

Present Situation of Road Installations of Tokyo Metropolitan Government and Road Asset Management

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Present Situation of Road Installation in the Tokyo Metropolitan Area

The road extension done within the Tokyo Metropolitan area was about 23,848 kilometers long as of November 2003, out of which 9%, 2,239 kilometers are placed under the management of the Bureau of Construction, the Tokyo Metropolitan Government. The extended road network is 1.24 times as long as the one at the time of 1965 after Tokyo Olympics

The peak periods of road facility construction such as bridges and tunnels, as Figure 1 shows, came in the period of the post-earthquake reconstruction period of the Great Kanto Earthquake and in the period from the Tokyo Olympics to the high economic growth period. Based on estimated road facilities' service lives, a period when these road facilities are to be repaired or replaced will come in ten years or so, thus, how to repair and maintain these road facilities is a major issue. Among these facilities, bridges and tunnels are not many, 1997 and 90 respectively. However, the bridges especially, due to advancing ages, can become a huge economic burden in the near future: over 40-year-old bridges account for 46% of the total bridges at the present time, and will be for 73% in ten years. Also, more than half of the total bridges constructed during the 1930s to the high economic growth period and those have

been weighing heavily in road management because they are not quite healthy stocks in terms of durability and the levels of service.

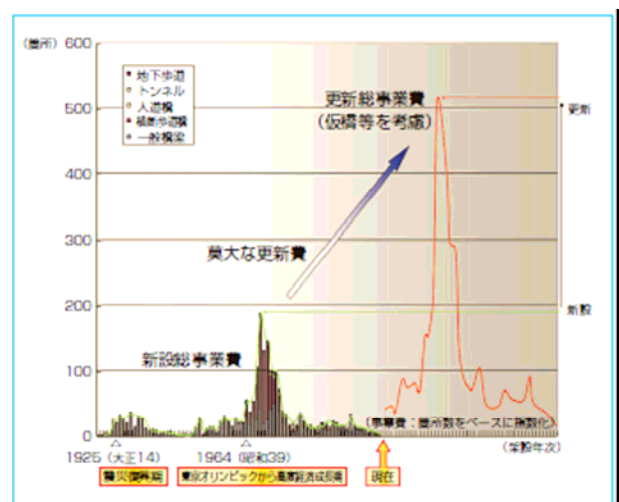


Figure 1: Road facility construction in Tokyo

In order to efficiently manage these road stocks towards a time of renewal, the conventional road management should be switched to such management that road facilities' soundness, deterioration rate and durability are evaluated accurately, preventive measures are applied effectively and peak periods of renewal are controlled properly.

Also, it is an urgent task for the metropolitan government to build a two-way communication, not an one-way one, with the citizens and road users, to explain about their management procedures, what, when, why and how they will do, in order to respond to the public's needs.

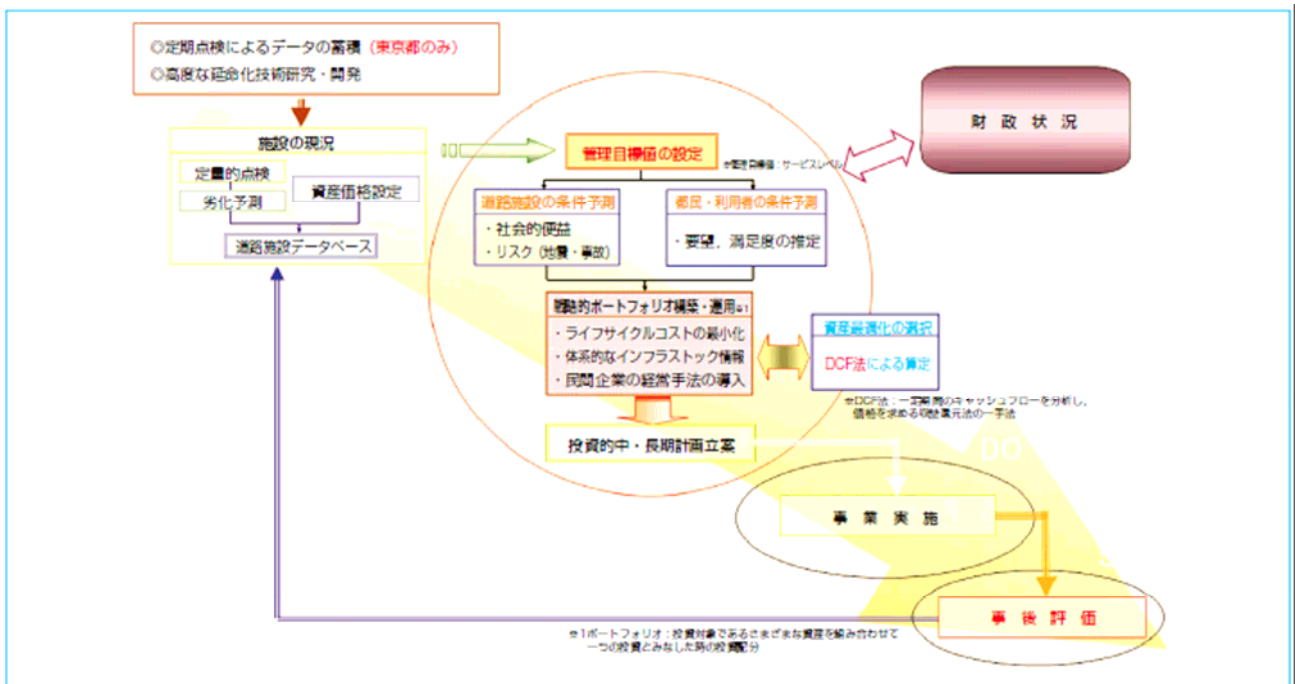


Figure 2: Outline of road asset management implemented by the Tokyo Metropolitan Government

In sum, road asset management should be the management that makes it possible to provide effective and efficient approaches to the aforesaid issues.

Why is Road Asset Management Needed?

The term Asset Management is usually used in the fields pursuing profits like real-estate and financial industries: assets such as credits, stocks, capitals, human resources and technologies are to be managed altogether to yield the largest returns from investments while involving risks and profitability.

Now why is it necessary for the metropolitan government to take the concept of asset management into their managing road facilities? The reason is that asset management is to possibly maximize asset values and optimize asset operations so as to yield higher returns with efficient fund

allocations and various investment destinations. In case of road asset management, road facilities, varying from bridges to tunnels, pavements, retaining walls, safety barriers, street lights and to machinery, need the management system to operate constructions, maintenance and repair and renewals efficiently and effectively; at the same time, to provide the most services to taxpayers as much as possible as well as ensuring accountability to them.

At present the metropolitan government has calculated Benefit (social benefits) in terms of monetary value at the time of construction each road facility, employing cost-benefit (B/C) as assessment criterion; however, in the consideration of the Benefit of the facilities under their management, they have not employed the B/C at the time of employing maintenance and repair works or renewals.

In the time when road facilities were

constructed mainly for the public convenience, there were not enough road facilities to compare with; accordingly, each facility was assessed soundness and calculated a time to be repaired and renewed. Today there are more road facilities to be managed than before, and an expected road administration is to integrate those facilities, to minimize possible risks and to maximize their asset values.

In this paper, the road asset management is discussed which the Tokyo Metropolitan Government has been implementing as a master card to solve the issues relating to the aging of the road facilities.

Road Asset Management of the Tokyo Metropolitan Government

Why today has the Tokyo Metropolitan Government been able to implement asset management into their administration? The first reason is that the metropolitan government has collected enough data on the road facilities to enable them to accurately assess those facilities' deteriorations and to predict their service lives. It is a key point of asset management to assess subject facilities' present conditions and to predict their future conditions. The metropolitan government has done a inspection of various road facilities regularly: Regarding bridges, for example, an inspection has been done every five years since 1987, based on " Procedures for Bridge Inspection," and by studying the data obtained through the inspections on soundness, that government is able to assess the surrounding environments of bridges and to predict each bridge's deterioration. As to paved roads, the government has done the unique survey MNI

Diagnosis-Crack & Rut Survey since 1991, and with the data collected through the survey, they have been developing the understanding of some relationships between the paved roads' structures, materials and the traffic volume of heavy vehicles, and of the progressing deteriorations of the paved roads.

The second reason is that the metropolitan government will implement a business accounting system as private corporations do, and reform public accounting systems for improving balance sheets and cost reports towards 2006. Then, that government will be able to accurately assess the asset values of various road facilities and disclose the details of their owning net assets to the public.

The third is to collect the data on prolongation methods of road facility service life which level the peak times of reconstructions and to devise accurate road facility assessment criteria. The metropolitan government has developed road facility assessment criteria by studying the efficiency of various construction methods with fatigue and other tests in the Institute of Civil Engineering of Tokyo Metropolitan Government while collecting the data on newly developed construction methods and materials

With these reasons, the Tokyo Metropolitan Government has decided to implement road asset management as an ace card to solve the issues.

As the first step in the road asset management, it is necessary to manage each road facility with an integrated approach. Thus, the data collected on each facility should be integrated

into a database system of road facility so that any data is referred and compared with others in the database. The second step is to accurately calculate the asset value of road facilities and obtain their historical costs, estimated serviceable lives, depreciation methods and estimated salvage values. The third is to determine the most appropriate times for repair and reconstruction by computing the total life-cycle cost and lowest life-cycle cost based on the condition of each road facility's serviceability.

The fourth is to calculate the present values of each road facility by applying the DCF method after computing each road facility's serviceability, and risk-return at the times of construction, maintenance and repair and renewal.

By setting a targeted level of road management based on the aforesaid asset management, budgets and the needs of the citizens and road users, the metropolitan government is able to make proper mid- and long-term investment plans of road asset management and improve them with feedbacks given on the operated plans in next projects. Fig. 2 shows the outline of road asset management that the metropolitan government has implemented as discussed.

Without implementations of proper road asset management, the city of Tokyo might follow the same path as the American society took to "America in Ruins." In order to prevent it, the metropolitan government should switch to preventive type maintenance management in view of limited financial resources by

implementing road management as early as possible, which will be able to produce the most benefits of securing safe and convenient transportation systems at the least cost.