

## IV-28

## COMPARATIVE STUDY BETWEEN URBAN TRANSPORTATION SYSTEMS IN JAPAN AND BRAZIL

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1-INTRODUCTION

This paper aims to compare two national approaches to confront transportation problems in a developed and in a developing country.

It analyses how the transportation problems are perceived, the policies and decisions related to transportation and the case of Curitiba- a city of Brazil that, although its financial limitations typical of a developing country city, could find solutions without high investments nor dramatic urban surgeries.

2-TRANSPORTATION PROBLEMS

In spite of great economical and cultural differences between a developed country and a developing country, the fact is the majority of transportation problems presented by countries are almost the same, seeing that, with rapid urbanization of cities all over the world, problems such as traffic-jam, lack of parking areas, environmental pollution, safety and necessity of suitable land-use transportation planning are common challenges that must be faced with adequate and efficient solutions.

Fig1 NATIONAL DEVELOPMENT PLANS

JAPAN	BRAZIL
1962-Comprehensive National Development Plan(Zenso)- Based on Comprehensive National Land Development Act(1950)- development induction in areas far from metropolises in order to place industries (Balanced National Development).	1960-I National Plan of Economic and Social Development. First Measures to introduce new modes of transportation like the subways in Rio de Janeiro and Sao Paulo. Integration of urban development plan and transportation system.
1969- Second Comprehensive National Development Plan(Shinzenso)- Introduction of high-speed transportation (Shinkansen, expressways) new technology informatization to redistribute the population concentrated in metropolitan areas into depopulated areas(Rational Land Occupancy).	1970-II National Plan of Economical and Social Development-urban development considering social and economic priorities. Implantation of the nine metropolitan regions( Belem, Recife, Salvador, Belo Horizonte, Rio de Janeiro, Sao Paulo, Porto Alegre and Curitiba).
1977- Third Comprehensive National Development Plan(Sanzenso)- Development and improvement of expressway network, increase of high speed railway network(Shinkansen) and finishing works of Narita Airport.	1974- Creation of Brazilian Urban Transportation Company to define and implement the National Urban Transportation Policies, giving priority to social and economic development of urban areas.. Improvement of mass transportation systems in main cities. Implantation of urban and passengers bus transfer terminals in Porto Alegre, mass transportation corridors (exclusive bus lanes) was introduced in Curitiba and Salvador.
1987- Fourth Comprehensive National Development Plan(Yonzenso)- Internationalization, multi-choice high speed transportation modes, in order to promote the interaction between people environment, nations and intercalation of informations. Preparation of Japan of 21st century.	1988- II National Plan of Mass Transport analyse the conditions of Brazilian cities and recommend the implantation of an intermediate capacity transportation mode in 20 corridors, with 8 corridors starting operation in 1995 and 8 corridors should start operation in 2000.

In developing countries, such as Brazil, the transportation solutions adopted are based on the social and economic conditions considering the stringent financial limitations, and sometimes, the goals can not be achieved and some of the improvements must be postponed or simply forgotten.

Instead, developed countries, most of the time, can plan, decide and accomplish their goals, since they can do more significantly investments in transportation area.

3- THE CASE OF CURITIBA

The case of Curitiba, a city located in the south of Brazil is an example of, how a city of

developing country can lead with its urban and transportation problems, creating new and efficient alternatives within a restricted budget.

Fig. 2 COMPARISON BETWEEN BUS SYSTEM IN NAGOYA AND CURITIBA

population	2,150,000	1,600,000
area	326 km <sup>2</sup>	431 km <sup>2</sup>
operating distance	649 km	509 km
number of routes	112 routes	250 routes
average interbus stop distance	463 m	400m
number of vehicles	1323	1161
operating kilometers	122,000 km (daily)	235,363 km (daily)

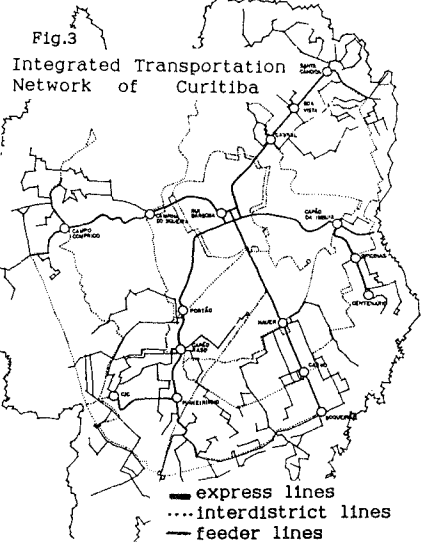
The number of daily bus passengers in Nagoya shows that a low percentage of population use the bus system(17%), owing to the possibility of choice between another modes of transportation such as the subway system. Also, the percentage of private car owners are very high(60.6%). Instead, in Curitiba, the majority of population, mainly the low income population, depend on the bus system, the only public transportation system available in the city. For this reason, the system has been improved among the years. In 1974, the mass transportation system was implanted in Curitiba with the conversion of 8 conventional lines into two trunk lines-the express lines and the buses started to circulate in a central segregated lane, part of a trinary system.

Now, the Integrated Transportation Network is constituted by 5 main axes, converging to a main square located in the city center. The other lines that complete the system are:

- 1) FEEDER LINES-allow the linkage between the districts and transfers in integration terminals.
- 2) INTERDISTRICT LINES concentric lines linking the habitational areas with the express lines (main axes) avoiding the necessity to cross the city center.
- 3) CONVENTIONAL LINES-lines already existed, before Integrated System's implantation with different itineraries.
- 4) NIGHT LINES- Special night service, between 00:01AM and 05:00AM, within intervals of one hour.
- 5) CIRCULAR CENTER LINES-mini-buses that attend only the central area of the city, with small itineraries.

#### SPECIAL LINES

- 1) DIRECT LINES-New project developed in Curitiba, similar to a surface subway, implanted to reduce the travel time. The bus stops are tube stations made of glass, where the fare is paid before boarding. The system reduced the stop time and, depending on passengers demand, the frequency can fall to 1 minute.
  - 2) OCCUPATION LINES-utilizing buses with expired life-time, this lines travel between districts with a teachers staff(barbers, shoe-repairers, dress-makers), in order to teach an occupation to low income population.
  - 3) SPECIAL TEACHING LINES-twenty lines that carry students to the mental disease and handicapped schools and transfer in a special terminal constructed for handicapped and there, they are redistributed to their respective schools.
  - 4) PRO-PARQUE LINES-special lines that, from a central square in the central area, go to all the parks existing in the city.
- Studies are being conducted to implant a medium capacity system, seeing that, the North-South axe is saturated with 13,000 passengers/hour/direction.



#### 4. CONCLUSION

Developing countries face many transportation problems that, most of the time, can not be solved adequately, due to financial limitations. However, creative and efficient solutions can be found, coming, exactly from the financial and economic difficulties, which force the development of new alternatives that can be utilized even by the developed countries.

#### REFERENCES

IPPUC-Light Rail Transit Project for Curitiba City-(pre-feasibility study).1990.