of an area, a line or a point and then such data are classified according to the shape of its figure. From this point of view, every data will be classified into five categories:

- a) Zonal information data
- b) Line information data
- c) Point information data
- d) OD information data(Inter-provincial information data)
- e) Other non-geographical data

An example of this data classification is shown in Figure 4.2.1. The classification will be become when the data retrieval system is designed.

Figure 4.2.1
 Relationship between Database and Graphic Data



4.3 Basic Structure of VITRANSS Database

Concept of VITRANSS Database System

Figure 4.3.1 illustrates a total image of the VITRANSS Database system. Each data file is compiled either into the numeric database or into the graphic data, both of which compose the VITRANSS Database.

It is recommendable for an agency (for example, TDSI) in charge of management and maintenance of the VITRANSS Database to open a home page in the Internet which will provide users with a detail menu, sample outputs of the Database and an application form to request a data.

In order to process the data into the requested form, it may be recommendable to apply ready-made software rather than developing a new package for data processing. Well-known software is, for example, "Microsoft Excel" as a database application, "Mapinfo" as a graphic(or GIS) application and "JICA-STRADA" as a planning application. All data files should be designed to be accessible with those applications.

After setting up database system, output information can be obtained either in a file saved in a floppy disk or in a printed list and/or drawing with a printer or a plotter.

VITRANSS Database

VITRANSS database consists of socio-economic database, traffic and transport demand database, transport network database and other transport-related database as illustrated in Figure 4.3.2.

1) Socio-economic Database

Socio-economic database includes socio-economic indicator such as population, urban population, population density, GDP, GDP per capita, employment, foreign direct investment and so on. It was compiled into "Microsoft" format but it can also be integrated with zonal information using GIS software such as "Mapinfo". As a result, it can be processed into graphic information and it can help to upgrade the understanding of social, economic structure with easy and simple. Future socio-economic data forecasted under the precondition or assumption of VITRANSS as well as present one mainly from the "Statistic Yearbook" can be made access.

2) Traffic and Transport Demand Database

Traffic and transport demand database is composed of road traffic survey data,

river traffic survey data, supplementary road/river traffic survey data and OD matrices. Most of the data is the result of field survey conducted in the first stage of VITRANSS. It was compiled both into “Microsoft” file format and into “Text” file format. On the other hand, OD matrices are the secondary data processed from field survey data and data provided by related agencies. They were compiled into the “JICA STRADA” file format.

3) Transport Network Database

Road inventory data, mode route data and transport network data for assignment are the main parts of transport network database. Road inventory data is a mixed result of existing road inventory data and findings of VITRANSS. It contains detail components such as link length, road type, paved width, surface condition, paved type, roadside friction and terrain condition. It was made full use in order to decide the capacity and speed of road in transport network for assignment. Modes’ route data contains basic data such as link length, frequency and so on concerning railway, inland waterway, coastal shipping and air route. The road inventory data and modes’ route data were compiled into “Mapinfo” file format. As a result of the process of road inventory and modes’ route data, transport network for assignment is completed as a file of “JICA STRADA”.

4) Other Transport Related Database

Other transport-related database consists of passenger/truck driver interview data, transport industry survey data and questionnaire survey data for 61 provinces. The passenger/truck driver interview survey was to investigate the movement of passenger and cargo at passenger/cargo terminal. It was compiled both into “Excel” file format and into “Text” file format. The rest were to grasp the transport-related situation such as operational, financial condition in transport industry and in 61 provinces. They were compiled into “Microsoft Excel” file format.

Figure 4.3.1
Basic Concept of VITRANSS Database System

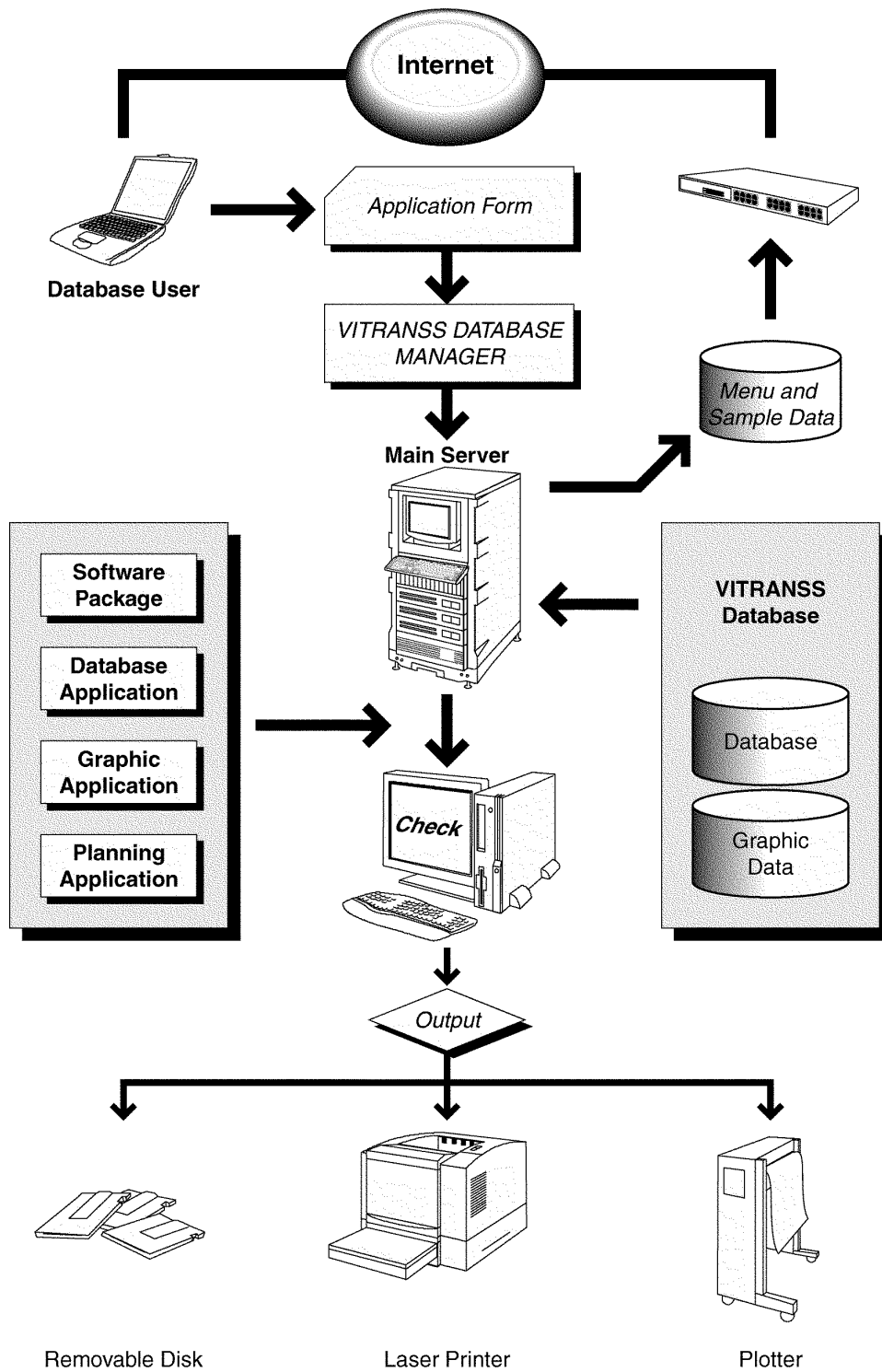
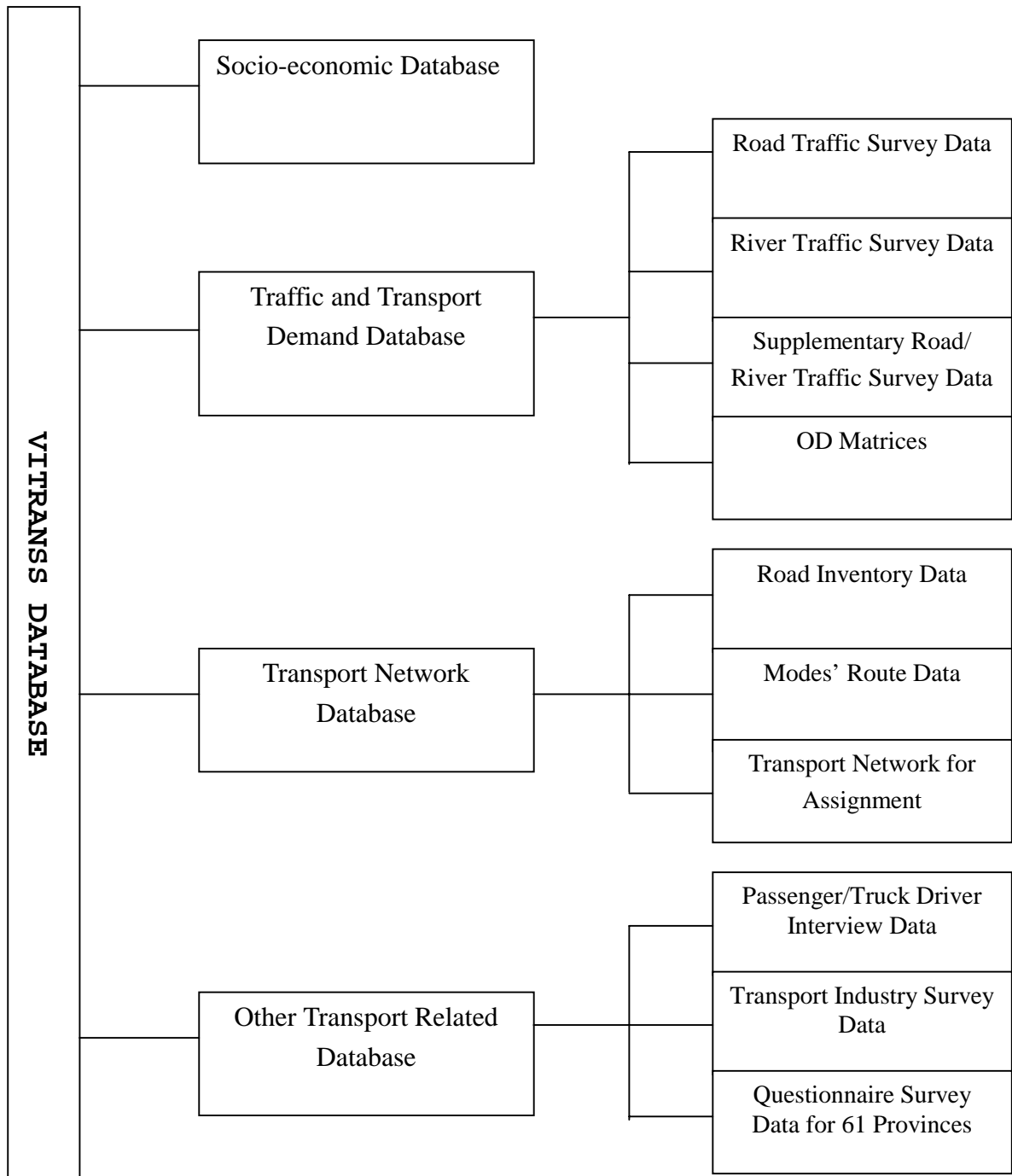


Figure 4.3.2
 Structure of VITRANSS Database



4.4 Socio-economic Database

Outline

In order not only to capture the current social, economic structure but also to implement the effective, scientific transport master plan, socio-economic database should be set up and analyzed. Most of the socio-economic data are provided from the “Statistical Yearbook”. Also, if necessary, other related references such as WB report are referred.

Based on present socio-economic data, socio-economic data in future, mainly population and GDP, are also proposed by VITRANSS. Though those data will need a careful treatment in their usage, they will be also made open to the public as relevant socio-economic database.

Present Socio-economic Database

Socio-economic data file includes nine sheets; demography, GDP, transport, agriculture, forestry & fishery, industry & construction, foreign investment & trade, education & culture and health. It was compiled into “Microsoft Excel” format as illustrated in Table 4.4.1.

Table 4.4.1
 Contents of Present Socio-economic Data File

Name of Sheet	Contents
Demography	<ul style="list-style-type: none"> • Area • Population • Population Density(pers./km²) • Urban population • Ratio of urbanization
GDP	<ul style="list-style-type: none"> • GDP by sector(VND billion) • GDP per capita(VND million)
Employment	<ul style="list-style-type: none"> • Employment by sector(1,000 persons)
Transport	<ul style="list-style-type: none"> • Passengers by road and inland water(1,000 passengers and million-passenger km) • Freight by road and inland water(1,000 tons and million-ton km)
Agriculture, Forestry & Fishery	<ul style="list-style-type: none"> • Gross output by the type of crop • Sown area(1,000 ha)
Industry & Construction	<ul style="list-style-type: none"> • No. of industrial establishments • No. of enterprises • Industrial gross output(VND billion)
Foreign Investment & Trade	<ul style="list-style-type: none"> • No. and amount of FDI projects • No. of trade business, hotel, restaurant, tourism and service
Education & Culture	<ul style="list-style-type: none"> • No. of students by type of school • No. of teachers by type of school
Health	<ul style="list-style-type: none"> • No. of doctors and nurses • No. of hospital beds

Future Socio-economic Database

Population and urbanization in future have been forecasted after reviewing the two government documents issued by the National Committee for Population and Family Planning(NCPFP) and the Ministry of Construction. Whereas an econometric model proposed by L.R. Klein and R.F. Kosobud was applied for GDP forecast in future. The data will provide information on population, urban population, GDP and GDP per capita by province or by sector in future. A summary of socio-economic data in future is listed in Table 4.4.2.

Table 4.4.2
 Contents of Future Socio-economic Data File

Name of Sheet	Contents
Population2010	<ul style="list-style-type: none"> Population and urban population in 2010
Population2020	<ul style="list-style-type: none"> Population and urban population in 2020
GDP2010L	<ul style="list-style-type: none"> GDP by sector and GDP per capita under the assumption of low economic growth in 2010
GDP2010H	<ul style="list-style-type: none"> GDP by sector and GDP per capita under the assumption of high economic growth in 2010
GDP2020L	<ul style="list-style-type: none"> GDP by sector and GDP per capita under the assumption of low economic growth in 2020
GDP2020H	<ul style="list-style-type: none"> GDP by sector and GDP per capita under the assumption of high economic growth in 2020

4.5 Traffic and Transport Demand Database

Outline

Among others, information on traffic and transport demand is one of the most essential and important data in the VITRANSS Database. It is made from VITRANSS transport surveys or from existing traffic data. Traffic data of road and inland water comes from the former whereas that of rail, coastal shipping and air is made from the latter.

As for VITRANSS transport surveys shown in Table 4.5.1, data processing works started to develop the master file after survey was completed. The transport survey result includes non-numeric information such as a provincial name and a river name. This non-numeric information was transformed to numeric data according to a code system. After the coding, all information was encoded by a data entry system. Encoded data was checked and the error data was corrected. Such primary data encoded was processed and used to make the secondary data such as present OD matrices.

Table 4.5.1
 A Set of VITRANSS Transport Surveys

Survey Type	Objective	Coverage	Method
Road Traffic Survey	<ul style="list-style-type: none"> • Current traffic volume • Transport characteristics of passengers and cargoes 	<ul style="list-style-type: none"> • On-road 39 stations(20 in the north, 6 in the central and 13 in the south) 	<ul style="list-style-type: none"> • 3-day traffic count • 1-day(14 hrs.) OD interview
River Traffic Survey	<ul style="list-style-type: none"> • Current vessel traffic volume • Transport characteristics of river vessels 	<ul style="list-style-type: none"> • 40 stations at river sections(20 in the Red River Delta and 20 in the Mekong River Delta) 	<ul style="list-style-type: none"> • 2-day(24 or 14 hrs.) traffic count • 1-day(14 hrs.) OD interview at selected 15 stations
Supplementary Road/River Traffic Survey	<ul style="list-style-type: none"> • Current road/river traffic volume during rainy season 	<ul style="list-style-type: none"> • On-road 18 stations • 5 river sections 	<ul style="list-style-type: none"> • 1-day(14 hrs) traffic count

From the viewpoint of cost efficiency, existing traffic data was also made full use. Some data was provided by related agencies and the other came from the past studies. As a relevant data, they will be also made open to the public.

Taking seasonal fluctuation of traffic volume into account, supplementary road/river traffic survey is needed. Though no significant differences of traffic volume between dry and rainy season are found out in VITRANSS, it will be the portion of VITRANSS database.

OD matrices, resulting from the process of transport survey data and existing traffic data, will be made open to the public as a “JICA STRADA” file.

Road Traffic Survey

On-road traffic survey was conducted at 39 stations along National Highway, including traffic count and OD interview. See Technical Report I for more details concerning traffic survey.

1) Traffic Count Database

Traffic count data was processed into “Microsoft Excel” file format as illustrated in Table 4.5.2. As traffic survey was conducted through 3 days, each file is composed of four sheets, i.e., traffic count data of the first day, the second day and the third day and the average traffic count data.

2) OD Interview Survey

OD interview survey data was processed not only into “Microsoft Excel” file format but also into “Text” file format. Its format is shown in Table 4.5.3.

Table 4.5.2
 List of Road Traffic Count Data Files

Station No.	National Highway No.	Location	Province	Traffic Count Data File
1	6	North of Thuan Chau	Son La	Tram1.xls
2	70	South Bao Yen	Lao Cai	Tram2.xls
3	2	North of Ham Yen(Tan Yen)	Tuyen Quang	Tram3.xls
4	2	South of Viet Tri Bridge	Vinh Phuc	Tram4.xls
5	3	Dong Phu(South of Cho Moi)	Thai Nguyen	Tram5.xls
6	3	South of Pho Yen(Ba Hang)	Thai Nguyen	Tram6.xls
7	1	South of Dap Cau	Bac Ninh	Tram7.xls
8	1	North of Kep	Bac Giang	Tram8.xls
9	18	East of Sao Do(Chi Linh)	Hai Duong	Tram9.xls
10	4B	East of Dinh Lap	Lang Son	Tram10.xls
11	6	North East of Tong Dau	Hoa Binh	Tram11.xls
12	6	East of Xuan Mai	Ha Tay	Tram12.xls
13	37	Thuong Bang La	Yen Bai	Tram13.xls
14	1	South of Dong Van	Ha Nam	Tram14.xls
15	21	North of Lac Thuy(Chi Ne)	Hoa Binh	Tram15.xls
16	1	North of Ninh Binh Town	Ninh Binh	Tram16.xls
17	1	North of Bim Son	Thanh Hoa	Tram17.xls
18	10	South of Nghin Bridge	Thai Binh	Tram18.xls
19	5	East of Du Nghia	Hai Phong	Tram19.xls
20	10	West of Yen Hung(Quang Yen)	Quang Ninh	Tram20.xls
21	9	West of Dong Ha	Quang Tri	Tram21.xls
22	1	Lang Co	Thua Thien Hue	Tram22.xls
23	14B	East of Dai Loc(Ai Nghia)	Quang Nam	Tram23.xls
24	1	North of Tam Ky	Quang Nam	Tram24.xls
25	19	East of An Kye Pass(Phu Phong)	Binh Dinh	Tram25.xls
26	26	East of Phuong Hoang Pass	Khanh Hoa	Tram26.xls
27	14	North of Dong Xoai	Binh Phuoc	Tram27.xls
28	20	South of Ma Da Gui	Dong Nai	Tram28.xls
29	1	South of Ham Thuan Nam	Binh Thuan	Tram29.xls
30	51	North of Phu My(Tan Thanh)	Ba Ria Vung Tau	Tram30.xls
31	1	North of Dong Nai Bridge	Dong Nai	Tram31.xls
32	13	South of Thu Dau Mot	Bing Duong	Tram32.xls
33	1	North of Tan An	Long An	Tram33.xls
34	22	East of Trang Bang	Tay Ninh	Tram34.xls
35	60	South of Rach Mieu Ferry	Ben Tre	Tram35.xls
36	30	East of Cao Lanh	Dong Thap	Tram36.xls
37	1	North of Can Tho Ferry	Ving Long	Tram37.xls
38	80-	South of Thach Hung(Lap Vo)	Dong Thap	Tram38.xls
39	91	West of Long Xuyen	An Giang	Tram39.xls

Table 4.5.3
On-road OD Interview Survey Format

No.	Item	Type	Length	Column	Remark
1	Station No.	N	3	1-3	See Table 4.5.2
2	Road No.	C	7	4-10	
3	Date	N	3	11-13	
4	Month	N	3	14-16	
5	Year	N	5	17-21	
6	Time	N	6	22-27	
7	Direction	N	2	28-29	
8	Vehicle Type	N	2	30-31	1:car, 2:mini bus, 3:large bus, 4:pick-up, 5:2 axle 6-w truck, 7:4 or more axle truck, 8:others
9	Vehicle Model	N	3	32-34	
10	Vehicle Owner	N	2	35-36	1:private, 2:state, 3:joint venture
11	Origin Code	N	6	37-42	See Appendix 1-A
12	Destination Code	N	6	43-48	See Appendix 1-A
13	No. of Seat	N	4	49-52	
14	No. of Passengers(including driver)	N	4	53-56	
15	No. of Passengers(excluding driver)	N	4	57-60	
16	No. of Trips	N	3	61-63	
17	Per day	N	3	64-66	
18	Total weight of truck	N	5	67-71	
19	Total weight of cargo carried	N	5	72-76	
20	Type of cargo carried	N	3	77-79	See Appendix 1-B
21	Weight of cargo carried	N	7	80-86	
22	Type of cargo carried	N	3	87-89	See Appendix 1-B
23	Weight of cargo carried	N	7	90-96	
24	Type of cargo carried	N	3	97-99	See Appendix 1-B
25	Weight of cargo carried	N	7	100-106	
26	Type of cargo carried	N	3	107-109	See Appendix 1-B
27	Weight of cargo carried	N	7	110-116	
28	Type of Transport	N	2	117-118	See Appendix 1-B
29	Type of Loading	N	2	119-120	

River Traffic Survey

1) Traffic Count Database

Traffic count data was processed into “Microsoft Excel” file format as illustrated in Table 4.5.4. As traffic survey was conducted through 2 days, each file contains three sheets, i.e., traffic count data of the first day and the second day and the average traffic count data.

2) OD Interview Survey Database

OD interview survey data was processed not only into “Microsoft Excel” file format but also into “Text” file format. Its format is shown in Table 4.5.5.

Table 4.5.4
 List of River Traffic Count Data Files

Station No.	Station Name	River Name	Traffic Count Data File
1	Yen Hung	Chanh	
2	Thai Binh	Tra Ly	
3	Ben Trieu	Kinh Thay	
4	Bac Giang	Thuong	
5	Yen Tap	Cau	
6	Duong Ha	Duong	
7	Son Tay	Hong	
8	Viet Tri	Lo	
9	Co Tiet	Hong	
10	Khanh Chuc	Da	
11	Khuyen Luong	Hong	
12	Ha Noi	Hong	
13	Phu Nha	Hong	
14	Ben Kien	Cam	
15	Noi Thanh	Ha Ly-Lach Tray	
16	Ninh Giang	Luoc	
17	Lac Quan	Ninh Co	
18	Do Quan	Nam Dinh	
19	Kim Dai	Cua Day	
20	Cong Cau	Thai Binh	
21	Phuoc Dong	Can Giuoc-Nuoc Ma	
22	Binh Duc	Vam Co Dong	
23	Ben Luc	Cho Dem-Ben Luc	
24	An Long	Thap Muoi Soi	
25	Chau Phu	Ba The	
26	Tan Hiep	Rach Soi	
27	Hon Dat	Rach Gia-Ha Tien	
28	Cho Gao	Cho Gao	
29	Song Tien	Tien	
30	Cho Lach	Cho Lach	
31	Tam Binh	Mang Thit	
32	Ca Mau	Ganh Hao	
33	Vin Thanh	Xa No	
34	Ben Tre	Ben Tre	
35	Long Xuyen	Hau	
36	Bien Hoa	Dong Nai	
37	Lap Vo	Sa Dep-Lap Vo	
38	Cao Lanh	Tien	
39	Bac Lieu	Ca Mau-Bac Lieu	
40	Vinh Thai	Co Chien	

Table 4.5.5
 River OD Interview Survey Format

No.	Item	Type	Length	Column	Remark
1	Station No.	N	3	1-3	See Table 4.5.4
2	Date	N	3	4-6	
3	Month	N	3	7-9	
4	Year	N	5	10-14	
5	Time	N	6	15-20	
6	River Name	N	7	21-27	See Appendix 4-A
7	Direction	N	2	28-29	
8	Vessel Type	N	2	30-31	1:sea-going vessel, 2:ship & self propelled, 3:oil tanker, 4:tow barge, 5:push barge, 6:passenger ship, 7:non-motor boat
9	Vessel Owner	N	2	32-33	1:private, 2:state, 3:joint venture
10	Origin Code	N	6	34-39	See Appendix 1-A
11	Destination Code	N	6	40-45	See Appendix 1-A
12	No. of Seat	N	4	46-49	
13	No. of Passenger	N	3	50-52	
14	No. of Crew	N	3	53-55	
15	No. of Trip	N	4	56-59	
16	Per day	N	4	60-63	
17	Capacity registered (Vessel)	N	6	64-69	
18	Dimension of Vessel (Length)	N	6	70-75	
19	Dimension of Vessel (Width)	N	6	76-81	
20	Dimension of Vessel (Depth registered)	N	6	82-87	
21	Capacity of Pushing Vessel	N	6	88-93	
22	Capacity of Towing Vessel	N	6	94-99	
23	No. of barge	N	6	100-105	
24	Capacity registered (barge)	N	6	106-111	
25	Dimension of Barge (Length)	N	6	112-117	
26	Dimension of Barge (Width)	N	6	118-123	
27	Dimension of Barge (Depth registered)	N	6	124-129	
28	Type of cargo carried	N	3	130-132	See Appendix 1-B
29	Weight of cargo carried	N	7	133-139	
30	Type of cargo carried	N	3	140-142	See Appendix 1-B
31	Weight of cargo carried	N	7	143-149	
32	Type of cargo carried	N	3	150-152	See Appendix 1-B
33	Weight of cargo carried	N	7	153-159	
34	Type of cargo carried	N	3	160-162	See Appendix 1-B
35	Weight of cargo carried	N	7	163-169	

Supplementary Road/River Traffic Survey Database

Supplementary traffic survey was conducted in some selected places for both road and river in order to assess the traffic volume of the rainy season. It contains only traffic count data processed into “Microsoft Excel” file format as shown in Table 4.5.6 and Table 4.5.7.

Table 4.5.6
 List of Supplementary Road Traffic Count Data Files

Station No.	National Highway No.	Location	Province	Traffic Count Data File
4	2	South of Viet Tri Bridge	Vinh Phuc	Sram4.xls
5	3	Dong Phu(South of Cho Moi)	Thai Nguyen	Sram5.xls
6	3	South of Pho Yen(Ba Hang)	Thai Nguyen	Sram6.xls
7	1	South of Dap Cau	Bac Ninh	Sram7.xls
11	6	North East of Tong Dau	Hoa Binh	Sram11.xls
14	1	South of Dong Van	Ha Nam	Sram14.xls
17	1	North of Bim Son	Thanh Hoa	Sram17.xls
19	5	East of Du Nghia	Hai Phong	Sram19.xls
27	14	North of Dong Xoai	Binh Phuoc	Sram27.xls
28	20	South of Ma Da Gui	Dong Nai	Sram28.xls
29	1	South of Ham Thuan Nam	Binh Thuan	Sram29.xls
30	51	North of Phu My(Tan Thanh)	Ba Ria Vung Tau	Sram30.xls
31	1	North of Dong Nai Bridge	Dong Nai	Sram31.xls
32	13	South of Thu Dau Mot	Bing Duong	Sram32.xls
33	1	North of Tan An	Long An	Sram33.xls
34	22	East of Trang Bang	Tay Ninh	Sram34.xls
37	1	North of Can Tho Ferry	Ving Long	Sram37.xls
39	91	West of Long Xuyen	An Giang	Sram39.xls

Table 4.5.7
 List of Supplementary River Traffic Count Data Files

Station No.	Station Name	River Name	Traffic Count Data File
3	Ben Trieu	Kinh Thay	
6	Duong Ha	Duong	
13	Phu Nha	Hong	
21	Phuoc Dong	Can Giuoc-Nuoc Ma	
28	Cho Gao	Cho Gao	
37	Lap Vo	Sa Dep-Lap Vo	

OD Matrices

OD matrices were made from the traffic survey data and the full usage of existing traffic data. The OD matrices of road and inland water came from the former while those of rail, coastal shipping and air were made from the latter. Finally, they were compiled into “JACA STRADA” file format as illustrated in Figure 4.5.1. All the OD matrices are summarized as Table 5.8.

Figure 4.5.1
 An Example of OD Matrix

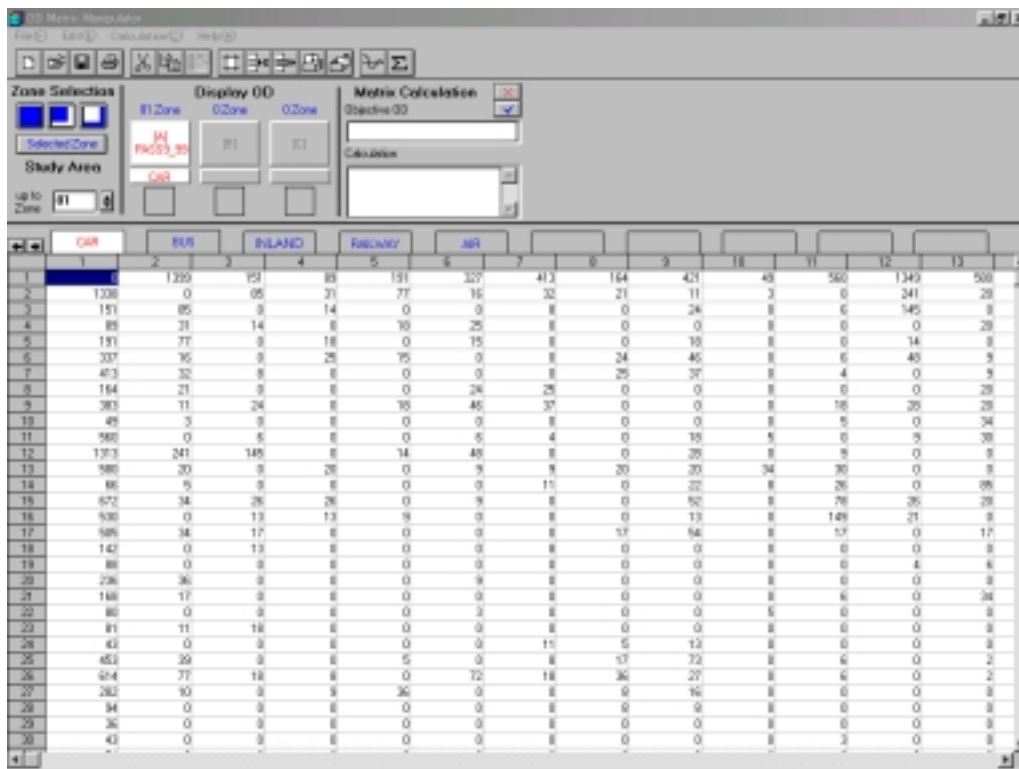


Table 5.8
 Summary of OD Matrices

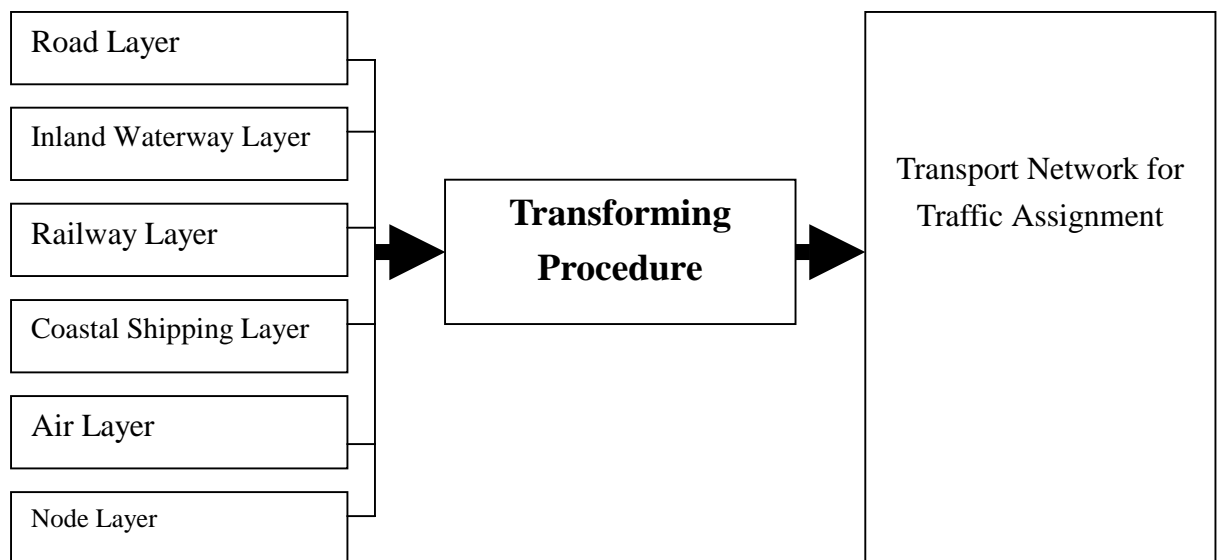
Type	Year	By Mode	By Commodity	By Mode and Commodity
Passenger	1999	Pass99.aod		
	2010	Pass10.aod		
	2020	Pass20.aod		
Freight	1999		F99.aod	R99.aod(road), I99.aod(inland water), ra99.aod(rail), c99.aod(coastal shipping), a99.aod(air)
	2010		F10.aod	R10.aod(road), I10.aod(inland water), ra10.aod(rail), c10.aod(coastal shipping), a10.aod(air)
	2020		F20.aod	R20.aod(road), I20.aod(inland water), ra20.aod(rail), c20.aod(coastal shipping), a20.aod(air)

4.6 Transport Network Database

Outline

Transport network inventories provide the basic information on establishing transport network that is used as a tool to determine traffic flows at present or in future. The inventories consist of five modes' layers of locating and describing each link and one node layer of locating and representing each node. The description of each link includes a measure of link capacity and condition, and a statement of its performance characteristics. Those inventories were all compiled into "Mapinfo" file format and enable to make transport network for traffic assignment represented as "JICA STRADA" file format. Interaction between transport inventory data and transport network for traffic assignment is illustrated in Figure 4.6.1. A tool of transforming procedure, which was developed in the VITRANSS, transforms "Mapinfo" files of road, inland waterway, railway, coastal shipping, air and node layers into a transport network of "JICA STRADA" file and, as a result, enables to make the transport network for traffic assignment with easy.

Figure 4.6.1
Interaction between Node's & Modes' Layers and Transport Network



Transport Network Inventory Database

Transport network inventory data has been built in "Mapinfo", a kind of GIS software, which enables users to update the database, create thematic maps, perform geographic analysis and give graphic presentations. As mentioned earlier, it consists of five modes' layers, i.e., road, inland waterway, railway, coastal shipping and air route, and one node layer. The modes' layers are composed of a set of line objects and polyline objects, with each object representing road section,

railway segment, air route and so on. Also each link contains information on geographical characteristics, modes' characteristics and land use. The node layer is composed of a set of point objects, with each object representing intersection, railway station, port, airport and zone centroid. The file name of each layer is summarized as Table 4.6.1 and An example of transport network is depicted in Figure 4.6.2.

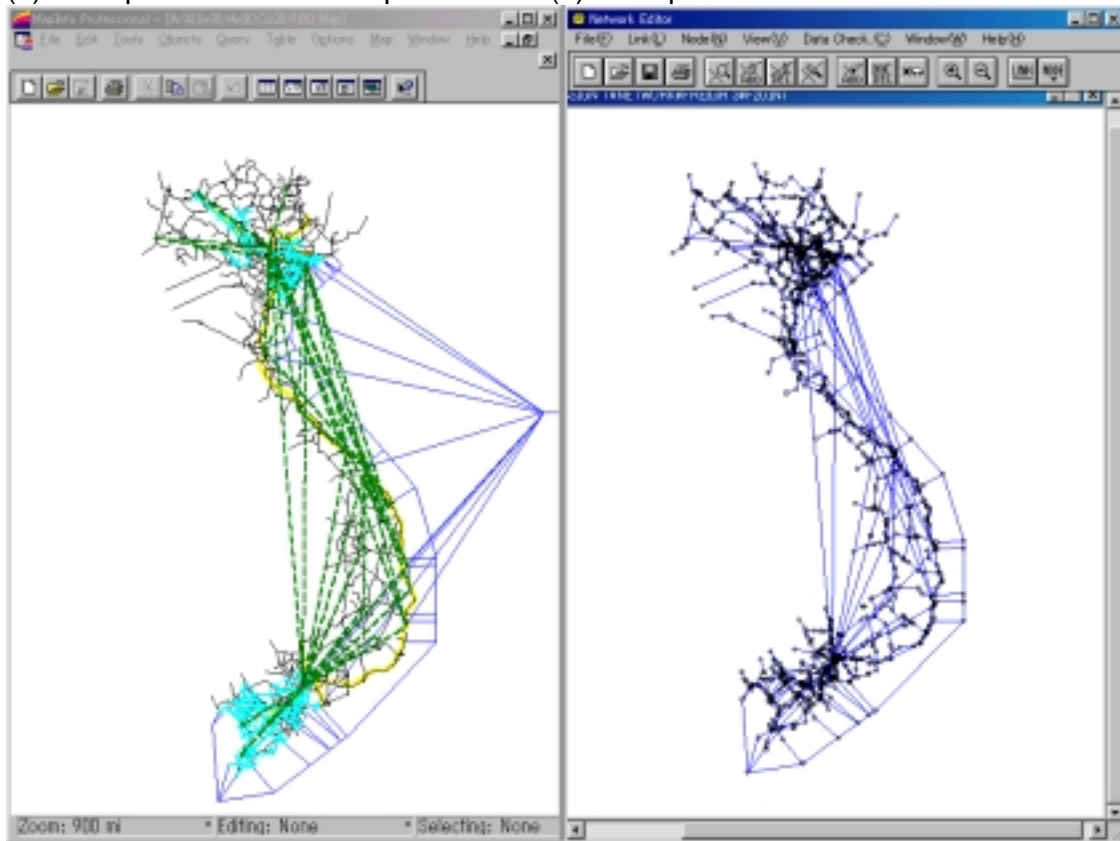
Table 4.6.1
 List of Transport Inventory Data Files

Layer	Inventory	File Name
Road	Link length, road type, province name included, paved width, paved type, terrain condition, roadside friction, etc.	Hw30.mif Hw30.mid
Inland Waterway	Link length, speed, river classification, etc.	lw30.mif lw30.mid
Rail	Link length, speed, frequency, etc.	Ra30.mif Ra30.mid
Coastal Shipping	Link length, speed, etc.	Cs30.mif Cs30.mid
Air	Link length, speed, etc.	Ar30.mif Ar30.mid
Node	Latitude and longitude	Nodes.mif Nodes.mid

Figure 4.6.2
 A glance of Transport Network

(a) Transport Network of "Mapinfo"

(b) Transport Network of "JICA STRADA"



Transport Network for Traffic Assignment

Transport network mentioned in this section is a data file for traffic assignment processed into the “JICA STRADA” file format². Five modes’ layers and one node layer as inputs are integrated into one file of network data. Each link, which contains information such as link length, initial speed, link capacity and so on, can be discriminated by user flag as shown in Table 4.6.2. Dummy link is for representing of transfer from one mode to other modes.

Table 4.6.2
 User Flag of Transport Network in VITRANSS

	Link	Dummy Link
Centroid	Z	
Road	R	
Inland Waterway	I	W
Railway	L	Y
Coastal Shipping	C	S
Air route	A	P

According to purposes or projects taken into account in VITRANSS, the performance characteristics of link or the number of link in transport network will be changed. So, two types of transport networks will be made open: ones at present and for Master Plan in VITRANSS. It is summarized as Table 4.6.3.

Table 4.6.3
 List of Transport Network Data Files

Type	File Name
Passenger	P99.int(at present) P10.int(for MP)
Freight	F99.int(at present) F10.int(for MP)

4.7 Other Transport-related Database

Outline

Other transport-related database is composed of passenger/truck driver interview survey data, transport industry survey data and questionnaire survey data for 61 provinces as shown in Table 4.7.1.

² For the format of transport network in “JICA STRADA”, it is recommended to refer to its manual.

Table 4.7.1
 List of Other Transport-related Database

Survey Type	Objective	Coverage	Method
Passenger/Truck Driver Interview Survey at Transport Terminal	<ul style="list-style-type: none"> • Characteristics of passenger's and cargo's movement 	<ul style="list-style-type: none"> • Major transport terminals(bus station, railway station, airport, truck terminal) 	<ul style="list-style-type: none"> • Direct interview of passengers and truck drivers
Transport Industry Survey	<ul style="list-style-type: none"> • Characteristics of transport industry(operation, finance, management and labor force etc.) 	<ul style="list-style-type: none"> • Coastal shipping operators • Inland waterway transport operators • Bus operators • Truck operators 	<ul style="list-style-type: none"> • Preparation of operators' list • Sending questionnaire to sampled operators
Questionnaire Survey for 61 Provinces	<ul style="list-style-type: none"> • Characteristics of transport-related aspects in 61 provinces 	<ul style="list-style-type: none"> • 61 provinces 	<ul style="list-style-type: none"> • Preparation of operators' list • Sending questionnaire to sampled operators

Passenger/Truck Driver Interview Survey Database

Passenger/truck driver interview survey was conducted at main mode interchange facilities, i.e., bus terminal, railway station, airport and truck terminal(port and railway station), in order to grasp the situation of the interchange facilities and the movement of passenger and cargo. After survey was completed, survey data was processed both into "Microsoft Excel" file format and into "Text" file format according to a coding system. As for the former, the list of files is shown in Table 4.7.2. In addition, the format of "Text" file is depicted in Table 4.7.3.

Table 4.7.2
List of Passenger/Truck Driver Interview Survey Data Files

Survey Type	Data File Name	Sta. No.	Survey Station
Bus Terminal Passenger	Bus.xls	11	Gia Lam(Ha Noi)
		12	Giap Bat(Ha Noi)
		13	Hai Phong
		14	East Terminal(HCMC)
		15	West Terminal(HCMC)
		16	Vinh
		17	Hue
		18	Da Nang
		19	Buon Ma Thuot
		20	Can Tho
Railway Passenger	Railway.xls	21	Long Bien(Ha Noi)
		22	Ha Noi
		23	Hai Phong
		24	Viet Tri
		25	Kep
		26	Vinh
		27	Hue
		28	Da Nang
		29	Nha Trang
		30	Hoa Hung(HCMC)
Airport Passenger	Airport.xls	31	Noi Bai(International)
		32	Noi Bai(Domestic)
		33	TSN(International)
		34	TSN(Domestic)
		35	Da Nang
		36	Nha Trang
		37	Hue
Truck Driver	Trucksurvey.xls	41	Hai Phong Port
		42	Sai Gon Port
		43	Cua Lo Port
		44	Da Nang Port
		45	Quy Nhon Port
		46	Viet Tri Sation
		47	Yen Vien Station
		48	Van Dien Station
		49	Da Nang Station
		50	Song Than Station

Table 4.7.3
Passenger Interview Survey Data Format

No.	Item	Type	Length	Column	Remark
1	Sex	N	4	1-4	1:Male, 2:Female
2	Age	N	4	5-8	
3	Occupation	N	4	9-12	See Appendix 4-B
4	Residence	N	6	13-18	See Appendix 1-A
5	Work/school place	N	6	19-24	See Appendix 1-A
6	Car ownership	N	4	25-28	1:yourself, 2:family member's, 3:none
7	Origin	N	6	29-34	See Appendix 1-A
8	Final destination	N	6	35-40	See Appendix 1-A
9	Trip purpose	N	4	41-44	1:to home, 2:to work, 3:to school, 4:private business, 5:employer's business, 6:accompany, 7:others
10	From(origin)	N	6	45-50	See Appendix 1-A
11	To	N	6	51-56	See Appendix 1-A
12	Transport Mode	N	4	57-60	See Appendix 4-C
13	To	N	6	61-66	See Appendix 1-A
14	Transport Mode	N	4	67-70	See Appendix 4-C
15	To	N	6	71-76	See Appendix 1-A
16	Transport Mode	N	4	77-80	See Appendix 4-C
17	To	N	6	81-86	See Appendix 1-A
18	Transport Mode	N	4	87-90	See Appendix 4-C
19	To	N	6	91-96	See Appendix 1-A
20	Transport Mode	N	4	97-100	See Appendix 4-C
21	To	N	6	101-106	See Appendix 1-A
22	Transport Mode	N	4	107-110	See Appendix 4-C
23	To	N	6	111-116	See Appendix 1-A
24	Transport Mode	N	4	117-120	See Appendix 4-C
25	Time for walking and buying ticket	N	4	121-124	
26	Time for waiting	N	4	125-128	
27	Chosen reason 1	N	4	129-132	1:near to origin/destination, 2:convenient route, 3:no. of transfer, 4:quick transfer, 5:seat available, 6:clear, 7:others
28	Chosen reason 2	N	4	133-136	
29	Problem 1	N	4	137-140	1:congestion around, 2:congestion inside, 3:poor walking condition, 4:dirty, 5:poor security/safety, 6:poor waiting facility, 7:undisciplined driver, 8:others
30	Problem 2	N	4	141-144	
31	Service availability	N	4	145-148	1:very good, 2:good, 3:fair, 4:bad, 5:very bad
32	Frequency	N	4	149-152	
33	Comfort	N	4	153-156	
34	Safety	N	4	157-160	
35	Punctuality	N	4	161-164	
36	WTP for 30 min. reduction	N	6	165-170	
37	WTP for 20 min. reduction	N	6	171-176	
38	WTP for 10 min reduction	N	6	177-182	
39	WTP for 5 min reduction	N	6	183-188	
40	Station No.	N	4	189-192	See Table 4.7.2

Table 4.7.4
Truck Driver Interview Survey Data Format

No.	Item	Type	Length	Column	Remark
1	Vehicle Type	N	4	1-4	1:4-W truck, 2:2-axle 6-W truck, 3:3-axle truck, 4:4 or more than axle truck, 5:trailer, 6:others
2	Vehicle Model	N	4	5-8	
3	Vehicle Owner	N	4	9-12	1:state, 2:provincial, 3:company, 4:individual, 5:joint venture, 6:other
4	Cooperative	N	4	13-16	1:not belonging, 2:belonging
5	Origin	N	6	17-22	See Appendix 1-A
6	Destination	N	6	23-28	See Appendix 1-A
7	Total weight of truck	N	6	29-34	
8	Total weight of cargo carried	N	6	35-40	
9	Types of cargo carried	N	4	41-44	See Appendix 1-B
10	Weight of cargo carried	N	6	45-50	
11	Types of cargo carried	N	4	51-54	See Appendix 1-B
12	Weight of cargo carried	N	6	55-60	
13	Types of cargo carried	N	4	61-64	See Appendix 1-B
14	Weight of cargo carried	N	6	65-70	
15	Types of cargo carried	N	4	71-74	See Appendix 1-B
16	Weight of cargo carried	N	6	75-80	
17	Type of transport	N	4	81-84	See Appendix 1-B
18	Standard of road	N	4	85-88	
19	Condition of road	N	4	89-92	1:serious 2:moderate 3:minor
20	Traffic condition/congestion	N	4	93-96	
21	Loading facilities/services	N	4	97-100	
22	Bus station/freight terminal charges	N	4	101-104	
23	Parking facilities	N	4	105-108	
24	Tolls and other charges	N	4	109-112	
25	Competition from other transporters	N	4	113-116	
26	Police enforcement measures	N	4	117-120	
27	Others	N	4	121-124	
28	Station No.	N	4	125-128	See Table 4.7.2