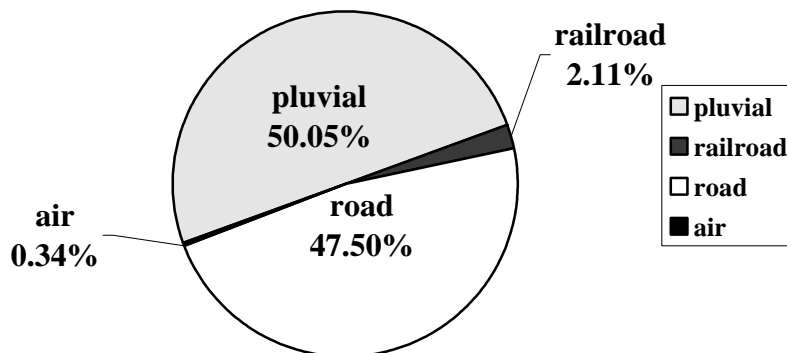


# CHAPTER 4 ORGANIZATION OF TRAFFIC AND ROAD CONSTRUCTION ISSUES

## 4 ORGANIZATION OF TRAFFIC AND ROAD CONSTRUCTION ISSUES

### 4.1 Air, Water, and Land Traffic in Paraguay

Paraguay is located in the center of South America, and despite its not having access to the sea, it holds an extremely important position, since it is in the middle of a future Pacific – Atlantic bi-ocean corridor. Also with the establishment of MERCOSUR, the movement of passengers and goods, both within the country and from/to the other countries member of MERCOSUR, has increased dramatically. Brazilian producers use Paraguay as an access road to Bolivia and some parts of Argentina, and vice-versa. According to the National Direction of Navigation and Ports (Administración Nacional de Navegación y Puertos), 50.04% of Paraguayan imports in 1997 used pluvial transportation, whereas 47.49% of the imports used land transportation, 2.11% used the railroad, and 0.34% used air transportation (see figure below).



**Figure 4.1.1 Transportation of Paraguayan Imports per Mode**

#### (1) Air

There are 10 airports in Paraguay (nine in the eastern region and one in Chaco). Half of these airports are not equipped with lighting, radio help, or a meteorology department. They can operate only during the day. Domestic air services are limited. TAM (Air Transportation of MERCOSUR) that has flights to all the countries of MERCOSUR and to Ciudad del Este, but the new private carriers LADESA and ARPA serve Pedro Juan Caballero, Ciudad del Este, and Encarnación. The National Transportation airlines (LATN) and the Military Air Transportation (TAM), the air force's passenger service, fly to a very few isolated parts of Chaco. In 1997, the domestic air services transported 40,827 passengers. The movement of air freight – imports during 1997 was 8,704.7 tons. Domestic air services are over four times more expensive than land transportation, and the frequencies are low. That is the reason why most people prefer land transportation for trips within the territory of the country, and domestic air services are mostly used by wealthy businessmen, politicians, or in case of emergency.

**(2) Railroad**

There are 434 trains for passengers, and 59 for freight. In 1997, total of 264,923 tons was transported. The ratio Km/passenger was 10,999, and Km/freight was 8,858, Km/operation: 45,868, which makes a total of 65,725 kilometers. The usage of rail for freight transportation has diminished to a great extent in the last five years, because of the shortage of wood production. Five years ago, firewood and wood for construction were two of the most important goods transported by rail, along with cotton and soybean, but the production of wood has severely decreased, partially because of a dramatic shortage in the number of trees due to illegal exploitation, and also because of the laws drawn by the government to protect the remaining forest. In general, Paraguay's antique, wood – burning trains are more interesting than practical. In the capital city, passenger services are limited to a short ride from Asuncion to Aregua, on the shores of Ypacarai Lake, but it is used mainly for touristic purposes.

**(3) Water**

The Paraguay River is navigable almost throughout its entire length. From its confluence with the Parana River in the south of the country through Asuncion to its confluence with the Pilcomayo River, it is navigable through very dense forests. Through less dense forests it is possible to continue up river to Corumbá (Brazil) in the north. The Parana River is also navigable through most of its extension. From its confluence with the Paraguay River up to the Itaipú Dam, near its confluence with the Iguazú River, it can be navigated by large – draft vessels. Upstream of the dam, shallower draft vessels can continue up river. However, during dry seasons, the navigability of the rivers diminishes, and large draft vessels are unable to get to their ports of destination. The main products transported by water are fuel, construction materials, wood, paper, cardboard, agricultural products, cereals, and manufactured goods.

**(4) Roads**

According to the MOPC, the National Road Network includes 25,901 kilometers of route, 3,333 kilometers of which are paved (12%), 2,149 kilometers have a primary gravel course (or another selected material), and 20,419 kilometers are not paved. There are also 35,000 kilometers of tracks. So it makes a total of 60,901 kilometers. Most national roads have 2 lanes only. As mentioned in previous chapters, 80% of domestic freight transportation is carried out through the national road network. Also, bus service is the mode of transportation available to and used by most people in Paraguay for domestic trips, mainly because of its low cost (especially in comparison to air service charges) and the very high frequencies. The quality of Paraguayan bus services varies considerably. Buses run very frequently to destinations all around the country, and the bus routes serve places where no other means of public transportation can reach. Therefore, public transportation buses are the most important mean of transportation for passengers within the territory of the Republic. Also, road transportation has priority in the allocation of public investment. This sector receives 90 percent or more of the total public investment for transport.

## 4.2 Organizations related to Transport

The organizations related to transport in Paraguay are six: the Ministry of Public Works and Communications (Ministerio de Obras Públicas y Comunicaciones: MOPC), the Ministry of Agricultural and Stock Raising (Ministerio de Agricultura y Ganadería), the Ministry of Defense (Ministerio de Defensa Nacional), the National Direction of Navigation and Ports (Administración Nacional de Navegación y Puertos), Paraguay Railway (Ferrocarril Central del Paraguay “Presidente Carlos Antonio Lopez), and the National Direction of Civil Aviation (Dirección Nacional de Aeronáutica Civil). The organizations relevant to transport can be observed in Figure 4.2.1.

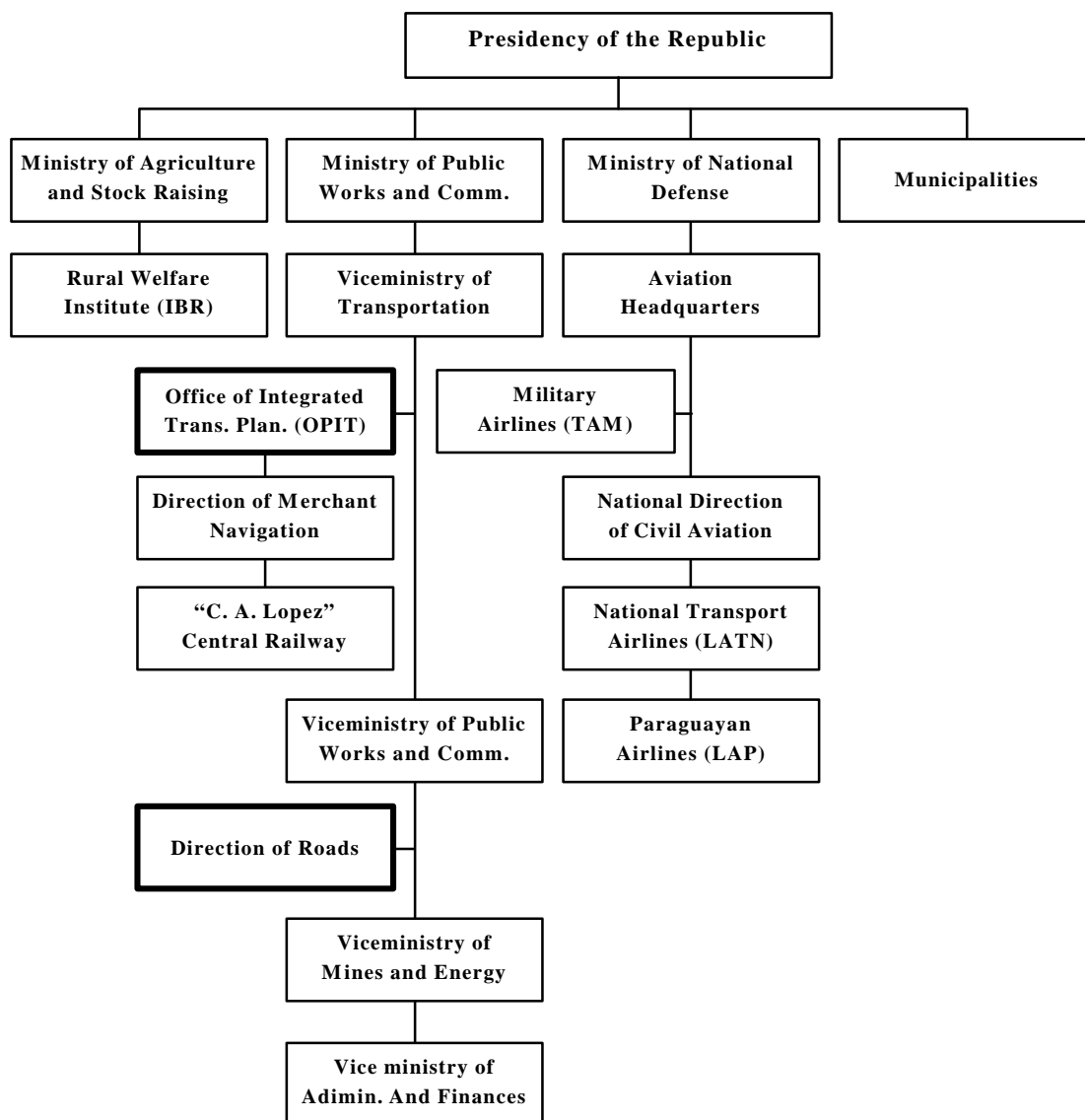


Figure 4.2.1 Organizations related to Transport

### **4.3 Organization of MOPC**

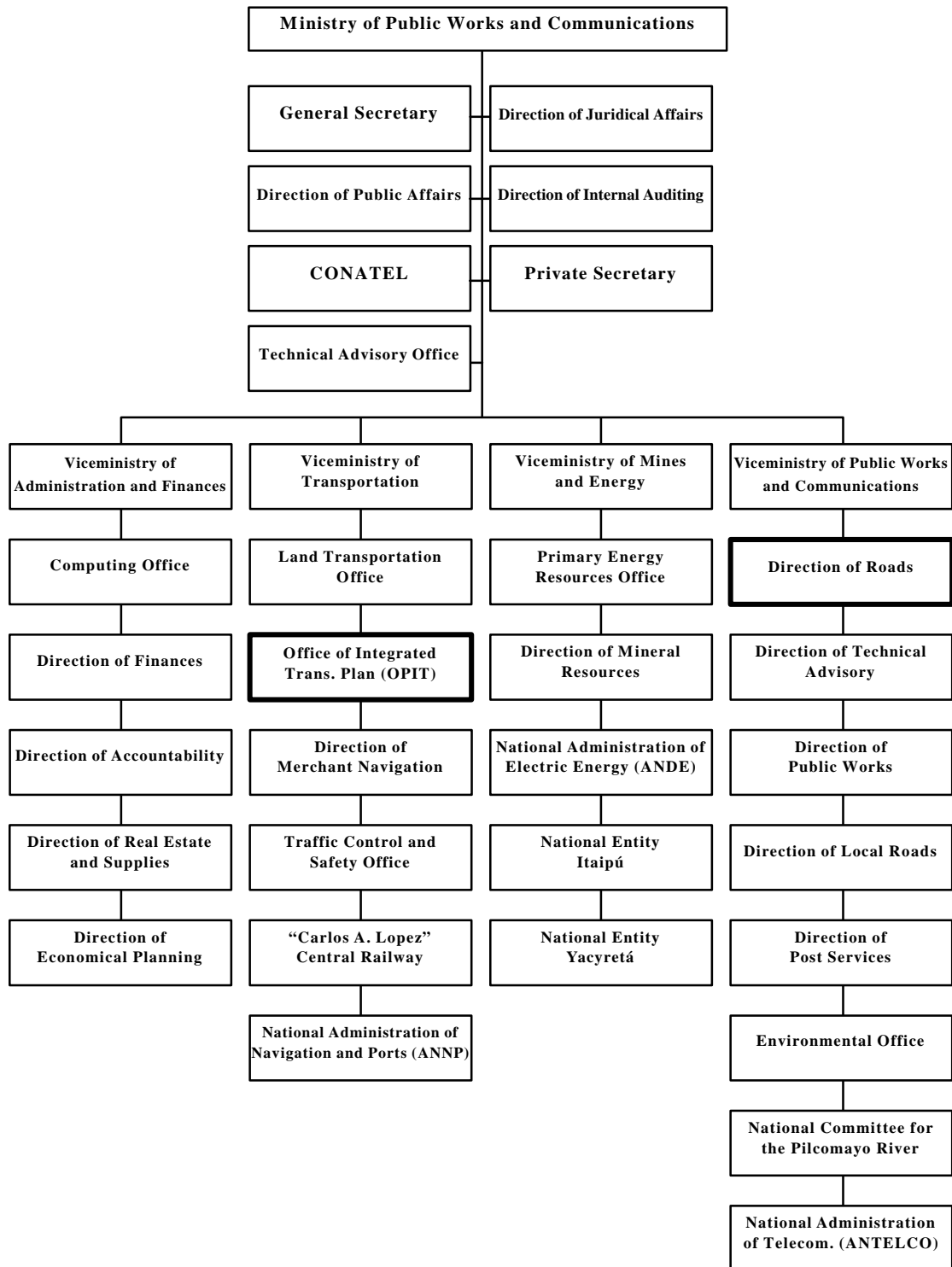
The Ministry of Public Works and Communications (MOPC) is the organization in charge of elaborating, proposing and executing the Executive's policies and dispositions with reference to the infrastructure and basic services for the integration and economic development of the country. The MOPC is divided into four Sub-Secretariats, which are in charge of Administrative Issues, Energy Supply and Distribution, Transportation, and Public Works and Communications, respectively. Of all the offices under those Secretariats, the most important ones related to land transport are the Office of Integrated Transportation Planning (Oficina de Planificación Integral del Transporte: OPIT), under the Secretary of Transportation, and the Direction of Roads (Dirección de Vialidad), which depends on the Secretary of Public Works and Communications (see Figure 4.3.1 for the entire organization).

#### **(1) Office of Integrated Transportation Planning (Oficina de Planificación Integral de Transporte: OPIT)**

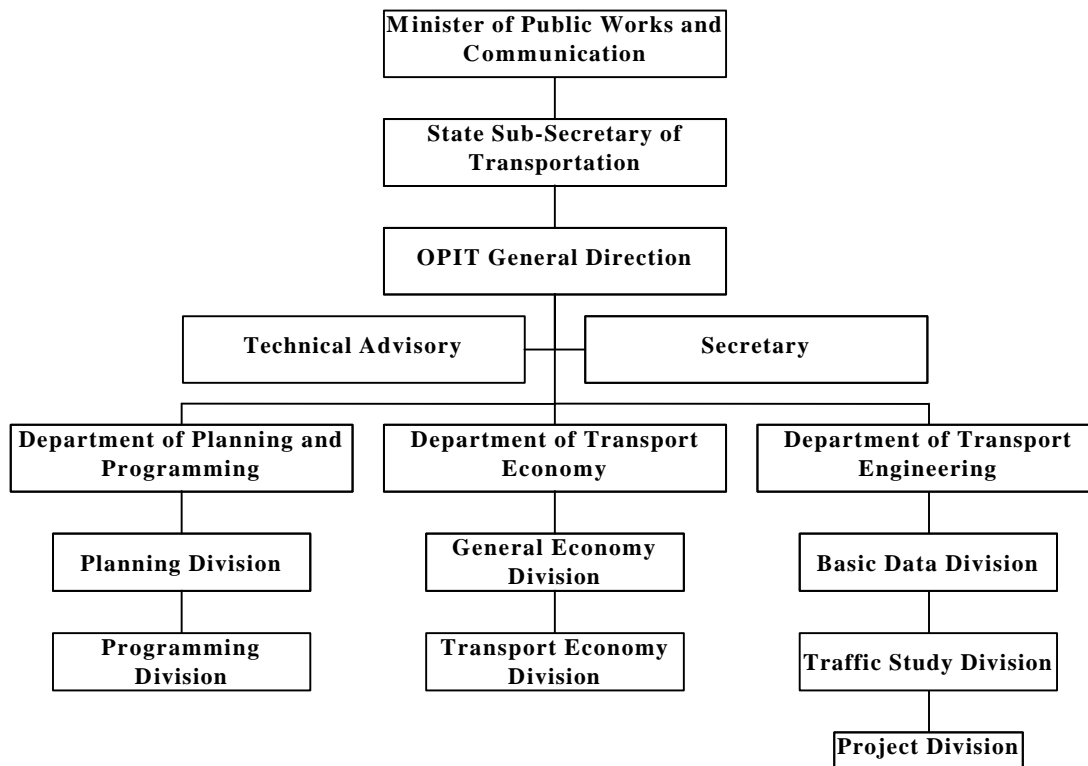
The OPIT is under the authority of the Sub-Secretariat of Transportation. The main functions of the OPIT are the following:

- It decides upon comprehensive traffic plans.
- It executes the plans for road maintenance.
- It carries out research and investigation on transportation development at the national level.
- It performs the priority allocation of investments, approving the proposals for new projects.

The organization of the OPIT is shown in Figure 4.3.2.



**Figure 4.3.1 Organization of the MOPC**

**Structure of the OPIT****Figure 4.3.2 Organization of the OPIT****(2) The Direction of Roads (Dirección de Vialidad)**

The Direction of Roads, under the Secretary of Public Works and Communications, is responsible for the implementation of the road policies planned by the Ministry. It is mainly in charge of national highways, budget control, bid conditions, construction, repair and maintenance management, and promotion of projects for new road construction. Moreover, the MOPC is in charge of the management of support measures in every city, and of the procurement of external resources of revenue (foreign assistance, etc.) at the time of the development of the project. Furthermore, the sections of Supervision and Construction are directly in charge of carrying out the work. The organization of the Direction of Roads is shown in Figure 4.3.3.

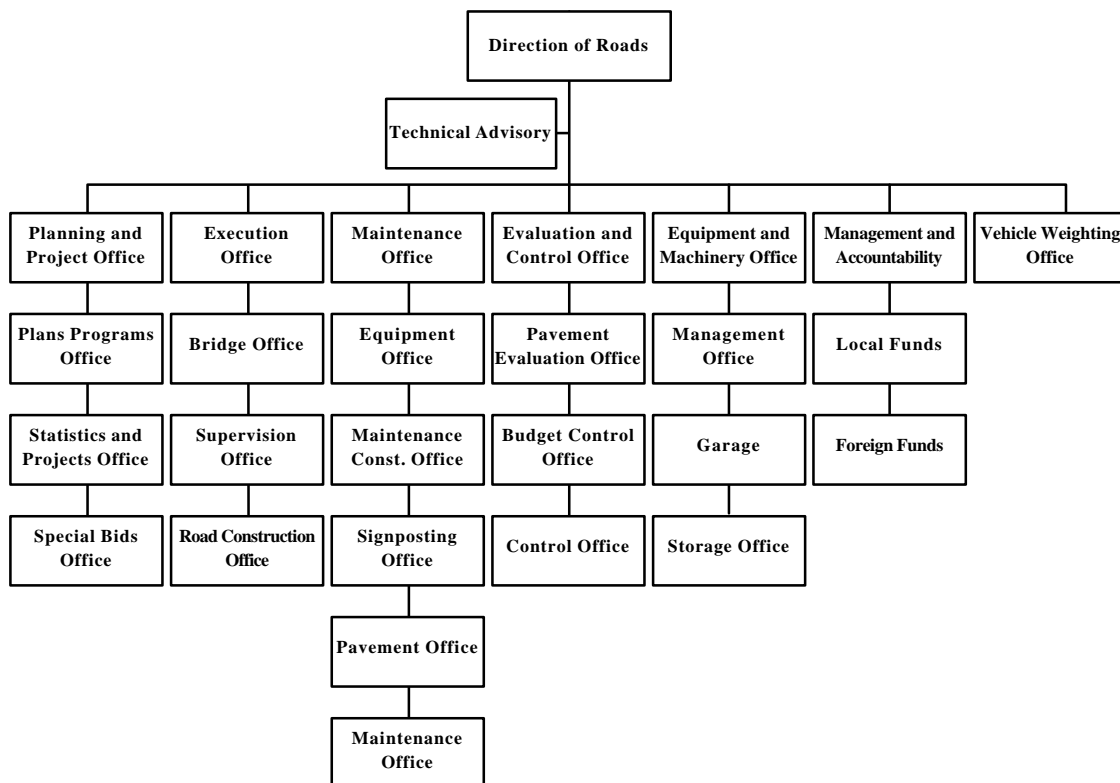
The main functions of the Direction of Roads, according to Law No. 167 dated May 25, 1993, are the following:

- 1) To plan, budget for and establish the basis and conditions to call a tender for and/or to contract the construction, rehabilitation, conservation and maintenance of national trunk and branch roads and works of art of the Republic;
- 2) To promote the projects and routing of new roads and, once the contracts have been awarded, to supervise and overlook the work carried out by the companies contracted for construction and inspection, whether these works have been financed locally or with foreign resources;

- 3) To direct or execute the works by Direct Administration, when necessary;
- 4) To exercise and apply the instructions as ordered by law, decree and special regulations; and
- 5) To carry out the distribution, control and maintenance of the vehicles, machinery and equipment to be used within the national territory.

The Direction of Roads includes the following subdivisions:

- Planning and Project Office
- Execution Office
- Conservation Office
- Evaluation and Control Office
- Equipment and Supplies Office
- Vehicle Weight Office
- Administration and Accountability Office



**Figure 4.3.3 Organization of the Direction of Roads**



#### **4.4 Construction Procedures for New Roads**

##### **4.4.1 Financing of New Road Construction**

New road construction is financed with local funds as estimated for in the National Budget and with funds provided by foreign loans, such as from:

- 1) Inter-American Development Bank (IDB)
- 2) International Bank for Reconstruction and Development (IBRD)
- 3) Brazilian Chamber of Commerce (BCC)
- 4) Andean Development Corporation (ADC)
- 5) Ministry of Development of Spain
- 6) Japan Bank of International Cooperation (JBIC)
- 7) Chinese Government (Taiwan)

##### **4.4.2 Project Management Method**

In Paraguay, when projects are financed with local funds, these projects are, in most cases, executed by third parties, although they can be carried out by direct administration as in the case of the Itapúa Project, which consists of the reconditioning and overlay of 125 km of route, extending from Carmen del Parana to Pirapo and the branch road to Capitan Miranda. For the works financed with external funds, it is a requirement of the financial organizations that all the stages of the project, such as the elaboration of the design, the construction and the inspection, be carried out by third parties. The qualifications of consulting firms and contractors are always rated prior to the awarding of the contracts, and this allows the selection of bidders with sufficient technical capacity and economic solvency to guarantee that the project be executed with efficient quality control both of the materials and of the execution of the works, in accordance with the corresponding plans and technical specifications.

##### **4.4.3 Bid Management for Road Constructions**

The tenders and awards of contracts for road constructions are governed by the following laws :

- 1) Law of Administrative Organization and its modification, Law 25/91
- 2) Law 1533/2000 of Public Works issued on January 4, 2000

The contracting of road constructions can be carried out by:

###### **(1) Price Bids**

When the value of the works or services is less than the equivalent of ten thousand minimum daily wages in the capital for the diverse activities not specified.

###### **(2) Closed Offer Public Tenders**

When the value of the works or services is higher than the equivalent of ten thousand minimum daily wages mentioned in point (1).

The value of the road constructions is generally higher than the equivalent of ten thousand Guaraní minimum daily wages. Therefore Price Bids are rarely used, which is why public tenders are called for most of the projects carried out by the Direction of Roads. These public tenders are shown below :

**a. National**

When the projects are financed totally with funds allocated from the National Budget. In these cases, the only firms permitted to participate are specialized national companies which have the technical capacity, experience and financial solvency to carry out, with the required quality and on schedule, the works to be executed.

**b. International**

Depending on the size of the projects, for budgetary reasons, recourse is made to International Financial Organizations for financing.

The basic procedures for this bid type are governed by the Agreements and Treaties signed by the international financial entity and the Paraguayan Government and approved by the Law of the National Congress.

#### **4.4.4 Road Development Control Systems**

Paraguay, like any developing country, finds it difficult to cover the maintenance and improvement of its road network with in its National Budget. For that reason the MOPC is aware of the fact that part of these expenses must be covered by the private sector.

For this reason the MOPC has implemented the Concession System for one of its busiest roads, National Route. No.7, in the Caaguazu-Ciudad del Este stretch, by allowing the concessionaire to charge a toll for a 25-year period.

Also, it is intended to carry out studies for the implementation of the Concession System in other stretches of the national road network.

Likewise, Law 1302 - which allows special methods and conditions complementary to Law. 1,045/83, "Which establishes the Public Works Regulations" - can be used for the national and/or international public tenders and the corresponding awards for the elaboration of the feasibility studies and the projects, the inspection, the construction of public works and services, for bidders who can guarantee that they have secured total financing. With this law the paving of approximately 2,500 Km of roads and the construction of bridges and railroads will be possible, and the implementation of these works is to be given priority.

It must be emphasized that a great effort is being made by the National Government to provide the country with the road infrastructure necessary for its development, building new roads, rehabilitating and paving existing roads and investing large sums for their maintenance.

## 4.5 Implementation Schedule

Within the context of the transport master plan and the investments forecast for the 1999 to 2003 period, the following are either in the process of being implemented or to be implemented:

- 1) Works in execution with external financing and local compensation, for an amount of US\$ 347,930,000. Please see Table 4.5.1.

**Table 4.5.1 Works in Execution**

No.	Work	Total Length (Km)	Total Cost (US\$)
<b>IDB Projects F.F.</b>			
1	Rehabilitation and pavement of a road 5 section Concepción – C. Fresco	88.00	42,030,000.00
2	Export Corridor of a road five section Emboscada – S. Estanislao	130.00	54,000,000.00
	<b>IDB Projects - Total in dollars</b>	<b>218.00</b>	<b>96,030,000.00</b>
<b>IBRD Projects F.F.</b>			
3	Improvement of 4 Mojones – Itá – Paraguari	36.00	39,200,000.00
4	Improvement 4 Mojones – Road 4	11.10	47,000,000.00
5	Pavement Road 3 – Limpio – Emboscada	15.00	4,900,000.00
6	Overlay Road 6 – North Section	100.00	6,800,000.00
	<b>IRDB Projects – Total in dollars</b>	<b>162.10</b>	<b>97,900,000.00</b>
<b>Fonplata Projects F.F.</b>			
7	Road 12 Chacoí – Gral. Bruguez	153.00	76,500,000.00
8	Pavement Section San Ignacio – Pilar	155.00	77,500,000.00
	<b>Fonplata Projects – Total in dollars</b>	<b>308.00</b>	<b>154,000,000.00</b>
	<b>Total in dollars</b>	<b>688.10</b>	<b>347,930,000.00</b>

- 2) Works for which it can be guaranteed that financing will be secured, for an amount of US\$ 267,000,000. Please see Table 4.5.2.

**Table 4.5.2 Works with Guaranteed Finance**

No.	Works	Total Distance (Km)	Total Cost (US\$)	Location
	<b>Projects financed by OECF</b>			
	<b>Overlay</b>	496.0		
22	Road 5 Section Yby Yau – P.J. Caballero (70 km)			Amambay–Concepción
23	Road 6 section Bella Vista – Km. 148 (106 km)			Itapúa
24	Road 1 section S.J. Bautista – Encarnación (170 km)			Misiones – Itapúa
25	Cnel. Oviedo – San Estanislao Branch (100 km)			Caaguazú – San Pedro
26	1ª Sec. Road Transchaco – Río Negro (50 km)			Pte. Hayes
	<b>Rehabilitation and Paving</b>	121.1		
27	Rehabilitation and Paving La Colmena – Tebicuarymí – Tebicuary (38,10 km)			Paraguarí
28	Rehabilitation and Paving Paraguarí – Sapucaí – Tebicuary – Villarrica (82,6 km)			Paraguarí – Guairá
	<b>Extension of Bridges</b>	17.7		
29	Road 1 Section Paraguarí – S.J. Bautista			Paraguarí– Misiones
30	Carapeguá – La Colmena Branch			Paraguarí
	<b>Total Projects financed by OECF</b>	<b>634.8</b>	<b>219,000,000.00</b>	
	<b>Projects financed by IRDB</b>			
31	Construction of wooden and reinforced concrete bridges in several road sections		8,000,000	All around the country
	<b>Total Projects financed by IRDB</b>		<b>8,000,000</b>	
32	<b>Projects financed by the Taiwan Credit</b>			
	Capiatá – Posta Ybycua (5 km)			Central
	San Lorenzo – Luque (Shouldres) (8 km)			Central
	Nueva Colombia – Paso Pe (4 km)			Cordillera
	Ruta 2 – Aguaité (5 km)			Cordillera
	Ruta 5 – Belén (11 km)			Concepción
	Ruta 3 – Sta. Catalina (3 km)			Caaguazú
	J.D. Ocampos – Empalme Yguazú (3 km)			Caaguazú
	Pirayú – Paraguarí (21 km)			Paraguarí
	Ruta 6 (Sta. Rita) – Sta. Rosa (20 km)			Alto Paraná
	Franco – Cedrales (20 km)			Alto Paraná
	Km 28 (Ruta 6) – Trinidad (Ruinas Jesuíticas)			Itapúa
	Iturbe – Numí (20 km)			Guairá
	Horqueta – Río Ypané (20 km)			Concepción
	Ruta 3 – Tacuatí (40 km)			San Pedro
	Villarrica – Ytapé (20 km)			Guairá
	Colonia Independencia – Paso Yobai (22 km)			Guairá
	San Pedro del Paraná – La Paz (41 km)			Itapúa
	Santa Rosa – San Solano – Ruta 1 (30 km)			Misiones
	Ruta 1 – Rosado Guazú (8 km)			Central
	Areguá – Isla Valle – Yuquity (10 km)			Central
	<b>Total Projects financed by the Taiwan Credit</b>	<b>121.0</b>	<b>40,000,000</b>	
	<b>Total in Dollars</b>	<b>755.0</b>	<b>267,000,000</b>	

- 3) Works with financing in the process of being procured for an amount of US\$ 846,500,000. Please see Table 4.5.3.

**Table 4.5.3 Works with Financing in Process**

No.	Works	Total distance (km)	Total Cost (US\$)
9	Paving Mcal. Estigarribia – La Patria	120.0	60,000,000
10	Between Inf. Rivarola – Pedro P. Peña	85.0	12,750,000
11	Between La Patria – Inf. Rivarola – Frontier with Bolivia	112.0	16,800,000
12	Between Road 9 Section Neuland – Pozo Hondo – Ramal P.P. Peña	313.0	46,950,000
13	Paving Section Tacuara – Salto del Guairá	180.0	90,000,000
14	Paving Section San Estanislao – Pto. Rosario	86.0	43,000,000
15	Paving Section Caazapá – Cnel. Bogado	140.0	70,000,000
16	Rehabilitation of Puente Remanso – Filadelfia	250.0	125,000,000
17	Rehabilitation of Mcal. Estigarribia – Pto. Casado	298.0	149,000,000
18	Pozo Colorado – Gral. Díaz	216.0	108,000,000
19	Access to Loma Plata	42.0	21,000,000
20	Access to Asunción Port	10.0	78,000,000
21	Repair of Ytay Stream – Lambaré Basin		26,000,000
	<b>Total in Dollars</b>	<b>1,036.0</b>	<b>846,500,000</b>

- 4) The above mentioned amount includes the rehabilitation and paving of the stretch of 120 km, Mcal. Estigarribia – La Patria – Inf. Rivarola, which is part of the bi-ocean corridor which will connect Paraguay to the Pacific coast through the Bolivian road network, and which is the last remaining stretch within the Paraguayan territory, the paving of which still remains to be contracted out.
- 5) Self-financed works, as per Law 1302, for an amount of US\$ 164,674,000. Please see Table 4.5.4.

**Table 4.5.4 Candidate Works for Self-financing**

No.	Works	Total Distance (km)	Total Cost (US\$)
33	S.J. Nepomuceno – Road 6	97.4	48,750
34	Santa Rosa – Puerto Antequera	88.1	46,074
35	Caaguazú – Curuguaty	139.7	69,850
	<b>Total in Dollars</b>	<b>325.2</b>	<b>164,674</b>

- 6) A total investment in road construction with external funds and the local compensation of US\$ 1,746,094,000 is foreseen for the period 1999 – 2000. Please see Table 4.5.5.

**Table 4.5.5 Total Investment for Road Construction**

No.	Description	Total Distance (km)	Total Cost (US\$)
1	Works in Execution	688.10	347,930,000
2	Works with Financial Assistance Guaranteed	755.80	267,000,000
3	Works with Financial Assistance in Process with Final Design and Environmental Impact Study ready	1,036.00	846,500,000
4	Self-financed works by Law 1302	325.29	164,664,000
5	Awardings		120,000,000
	<b>Total in Dollars</b>	<b>2,805.19</b>	<b>1,746,094,000</b>

#### 4.6 Annual Budget of the Direction of Roads

The Direction of Roads' annual budget for construction and maintenance can be seen in Table 4.6.1.

**Table 4.6.1 Direction of Roads' Annual Budget**

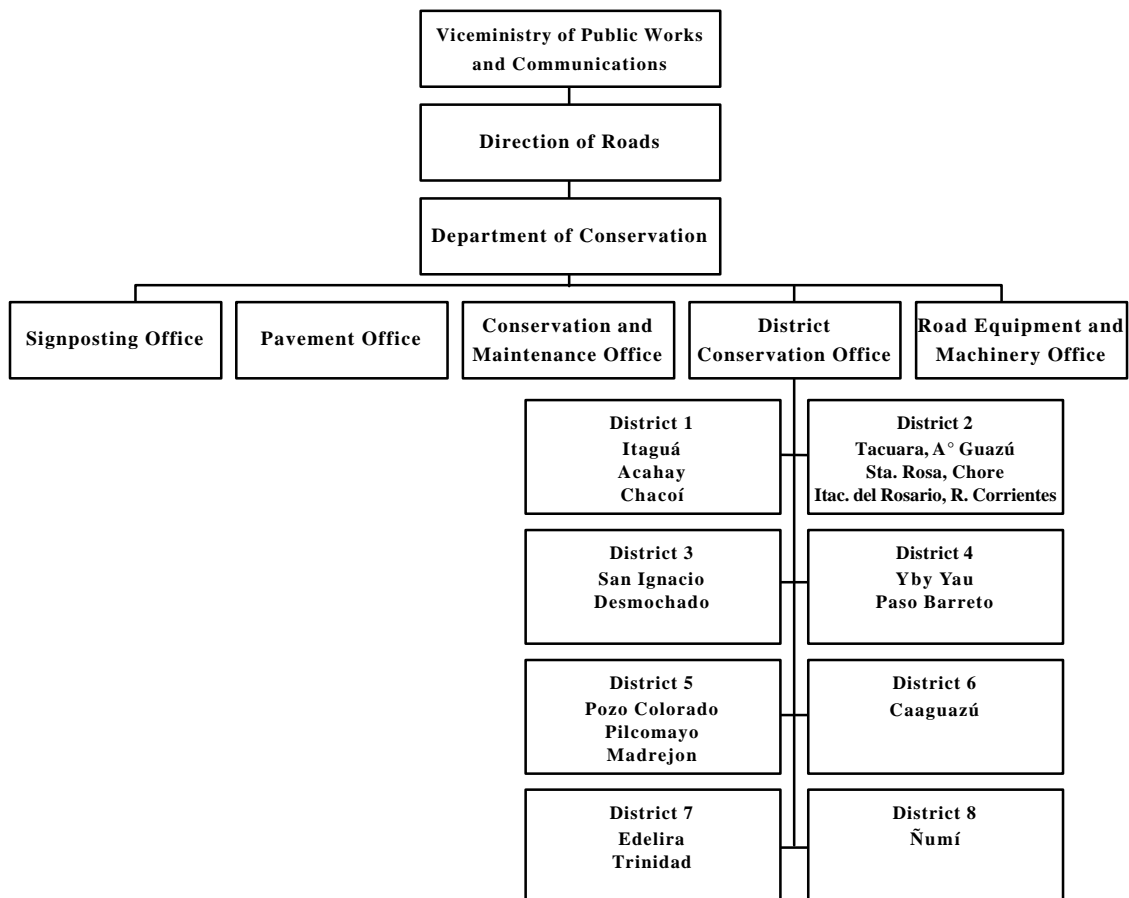
No.	Year	Construction	Maintenance	Total Executed	Total Budgeted	%
1	1993	163,101,300,000	16,689,700,000	179,791,000,000	221,249,700,000	81.26
2	1994	147,720,666,809	25,185,069,677	172,905,736,486	221,668,332,772	78.00
3	1995	199,795,034,759	32,486,498,977	232,281,533,736	280,452,811,838	82.82
4	1996	173,514,235,383	36,256,658,102	209,770,893,485	263,650,601,099	79.56
5	1997	197,315,345,483	42,428,920,995	239,744,266,478	313,618,541,519	76.44
6	1998	255,144,951,865	43,217,212,257	298,362,164,122	375,003,936,398	79.56
7	1999	345,744,016,904	35,193,017,693		380,937,034,497	

#### 4.7 Road Operation and Maintenance Systems

##### 4.7.1 Method of Road Maintenance

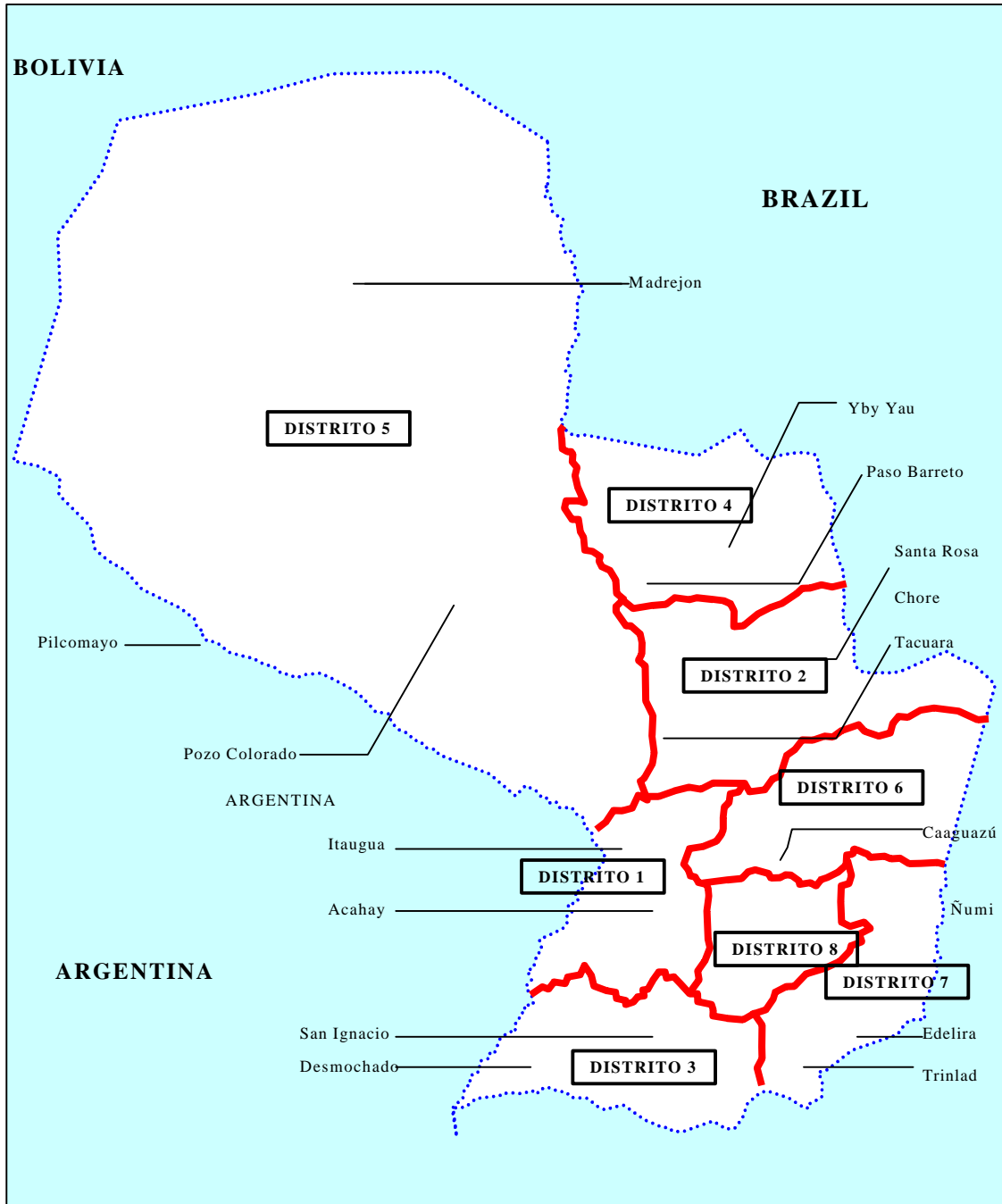
###### (1) Conservation by Administration

This is the method mostly used. By means of this system the Districts of Conservation, which number eight in total, and the Paving Division administer the personnel, the machinery and the equipment used in maintenance work on the roads of the national road network directly. The structure of the Department of Conservation is shown in Figure 4.7.1.



**Figure 4.7.1 Organization of Department of Road Conservation**

The location and area of influence of the conservation districts can be seen in Figure 4.7.2.



**Figure 4.7.2 Administrative Map of Road Conservation**

District offices have their own personnel and machinery, as shown in Table 4.7.1 and 4.7.2.

**Table 4.7.1 Personnel in District Offices**

Branch	Number of Personnel				
	Engineers	Managers	Nechanics	Draftsmen	Total
Central Adm.	9	24	0	0	33
District 1	3	56	35	168	262
District 2	2	67	41	159	269
District 3	2	32	21	71	126
District 4	2	45	23	84	154
District 5	2	13	11	59	85
District 6	2	15	9	45	71
District 7	2	27	21	77	127
District 8	2	27	18	79	126
Paving Div.	2	16	8	87	113
Total	28	322	187	829	1,366

**Table 4.7.2 Machinery in District Offices**

Branch	Van	Dump Truck	Power Shovel	Other Trucks	Other Tractors	Service Lift	Roller	Tractor with Triler	Asphalt Plant	Total
District 1	2	34	19	14	11	12	8	5	0	105
District 2	7	32	21	12	4	8	10	13	0	107
District 3	3	22	13	13	6	5	4	0	0	66
District 4	2	24	16	12	8	8	4	2	0	76
District 5	4	13	10	15	6	3	3	4	0	58
District 6	4	17	15	11	6	4	2	6	0	65
District 7	3	22	15	14	9	7	5	4	0	79
District 8	4	18	13	12	7	4	4	3	0	65
Pav. Div.	4	19	2	9	19	3			3	59
Total	33	201	124	112	76	54	40	37	3	680

The maintenance work done is usually of a routine nature, such as the repair of potholes and edges, the maintenance of sewers, the cleaning of ditches, the cutting of vegetation and bridge maintenance.

Special maintenance work in the form of the restoration of platforms and verges or hard shoulders, the repair of banks and bridges, and the maintenance of the right-of-way of the road is carried out. Improvements such as asphalt or gravel resurfacing, widening, the installation of sewers, the installation of signs and the rehabilitation of bridges are also carried out.

## **(2) Conservation by Third Parties**

This method of carrying out road conservation is only beginning to be used in Paraguay. Previously the Direction of Roads was always in charge of road maintenance.

Maintenance work and improvements are currently being carried out very successfully by third parties or by the awarding of contracts signed by the Direction of Roads and local construction companies.



In the case of paved highways, the rehabilitation of those stretches which are not up to the standards is carried out on the basis of studies which have been carried out by the Department of Evaluation and Control since 1996. These studies were made using loans from international financial entities.

#### **4.7.2 Systems of Maintenance Planning**

The national planning of the road conservation policies used is determined by means of the use of the SIAMV 3.0 (Integral Road Maintenance System).

Developed with funds acquired through an IDB loan, the SIAMV 3.0 is an administration system which provides the Direction of Roads a tool that enables it to plan and program maintenance at different levels. The basic objectives of this system are:

- 1) To guarantee the conservation of the road network at a reasonable cost
- 2) To provide a long term maintenance program which will enable the carrying out of priority works on time.
- 3) To make the system more efficient, by making good use of the resources, and more effective in imposing the achievement of goals and objectives.
- 4) To create a base of orderly information which will give feedback to the system thus allowing such information to be updated and gauged whenever necessary.
- 5) To optimize the ratio of costs to benefits of the highway transport system.

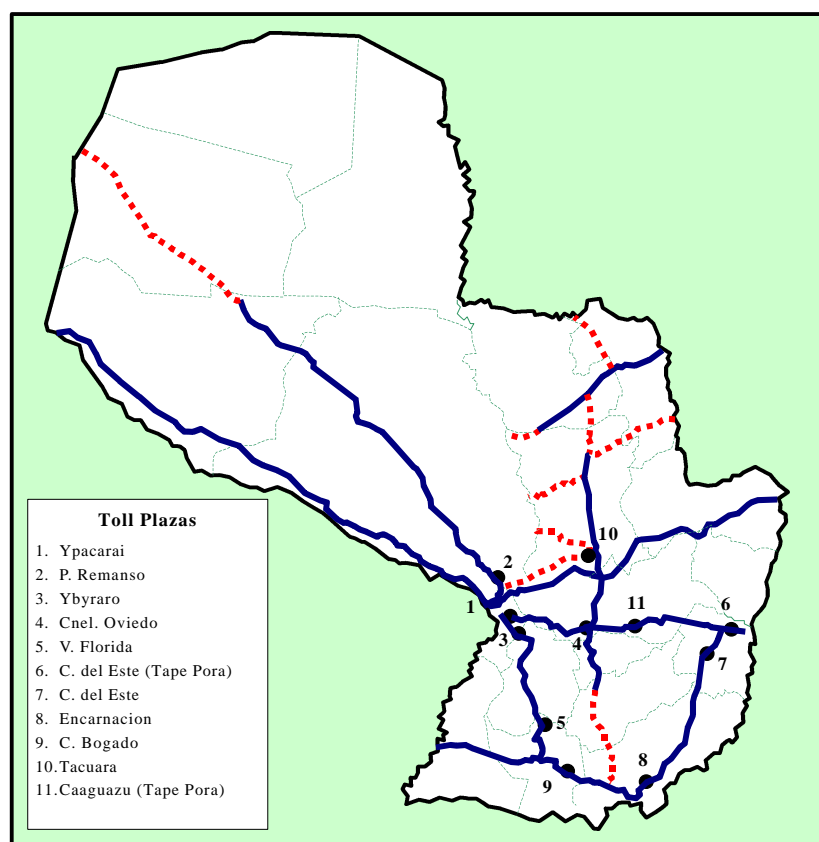
## 4.8 Toll Road

There are two types of toll road in Paraguay.

- 1) Public toll collection administered and operated by MOPC
- 2) Concession: construction, operation, and maintenance of a road by a consortium

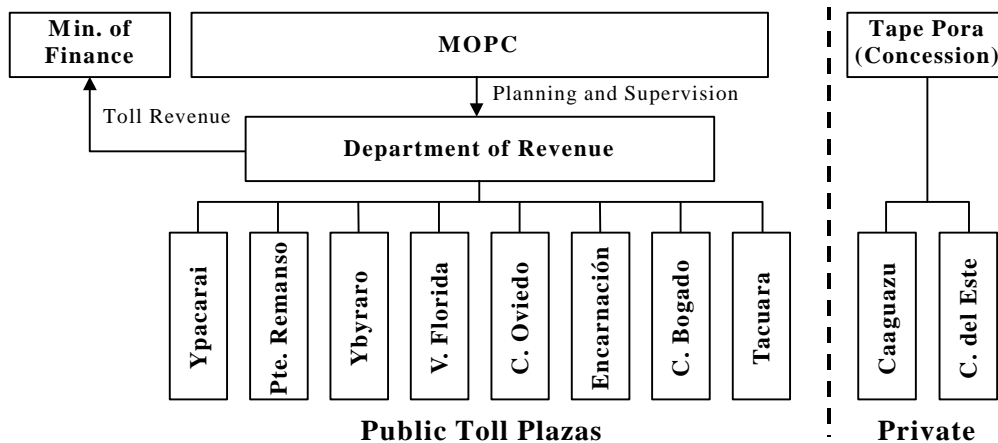
### 4.8.1 Public Operation of Toll Collection

Currently Paraguay has ten toll plazas, two of which went private in 1999. As shown in Figure 4.8.1, all of them are located on major national roads except Remanso, which is on a bridge connecting Asuncion and the Trans-Chaco highway.



**Figure 4.8.1 Location of Toll Plazas**

The figure below shows an organizational structure of the toll collection system. MOPC supervises the operation and maintenance of the toll roads and is responsible for physical planning of the plazas. Tolls collected at each plaza are all transferred to Department of Revenue (Departamento de Ingreso) under MOPC. It keeps an accounting of the revenues and further transfers them to the Ministry of Finance. The private plazas are operated by a concessionaire as discussed further in detail below.



**Figure 4.8.2 Organizational Structure of Toll Collection System**

Public toll plazas collect tolls from traffic of one direction only, and vehicles of the other direction can pass freely. Generally, each plaza is equipped with two or three gates. Toll rates are set differently according to types, i.e. the number of axles, of vehicle as shown in Table 4.8.1, presumably depending on damages each user causes to the road. As of December 1999, passenger vehicles pay Gs 5,000, whereas heavy trucks with more than 4 axles pay Gs. 15,000. These rates were determined in October 1999.

**Table 4.8.1 Toll Rates**

Category	Vehicle Type	Toll (Gs.)
I	Light vehicle	5,000
II	Lorry and bus with 2 axles	7,000
III	Light vehicle with cart	7,000
IV	Lorry with 3 axles	8,000
V	Lorry with more than 3 axles	15,000

Basically, the toll collection system follows a simple procedure. Whoever passes a collection plaza, pays. Those who use a section between two given collection plazas are not required to pay anything as long as they do not pass a gate. This creates problems for users who frequently use the section that contains a toll plaza. For example, people who need to pass a toll plaza for commuting are required to pay the toll on a daily basis.

Because of the simplicity of the system, MOPC faces a number of problems. Since tolls are collected at a "point," users can avoid paying tolls if they take a detour route and do not go through it. Roads are not access-controlled, and thus it is relatively easy to find loopholes to avoid tolls.

However, an even more serious problem is that of economic fairness. That is, collected tolls are used for other purposes than roads. Although tolls are collected by MOPC, the Ministry of Finance takes all those revenues and puts them into its General

Revenue. It is not clear at all, therefore, for what purposes the collected tolls are used, and tolls are not reflected in the improvement of the roads. In fact, Department de Revenue, responsible for the toll collection under MOPC, suffers from a chronic shortage of financing to run the toll plazas. In short, MOPC supervises the toll collection operation but has no control over the revenues from it.

Despite these problems, the toll plazas continue to generate revenues for the country. According to Department de Revenue, as shown in Table 4.8.2, annual revenue from the toll road operation in 1998 was about Gs34 billion, which increased from approximately Gs30 billion in 1997. This increase is mostly attributable to the increase in the toll rates in February 1998 because the recorded number of vehicles that passed the gates actually decreased from 1997 to 1998, 8.6 million to 8.4 million, respectively.

**Table 4.8.2 Data on Annual Operation of Public Toll Collection**

	1997	1998	% Change
Toll Revenue (Gs billion)	30.0	34.4	15%
Number of Vehicles	8,600,615	8,437,480	-2%

#### **4.8.2 Concession**

Like many other developing countries in the world, the lack of public funds in Paraguay leads to an idea of utilizing private capital to construct infrastructure such as highways. In 1998, MOPC and a consortium of private companies came to an agreement for a concession for construction, operation, and maintenance of a toll road between Ciudad del Este and Caaguazu on Route 7 with a length of about 140km. The consortium, called Tape Pora, consists of three Paraguayan firms, namely Conempa S.A., Benito Roggio e Hijos S.A., and Tecnoedil Construtora S.A. The capital investment for the first phase of the project will be shared between the concessionaire and a group of private banks. The banks issue bonds through the Asuncion stock market and expect investment returns with an interest rate of 10% for a repayment period of seven years.

In Paraguay, this is the first purely private venture of constructing and operating a highway. The consortium is given 25 years to recover the cost of construction by collecting tolls from users of the section it constructs. After the end of the contracted period, the consortium will be required to pass all the facilities and rights to use them to MOPC. The permission to use roadside spaces can be a significant incentive for the private sector to participate in this type of project. In addition, MOPC provides another incentive by acquiring land for the right-of-ways.

The contents of the works for which Tape Pora is responsible can be divided into four parts, as shown in the table below. There are basically two major components to this project. The principal works include the construction of two more lanes added to the existing road near Ciudad del Este and collector roads on either side of the highway. Second, the rest of the section on Route 7 will be overlaid by asphalt with paved shoulders.

**Table 4.8.3 Contents of Concession Works**

Construction		Regular Service	
1. Principal Works	2. Secondary Works	3. Maintenance	4. Service Provision
Adding lanes (for 26km) Collector roads (for 6km) Road signs, signals, lighting	Overlay (for 140km)	Maintenance works (for 140km)	Weight stations Toll plazas Emergency services
June, 1998 to March, 2000	Jan. to Dec., 2000	Throughout the project period	

The project will cost more than US\$58 million for physical works such as construction and refurbishment as indicated in the table below. Operation and maintenance of the highway further amount to about US\$2 million annually once the toll road is put into operation. On the other hand, the consortium expects the total accumulated revenue of nearly US\$400 million during the period of 25-year operation, assuming a basic toll rate of Gs 3,952.80, or about US\$1.83, for passenger vehicles. Like the toll collection system by MOPC described above, toll rates are determined according to the size of vehicle. Moreover, the use of roadside spaces for commercial and other purposes can significantly contribute to the revenues of the consortium, although no figure has yet been projected regarding the extent of it. It can either exert this right by itself or receives fees by letting someone else use it.

**Table 4.8.4 Basic Financial Information**

COSTS	(US\$ million)	REVENUES	(US\$ million)
Construction	58	Toll (25 years)	400
O & M (annual)	2	Use of Roadside Spaces	No projection

Interest rate	10%	Concession Period	25 years
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Based on the conditions agreed upon between MOPC and Tape Pora as described above, on October 7, 1999, the new toll road between Ciudad del Este and Caaguazu launched its operation. Even before the commencement, however, this new venture was already confronted with strong protests from users like truck drivers and neighbors. Among others, controversial points include (1) high tolls, (2) public relations, (3) lack of careful planning, and (4) lack of consideration for frequent users.

First of all, many people, especially neighbors and truck drivers who use the road frequently, strongly complain about the high tolls. Although the same section was tolled before, the rate was much lower and collected for only one direction. For example, Tape Pora charges Gs6,000 at Ciudad del Este and Gs5,000 at Caaguazu for passenger vehicles for both directions. In other words, it almost doubles the public tolls.

**Table 4.8.5 Toll Rates of New Road by Tape Pora (excerpt)**

Vehicle Type	Toll (Gs.)	
	C. del Este	Caaguazu
Light vehicle	6,000	5,000
Lorry and bus with 2 axles	10,000	9,000
Lorry and others with 3 axles	20,000	18,000
Lorry and others with 4 axles	22,000	20,000
Lorry and others with 5 axles	24,000	21,500
Lorry and others with 6 axles	30,000	27,000

Despite the protests, however, it is not easy to say what is an appropriate level of toll for this particular section because the new road actually generates benefits to users. For example, the consortium built a flyover at an intersection near Ciudad del Este where traffic congestion used to be a serious problem. In fact, the congestion on this intersection has been improved dramatically. Another example of the benefit is that Tape Pora completed its construction works six months earlier than scheduled. It was unimaginable before in Paraguay, that construction works of this scale could be finished in one year and four months.

It seems that the new toll road is not appreciated as much as it should deserve. This is partially because the concessionaire does not explain the project very well, and users do not see the benefits clearly. There is a lack of communication between the service provider and users. This shows that it is crucial to have good relationships with the general public. It might have been a good idea that well before the inception of the project, the consortium had disclosed information to the public to reach a consensus.

Related to the problem of communication with the public mentioned above, it appears that the concessionaire has not planned the highway very carefully. For instance, the location of the toll plaza in Ciudad del Este changed just before the project inauguration because of protests from the citizens living nearby. MOPC took action by moving the toll plaza further away from Ciudad del Este. However, to compensate for the decrease in toll revenues resulting from this location change, MOPC approved the placement of another toll plaza at the other end of the tolled section, i.e. in Caaguazu, which was not previously included in the original contract. Now, people in Caaguazu strongly express their complaints by saying that they have to pay tolls for nothing. In fact, the section close to Caaguazu will have much less improvements than that near Ciudad del Este. Careful planning and communication with citizens before the project inception could have prevented or abated this difficult situation.

Among all the problems mentioned above, the most serious is probably the fact that there are people who use the road on a daily basis. This problem must be addressed in some way or another because the new road will impose a much bigger burden on them than before. In fact, MOPC and Tape Pora have begun examining this issue and considering special treatment, i.e. lower tolls, for frequent users, such as school buses, public transport, taxis, freight taxis (short-distance transport of goods), and so forth in response to the requests from citizens from the nearby community.

### **4.8.3 Implications**

This brief section on toll roads concludes with some of the institutional implications for the future drawn from the above analysis of the current situation.

- 1) The concession scheme will continue to be employed in Paraguay because the country does not have enough funds to build new roads or improve existing ones.
- 2) In order to make the concession scheme more acceptable to the public, MOPC and interested private firms need to explain the benefits more clearly.
- 3) Ministry of Finance, since the revenue from the toll road decreases with more concession projects, will likely reduce the budget for MOPC. Thus, MOPC will need to operate the existing road maintenance more efficiently.
- 4) A new law that regulates concession projects in Paraguay is in the process of authorization in the Parliament. With this new law and additional revisions, the country is likely to have more concessions of highways as well as in other fields.
- 5) MOPC needs to strengthen its supervisory role in the process during both construction and operation of concession projects.

In Paraguay, private highway projects have just begun. Currently, the new venture is under tremendous pressure from users, but it clearly shows some benefits. Now, it is necessary for them to explain what they attempt to realize and offer in the tolled section and gain some understanding from users. Although it will take some time, it is probably the only way to make this new type of road venture acceptable to the public.