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Asset Management Guidance for Transportation Agencies

This digest announces interim results from NCHRP Project 20-24(11). The digest describes three agency reports prepared by Cambridge Systematics, Inc., assisted by Parsons Brinckerhoff Quade & Douglas, Inc.; Roy Jorgensen Associates, Inc.; and Paul D. Thompson. The three reports (i.e., the synthesis, framework, and recommended research) are available on the NCHRP website as NCHRP Web Document 41. Michael J. Markow served as the principal investigator.

SUMMARY

The primary product of the completed first phase of the subject research project is an overall framework for transportation asset management. The framework gives structure to the development, under the second phase of research, of a first-generation *Transportation Asset Management Guide*. However, of interest now is that agencies can also use the framework as a self-assessment tool to compare themselves with benchmarked ideal practice. A synthesis of domestic and international practice and a recommended research program were also produced. The Phase I products (i.e., the synthesis, framework, and recommended research) are documented in three separate reports and are available on the NCHRP website as *NCHRP Web Document 41*. This digest provides background for NCHRP Project 20-24(11) and summary material from the three reports.

Transportation officials at all levels face the task of managing a wide range of assets to meet public, agency, and legislative expectations. These assets include the physical transportation infrastructure (e.g., guideways, structures, and associated features and appurtenances), as well as other types of assets (e.g., an agency's human resources, financial capacity, equipment and vehicle fleets, materials stocks, real estate, and corporate data and information). Although, for the purposes of this study, transportation asset management is treated as a strategic approach to managing physical transportation infrastructure, the concepts and principles have application across a wide spectrum of business activities and assets. Transportation asset management promotes more effective resource allocation and use based on quality information.

BACKGROUND

Recognizing its growing importance to transportation agencies worldwide, the American Association of State Highway and Transportation Officials (AASHTO) in 1998 adopted transportation asset management as a priority initiative. At that time, a task force was formed to develop and implement a *Strategic Plan for the Task Force on Transportation Asset Management 2000–2010*. To respond to several tasks in this strategic plan, the National Cooperative Highway Research Program (NCHRP) awarded Project 20-24(11) to a study team headed by Cambridge Systematics, Inc. The goal of this NCHRP project is to develop information on transportation asset management and to apply these findings in producing a *Transportation Asset Management Guide* for use by AASHTO members and other transportation agencies. The guide will help agencies to develop and apply the principles, techniques, and tools that can advance the management of their transportation assets.

RESULTS

The objectives of NCHRP Project 20-24(11), "Asset Management Guidance for Transportation Agencies," were to gather information on asset management practices in the United States and overseas, develop a framework for transportation asset management, and apply this framework to produce the *Transportation Asset Management Guide*. The study was organized in two phases. Phase I, now completed, comprised information gathering, framework development, and recom-

mendation of a research program; Phase II, currently underway, will produce the *Transportation Asset Management Guide*.

The overall management framework that has been developed in this study is flexible enough to be adapted and refined for use with a number of transportation agency assets. To develop the depth and breadth of material needed to build a meaningful first-edition *Transportation Asset Management Guide*, however, the research team focused the scope of this study on the particular set of assets that constitutes an agency's physical transportation infrastructure. This focus enables asset management principles, methods, examples, and research recommendations to be developed in a concrete, practical, and understandable way. It facilitates comparisons with corresponding work by transportation agencies overseas and the private sector, which have mostly adopted a similar scope in their studies. It provides a specific frame of reference within which differences among state departments of transportation (DOTs) can be addressed by particular business management models, approaches, and procedures.

The concept of transportation asset management covers a broad array of DOT functions, activities, and decisions—for example, transportation investment policies, institutional relationships between DOTs and other public and private groups, multimodal transportation planning, program development for capital projects and for maintenance and operations, delivery of agency programs and services, and real-time and periodic system monitoring. All of these management processes have important implications for an agency's attainment of its goals in public policy, financial resource availability, engineering standards and criteria, maintenance and operation levels of service, and overall system performance.

A number of support activities are involved, as well. Information technology can inform many of these management processes, and agencies have already spent considerable sums to develop management systems, databases, and other analytic tools. These systems must, however, complement the decision-making processes and organizational structures of individual agencies if the systems are to operate effectively and support good asset management at all organizational levels. Effective communication of information on asset management between an agency and its governing bodies, stakeholders, and customers is likewise critical to success.

REPORTS

The product of Phase II, the *Transportation Asset Management Guide*, is presently under development; Phase I is completed. The products of Phase I are available as *NCHRP Web Document 41* (see "Web Documents" on the CRP website at http://www4.trb.org/trb/crp.nsf). The web document has three parts, or tasks.

Task 1: Synthesis of Asset Management Practice

The Task 1 report is a synthesis of current information and practices in asset management. Agencies worldwide have studied asset management concepts and techniques for several years to see how these techniques and concepts apply to transportation and other civil infrastructure. Several transportation and public works agencies overseas have already developed handbooks and references describing asset management and its applications. The Organization for Economic Cooperation and Development (OECD), representing countries with advanced economies in North America, Europe, Australia, and Asia, has recently conducted a study of its member nations to document current asset management practices. Within the United States, AASHTO and the Federal Highway Administration (FHWA) have cosponsored a series of national workshops. These workshops have explored the question, "What is asset management?" and identified how practices and techniques applied in public- and private-sector organizations can apply to transportation specifically. AASHTO's *Strategic Plan for the Task Force on Transportation Asset Management* outlines several goals, strategies, and tasks to nurture and promote transportation asset management among member agencies over a 10-year period. The FHWA has organized an Office of Transportation Asset Management and produced a primer that describes relevant concepts, practices, and tools.

State DOTs have also begun to consider how asset management can apply to their management and decision processes. Some agencies have undertaken formal studies about how asset management can improve their practices and information and have developed asset management plans to coordinate long-term actions. Although other DOTs have not produced formal plans, they have identified goals, business and decision processes, management systems, and organizational responsibilities that can improve their "way of doing business" and thereby advance their transportation asset management approaches.

The Task 1 report summarizes the state of practice in asset management and its application to transportation infrastructure. The report reviews work by national, state, and provincial transportation agencies and professional associations in the United States and overseas and related studies by international organizations. It also describes private-sector asset management approaches that are used in selected industries to identify principles and practices that may have value in public-sector applications. This information will provide background to development of the *Transportation Asset Management Guide* in Phase II of this study. An important finding of this synthesis is that, although good asset management is guided by a set of basic principles of good practice, state DOTs differ significantly in the types of asset management challenges that they face. The asset management focus and the specific techniques that may be of most value must be tailored to state DOTs' institutional,

organizational, financial, technological, and managerial settings.

Task 2: Asset Management Framework

The Task 2 report describes a comprehensive framework for developing the *Transportation Asset Management Guide*. This framework defines transportation asset management within the context of NCHRP Project 20-24(11) and establishes transportation asset management's basic concepts and elements. The task's management approach is built on the idea that an agency's processes for resource allocation and use are at the core of asset management. Using this concept, the Task 2 report builds a framework for agencies to evaluate their current and desired practices. This framework identifies key characteristics and criteria of transportation asset management in four basic areas relating to resource allocation and use: policy goals and objectives, planning and programming, program delivery, and information and analysis. State-of-the-art practices illustrate each of these characteristics and criteria to provide benchmarks by which agencies may establish targets for incremental improvement and may gauge progress toward these targets. The report discusses strategies for updating legacy management systems and data to better support asset management. The report also examines the relationship between transportation asset management and recently adopted standards for financial reporting of transportation.

Task 3: Recommended Research Program

The Task 3 report describes a prioritized program of research in asset management. The asset management research needs that were described in the program were identified from the following activities:

- The formulation of a conceptual framework for transportation asset management (Task 2),
- An understanding of the current state of the practice in asset management among state DOTs (Task 1),
- The formulation of the AASHTO Task Force on Transportation Asset Management's strategic plan, and
- The identification of priority research needs in asset management and related fields by knowledgeable transportation executives and managers.

The recommendations of the Task 3 report focus on areas of research that reflect the strategic nature of asset management business processes and information needs. Many of the topics proposed in the report are not widely addressed in existing research programs. Certainly, asset management will also benefit from a much wider sphere of research that will continue to be carried out at many levels and by many groups in related fields, such as the following: pavement, bridge, and maintenance management; performance-based planning and budgeting; new engineering materials and technology; Intelligent Transportation Systems (ITS) hardware and software; and new methods of delivering an agency's projects, products, and services. A conscious effort has been made in this report, however, to identify research topics that will advance the more fundamental aspects of transportation asset management as a way of doing business by state DOTs.

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