CONCEPTS OF THE COLLABORATIVE INFRASTRUCTURE MANAGEMENT METHOD AND ITS APPLICATION IN HOKKAIDO

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Abstract: The “collaborative infrastructure management method” is a part of new infrastructure administrative management. This paper aims to examine its significance, role, conceptual development and related issues, and summarizes the results of the study on its institutional design for implementation in Hokkaido. The collaborative infrastructure management method is an organization control and operation procedure for managing cooperative projects between an infrastructure administrative body and relevant public and private organs as well as users and interested people in general to successively improve the quality, utilization and maintenance of facilities, and to systematically, continuously and collaboratively promote concrete management methods, future planning and improvement projects and educational activities of social facilities as a whole.

Key Words: collaboration, management system, evaluation
1. INTRODUCTION

The term "collaboration" has come to be used frequently within the field of road-related infrastructure. Such "collaboration," meaning the cooperation of facility administrators with other groups such as users in joint activities, has been practiced in various ways and within a broad range of infrastructure.

In the field of roads, activities under the name of “Road Traffic Performance Management”, for example, were carried out in the Kumagaya area on National Highway 17. The activities included workshops participated in by general road users to identify road-related issues and their necessary countermeasures. Using the UK’s previously developed “Route Management Strategies (RMS)” as a model, they tried to develop a new method, systematically applying the key concept of “collaboration” to road management and planning and improvement projects. Currently, practical collaborative road management activities are also under way in Hokkaido.

All these activities can be aptly termed as employing the “collaborative infrastructure management method”, which is defined at this point as: an organization control and operation procedure for managing cooperative projects between an infrastructure administrative body and relevant public and private organs as well as users and interested people in general to successively improve the quality, utilization and maintenance of facilities, and to systematically, continuously and collaboratively promote concrete management methods, future planning and improvement projects and educational activities of social facilities as a whole.

In this paper, the authors discuss the significance, role and related issues of collaboration-based infrastructure management and examine the concept and institutional status of collaborative infrastructure management in Hokkaido.

2. NECESSITY TO INTRODUCE A NEW METHOD FOR ROAD PLANNING, IMPROVEMENT AND UTILIZATION

Japan’s period of rapid economic growth started in the mid-1950s, and led to the rapid motorization of society. Actions typically taken to address the situation at the time were quantitative expansion of both inter-city arterial and residential roads.

Today, although the necessity for road improvement is still high in order to mitigate chronic urban traffic congestion and traffic accidents, the social factors surrounding road administration are changing. These factors include phenomenon such as the decrease in population, the aging of society due to the decrease in the number of children and declining social and economic activity in local areas. Accordingly, the needs of community residents and users in terms of comfort, safety, scenic beauty and environment have much diversified.

In Hokkaido, each area differs not only in local appeal and assets, but also in the type of road-traffic problems it faces. Thus, actual situations have to be taken into account to carefully identify local needs and solve various road-related problems. Improvement and utilization of road network need to be carried out through the integration of road, roadside and regional elements in order to enhance users' satisfaction, to improve regional appeal and vitalization, and to benefit people in their daily lives. Because of the continuous changes seen in roads
and their surroundings as well as in the needs of locals and road users, a system to continuously identify road users’ needs has to be established.

3. BACKGROUND TO THE COLLABORATIVE INFRASTRUCTURE MANAGEMENT METHOD

3.1 Collaboration-oriented movement

This is a movement for incorporating the views and ideas from all of a project's related parties into the project's decision making process. In such an event, landholders, peripheral residents, facility and service users, and public in general are invited to participate, with the aim of resolving or preventing serious conflicts associated with land acquisition procedures and environmental measures which are likely to occur when a project is initiated.

A big turning point came in the area of road administration when a process called “Public Involvement” was introduced to the Road Council in 1996 under which opinions were collected from the public and some of them were reflected in proposals. This movement’s major goal was to settle and prevent conflicts, inviting not only landholders and peripheral residents who expressed their anxiety about a project but also all users and the general public using the client-oriented principle. The “Strategic Environmental Assessment” which has already been legalized in major nations including the US calls for the participation of the general public not only in a project’s implementation stage but also in its initial planning stage. Related to this precedent, guidelines for the “Public-Involved Road Planning Process” were formulated in 2002, to deal with new road projects. The guidelines have been applied to road construction and improvement projects in various places with the aim of drawing up plans and conducting projects smoothly and rationally.

At the same time, a different style of approach to projects has appeared nationwide in which road management and daily maintenance as well as road-related cultural events are actually carried out by NPO's and the general road users themselves. In such projects the administrator's role is to promote the project and provide assistance to those managing and maintaining the road. One good example is the “Michimori Kyushu Kaigi [Road-caretaker Kyushu Conference]” organized in 2003, and activities focusing on the promotion of collaboration-based social exchange in road management projects include the “Zenkoku Michizukuri Joseidantai Koryu Kaigi [National Conference for Exchange of Women’s Road Planning Organizations]”.

The range of interest in activities has also expanded. For instance, an event named “Shio-no Michi Kaigi [Salt Road Conference]” conducted by local governments in the three prefectures of Shizuoka, Nagano and Niigata with the help of volunteers focuses on culturally related aspects which have developed along with the roads. The “Scenic Byway Hokkaido” project is also a collaborative road-related local activity to promote Hokkaido’s sight-seeing tourism in cooperation with local volunteers.

3.2 Movement to improve administrative management

Due to the rigorous social climate resulting from stagnant-and-low economic growth after the collapse of the bubble economy, projections of future depopulation, financial pressures on the national and local governments and assertions that near-complete levels of infrastructure including road facilities have been attained, the public has been demanding more effective management and greater public accountability for administrative activities.
Since the 2001 enactment of the “Government Policy Evaluations Act (GPEA)” each policy has come to be evaluated under the leadership of the Ministry of Internal Affairs and Communications. Accordingly, in the field of infrastructure --- road administration in particular --- a new road administration management system has been employed since 2003 centering on outcome-based management. In this system, the main viewpoint was shifted from a conventional output-based concept that weighed such factors as the work volume into a new user-oriented outcome-based concept focusing on such factors as the degree of congestion and safety. These outcomes were converted into 17 numerical indexes with which a performance plan and an achievement report have been made for each national region. One of its features is that it emphasizes the implementation of clear and cyclic management repeating a “Plan-Do-Check-Action” flow and also highlights the importance of decision-making and use of ingenuity at the operation site.

4. CONCEPTS OF THE COLLABORATIVE INFRASTRUCTURE MANAGEMENT METHOD

4.1 Status of collaborative activities in infrastructure management
The authors believe that collaborative activities involving users should be integrated into infrastructure-related administration management as a mainstay element. New types of administration management systems like the one mentioned above employ a continuous and successive spiraling-up “Plan-Do-Check-Action” improvement process. These management systems place more stress on setting outcome-based goals and evaluation, enhancing the transparency of the process and accountability for decisions taken.

Of course these systems have been tailored to keep in mind the needs and opinions of the taxpayers and general public to a great degree. Therefore, collaborative activities with users are essentially feasible.

The concept of “continuous improvement” is particularly intrinsic. The history of infrastructure is actually the same as the history of human civilization. For a long period of time, mankind has established, maintained and gradually improved infrastructure. The range of infrastructure, initially based on long-standing facilities such as roads, seaports and urban installations, has expanded further along with successive technological developments, resulting in the creation of new types of infrastructure. In view of the continuous improvement and innovative developments attained over a long history, to declare that “the necessary level of infrastructure has mostly been attained” seemingly fails to notice the above mentioned intrinsic values of infrastructure.

Also, although adjustments to administrative management systems mainly tend to originate from administrators in a top-down fashion, it is essential that bottom-up elements also be integrated into such adjustments to ensure the steady improvement of infrastructure management.

Specifically, outcome-based evaluation indexes, for example, can be designed in a cascade form, ranging from common indexes used nationwide to those created and implemented by a regional bloc and those unique to a sub-region.

Furthermore, it is quite important to establish systems which can identify detailed needs and problems on the spot and systems which can recommend resourceful solutions taking regional
features into account. Such activities carried out from local perspectives are suitable for collaboration with users. To improve and add to an infrastructure-related administrative management system, it is effective to integrate such collaborative activities.

4.2 Significance of collaborative activities in infrastructure management

The nucleus of the collaborative infrastructure management method is to carry out highly transparent collaborative activities between the administrators and users of a particular infrastructure facility, or in other words, the general public and the relevant public and private administering organizations.

Yet, the significance of “collaboration” may not seem compatible with mutually-opposite-stance-type relationships like those between the public and the public administration, clients and suppliers or between producers and claim-making consumers. The essence of “collaboration” is for both sides to view each other as groups of ordinary individuals with whom face-to-face contact is possible, and it aims at establishing a mutual harmony instead of conflict. The significance of collaboration can be broken down into four principles: “Identification of and common sharing of each group’s specific needs and problems”, “Harmony between users and administrators”, “Promotion of integration and original creativity” and “Providing a place to learn and exchange knowledge about infrastructure”.

Particularly, regarding “Identification and common sharing of each group’s specific needs and problems”, it is a matter of course that the needs, problems and issues of infrastructure have to be acquired from the viewpoint of users so as to be able to provide them with the necessary direct and indirect services. But more importantly these tasks have to be conducted collaboratively with the participation of users themselves. The significance of common sharing becomes all the greater when viewed from the fact that facilities such as roads possess multi-dimensional functions as well as have multiple influences, and that they are used by a wide range of users with a diversified sense of values.

It is also critical to stimulate a desire for common sharing, or common responsibility, for these needs and problems. The term “common sharing” used here refers not only to a mutual group sense of responsibility between administrators of the facility and the public but also among relevant public and private organizations as well as among users and the public in general.

From the standpoint of users and the public, a discussion about the safety of existing roads and rivers or the reduced size of current natural areas is more straightforward and acceptable to start with than would be a debate about the effects and influences of a future road or dam.

After making best efforts to draw a common sympathy from among the participants, next the question, “What should we do for the future, and how should we do it?” should be asked. In other words, “Now and here” must be the starting point of infrastructure-related collaborative activities.

During periods of financial difficulty, it is not unusual for various groundless theories to surface making public works a scapegoat, and for various anti-infrastructure ideas to spread. Thus, it is important to initiate collaborative activities to identify needs and problems not on the basis of abstract theories but in a definite straightforward manner so as to eventually gain public acceptance for reasonable concrete arguments.
5. IMPLEMENTATION OF THE COLLABORATIVE INFRASTRUCTURE MANAGEMENT METHOD IN HOKKAIDO

To further refine and institutionalize the collaborative infrastructure management method, it was applied to a case in Hokkaido in order to evaluate its institutional design. To make the design comprehensive, systematic, continuous and collaborative, the following three principles were applied to its method of implementation in Hokkaido:

First, improvement and utilization policies are formulated by route from a long-term perspective, rather than just by road section. Then, subsequent road improvement and utilization tasks resulting from these policies are performed continuously. Conventional road improvement and utilization methods have been based on a spot-mending principle. But by formulating a plan for an entire route and operating the plan in a PDCA cycle, improvement and utilization can be continuously practiced comprehensively throughout the route from a long-term perspective. The whole route and its roadside areas need to be considered as a unified space, and ideas to enhance a route's scenic appeal need to be established in the future.

Second, opinions from community residents and users should be reflected in formulating road planning, improvement and utilization programs. In addition to maintaining transparency throughout the examination process, it is vital right from the initial planning stages to have a knowledge of the needs of community residents and users, and also to collect ideas aimed at meeting these needs so that flexible and appropriate road improvement and utilization measures that best fit local conditions can be obtained.

Third, exchange and contact with community residents and users should be strengthened through collaborative activities to encourage their own road utilization. In formulating road plans, road utilization methods should also be examined in an effort to find ways to enhance local attractiveness and revitalization.

The objective of the collaborative infrastructure management method in Hokkaido is for community residents, users and administrative organs to collaboratively think about “roads” and flexibly address diversified needs using ingenuity while keeping within a limited budget, to maintain and develop local attractiveness and vitalization, and to continuously improve and operate a “beneficial road” requested by the local community.

The collaborative infrastructure management method in Hokkaido prioritizes the use of existing stocks and roads as much as possible, preserving local attractiveness and natural features while cost-efficiently coping with diversified needs. It is believed that it is important for administrative organs, community residents and users to discuss current road-related problems and issues and figure out the most suitable road specifications for the community and ways to use unified road-roadside space.

6. INSTITUTIONAL DESIGN FOR THE COLLABORATIVE INFRASTRUCTURE MANAGEMENT METHOD IN HOKKAIDO

Figure 1 demonstrates the examination process of the collaborative infrastructure management method in Hokkaido and Figure 2 shows the project examination framework. In the 1st stage of the examination framework, the “Planning Advisory Group” consisting of users of a particular route and experts on the region formulates a basic plan (draft) through a
serial process of examining route-related regional strategies, functions and efficiencies required of the route, and improvement and utilization methods. Then, in the 2nd stage, more details are drawn up based on the basic plan and continuous implementation and evaluation are systematically performed. Two parties are involved in this stage. One is a “Region and Route Examination Council” consisting of representatives from relevant municipalities, local agriculture, commerce and tourism industries, and local communities around the route. The other is a “Road Section Study Group” consisting of members who are directly or indirectly concerned with the target road section itself.

Figure 1 Examination process

Figure 2 Examination framework
Route-related regional strategies: the direction which the region should take is examined from lifestyle, industry and tourism perspectives taking the degree of route utilization into account.

Functions required of the route: based on the regional strategies mentioned above, a discussion is conducted over how the target route is being used and how it should be used in future. Objectives of road use are examined from the three perspectives (lifestyle, industry and tourism) used in regional strategies.

Efficiencies required of the route: the level of services which needs to be provided to realize the above mentioned functions is examined. In determining the necessary level of services, various road factors such as structure, functionality and safety are studied, and emphasis is placed on the overall enhancement of route performance.

Devices for improvement/utilization: while taking into account the functions and efficiencies required of the overall route, measures for enhancing local attractiveness are studied. These include addressing the problems specific to each road section as well as making use of each section's unique local resources. In addition, hidden resources known only to those knowledgeable on the area should be explored for exploitation. Needs of community residents and users have to be fully reflected in the examination, and the creation of menus of appealing, cost considered, and easy to implement road improvement and utilization measures should also be examined. From these menus, the improvement and utilization programs that list measures particular to Hokkaido are generally called “Hokkaido Standard”.

Finally, all outcomes of the examination process are put together and drawn up into the basic plan defining the road improvement and utilization menu as well as prioritized items.

A feedback system in the form of a continuous PDCA cycle is employed in a series of examination tasks, in which the results of actual improvement, utilization and trial operations are assessed. Based on these assessments, further reexamination is rendered.

7. CONCLUSION

Finally we would like to clarify the differences between the collaborative infrastructure management method and its peer programs. The UK model program, RMS, is an excellent system but it is somehow businesslike and rigid. In comparison, our collaborative system, which involves the cooperation of users and the public, exhibits a more humane nature, and places more importance on historical, cultural and pleasurable elements.

In contrast, the National Scenic Byways Program of US origin contains many genial elements although it has a weaker framework for the continuous management and improvement of the main functions of roads, and some of its system configuration is fragile. The Michimori program in Kyushu excels in regularity, locality and sustainability whereas the collaborative infrastructure management method puts more emphasis on systemization, integration and consistency with administrative management setting of outcome-based targets. While cooperating with these peer programs, we have to improve our own collaborative infrastructure management method with its institutionalization in mind in order to realize its full comprehensive possibilities.

If our administrative system today could be described using an analogy about medicine, then
compared to Western medicine, the collaborative infrastructure management method introduced in this paper would be like Chinese herbal medicine curing or preventing illness fundamental to all problems.

The institutional design for the collaborative infrastructure management method in this paper has been gradually built up through a continuous process of trial-and-error through a number of experimental workshops. At present, the 1st stage has been completed, and a 2nd stage of trials is scheduled to be held. Based on these trial results, we hope to continuously improve the method.

REFERENCES

Japan Society of Civil Engineers, Business Administration of Infrastructure Improvement—Dawn of Policy Management: Journal of the Society of Civil Engineers (in Japanese).