MANAGEMENT OF CONGESTION IN JAPAN

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ABSTRACT

Over the 30 years, road traffic in Japan has increased with rapidly advancing motorization. The time loss due to traffic congestion was about 3.8billion person-hours per year in 2005, that is, when converted into a monetary value represents an economic loss of about 12 trillion yen. It is estimated that traffic demand will continue to grow in the future and that traffic congestion will worsen as a result.

To solve such problems and enhance urban mobility, in addition to introduce measures to expand transportation capacity, the Ministry of Land, Infrastructure and Transport is promoting to control traffic demand in coordination with the public transportation and further implementing policies in an integrated manner. This paper describes the current efforts and the direction of future road policies.

KEY WORDS

CONGESTION / CAPAXITY / DEMAND / CONTROL / INTEGRATION

1. INTRODUCTION

We have improved our living standards and furthering economic development through high-speed movement of people and goods. In response to social changes, roads were developed to their current form as the most accessible and fundamental social infrastructure supporting the transportation.

In 1956, A mission led by Watkins came from the United States to conduct a survey for the construction of Japan's first expressway, and in their report they summarized; "The roads of Japan are incredibly bad. No other industrial nation has so completely neglected its highway system." 50 years has passed ever since, and roads in Japan were dramatically improved through the eras of high economic growth and motorization.

For example, two-thirds of the total planned 14,000 km of arterial high-standard highways are in service nationwide, and are supporting the basis of Japan's economic activities. These roads became an essential infrastructure supporting our daily lives, making it possible to deliver timely and diverse door-to-door delivery services.

On the other hand, we are facing a number of problems such as chronic traffic congestion in cities, many traffic accidents, pollution along roadways, and the global warming due to CO2 emissions from automobiles.

In this paper, we will introduce the efforts being made toward sustainable transportation in order to deal with these issues and at the same time explain the direction of future road policies.

2. ENHANCING URBAN TRANSPORTATION

2.1 Traffic Congestion in Cities

While the development of our highway network system has focused on the radial road systems linking cities and region, the construction of ring roads around cities has lagged behind. For this reason, when heavy traffic from a wide area flows into cities, it causes tremendous congestion. Travel speed in central Tokyo during rush hour, for example, is 17.5 km/hr, that is slower than a marathon runner.

Consequently, the time loss due to congestion was about 3.81 billion man-hours in 2005, that is, when converted into a monetary value represents an economic loss of about 12 trillion yen. Most of that loss was incurred in the three largest urban areas of Tokyo, Osaka, and Nagoya that account for about 40%. Altogether, urban traffic congestion accounts for about 60% of total congestion nationwide.

Fig.1 3-D Map of Time Loss due to Traffic Congestion in Japan

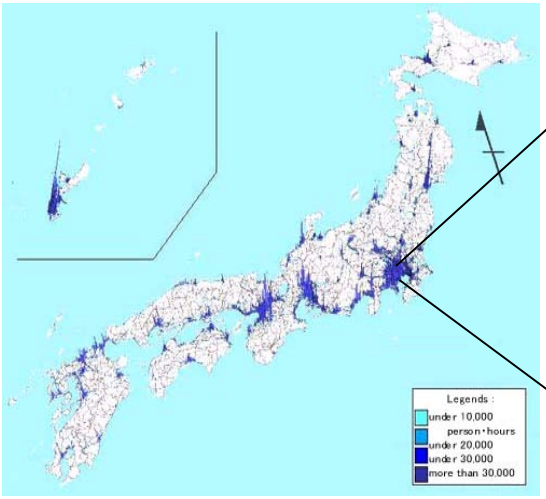


Fig.2 The major congestion points in the Tokyo Metro Area

In addition, there are still a large proportion of urban areas that have not yet achieved environmental standards for SPM and NOx along roadways, and these areas often create a controversy that further lead to a lawsuit over environmental damage.

To solve such problems and enhance urban mobility, in addition to introduce measures to expand transportation capacity, we are promoting to control traffic demand in coordination with the public transportation and further implementing policies in an integrated manner.

2.2 MEASURES TO EXPAND TRANSPORTATION CAPACITY

2.2.1 Construction of Ring Roads

Urban roads in Japan are still inadequate in terms of both quantity and quality. The construction of ring roads, which are concentrated in cities and are intended to divert and disperse traffic, lags significantly behind compared to the US and Europe. Therefore, our top priority is to construct ring roads in major cities, as well as to widen roads and to construct bypasses.

The construction of three ring roads are promoted in the urban area around Tokyo, where 34 million people live, as part of the network of three ring roads and nine radial roads. Currently, however, the construction rate has stopped at about 35%. When a 7-km stretch of the innermost of Tokyo's three ring roads, the Central Circular Route's Oji route, opened in 2002, it reduced congestion on Tokyo's expressways by about 10% in one day, and as a result of traffic returning to main roads from surrounding neighborhood streets, fatal traffic accidents on those streets fell by about 30%, thus achieving a significant result. Currently, in addition to the Central Circular Route, construction is being promoted for the Tokyo Outer Ring Road that links central Tokyo and the Metropolitan Inter-City Expressway that connects core cities in the urban area. Over the next 10 years, we are aiming to complete about 90% of the overall planned ring roads.

Fig.3 Three Ring Roads of the Tokyo Metropolitan Area

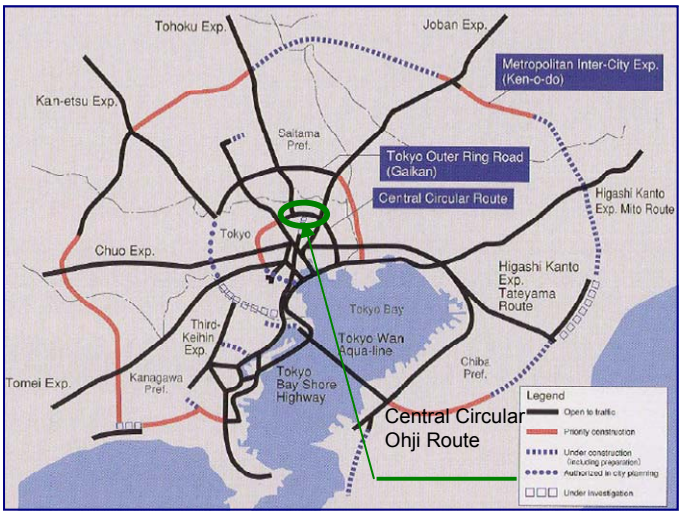
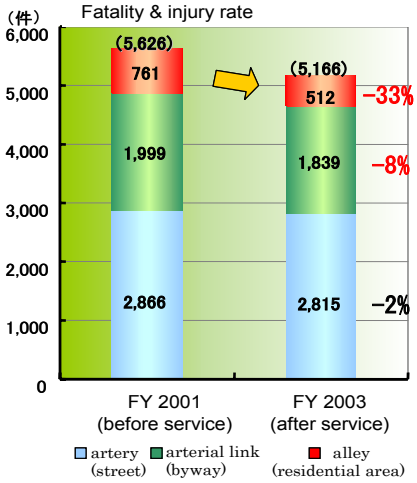


Fig.4 Accident decreases in residential areas through operations of Central Circular Ohji Route



Source: National Police Agency

The construction of ring roads began after the urbanization had progressed, thus it is always difficult to obtain agreement on the projects. For example, city planning was decided for the urban sections of the Tokyo Outer Ring Road in 1966, but opposition from local residents prevented its progress for the past 30 years. Now the government and the city of Tokyo are taking the procedures to drastically revise the plans from elevated structure to subterranean structure, and are ensuring the transparency, objectivity, and fairness of procedures through public involvement (PI), and providing detailed explanations to local residents.

Fig.5 Route in city planning of the Tokyo Outer Ring Road

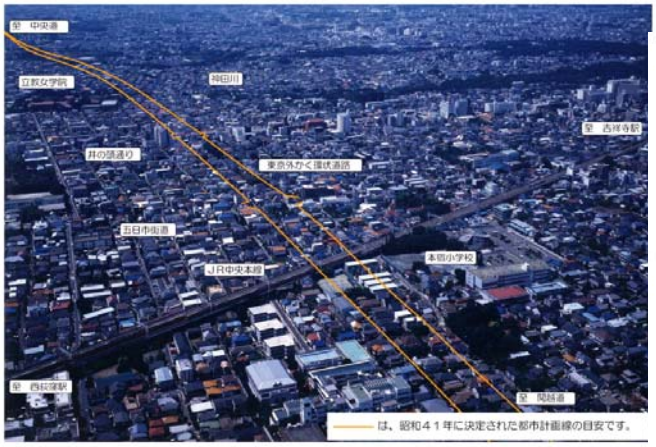
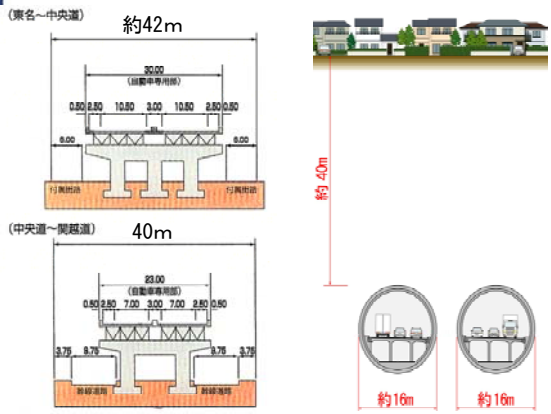


Fig.6 Structural revise of Expressway



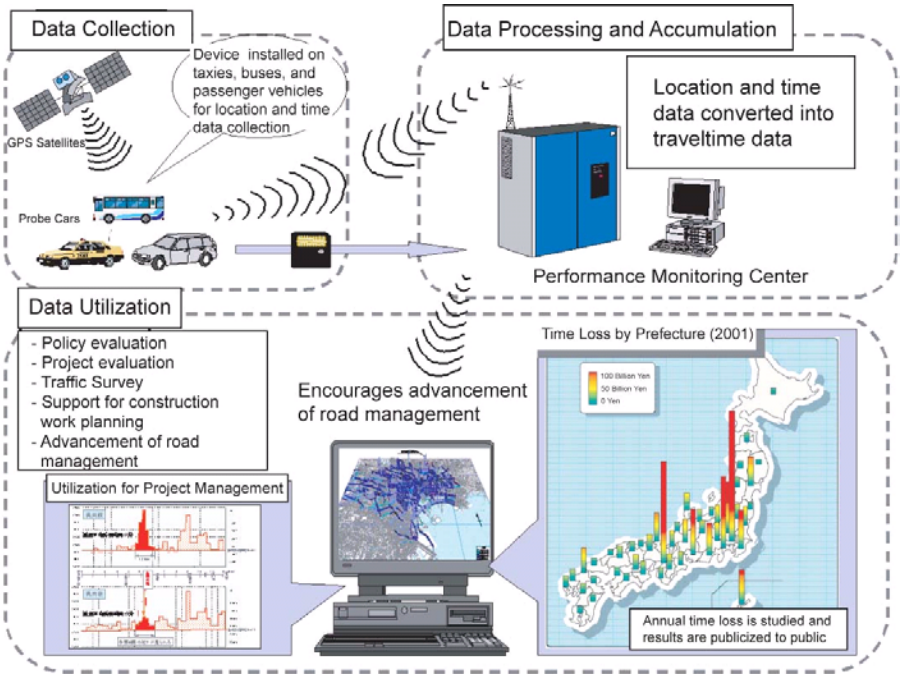
2.2.2 Traffic Congestion Measures Program

In order to effectively mitigate congestion, the institutions as a whole have to implement comprehensive countermeasures by localizing the congested sections through assessing the data and set priorities. In this respect, a traffic congestion measures program was formulated in 1987.

In practical terms, based on data obtained through a variety of methods, severely congested sections are identified as “major congestion points” and concrete measures for each congestion point are proposed by the Congestion Measures Council made up of people from related organizations. The information is released in the Traffic Congestion Measures Program.

In the past, local surveys were conducted at each major intersection to assess congestion points, but in recent years, by application the ITS technology we can more effectively assess congested sections with probe vehicles equipped with GPS or with VICS data shared in cooperation with the police.

Fig.7 Data collecting methods by using Probe Vehicles



In addition, to manage traffic congestion through ITS technology proves effective. Over 15 million car navigation systems equipped with VICS units are in use and the number of vehicle equipped with ETC on-board units exceeded 1.3million. ETC has almost entirely eliminated congestion at toll gates on the main line of the Metropolitan Expressway.

Fig.8 Shipment of car navigation systems Equipped with VICS

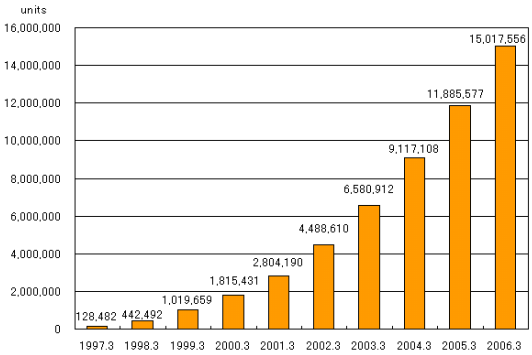


Fig.9 ETC gates on expressway

2.3 Measures for Transportation Demand Management

While we are trying to expand transportation capacity, we are also promoting efforts to control transportation demand. Since fiscal 1994, we have been striving to control transportation demand in cities, by introducing TDM measures to improve mobility in cities, and disperse peak traffic volume by introducing park and ride and flex time programs.

Since fiscal 1999 we have combined transportation capacity expansion and transportation demand control activities in major urban areas, and launched the “Urban Area Transportation

Facilitation Comprehensive Measures" to facilitate mobility. At present, 23 cities have formulated their plans, and representatives of the central governments, cities, and prefectures and city and prefectural public safety commission members meet together to propose and implement transportation facilitation measures.

2.4 Coordination with the Public Transportation

It is extremely important for cities to promote coordination with the public transportation to share the tasks with the road transport in order to achieve sustainable transportation. To this end, we are promoting to use the road budget for public transportation.

As the bus service is most closely related to roads amongst other mode of public transport, we are developing measures to improve its convenience by introducing bus priority lanes.

Furthermore, in fiscal 2005 a bus location system was fitted for expressway buses nationwide using road budget. This initiative will improve the convenience of inter-city bus service, and at the same time, travel time reliabilities on expressways can be measured by calculating time and location information obtained from the bus location system.

Currently, we are promoting measures to improve railway crossings. There are about 700 rail road crossings within 23wards of Tokyo, which is 80 times more than those of London. There are about 600 railway crossings in major cities, which were shut for 40 minutes/hour, causing many problems including traffic congestion. Therefore, we are using road budget to eliminate railway crossings by elevating them consecutively.

2.5 Efforts to Implement Comprehensive Transportation Strategies

Up until now, we have proposed countermeasures for traffic congestion in terms of capacity and demand in urban areas, but in the future it will be necessary to establish integrated plans in view of achieving sustainable transport. It is needed to conduct more comprehensive study of the urban transport system to formulate specific strategies for sustainable transportation. For instance, city scale, structure, and its characteristics should be taken into consideration, and basic policies for sharing tasks between public transportation and automobile traffic should be drawn. Also the areas to enhance the convenience of automobile traffic and areas where automobile traffic must be controlled should be marked off.

For this purpose, we will establish the Urban and Regional Comprehensive Transportation Strategy Conference in fiscal 2007, made up of representatives from road management, city planning and public safety commission members who have participated in the past, and representatives from the public transportation organizations, to propose and implement radical countermeasures for urban mobility.

3. CONCLUSION

Japan has aimed for balanced development of national lands, and in order to achieve land policies for decentralized development of national lands and a multi-axial national land structure, we have proactively promoted road development as the most fundamental element of infrastructure. These are considered extremely important efforts, from the perspective of both Japan's economic growth and social protection for vulnerable national lands.

However, in recent years as the society has been facing problems such as a rapid dwindling birthrate and aging populations as well as global warming that have not been experienced before. It is necessary to engage in a variety of efforts combined with the road development as a national land policy, taking into account with regional needs and conditions.

Japan's land area is long and narrow, extending south and north, and mountain ranges run through the central areas, resulting in still very large regional differences in transportation convenience.

Under these circumstances, comprehensive transportation measures are necessary to sufficiently utilize the strengths of all modes of transportation, not only road transportation, in order to resolve chronic traffic congestion in cities.

As Japan is facing a period of major social changes we aim to establish a sustainable transportation system by promoting these policies while fully taking into consideration regional characteristics and transportation characteristics.