

MANAGEMENT OF ROAD INFRASTRUCTURE ASSETS

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TECHNICAL COMMITTEE 4.1

INTRODUCTORY REPORT

CONTENTS

EXECUTIVE SUMMARY	3
COMMITTEE MEMBERS WHO CONTRIBUTED TO THE REPORT	3
1. GENERAL INTRODUCTION	4
2. ASSET MANAGEMENT METHODS	5
2.1. Introduction	5
2.2. Best practices	5
2.3. Corridor approach in relation to AMS	6
2.4. Way Forward.....	6
3. INTEGRATION OF PERFORMANCES INDICATORS	7
3.1. Introduction	7
3.2. Main results.....	8
3.3. Way Forward.....	9
BIBLIOGRAPHICAL REFERENCES	9
DRAFT CONCLUSIONS.....	10

EXECUTIVE SUMMARY

The Technical Committee explored three fields of activities during the period. Namely:

- Analysis of methods aimed at coordinating the management of all road assets, taking into account infrastructure performance as well as the perception of users and residents.
- Proposal of a structure for obtaining and elaborating performance indicators to explain the condition and function of road infrastructures. Those indicators will be integrated into an overall management system.
- The best practices capable of taking into account the expectations of users and residents.

The main objective of the Technical Committee 4.1 is to evaluate the best practices for managing road assets.

The Committee will review the various stages of implementation, the best performance indicators to be taken into account as well as the best practices in terms of communication with decision-makers, users and residents.

The output of this analysis will be presented by the Technical Committee and in the individual communications.

Presentations and discussions will allow the Technical Committee 4.1 – in contact with participants – to suggest the future for PIARC in the field of road asset management.

One specific purpose is to define the best practices for switching from an axis-based road asset management process to a corridor-based road asset management approach.

Discussions will also focus on road asset management as an element of sustainable development. They should make it possible to appraise the previous results in the field of road asset management and define the orientation for additional tasks in the future.

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1. GENERAL INTRODUCTION

Road asset management combines engineering, finance, economics and the best business practices for the purpose of improving investment decisions as well as continuous procurement and management of those investments. OECD's Asset management for the road sector is defined as: "A systematic process of maintaining, upgrading and operating assets, combining engineering principles with sound business practices and economic rationale, and providing tools to facilitate a more organized and flexible approach to making the decisions necessary to achieve the public's expectations".

Asset management is in fact the institutionalization of a business (culture) type of approach to the management of infrastructures. It implies the following:

- approach projects and programs as investments to specific customers;
- monitor performance and asset value in order to substitute with alternative projects and investments;
- implement elaborate short- and long-term investment strategies that are secure and competitive for current and future assets.

The overall objective when adopting an asset management approach is to be able to demonstrate prudent management of assets. Key decision-makers need a tool to support managers that combines data and information about assets and investments, allowing them to implement strategical compromises and respond to questions from politicians, customers, communities, pressure groups and stakeholders in the manner of consultants and entrepreneurs.

The Committee explored three main fields of activities during this term, namely:

- Analysis of methods aimed at coordinated management of all road assets; especially under focus were the performance of infrastructure in terms of functionality; with users and residents' perceptions also being taken into account; the functionally-different structures for road asset management systems and the implementation of the management concept per road corridor were reviewed.
- A structure was suggested to obtain and design indicators that can be integrated into an overall management system and identify the functional condition of the road infrastructure.
- Best practices taking into account users and residents' expectations were finally explored.

The main objective of the Technical Committee 4.1 session will be to summarize best practices that allow implementation of road asset management.

Stages of implementation, the best indicators to integrate as well as practices in terms of communication with decision-makers, users and residents will be explored.

Presentations and discussions will allow the Technical Committee 4.1 to define, in coordination with participants, the future orientation for PIARC in the field of road asset management.

The specific purpose is to define the best practices enabling a shift from an axis based- to corridor based-road asset management.

Discussions will also focus on road asset management as an element of sustainable development. This will make it possible to evaluate knowledge accumulated during the term in the field of road asset management and define the direction for the additional tasks in the future.

2. ASSET MANAGEMENT METHODS

2.1. Introduction

The strategies for this issue are expressed in the Work Programme:

- Identify and review methods aiming at a coordinated management of all road assets.
- In management systems, review how the performance of infrastructure is taken into account terms of functionality (expected service vs. service provided; consideration of users perception, etc.).
- Review the various operating structures for road asset management systems; review how the management concept per road corridor is implemented.

The objectives are deducted from the strategies to:

- Give practical topics to permit the implementation of Asset Management for roads.
- Describe differing levels of implementation within country type (developing, in transition, developed) and within road management administrations.
- Describe issues with development and/or integration of management systems.

The work has been based on the report “Asset Management for Roads – an Overview” drawn up by PIARC TC6 in 2005. In that report it was stated that despite more and more road and highway administrations have taken an active interest in comprehensive Asset Management, there remain very few practical examples of successful implementation, and no fully operational comprehensive Asset Management frameworks. Indeed, some are still failing to accept that Asset Management is not about purchasing or developing a new, sophisticated computer program. But this is not altogether surprising, since all too often one hears reference to Asset Management ‘systems’. Comprehensive Asset Management should not be regarded as a ‘system’, but rather as an ‘approach’ to managing infrastructure embodying a framework within which various ‘systems’ can be operated.

2.2. Best practices

The following list of best practices was obtained from a review of all reporting road administrations:

- Goals or standards are important for managing assets.
- “Outcome” indicators are replacing “output” indicators for assessing an agency’s asset management practices.
- Good inventory and condition data are necessary for managing assets.

- Budgets are based on asset management system outputs.
- Preventive maintenance is important to slow deterioration of assets.
- Customer satisfaction surveys are a useful input to program development.
- Outsourcing maintenance is a popular approach.
- A website is a good way to keep users informed about transportation.
- Benefit-cost analysis is a common approach to making tradeoffs. (project-level)

2.3. Corridor approach in relation to AMS

Viewing asset management in a road infrastructure perspective, all sub-assets belonging to the road network must be contained by the asset management process. Therefore the asset management process must encompass maintenance scheduling of all sub-assets in a corridor approach.

However the corridor approach seems to have two alternative strategies:

1. Corridor approach may take place as an integrated economic prioritising among more sub-asset in the road network, i.e. pavements and bridges.
2. Corridor approach may derive from strategic consideration about doing a complete make over of all required maintenance needs in the specific corridor to reduce recurrent traffic obstruction in the corridor for a pre-determined period of years.

The alternative approaches both pursue the economic rationale in defining the maintenance scheme as stated in the Asset management definition. Even though the second approach is reported to have difficulties in planning of coincide execution of works it also reports high benefits in users cost, because of reduced interference with the traffic flow in the long term.

2.4. Way Forward

Developing Countries/Economies in Transition

The gaps in the obtained information concern particularly Developing Countries/Economies in Transition. The Technical Committee 4.1 session in Paris will have to emphasize those countries expectations and provide itself with the means to future work on those expectations.

Benefit Calculation/Methodology for AMS

A number of (developed) countries use asset management either in segments, or fully. However, an issue of how to calculate benefits achieved by the use of AMS, and what methodology should be applied to optimize management of various assets in the road sector. The discussion during the session, and the future work of the Technical Committee 4.1 should analyze current practices and give recommendation of the best practice for benefit calculation/methodology for AMS for each of the four main topics (technical tools, administrative arrangements, business arrangements, owners objectives/customer needs).

Asset Management in Age of Outsourcing

In the last ten years outsourcing has been an increasingly present trend, not only in the maintenance works but almost in all activities within asset management in the road sector. In this process, considerable knowledge is being transferred from road administrations in the private sector that delivers these services, and a number of experts/specialists have left the administrations for the private sector. Such a process might ultimately lead to insufficient expertise and competence of road administrations in development of road sector strategies. Therefore, the discussion should be focused on the following:

- to analyze outsourcing process in countries with different levels of development;
- to analyze and recommend optimal role and advantages of private sector in asset management, and also of successive steps in outsourcing;
- to recommend functions which should stay in road administrations and knowledge management in administrations which are required for performing of these tasks.

Within this topic it would be beneficial to analyze past experiences in the use of long term performance based maintenance contracts, especially those types of contracts which include both routine maintenance and rehabilitation of road network in the same contract (significant part of total road management).

3. INTEGRATION OF PERFORMANCES INDICATORS

3.1. Introduction

The management of the Road Sector today is based on goals and results in most of the developed countries and countries in transition. Goals are basically formed from the overall transport policy addressed by the government. The most common denominated objectives for this policy world wide could be summarized as:

- accessibility
- safety
- environment
- high transport quality and
- positive regional development

The overall goal by this policy may be expressed as ensuring a socio-economically efficient transport system that is sustainable in the long term.

However, goals and result management has to be supported by suitable processes ensuring movements towards the pre-defined goals. Processes are usually used for defining and prioritizing between different organizational activities. Undertaken activities are directly related to the changes in condition and will affect the outcomes. The outcomes might vary in efficiency and have different impacts on the movement towards the objectives and goals. The changes in condition however, have to be evaluated in order to improve the obtained performance and outcomes in the future. One of the most important parameters to be considered in the procedure of evaluation is to obtain suitable and relevant indicators.

However, developing indicators for performance measurement has been one of the most important activities within modern organizations in most countries during the past decade. Substantial efforts have been invested in developing not only definitions for indicators but also the methods and techniques needed for their measurement.

3.2. Main results

The road asset management today is mostly based on goals and results management. Result improvement of any kind (methods, systems, products, approaches, etc.) require follow up and proper evaluation. The most common technique used in the procedure of evaluation is comparison between a series of data obtained from results in different time horizon. Experiences during the past decades have shown that relevant performance indicators are very useful tools to be used in the procedure of evaluation.

The primary objective of performance indicators is to support decision makers at all levels in management of road assets ensuring efficient actions and get the best use of public resources.

Basically there is a large number of potential performance indicators developed within the road sector during the past decades. In his work, the Technical Committee 4.1 highlights the importance of not only the hierarchies between these indicators (owner/manager/user and operator) but also the fact that they all are not equally important at the same time world wide. The main issue is how indicators can be assessed in terms of the strength of their relationship with pre-defined goals and objectives.

Development of relevant indicators requires understanding the process empowering/disempowering the achievement of the main goals in any area of transportation. Applying the concept presented by the Technical Committee enables organizations looking at problems from a holistic point of view. The holistic approach is necessary for findings of efficient solutions through multi disciplinary engineering as well as co-operation with all involved parties. However, the appropriate set of performance indicators may vary in different countries depending on the current circumstances.

The concept for development of performance indicators may be expressed as further development of the industrial quality management. The main difference is that instead of following up and improving each activity for itself, this concept suggests focusing on the final results through follow up of the relevant indicators.

It is also highly recommended to start working with harmonization of indicators with respect to same goals and objectives world wide. The target and ambition within the field of transportation may vary in different places but the challenges are the same. Environment, traffic safety and economy are examples on these challenges. The outcome of such a work would form the fundamental basis for improvement of organizational activities through benchmarking of efficient methods and approaches world wide. The latter can become true when different countries enable to compare their results in the same manner.

3.3. Way Forward

The work of Technical Committee 4.1 has only made a start to this huge area of work relating to non-technical road performance indicators and how they relate to users/residents and developing countries. Much more work needs to be done to come up with more specific performance indicators based on agreed levels of service that connect up to a strategic transport plan derived from users consultation input. The main areas that need addressed are highlighted below:

- **Development of non-technical performance indicators for inclusion in an integrated asset management system.** One of the most difficult issues encountered was the extent to which non-technical performance indicators existed within developed countries' asset management systems. There needs to be more work done to assess and develop those indicators that are of most relevance within an overall asset management system.
- **Reinforcement of information transfer and indicators for developing countries.** It was difficult to judge with any degree of certainty the extent to which this information was useful and useable for such countries. Only by receiving their input will a proper representation of performance indicators that are relevant to their needs be able to be made. There will therefore be a greater sense of ownership and understanding of the purpose of this work by developing countries. This should in turn lead to a real use from this initial attempt to set out broad principles for the development of users based performance indicators.
- **Definition of basis for international benchmarking.** There was a difficulty when deriving the performance indicators in this report in assessing how the relative measures from country to country could be compared. Because no real measure exists at present some form of information gathering needs to take place to be able to establish the performance of networks across international boundaries and between developed, developing and countries in transition.
- **Asset management and sustainable development.** The overall role of asset management and its contribution to sustainability needs to be brought out in future work including how levels of service and performance measures relate to and influence the sustainability of road networks. It needs to be shown how our decision making processes and actions contribute to effective and sustainable asset management practices including how we reflect these through performance measures and reporting to customers.

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DRAFT CONCLUSIONS

The work of Technical Committee 4.1 has made it possible to demonstrate in the first place that despite the fact that many countries are actively involved in road asset management, none has succeeded to develop a complete system to this day.

However, various elements are already available to guide road network management in developing a road asset management approach.

There is a close relationship between the systematic or methodological management of road assets and the indicators to be used with this approach. The relationship with those indicators is also very closely related to the consideration of residents and users' expectations. However in that case, qualitative indicators are often more important than quantitative indicators.

Efforts to integrate users and residents' expectations with associated indicators into the road asset management system will therefore be pursued.

In addition, the approach by road corridors, if it is confirmed that it is intended to replace the concept of management of road assets by axes, must also be enhanced. This refers to exceeding the simple concept of traffic management to attain management of infrastructure and traffic by considering the expectations of users and residents.

In this approach, as well as in other activities performed during that term, the role of integration of indicators will be noteworthy.

Similarly, the concept of sustainable development, with its economic, social and environmental components, can guide future activities, by structuring in a slightly different way the integration of the road network managers' objectives, users and residents' expectations as well as environmental protection.