



# SYNTHESIS OF NATIONAL EFFORTS IN TRANSPORTATION ASSET MANAGEMENT

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## NOTES FROM THE RESEARCHERS

In the Fall of 2001, the Midwest Regional University Transportation Center (University of Wisconsin, Madison) conducted a survey of national efforts in Transportation Asset Management. The organizations and efforts described herein are for illustrative purposes only and the survey was not intended to be comprehensive. The results show a wide breadth of interest and research in the area of transportation infrastructure management, which is generally not apparent to many who are new to this field.

Therefore, the report is intended to target a general audience that is interested in Asset Management and how various organizations are approaching the concept. Transportation professionals, officials, and researchers who are relatively unfamiliar with this area of infrastructure management may find this report helpful by introducing them to various past and present efforts.

### Disclaimer:

This research was funded by the Midwest Regional University Transportation Center, the Wisconsin Department of Transportation and the Federal Highway Administration under Project #0092-01-10. The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views of the Midwest Regional University Transportation Center, the University of Wisconsin, the Wisconsin Department of Transportation, or the Federal Highway Administration at the time of publication.

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## **ACRONYM DECODER**

### **Agencies and Government Institutions**

Federal Highway Administration (FHWA)  
Federal Rail Administration (FRA)  
Federal Transit Administration (FTA)  
Local Technical Assistance Program (LTAP)  
National Highway Institute (NHI)

### **Professional Organizations**

American Concrete Pavement Association (ACPA)  
American Public Works Association (APWA)  
American Road and Transportation Builders Association (ARTBA)  
American Public Transportation Association (APTA)  
American Society of Civil Engineers (ASCE) & Civil Engineering Research Foundation (CERF)  
Foundation for Pavement Preservation (FP<sup>2</sup>)  
Governmental Accounting Standards Board (GASB)  
National Association of County Engineers (NACE)  
Transportation Research Board (TRB)

### **Educational Organizations**

Midwest Regional University Transportation Center (MRUTC) – University of Wisconsin, Madison  
Midwest Transportation Consortium (MTC) and the Center for Transportation Research and Education (CTRE) – Iowa State University  
Urban Transportation Center (UTC) – University of Illinois, Chicago  
University Transportation Research Center (UTRC) – City College of New York

### **International Organizations**

Federation of Canadian Municipalities (FCM)  
National Research Council of Canada (NRCC)  
World Road Federation (PIARC)  
Organization for Economic and Cooperative Development (OECD)  
World Bank & the International Road Federation (IRF)

### **Other Acronyms**

Highway Development and Management model (HDM)



# SYNTHESIS OF NATIONAL EFFORTS IN TRANSPORTATION ASSET MANAGEMENT

A Study by the Midwest Regional University Transportation Center<sup>1</sup>

Spring 2002

**Purpose:** This project identifies several national efforts active today in Asset Management and provides information on their latest activities designed to help state and local governments implement long-term management strategies.

## SURVEY OF NATIONAL EFFORTS

### Organizations Introducing Asset Management

Organizations are using several methods to introduce Asset Management to a wide audience. In addition to the “primers” developed by FHWA and the initial meetings held by AAHSTO from 1996 to 1999, several other efforts have occurred or are occurring:

<b>Conferences and Meetings:</b>	
<i>MRUTC</i>	“4 <sup>th</sup> National Transportation Asset Management Workshop – Taking the Next Step in Asset Management” (September 2001)
<i>IRF</i>	“Executive Seminar on Asset Management” (November 2001)
<b>Committees:</b>	
<i>AASHTO</i>	Task Force on Transportation Asset Management
<i>TRB</i>	Asset Management Task Force
<i>NRCC</i>	Advisory Committees associated with the National Guide to Sustainable Municipal Infrastructure project
<i>PIARC</i>	Road Management Committee

### Organizations with Educational and Research Efforts

Several educational and research efforts explore the implementation of Asset Management systems from a policy and technical perspective. The national groups involved in this area are:

<b>Course Development and Training:</b>	
Educational Institutions <i>MRUTC, MTC, UC, UTC, UTRC</i>	Course development in transportation infrastructure management. Efforts to develop Master’s level transportation management degrees.
Professional Organizations <i>AASHTO, APWA, GASB</i>	Training opportunities in GASB Statement 34 implementation.
Technology Transfer <i>LTAP, FP<sup>2</sup>, NHI</i>	Training opportunities in Asset Management systems, pavement management, and bridge management.
<b>Policy Research:</b>	
<i>NCHRP &amp; AASHTO Task Force on Transportation Asset Management</i>	Developing a policy framework to implement Asset Management systems (NCHRP Project SP20-24[11] – the Asset Management Guide).
<i>TRB Asset Management Task Force</i>	Designing a research agenda to investigate implementation of Asset Management.
Educational Institutions <i>MRUTC, MTC, UC, UTC, UTRC</i>	Sponsoring research in strategic planning, decision-making frameworks, and the barriers to agency cooperation in management issues.
<i>OECD</i>	Surveyed international efforts implementing Asset Management.

**AASHTO:** American Assoc. of State Hwy & Trans. Officials  
**ACPA:** American Concrete Pavement Assoc.  
**APWA:** American Public Works Assoc.  
**ASCE & CERF:** American Society of Civil Engineers & Civil Engineering Research Found.  
**FHWA:** Federal Hwy. Admin.  
**FP<sup>2</sup>:** Foundation for Pavement Preservation  
**GASB:** Governmental Accounting Standards Board  
**IRF:** International Road Federation  
**LTAP:** Local Technical Assistance Program  
**MRUTC:** Midwest Regional Univ. Trans. Center  
**MTC:** Midwest Trans. Consortium  
**NCHRP:** National Coop. Hwy. Research Program  
**NHI:** National Hwy. Institute  
**NRCC:** National Research Council of Canada  
**PIARC:** World Road Federation  
**OECD:** Organization for Econ. & Coop. Development  
**TRB:** Trans. Research Board  
**UC:** Univ. of Cincinnati  
**UTC:** Urban Trans. Center  
**UTRC:** Univ. Trans. Research Center

<sup>1</sup> Authors: Bill Obermann, Ernie Wittwer, & Jason Bittner – Midwest Regional University Transportation Center. Principal Investigator: Jeffrey Russell, Professor, Department of Civil and Environmental Engineering, University of Wisconsin, Madison.

<b>Technical Research:</b>	
<i>NCHRP &amp; AASHTO</i>	Developing economic modeling, performance measurement, and valuation methods for transportation assets (NCHRP Projects SP20-24[11] & 20-57)
Educational Institutions <i>MRUTC, MTC, UTC, UTRC</i>	Investigating the use of modeling, GIS, and innovations in transportation technology to manage systems more efficiently.
<i>FP<sup>2</sup></i>	Examining improved techniques for construction and preservation.
<i>ASCE/CERF</i>	Evaluating research products in transportation management.
<i>ACPA</i>	Developing remaining service life and life cycle cost models.
<i>PIARC and IRF</i>	Continuing to refine the economic investment model HDM (the Highway Development and Management model).

### **Organizations Assisting with Institutional Change**

Relatively few organizations are working on the issue of managing the organizational change necessary to develop Asset Management systems. Several organizations recognize this field as a research priority, but so far only the following products are available:

<i>Utah LTAP</i>	Applied courses and consulting with agencies to phase in the components of Asset Management systems.
<i>FHWA, FP<sup>2</sup>, NHI</i>	Discussion of research needed in implementation and institutional change at the 1998 Forum to the Future.
<i>Rudin Center for Transportation Policy and Management</i>	Study on the implementation of Asset Management concepts in the traffic management departments of several large cities.

### **CONCLUSIONS AND RESEARCH NEEDS**

Several groups surveyed have developed research agendas in transportation infrastructure management. These groups are working to fill the policy and technical research gaps that hinder Asset Management implementation. At the same time, most groups are also developing research agendas that will explore implementation issues and future education/training needs. As these groups develop this future research, several conclusions from this project should be emphasized:

- **Duplication of Research Efforts and Need for Collaboration:** All of the groups in the survey have at least an awareness of Asset Management. This is raising interest for further research and many organizations are responding by developing studies on a variety of policy and technical topics. However, as these efforts occur, little collaboration and information sharing takes place. Projects need to emphasize working together to develop research and results, which will also maximize recognition and implementation.
- **Conservation and Community Focus:** Some international efforts in Asset Management consider conservation and community goals along with the engineering aspects of infrastructure management. As concerns over funding and mobility issues grow in the US, future research should develop frameworks and tools that detail how Asset Management systems can address community and conservation goals.
- **Interdisciplinary Focus:** Asset Management is a blend of engineering, management, reorganization, and planning. Any future education and training should emphasize this interdisciplinary reality. Some universities are developing interdisciplinary transportation management and policy Master's degrees.
- **Communication and Leadership:** Defining and communicating the importance of Asset Management is still necessary. National organizations could be more effective in communicating these issues. The groups could also assist agencies to empower managers and other leaders in promoting Asset Management among personnel.

## INTRODUCTION

### What is Transportation Asset Management and why do we need it?

Transportation agencies on the federal, state, and local levels have recognized the need to manage infrastructure under tightly constrained budgets. In addition, these agencies are not only responsible for construction of infrastructure, but also the maintenance, operation, safety, and other aspects of management. Transportation Asset Management is a systematic process to consider these areas and ensure attainment of the goals of the agency.<sup>1</sup>

#### **Why Asset Management?**

Transportation agencies have a range of responsibilities in managing infrastructure, such as construction, maintenance, operation, safety, and various other aspects. *Asset Management* is a concept recognizing the need to manage across these areas of responsibility.

#### **Asset Management is:**

*The assimilation of data and analytic tools together with systematic implementation processes to ensure attainment of agency goals.*

### The history of infrastructure management and key drivers influencing change

Among the key elements that can help shift focus to an Asset Management perspective is funding allocation. During conception of the interstate highway system, the Highway Trust Fund of 1956 was developed to fund construction. Many transportation agencies at the local and state level recognized the management needs of the system and developed excellent data collection systems, GIS capacities, and even performance measurement techniques to maintain what they had constructed. Federal legislation also acknowledged the need to emphasize infrastructure management through the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA). ISTEA gave greater flexibility of Highway Trust Fund monies and required the establishment of management systems for roads, bridges, tunnels, public transportation and other transportation assets.<sup>2</sup> ISTEA also acknowledged the need for system-wide decision-making tools, and initiated research implementing these systems.

Today, the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) maintains the original goals of ISTEA. Asset Management concepts remain an important component of these goals, however, most state and local transportation agencies have not moved far in implementation. They are actively seeking advice and research on Asset Management from federal agencies and other national and international organizations.

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<sup>1</sup> An additional source of information about Asset Management is the Primer on Asset Management, developed by the Federal Highway Administration, Office of Asset Management and available at: [www.fhwa.dot.gov/infrastructure/asstmgmt/resource.htm](http://www.fhwa.dot.gov/infrastructure/asstmgmt/resource.htm) (valid as of: 02/04/02).

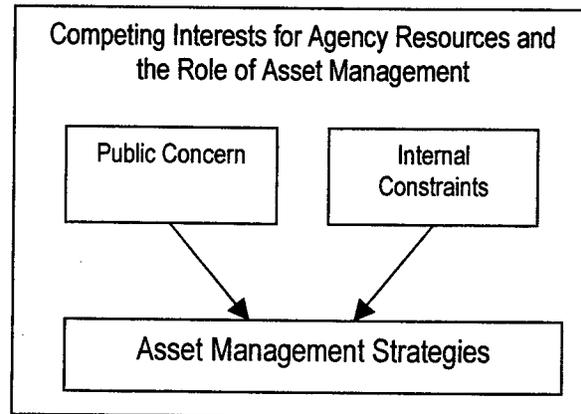
<sup>2</sup> The National Highway System Designation Act of 1995 made these management systems optional for states to adopt. Implementation efforts as of 1997 are summarized in "Transportation Infrastructure: States' Implementation of Transportation Management Systems" (GAO Report # T-RCED-97-79: February 26, 1997).

## **Project Purpose: To Raise Awareness of National Efforts in Transportation Asset Management**

This project identifies several national efforts active today in Asset Management and provides information on their latest activities designed to help state and local governments implement long-term management strategies.

### **Why is this project important?**

As people become more educated about government finance and the condition of transportation infrastructure, they expect government to adopt improved management systems. In addition, the typical driver encounters a number of managed attributes during an average trip, such as pavement roughness, inadequate signage, signalization, and congestion. Agencies are responsible for maintaining these roadway assets. The need to improve or maintain service levels lends directly to the adoption of the Asset Management strategies national groups are helping develop.



### **GASB 34: Component of a Future Asset Management Strategy?**

Asset Management is gaining awareness in many governmental agencies due to the Governmental Accounting Standards Board (GASB) Statement 34. If an agency chooses to adopt the "modified approach" in Statement 34, they will detail annual spending on maintenance and preservation efforts, as well as the overall value of the transportation asset.<sup>3</sup> Currently, most DOT expenditure summaries do not report these costs. A potential benefit of the more detailed GASB 34 reports could be to raise public awareness on the stewardship activities of federal, state, and local DOTs.

GASB 34 is not a stand-alone solution to the infrastructure management problem, but it is certainly a component of the rapidly evolving Asset Management methodology. Several national agencies and organizations contributed to the development of Statement 34's methodology, and many more are currently engaged in training local officials how to use it.

### **Federal Programs in Asset Management**

Some federal agencies, such as the Federal Highway Administration's (FHWA) Office of Asset Management and the FHWA's own Local Technical Assistance Program (LTAP) recognize the importance of Asset Management and are introducing the concept to their agencies and constituents. Other agencies such as the Federal Transit Administration (FTA) and Federal Rail

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<sup>3</sup> For more information on the modified approach and other approaches that can be used with Statement 34, see the following website available through the GASB organization: <http://www.gasb.org/repmode/index.html> (valid as of: 03/18/02).

Administration (FRA) are just beginning to recognize the concept and how it will be important for their agencies.

### **Other National Programs**

Outside of the federal agencies, many other organizations are also working to promote Asset Management systems and their components. From research efforts in the National Cooperative Highway Research Program (NCHRP) and the Midwest Regional University Transportation Center (MRUTC) to awareness building efforts through the American Public Works Association (APWA), many groups participate in developing Asset Management tools and policies. This list goes beyond some of the familiar groups commonly associated as working on a national level in Asset Management. In some cases, these groups may not use the phrase "Asset Management" to describe their work, but they are advocating for integrated decision-making across disciplines and each have efforts worth recognition.

#### **Groups Developing Asset Management tools and strategies:**

Not only AASHTO, FHWA, FTA, and FRA but also:

ACPA, APWA, ASCE, ARTBA, APTA, FP<sup>2</sup>, GASB, NCHRP, MTC, MRUTC, NACE, OECD, PIARC, TRB, UC, UTC, UTRC, World Bank, and several Canadian organizations.

(See the Acronym Directory for explanation of these acronyms)

The intent of this report is to explore these national and international efforts, the well known and the less known, and bring their contributions to the forefront. These efforts are discussed and conclusions drawn where the survey results demonstrated gaps in current knowledge and research. The conclusion of this report will include recommendations for future work and potential areas for collaboration between groups with similar interests. In addition, a summary of each national effort researched is included in the Appendix.

# NATIONAL EFFORTS IN TRANSPORTATION ASSET MANAGEMENT

National organizations with an interest in Asset Management are generally working in the following areas:

1. Introduction to the Concept: Introducing Asset Management to agency staff or wider, non-technical audiences.
2. Education: Specific education or training activities that embody the concepts of Asset Management, including curriculum or executive course development.
3. Research in Policy and Technical Issues: Development of guidance to implement technical, economic, and social policies in Asset Management. In addition, research efforts in data integration, economic and life-cycle analysis, and other technical issues related to transportation infrastructure management.
4. Institutional Change: Facilitating implementation of Asset Management in all levels of the organization.

Not every effort has an activity in each of these areas, but instead focuses on the elements within their expertise. For example, the American Road and Transportation Builders Association (ARTBA) is a national organization that represents the interests of the transportation construction industry. Their aims are clearly in the policy area of Asset Management and they advocate for improved programs in "consistent and timely maintenance" as well as researching new ways to optimize programs in maintenance, operations, and safety with the federal portion of state Department of Transportation budgets.<sup>4</sup> Each organization has unique perspectives to contribute to Asset Management in the United States. Recognizing these efforts and that they should be integrated into the development of Asset Management systems is the goal of this report. The authors do not intend to identify who would be the best in each role or function. The intention of this research is to identify these groups and initiate dialogue about potential resource sharing and collaboration.

## 1. Introduction to the Concept of Asset Management

### *Federal Highway Administration*

Several well-known organizations produce introductory material about Asset Management. Perhaps the most widely recognized is the Federal Highway Administration (FHWA) Office of Asset Management. This Office was formed during the 1998 restructuring of the US Department of Transportation into five core "business units" to realign the Department with a revised mission

### **FHWA's Efforts in Asset Management:** (Office of Asset Management)

#### ⊙ Educational Assistance:

- Primers: *Asset Management, GASB 34, Data Integration, Pavement Management*
- Website
- Workshops and Conferences

#### ⊙ Technical Assistance:

- Development of pavement, bridge, and tunnel management systems.
- Development of economic trade-off analysis tools.
- Guidance on quality construction and management.

<sup>4</sup> "America's Roadway Operations: Improving Capacity and Efficiency" American Road and Transportation Builders Association (ARTBA), October, 2001 [http://www.artba.org/government/tea-21/tea\\_21.htm](http://www.artba.org/government/tea-21/tea_21.htm) (valid as of: 02/04/02).

and strategic goals. As transportation management issues continue to evolve, even within FHWA, the Office has found a useful role offering educational and technical assistance.

The Office widely distributes educational materials in the form of “primers” on certain topics. To date, primers introduce the concept of Asset Management itself, as well as topics like GASB 34, data integration, and pavement management systems. These materials are not technical guidance with a step-by-step process to implement these concepts, but instead serve to increase awareness over a wide audience on the issues.

Other areas of technical expertise the Office offers are in pavement, bridge, and tunnel management systems and the development of economic trade-off analysis tools. The Office also offers technical advice on roadway construction and pavement design with a long-term preventive maintenance perspective. States and local government can participate as they design and maintain their own infrastructure.

*American Association of State Highway and Transportation Officials*

The American Association of State Highway and Transportation Officials (AASHTO) Task Force on Transportation Asset Management is also working on Asset Management awareness and implementation. The Task Force has developed a Strategic Plan with goals of integrating investment decisions in improvement, preservation, and operation of transportation facilities. Some of the strategies in the Plan are currently underway, such as the development of an Asset Management Guide (sponsored through the National Cooperative Highway Research Program (NCHRP) as Project SP20-24[11]) that will outline how to implement an Asset Management system. AASHTO also sponsored many of the initial Workshops and Seminars introducing the concept of Asset Management and is still very active in such efforts today.

AASHTO and FHWA have undertaken efforts to create an awareness of Asset Management on a national scale, but they are not the only ones doing such work. Within the general recognition of improved transportation management concepts, many organizations with a specialization in technical outreach, training, and education have developed programs or research in Asset Management to foster awareness in their constituents. The table below details the organizations studied and the concentrations of their efforts.

TABLE 1.1  
Organizations actively participating to raise awareness of  
Asset Management concepts (other than AASHTO and FHWA)\*

	Committees	Conferences & Meetings	Publications & Presentations
<b>Professional Organizations &amp; Government Agencies</b>			
ACPA (American Concrete Pavement Association)			X
APTA (American Public Transportation Association)		X	
APWA (American Public Works Association)	X	X	X
ARTBA (American Road and Transportation Builders Association)			X

	Committees	Conferences & Meetings	Publications & Presentations
<b>Professional Organizations &amp; Government Agencies (cont.)</b>			
ASCE & CERF (American Society of Civil Engineers & the Civil Engineering Research Foundation)	X	X	X
FP <sup>2</sup> (Foundation for Pavement Preservation)		X	X
FTA (Federal Transit Administration)			X
GASB (Governmental Accounting Standards Board)		X	X
NACE (National Association of County Engineers)		X	
NCHRP (National Cooperative Highway Research Program)			X
TRB (Transportation Research Board)	X	X	X
<b>Educational Organizations</b>			
LTAP (Local Technical Assistance Program)		X	X
MRUTC (Midwest Regional University Transportation Center – Madison, WI)		X	X
MTC & CTRE (Midwest Transportation Consortium & the Center for Transportation Research and Engineering - Ames, IA)		X	X
UTC (University of Illinois – Chicago, Urban Transportation Center – Chicago, IL)			X
UTRC (CCNY University Transportation Research Center – New York, NY)			X
<b>Canadian Programs</b>			
NRCC & FCM (National Research Council of Canada & the Federation of Canadian Municipalities)	X		X
MIIP (Municipal Infrastructure Investment Planning: a group through the Institute for Research in Construction)	X		X
<b>International Organizations</b>			
IRF (International Roads Federation)		X	X
OECD (Organization for Economic and Cooperative Development)			X
PIARC (World Road Federation)	X	X	X

Note: The categories **Committees**, **Conferences & Meetings**, and **Publications & Presentations** are general areas where discussion of Asset Management practices has occurred. Some examples of how this exchange has taken place could be online reports, sessions at annual meetings, or specific Task Forces in Asset Management.

As this table shows, professional organizations and agencies have assumed a large responsibility for creating an awareness of Asset Management, but several educational and international organizations have also contributed significant efforts.

## Past Committees

Several of these groups have convened special Committees with the charge to understand Asset Management better. Most of these Committees assembled to investigate how Asset Management pertains to the organization and how it can be useful to its constituents. Two significant past efforts are those of the American Public Works Association (APWA) and the Civil Engineering Research Foundation (CERF). Both these groups investigated Asset Management as a tool for infrastructure management in 1998. While these original efforts have ended, some discussion is still taking place today.

The APWA recognized Asset Management as an important concept for managing public works infrastructure and developed a Task Force to produce a report on the subject. The resulting paper entitled, "Asset Management for the Public Works Manager" described the theory of Asset Management as it pertains to the public works industry and developed a working definition that emphasized it as a decision-making tool to allocate resources across competing interests.<sup>5</sup> In addition, the paper proposed several strategies to initiate awareness of Asset Management and addressed several implementation issues inherent in such a systems approach. Since the Task Force disbanded, the Leadership and Management Committee of APWA has several goals in its mission that specially acknowledge Asset Management as an area needed for research and development. A part of this mission also emphasizes implementation of GASB 34 through identifying and encouraging adoption of performance measurement and management tools.<sup>6</sup>

In 1998, a major initiative in the Civil Engineering Research Foundation (CERF) involved collaboration between the Office of Science and Technology and the US Department of Transportation on an initiative called PAIR-T (the Partnership for the Advancement of Infrastructure and its Renewal through innovative products and processes – the Transportation component). The mission of the initiative was to use technology and innovation to promote advanced management of transportation infrastructure. While several key agencies championed the effort, it is not a functioning group today. However, CERF and its parent organization, the American Society of Civil Engineers (ASCE) have incorporated several of the Asset Management components of PAIR-T into their current work. In the Summer of 2000, CERF sponsored a Workshop entitled, "Managing Infrastructure Assets" to continue a dialogue about Asset Management and further the research goals of PAIR-T. In addition, ASCE continues to hold sessions on Asset Management at its annual

### National or International Committees:

#### Recent Past:

APWA: Asset Management Task Force (1998)

CERF: PAIR-T Initiative (1998)

#### Current:

AASHTO: Task Force on Transportation Asset Management

TRB: Asset Management Task Force

NRCC: Technical and Steering Committees associated with development of the National Guide to Sustainable Municipal Infrastructure

PIARC: Road Management Committee

Note: See the Acronym Directory for explanation of these acronyms.

<sup>5</sup> American Public Works Association (1998) *Asset Management for the Public Works Manager: Challenges and Strategies* <http://www.apwa.net/ResourceCenter> (valid as of: 02/04/02).

<sup>6</sup> American Public Works Association (2001) *Leadership and Management 2001 Business Plan* [www.apwa.net/About/PET/Leadership/index.asp?mode=businessplan](http://www.apwa.net/About/PET/Leadership/index.asp?mode=businessplan) (valid as of: 10/3/01).

conferences and addresses the need for better management tools in its "2001 Report Card on America's Infrastructure".<sup>7</sup>

### *Current Committees*

The Transportation Research Board (TRB) Asset Management Task Force is a relatively new effort addressing upcoming research needs in Asset Management, especially in the area of implementation. The Task Force has recognized several key issues that DOTs face when developing these systems, such as how to conduct trade-off analyses and determine level of service.

TRB has several other committees that have an interest in Asset Management concepts. Some examples are the Committee on Strategic Management, the Committee on Pavement Management Systems, the Committee on Structures Maintenance and Management, and the Committee on Statewide Multi-modal Transportation Planning.

Canada also has a number of committees and groups that concentrate on raising awareness of Asset Management. Through the National Research Council of Canada (NRCC) and the Federation of Canadian Municipalities (FCM) several committees are dedicated to the development of a National Guide to Sustainable Municipal Infrastructure (a \$25 million project to develop a decision-making and investment-planning tool and an appendix of best practices). In addition, several Canadian organizations are developing committees on Asset Management projects, such as the Strategic Asset Management Project within the Institute for Research in Construction (IRC), Municipal Infrastructure Investment Planning (MIIP) Group. The committees' research goals are to evaluate the tools and techniques currently available to assist municipal asset managers and develop recommendations about the tools required if managers are to make integrated management decisions. As in the United States, several significant committees also meet on the local and state (provincial) level to discuss Asset Management implementation, especially with respect to data integration and technical tool development.

Another international example is the World Road Federation (PIARC), which has a permanent committee to discuss road management and implementation of concepts like Asset Management. The Road Management Committee specifically addresses Asset Management as a necessary tool to promote efficient and economical government expenditures. A priority in the Committee is to track implementation of research developed within PIARC, especially the Highway Development and Management System, which is a highway investment analysis program known as HDM-4 (see the Appendix for a more detailed description of HDM-4).

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<sup>7</sup> American Society of Civil Engineers (2001) *The ASCE Report Card on America's Infrastructure* [www.asce.org/reportcard/index.cfm?reaction=policy](http://www.asce.org/reportcard/index.cfm?reaction=policy) (valid as of: 10/11/01).

## Conferences, Workshops and Meetings

As shown in Table 1.1, many groups raise awareness about Asset Management through conferences, workshops, and/or meetings. A key criterion for an organization to make this list was the sessions had to be open to the public. The term “meetings” does not imply an *internal* meeting on the subject. Instead, it is an organized setting where the constituents of these various groups were exposed to Asset Management, mostly for the first time.

Within the last year, two organizations held specific conferences or workshops with Asset Management as their main theme, one of which was a US group. The Midwest Regional University Transportation Center (MRUTC) hosted a Workshop entitled, “The Fourth National Transportation Asset Management Workshop: Taking the Next Step in Asset Management” in September 2001. Many of the US groups involved in Asset Management, such as AASHTO, APTA, APWA, FHWA, MTC, NACE, TRB, and UTC, co-sponsored the Workshop. The Workshop structure intended to bring different groups and their members together to foster information and idea sharing. Many of the sessions in the Workshop focused on publicizing the efforts of AASHTO, FHWA, and TRB in the field as well as the practical lessons learned from city, county, state, and transit agencies implementing Asset Management techniques. In addition, curriculum and course development in Asset Management received considerable attention.

The other conference recently held in Asset Management was on an international scale. This was the International Road Federation (IRF) Asset Management Seminar, held in the fall of 2001. The purpose of the Seminar was to introduce the concept of Asset Management to an international audience and identify the components and tools used around the world to implement integrated decision-making. In addition, the conference highlighted institutional issues such as effective training, communication, and benchmarking systems that require implementation on the human side of an organization. There was US interest in the Seminar and the attendees of the conference toured the Virginia DOT where an Asset Management system is in development. However, the conference did not emphasize a US perspective, but showed how other countries interpret Asset Management and implement programs in their country. Case studies from almost every continent were highlighted, including some countries that are well known for Asset Management, such as the United Kingdom, Australia, and New Zealand. In addition, the Seminar detailed efforts in Brazil, Kenya, the Philippines, Malawi, Mexico, Venezuela, Puerto Rico, and Saudi Arabia.

PIARC also sponsors a World Congress every 4 years. In 1999, the conference focused on managing road infrastructure assets. Specifically, the Congress discussed the criteria necessary to evaluate the needs of the transportation systems. This list not only included engineering and technical requirements to manage roadways, but also the social and environmental criteria.

### National or International Conferences and Workshops:

- ☀ With Asset Management at the theme:
  - MRUTC: “4<sup>th</sup> National Transportation Asset Management Workshop – Taking the Next Step in Asset Management” (September 2001)
  - IRF: “Executive Seminar on Asset Management” (October 2001)
- ☀ With Sessions in Asset Management:
  - APWA, ASCE, FP<sup>2</sup>, GASB, local and state LTAP groups, NACE, and TRB

Note: See the Acronym Directory for explanation of these acronyms.

Incorporated with these discussions were considerations of the responsibility of government to attain the highest community value and technology transfer for the money spent. A particularly relevant discussion with representatives from different countries gave perspective on using the Highway Development and Management System (HDM-4). A similar effort in the United States is the Highway Economic Requirements System (HERS) research developed through the FHWA Office of Legislation and Strategic Planning. Both of these efforts are developing methods to model the economic requirements of transportation infrastructure construction and management. If applicable, sharing between these groups is encouraged.

The other organizations mentioned in Table 1.1 under the "Conferences and Meetings" column held, or plan to hold, sessions in Asset Management at annual conferences or meetings. Many professional and educational organizations (specifically APWA, ASCE, FP<sup>2</sup>, GASB, state and local LTAP groups, NACE, and TRB) held introductory sessions on the concept of Asset Management, the financial reporting requirements of GASB 34, or implementation issues encountered. Many of these organizations brought in staff from the FHWA Office in Asset Management, state and local officials who are actively developing Asset Management systems, and managers responsible for managing assets in the private sector (such the railroad and trucking industries).

*Publications and Presentations*

Almost every national group surveyed had at least one publication or presentation that introduced the concept of Asset Management. Many of these sources were online quarterly or monthly newsletters and served to define Asset Management and its relevance to the constituents of the organizations and the transportation industry as a whole. Many presentations were given at annual conferences or meetings sponsored by professional, educational, and international organizations. A partial list of each organization's specific publications and presentations is in the Appendix.

**2. Educational Efforts in Asset Management**

Several of the organizations surveyed also have educational efforts in Asset Management. These efforts range from course and curriculum development to technical training courses in roadway management. Within these different forms, groups are educating individuals on a range of issues, from the specifics of GASB 34 compliance to a general introduction on the concepts of Asset Management. Table 2.1 below details what groups have some form of educational efforts.

TABLE 2.1  
Educational Efforts in Asset Management

	Course Development	Technical Training
<b>Professional Organizations &amp; Agencies</b>		
AASHTO (American Association of State Highway and Transportation Officials)		X
APWA (American Public Works Association)		X

	Course Development	Technical Training
<b>Professional Organizations &amp; Agencies (cont.)</b>		
FHWA (Federal Highway Administration)		X
FP <sup>2</sup> (Foundation for Pavement Preservation)		X
GASB (Governmental Accounting Standards Board)		X
<b>Educational Organizations</b>		
LTAP (Local Technical Assistance Program)		X
MRUTC (Midwest Regional University Transportation Center – Madison, WI)	X	X
MTC & CTRE (Midwest Transportation Consortium & the Center for Transportation Research and Engineering – Ames, IA)	X	X
UC (University of Cincinnati – Cincinnati, OH)	X	
UTC (University of Illinois – Chicago, Urban Transportation Center – Chicago, IL)	X	
UTRC (CCNY University Transportation Research Center – New York, NY)	X	
<b>International Organizations</b>		
IRF (International Roads Federation)		X
PIARC (World Road Federation)		X

### *Course and Curriculum Development*

Several educational groups are developing courses that introduce the Asset Management concept. Two University Transportation Centers actively developing Asset Management courses are the MTC and MRUTC (and their affiliated Universities). The MTC has developed several Asset Management related courses taught in Engineering, Planning, and Geography at Universities in Iowa, Missouri, and Pennsylvania. The MRUTC and Civil Engineering Departments at the University of Wisconsin and the University of Cincinnati have also developed courses on transportation infrastructure management. The Urban Transportation Center (UTC) at the University of Illinois – Chicago and the University Transportation Research Center (UTRC) at the City College of New York both offer courses in transportation infrastructure management. The UTC program focuses mainly in the engineering and planning aspects of Asset Management while the UTRC explores implementation and organizational change.

As many of these universities offer Asset Management coursework, some are also developing Master's degree programs in transportation management and policy. Groups working in this area are the University of Wisconsin, the University of Cincinnati, George Mason University and the University of Minnesota. At this time there are no Master's programs offered in Asset Management by any University. However, the University of Cincinnati is considering the feasibility of restructuring their Civil Engineering Department around the theory of Asset Management.

Finally, several other universities without a transportation research center, such as George Mason University and Lafayette College, are working on course development. These efforts are mainly developing courses in transportation and infrastructure management with a multi-disciplinary focus

that considers policy, planning, engineering, and organizational management skills. Lafayette is an undergraduate college, but has taken an active role in developing Asset Management curriculum and plans to hire a Professor in 2002 specifically in transportation infrastructure management.

### *Training*

Several groups are developing training sessions to build the skills needed to implement Asset Management concepts. Groups such as AASHTO, APWA, and GASB have training efforts detailing the financial reporting requirements of GASB 34 and the options government has in demonstrating compliance with the new standards. Using the "modified approach" to report municipal capital assets under GASB 34 enables Departments of Transportation to quantify the value of their current network of roads, bridges, transit, etc. and funds spent to maintain them. Much of the guidance offered by groups like AASHTO, GASB, and APWA detail methods to value these assets and offer advice in how to adopt the modified approach.

Another significant effort in Asset Management related training takes place through national and state LTAP centers. Several state LTAP centers have roadway management related training seminars and conferences open to a nationwide audience. Some specific efforts are the Tenth Annual Roadway Management Conference in Virginia, Utah's course on how to implement Asset Management principles (see Section 4: Implementing Institutional Change), several project management courses offered by the University of Wisconsin's Engineering Professional Development program, and Iowa's focus on GASB 34 compliance through CTRE and other educational organizations in the state. Many LTAP centers have training courses on pavement and bridge management and as Asset Management becomes widely recognized, the centers will be ideal places to share ideas and innovation.

Other groups with training efforts in Asset Management are FHWA, AASHTO and the Foundation for Pavement Preservation (FP<sup>2</sup>). These three groups and the National Highway Institute (NHI) are developing a course in Transportation Asset Management with a focus in implementing the AASHTO Guide to Asset Management (NCHRP Project SP20-24[11], scheduled for completion by Fall 2002). In addition, several courses in pavement performance and management (specifically, "Pavement Preservation: The Preventive Maintenance Concept", "Pavement Preservation: Selecting Pavements for Preventive Maintenance", and "Engineering Applications for Pavement Management Systems") are currently available through NHI. Other NHI courses developed with a focus in Asset Management include a technical course on PONTIS 4.0 (a bridge management software program developed by Cambridge Systematics for the Office of Asset Management) and several courses in construction management.

Internationally, PIARC offers a variety of training courses on how to use HDM-4, a highway investment analysis program that is being used in many countries as they develop Asset Management systems. The International Road Federation (IRF) recognized the PIARC effort and discussed HDM-4 briefly at their Asset Management Seminar.

### 3. Research in Policy and Technical Issues in Asset Management

#### *Developing Asset Management Policy*

Several of the groups surveyed have research efforts in developing Asset Management policy. The AASHTO Task Force on Transportation Asset Management currently supports projects through the NCHRP and the TRB Asset Management Task Force is developing a research agenda. The MRUTC, MTC, and UTRC are the main educational institutions sponsoring policy research. Internationally, the Organization for Economic and Cooperative Development (OECD) has sponsored policy research in the past and developed a publication entitled, "Asset Management for the Roads Sector" which highlighted policies and technologies used for transportation infrastructure management in other countries.

The AASHTO Task Force Strategic Plan identified the importance of developing a Guide to Asset Management and initiated Project SP20-24[11] through NCHRP. Phase 1 of the Guide is complete with one section dedicated to developing a framework for implementation that relies upon goal setting and strategic planning. The report contains several recommendations on how to develop policy and the characteristics of good Asset Management policy.<sup>8</sup> NCHRP is also sponsoring a review of GASB Statement 34 compliance in state Departments of Transportation (Project 19-04). This project is studying whether GASB 34, a policy in effect today, is achieving its desired effect of greater awareness and development of infrastructure management systems.

The TRB Task Force on Asset Management is developing a set of research needs in the area of Asset Management implementation. The Task Force is relatively young (formed in 2000) and has not formally initiated research projects with groups like NCHRP. However, they do place a priority on coordinating research with other TRB Committees and national groups to develop a clearer vision of required research needed to implement Asset Management, especially in institutional change.

The MRUTC and MTC have both sponsored research in Asset Management policy. The policy research efforts at the MRUTC focus on (1) developing a multi-objective decision-making framework to assist in complex decisions, (2) designing a guidebook that will outline a model process, guidelines, and performance metrics to develop Asset Management systems, and finally (3) the Asset Management experience in transit systems, inter-modal freight terminals, and long-

#### **Research in the Policy Issues of Asset Management:**

##### Professional Organizations:

- ☼ **AAHSTO:** Supports policy research through NCHRP. Projects include:
  - Asset Management Guide (Project SP20-24[11])
  - State DOT compliance with GASB 34 (Project 19-04)
- ☼ **TRB:** Developing a research agenda in Asset Management systems implementation.

##### Educational Efforts:

- ☼ Several research efforts at the MRUTC, MTC, and UTRC.

##### International Efforts:

- ☼ **OECD:** Researching the policies used in other countries to implement Asset Management.

Note: See the Acronym Directory for explanation of these acronyms.

<sup>8</sup> Phase 1 of the Asset Management Guide (NCHRP Project SP20-24[11]) can be obtained through the NCHRP Products website at <http://www4.trb.org/trb/crp.nsf> (valid as of 03/06/02).

term ITS applications. The MTC has several policy-oriented research projects underway, including development of a local government Asset Management system manual and a model Asset Management strategic plan.

The UTRC sponsors research to assess how technological innovation influences the organizational structure and the transportation planning process in DOTs. Examples include studying the barriers to cooperation between public transportation agencies in New York and New Jersey and analyses of the impacts of federal urban transport policies including ISTEA and TEA-21. UTRC also studies the impacts of transportation policies and investments on economic development.

In a 2001 paper entitled, "Asset Management for the Roads Sector" OECD researched policies other countries are using to promote development of Asset Management systems. Overall, most of these systems are planning and policy intensive. As a result, there are several guidelines for infrastructure management as well as human resources, finances, risk, and heritage management. The purpose is somewhat similar to the NCHRP Asset Management Guide project, but developed as more of a survey of management planning over a wide area of interest.

#### *Research in the Technical Issues of Asset Management*

Several national groups sponsor technical research in the area of Asset Management. The National Cooperative Highway Research Program (NCHRP), several University Transportation Research Centers, and professional organizations including the Foundation for Pavement Preservation (FP<sup>2</sup>), ASCE & CERF, and ACPA all sponsor research efforts. Internationally, PIARC and IRF have also contributed to technical research by sponsoring a variety of projects.

The Asset Management Guide (NCHRP Project SP20-24[11]) will offer technical guidance on issues such as considerations in developing an economic modeling system, performance measurement, and methods to determine the value, economically and socially, of the transportation system. The Guide itself will package these tools and knowledge into one source of reference for State and local governments. This will be one of the most comprehensive sources of technical assistance supplied to the state and local level to date. Another technical project also recently funded by NCHRP will develop of suite of analytic tools to enhance the decision-making process (Project 20-57). The emphasis on this project is to develop a set of comprehensive engineering-economic analysis programs that maximize the benefit of a certain policy, which could be mobility, safety or preservation. It will be the first national program that has

#### **Research in the Technical Issues of Asset Management:**

- ⊗ NCHRP: Several research efforts, including:
  - Asset Management Guide
  - Analytic Tools to support Asset Management
- ⊗ MRUTC, MTC, and UTRC: Sponsoring a variety of studies in using technology to promote management systems
- ⊗ FP<sup>2</sup>: Development of pavement preservation technologies and tools.
- ⊗ ASCE/CERF: Testing of research products in the Highway Innovative Technology Evaluation Center (HITEC)
- ⊗ ACPA: Developing remaining service life and life cycle costing models
- ⊗ International Organizations: Efforts within PIARC and several Canadian organizations

Note: See the Acronym Directory for explanation of these acronyms.

attempted to model policies other than construction and maintenance. Another important goal of the Tools project is to incorporate trade-offs among other modes of transportation into the decision-making framework.

Each of the University transportation research centers mentioned in the policy section are also involved in technical research. These projects are typically quite specific in their application, but have the common theme of enhancing technology to make better decisions and manage transportation infrastructure more efficiently. Generally, the MTC sponsors research in GIS and other geographic data inventory systems that promote better management and decision-making tools. UTRC also sponsors a variety of technical research that considers regional transportation demands and how to optimize existing infrastructure. The MRUTC is supporting development of models for a multi-objective decision support tool and a transit resource allocation tool.

Several professional organizations, especially the Foundation for Pavement Preservation (FP<sup>2</sup>), ASCE, and ACPA, are sponsoring technical research efforts within their areas of specialization. FP<sup>2</sup>, in partnership with FHWA, developed a research agenda in December 2001 centered on improved techniques for construction and preservation as well as prioritization, measurement and management of these needs. ASCE sponsors transportation research through the Civil Engineering Research Foundation (CERF), Highway Innovative Technology Evaluation Center (HITEC) which is an organization that evaluates innovative market-ready highway products before release. Most of the evaluations conducted are on bridge, pavement, traffic engineering, or maintenance technologies, but the organization is beginning to consider management programs and technologies as they are developed. A third professional association researching Asset Management technologies is the ACPA, which is developing a remaining service life model for integration into a life-cycle costing program. This research program is a partnership between ACPA and the Michigan DOT and will be available in 2002.

It is also important to note the efforts of several international organizations in technical research and innovation. As mentioned, PIARC has developed an economic investment model named HDM-4. Several Canadian efforts, mainly the Federation of Canadian Municipalities and the National Research Council of Canada, are researching management technologies currently used by provincial and local governments and will make recommendations for improvement in the National Guide to Sustainable Infrastructure. One product of the Guide will be an investment planning tool, which can be applied to all infrastructure assets and not just transportation. A second research effort just beginning in Canada is the Municipal Infrastructure Investment Planning (MIIP) project, which will complement the National Guide research with investigation of methods governments are currently using to manage assets and what techniques, such as service-life prediction and life-cycle economic modeling, they could be using more.

#### **4. Implementing Institutional Change**

The issues covered in Sections 2 and 3 (educational efforts and research in policy and technology) are by far the most researched areas of Asset Management. Much of this research circulates around *perceived* critical needs such as training in the theory of pavement management, development of investment planning software, or the implementation of roadway management policy. The need for these research efforts and the many others presented in this report are critical, but there is a gap discussing *how* to implement these innovations. It is one thing to

develop a new technology or policy in Asset Management, but another to implement and track how well it performs towards the greater goal of efficient transportation system management. This section details national groups that have recognized and researched the institutional change necessary to implement Asset Management systems. The groups found working in this area are the Local Technical Assistance Program (LTAP), the Federal Highway Administration (FHWA), and New York University's Rudin Center for Transportation Policy and Management.

The LTAP organization, and specifically the Utah LTAP group, has developed a core curriculum in Asset Management that goes beyond the classroom and into the workplace. After participants attend the technical training on specific concepts such as GASB Statement 34, data integration, or pavement management systems, the Utah group goes into the agency itself and assists managers and technical staff in adopting the new technologies and policies. The issues frequently encountered are more institutional and even personal as employees must change work habits and adapt to change. Because this is often a stressful transition for many, the strategy of the Utah group is to assist on specific Asset Management components instead of attempting to develop an entire system at once. Many agencies do not have the resources to develop full Asset Management systems and a more realistic approach is to phase-in the components (such as GASB Statement 34 management and accounting systems) and to encourage the individuals within the agency to develop a response. Individuals at LTAP, APWA, and FHWA hope this issue of "organic" awareness and implementation of Asset Management within local agencies will grow as national groups continue to provide assistance.

Institutional change was not the theme of a conference sponsored by the FHWA Office of Asset Management, but considered within the greater context of implementing pavement preservation practices. A 1998 effort entitled the "Forum on the Future" was co-sponsored by many organizations in the pavement management and construction industry as well as AASHTO, FP<sup>2</sup>, and the National Highway Institute (NHI). The purpose of the Forum was mainly to explore needed technologies, policies, and studies to further the practice of pavement preservation.

A third group researching the institutional change necessary to implement Asset Management concepts was the Rudin Center for Transportation Policy and Management, a part of the NYU Wagner Graduate School of Public Service. The Center specializes in large city technical research exchange and it conducted a study of inter-jurisdictional coordination for traffic management. Several major cities currently use traffic management programs and the study focused on the development of these multi-agency systems and overcoming institutional barriers to achieve successful coordination. The study had two groups of findings: individual employee change and organizational change. On the employee side, the study found in-house staff expertise, face-to-face interaction, and ability for staff to move among agencies all invaluable in achieving the goal of better traffic management through collaboration. On the organizational side, some of most significant conclusions of the study were to address high-visibility collaboration problems from the outset, identify common interests between the agencies, proceed incrementally and in phases (much like the Utah LTAP Asset Management Course strategy), and find a leader who can champion the effort. More information on this study is available in the Appendix in the UTRC section.

## CONCLUSIONS

Based on the results of this survey, the authors draw several conclusions on the level of awareness of Asset Management and current education and research gaps. Several of the organizations surveyed also identified research gaps. The authors and these national organizations find similar research needs, but several other areas of study are also proposed.

### *Introduction to Asset Management*

An awareness of the concept of Asset Management exists in all the groups surveyed. Evidence of this awareness appears in presentations at annual meetings, publications on websites, and in interviews with individuals at each organization. However, the knowledge of Asset Management remains primarily within upper level management of these national organizations. It is a theory for discussion rather than a task-oriented strategy. Groups see value in the theory of Asset Management but many of them need to move into the implementation phase. Research and educational efforts should add insight into the needs of this next phase.

### *Educational and Research Efforts*

The groups surveyed have the potential to contribute and share much research and education in Asset Management. However, groups recognize similar research gaps and often pursue parallel efforts. Not only is this inefficient but the overall study impact is minimal when they are pursued alone. Meetings where groups share applied research and educational efforts should be encouraged. Particular topics at these meetings could include institutional change and development of transportation infrastructure management Master degree programs.

Especially in the area of technical research, efforts must not replicate ongoing or previous work. In the management software area alone NCHRP, ACPA, and ASCE/CERF are all developing, testing, and/or improving programs. Sharing the results could avoid duplication of effort.

In addition, it is apparent that a large amount of technical research must occur to clarify the role of Asset Management and facilitate implementation. Most of the research identified in the survey raises issues that future research efforts will have to address. AASHTO, NCHRP, and other organizations providing resources for further technical study should acknowledge further technical needs.

The international survey of Asset Management efforts shows that another gap in current US research is considering how Asset Management can assimilate community goals, conservation, and sustainability into a decision-making framework. The Australian Procurement and Construction Council advocates for an Asset Management framework that addresses these concerns in tandem with the future engineering requirements of the system.<sup>9</sup> They conclude the benefit of this comprehensive system is it assimilates these concerns into one framework instead

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<sup>9</sup> Australian Procurement and Construction Council (APCC), *Asset Management 2001* [www.apcc.gov.au](http://www.apcc.gov.au) (valid as of: 02/20/2002).

of neglecting one or the other. This system is still in developmental stages in Australia, but should these same issues be a part of Asset Management discussion in the US? Several indicators in our funding predictions alone advocate for better community decision-making and conservation of transportation infrastructure. The US DOT, "1999 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance" reports \$94 billion/year will be needed over the next twenty years to improve just the roads and bridges on the federal network.<sup>10</sup> Considering this figure, an important question to consider is not just how to get this funding, but if there are ways to manage mobility and transportation needs more efficiently through conservation policies in an Asset Management system. The decision-making and tradeoff analyses in Asset Management systems can question how community, conservation, and sustainability goals influence the construction, maintenance, operations, and other requirements of the system.

### *National Research Agendas*

Several of the groups surveyed have research agendas in policy, technology, planning, and education. The AAHSTO Task Force on Transportation Asset Management Strategic Plan, the TRB Asset Management Task Force August 2001 Research Agenda, and the Recommended Research Program section of the Asset Management Guide (Phase 1 of NCHRP Project SP20-24[11]) are among these. Other research agendas in transportation infrastructure management are the Infrastructure Renewal Research Agenda developed by the National Highway Research and Technology Partnership Forum and the results of a session entitled "Setting the Transportation Asset Management Research Agenda" at the MRUTC 2001 Transportation Asset Management Workshop.

Many of the needs raised by these five groups are similar. The discussions can roughly be categorized into four areas: (1) policy, (2) implementation, (3) technology and information management, and (4) education. Specific recommendations from these research agendas and this survey include, but are not limited to, the following:

- Development of tools and policies to facilitate implementation of Asset Management.
- Case studies that document the economic and social benefits of enhanced management techniques.
- Development of a multi-disciplinary educational program that focuses on the many aspects of transportation infrastructure management, including policy, engineering, and planning.

These areas of research are very timely considering the level of awareness of Asset Management in the organizations surveyed by this study. These products will also facilitate implementation of Asset Management systems.

### *Other Areas of Recommended Research*

The authors of the study found a need for better communication between national groups as well as more research in effective communication. Best practice studies demonstrating effective communication and leadership in implementing an Asset Management program could yield significant insight for many national groups as well as state and local governments.

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<sup>10</sup> US DOT, 1999 Status of the Nations Highways, Bridges, and Transit: Conditions and Performance, 2000.

In line with this topic, future research should also address institutional change and elaborate upon the internal alignment issues necessary to develop Asset Management programs. Often these are the hardest to address and not surprisingly the most difficult for government agencies to overcome. Investigating these areas or at least admitting they are significant concerns is an important issue to address. As Asset Management theories and systems evolve, the national efforts investigated in this report must recognize these needs and give them the same priority they give technical research today.



# APPENDIX

## DETAILED SUMMARIES OF ORGANIZATIONS SURVEYED



## ORGANIZATIONS SURVEYED:

### Professional Organizations & Agencies

American Association of State Highway and Transportation Officials (*AASHTO*)  
American Concrete Pavement Association (*ACPA*)  
American Public Transportation Association (*APTA*) & Federal Transit Administration (*FTA*)  
American Public Works Association (*APWA*)  
American Road and Transportation Builders Association (*ARTBA*)  
American Society of Civil Engineers (*ASCE*) & Civil Engineering Research Foundation (*CERF*)  
Federal Highway Administration (*FHWA*)  
Foundation for Pavement Preservation (*FP<sup>2</sup>*)  
Governmental Accounting Standards Board (*GASB*)  
National Association of County Engineers (*NACE*)  
Transportation Research Board (*TRB*)

### Educational Organizations

Local Technical Assistance Program (*LTAP*)  
Midwest Transportation Consortium (*MTC*) & Center for Transportation Research in Engineering (*CTRE*)  
- *Iowa State University, Ames, Iowa*  
Midwest Regional University Transportation Center (*MRUTC*) – *University of Wisconsin, Madison, Wisconsin*  
Urban Transportation Center (*UTC*) – *University of Illinois – Chicago, Chicago, Illinois*  
University Transportation Research Center (*UTRC*) & the Rudin Center for Transportation Policy and Management – *City College of New York, New York City, New York*

### International Organizations

Canadian Programs:

- Federation of Canadian Municipalities (*FCM*)
- National Research Council of Canada (*NRCC*)

International Road Federation (*IRF*)

Organization for Economic and Cooperative Development (*OECD*)

World Road Federation (*PIARC*)



PROFESSIONAL ORGANIZATIONS  
WORKING IN ASSET MANAGEMENT



**American Association of State Highway and Transportation Officials (AASHTO):**  
(<http://www.transportation.org>)

**Significant Past Efforts:**

**1<sup>st</sup> Executive Seminar on Asset Management:** (September 1996 – Washington DC) – 23 states attended. One of the first conferences to bring public, private, and quasi-governmental sectors together to discuss the theory of Asset Management.

**2<sup>nd</sup> Executive Seminar on Asset Management:** (October 1997 – Rensselaer Polytechnic Institute, Troy, NY) – Organized to evaluate current practices and develop a cooperative strategy to move forward with Asset Management.

**Asset Management Peer Exchange:** (December 1999 - Scottsdale, AZ) – 33 states attended. The Exchange “provided important insights into the work that is still needed to assist the states in guiding their ongoing transportation Asset Management programs.” (AASHTO 2001 Strategic Plan Introduction) The states of New York, Minnesota, Virginia, Montana, and Michigan were present to share past experience and gain knowledge on how to further implement Asset Management strategies.

**GASB 34 Training:** Workshop in April 2001 to discuss the implications of GASB 34 to AASHTO member states. Sponsored by the Tennessee Department of Transportation.

**Current AASHTO Efforts:**

**Task Force on Transportation Asset Management:** Incorporated by the Board of Directors in 1998, current efforts by the Task Force include the following:

- *Strategic Plan:* To frame mission and outline goals of Task Force and AASHTO's role in Asset Management. Developed in cooperation with FHWA, “The plan. . . provides a comprehensive, broad-based, and proactive approach to fully developing transportation Asset Management techniques and applications.” (AASHTO 2000-2010 Strategic Plan)
  - The Plan includes 5 goals and strategies. These goals “Provide the framework and focus necessary to develop partnerships, promote concepts, and assist the states in implementing the principles and practices of transportation Asset Management.”

**NCHRP Project 20-24 (11) Asset Management Guidance for Transportation Agencies:** One recommendation from the Strategic Plan is to develop an AASHTO Asset Management Guide. The main product of this research will be a detailed framework that allows agencies to use existing knowledge and tools to start implementing Asset Management systems. Auxiliary products will include a research agenda and a summary of best practices in states as well as national and international organizations. A target of August 2002 has been set as the final date for issuance of this report.

**Asset Management Communities Website:** This site is in the initial stages of development. When fully developed, it will ideally contain a discussion forum and links to research and organizations involved in Asset Management. The concept is to develop a portal through the web to facilitate information sharing and education.

(<http://assetmanagement.transportation.org/tam/aashto.nsf/home>)

### **AASHTO Perspectives:**

**Key Challenges in Asset Management:** (Taken from a presentation by Tony Kane at the 4<sup>th</sup> National Transportation Asset Management Workshop, hosted by the Midwest Regional University Transportation Center, September 2001)

- Integration (engineering, management, data, GIS, decision making and resource allocation)
- Developing performance measures that reflect customer perspective as well as life cycle and “what-if” analyses.
- Encouraging management staff to support Asset Management principles, especially in developing pub-private partnerships.
- Recognizing that “one size does not fit all”. Agencies must go through their own visioning, learning and understanding of what Asset Management is and agree on the results of the NCHRP project.
- Cross-pollination is integral. Important to set up a future session with key stakeholders (FHWA, AASHTO, APWA, FTA, etc) to discuss the roles that need to be filled and who will take responsibility.
- Funding the effort.
- Move away from implying states are doing management wrong. The emphasis needs to be put on integration, which is flexible within each agency.

### **Partial List of AASHTO Publications:**

*2000-2010 AASHTO Task Force on Transportation Asset Management Strategic Plan*

*Asset Management Peer Exchange, Using Past Experiences to Shape Future Practice – Executive Summary*

*Asset Management: Advancing the State of the Art into the 21<sup>st</sup> Century through Public-Private Dialogue – Executive Summary*

*Periodic articles in the AASHTO Quarterly and AASHTO Journal*

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Lance Newman – Cambridge Systematics

**American Concrete Pavement Association (ACPA)**  
**(<http://www.pavement.com/>)**

**Significant Past Efforts:**

**“Asset Management of Streets and Local Roads”:** A technical paper and presentation describing Asset Management and how local municipalities can start integrating this concept into decision-making. Describes why Asset Management is needed, the life cycle cost analysis methodology, and supports a conclusion that improved transportation management will include a “mix of fixes” where a variety of pavement preservation technologies will be necessary to maintain infrastructure at the desired level of service.

**Current ACPA Efforts:**

**Remaining Service Life Model:** The ACPA anticipates completing a model in 2002 that will be readily available for local governments to forecast remaining service life based on their inventory of current roadway conditions. With this condition data, the model will predict when to maintenance certain segments of the system to achieve ultimate overall benefit.

**Life Cycle Cost Analysis:** The ACPA is also pursuing development of refined life cycle costing methodologies and are working closely with the Michigan DOT to develop such models. ACPA also has a life cycle costing model available in their WinPAS pavement design software, which is available for purchase through the internet.

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**American Public Transportation Association (APTA) & Federal Transit Administration (FTA):**  
(<http://www.apta.org>)  
([www.fta.dot.gov](http://www.fta.dot.gov))

**Current Efforts:**

**APTA: Financial Management Committee:** This Committee considers several areas in financial management relevant to transit operators. One recent interest is GASB 34 and its implications for transit authorities. APTA brought together consultants and interested transit agencies to discuss the Statement more. In the future, APTA will facilitate more of these discussions.

**FTA: National Transit Database:** Accumulation of operation and financial information on nationwide transit providers.

**FTA/FHWA: Tunnel Management Guide:** Phase 1 is complete – an inventory of highway and rail tunnels. Phase 2 will be a guide on standards for operation and maintenance as well as management techniques for tunnel systems.

**APTA Perspectives:**

The organization does not have an Asset Management effort underway, but is aware of the concept and facilitating dialogue between its members and partner organizations such as FHWA. The FHWA Primers on GASB 34 and Asset Management have been helpful to APTA in distributing information to form an initial understanding of the concepts.

**FTA Perspectives:**

FTA is in the process of forming initial partnerships in Asset Management with the Office of Asset Management at FHWA. They developed the National Transit Database as a first step in compiling the data needed for a management system. Rich Steinmann has led some effort to assimilate fleet management with Asset Management principles. Also, Ed Thomas has given several presentations on emerging trends and reasons to adopt Asset Management concepts. These are mainly awareness building efforts by upper-level management staff at FTA.

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**American Public Works Association (APWA)**  
(<http://www.pubworks.org/>)

### **Significant Past Efforts:**

**Asset Management Task Force:** (disbanded August 31, 1998) – Developed paper entitled “Asset Management for the Public Works Manager – Challenges and Strategies.” This report was the first concentrated effort by APWA to define Asset Management and recognize potential benefits and issues. The discussion centered on the following areas:

- **A Definition of ‘Asset Management’:** Defined Asset Management as more of an investment policy than a management tool. The focus should be to integrate the many tools that *already* exist and interpret their output from dissimilar systems. The ideal goal is to provide decision makers with a reliable, integrated analysis.
- **Reasons for and Benefits of an Asset Management Program:** The economical importance of the nation’s infrastructure and the high cost of replacement are certainly the main reasons to implement Asset Management. Immediate benefits of Asset Management will be most visible at higher levels within organizations where users can interpret the overall performance of the system.
- **Implementation Issues:** There are a myriad of legal, financial, political, and accountability issues in implementing an Asset Management system.
- **Proposed Strategy:** To move on from this initial phase several steps are necessary:
  - Identify all stakeholders and coordinate their needs and contribution. Within this effort, APWA must ensure the Asset Management concept is well understood and that disparate groups can form common strategies.
  - A commitment from management of APWA to dedicate staff time and resources to studying and developing and researching Asset Management.

### **Current APWA Efforts:**

**Leadership and Management Committee:** This Committee has taken concepts from the Task Force study and incorporated it into their 2001 Business Plan in the following strategic goals:

- **Goal A1:** To influence government and private sector organizations to develop programs, systems, procedures, systems and tools that can be effectively used by public works agencies for efficient Asset Management.
- **Goal A2:** To provide information on Asset Management principles and practices as useful tools for improving public works management.
- **Goal A3:** To influence implementation of GASB Statement 34 by identifying and encouraging adoption of practical policies and tools for public works infrastructure performance monitoring and management.

**GASB 34:** Much of APWA's recent efforts have concentrated on development of guidance for GASB 34. APWA was involved in developing GASB 34 with the Governmental Accounting Services Board. They have several published guidebooks and videos in addition to regular training courses.

**Visioning:** As the industry tries to define the meaning of Asset Management, APWA is working with mainly local government to build consensus around a common definition.

**2001 Congress:** APWA held several sessions on Asset Management at their 2001 Congress. Several experts in the field gave presentations, including Dennis Shea, Kent Lande, Bevis Greay, and Dana Vanier. Many of these individuals are international representatives from Australia, New Zealand, and Canada.

**2002 Urban Transportation Forum:** The Forum will feature a day-long session on Asset Management and the state of development in local governments. The meeting will especially emphasize efforts to adopt GASB 34 and the development of pavement management and other planning systems.

**Perspective:** (A summary from an interview with Dennis Ross, Director of Professional Development, APWA)

Largest challenges in developing and implementing Asset Management: There are several key challenges the transportation community has to overcome in implementing Asset Management. These challenges are:

- Coalition building: Organizations such as APWA need to reach a common goal on the mission of Asset Management. Currently Asset Management has a different meaning to different agencies.
- Life Cycle Costing: Related to GASB 34, more agencies will be refining life cycle costing techniques. Future collaboration should be encouraged to standardize these techniques.
- The "un-funded mandate": Many local agencies perceive Asset Management theories and rhetoric to be a top-down mandate from state and federal agencies. These groups must develop common goals and strategies.

**Partial List of APWA Publications:**

*Asset Management for the Public Works Manager – Challenges and Strategies*

*GASB 34 Statement & Implementation Guide*

*APWA Reporter:* Monthly magazine periodically focusing on GASB 34 and other Asset Management related topics.

**Related APWA Activities:**

*Rebuild America Coalition:* Founded in 1987 by APWA to create public and political awareness of the need for significant infrastructure investment.

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**ARTBA (American Road & Transportation Builders Association)**  
**(<http://www.artba.org/>)**

**Current Efforts:**

The organization has not dedicated resources specifically to Asset Management, but their literature frequently emphasizes managing, maintaining, and preserving highway assets better.

**“America’s Roadway Operations: Improving Capacity and Efficiency”:** ARTBA prepared this paper for the National Summit on Transportation Operations on October 16, 2001. They acknowledge a need for better operations management and outline several recommendations to achieve better efficiency. These recommendations include strategies for federal roles, funding, and resolving institutional barriers in planning and operations.

**Professional Development Sections:** As a form of outreach, ARTBA has a Professional Development Section listserv to encourage dialogue about management activities in several areas of transportation. This program has been most successful in the safety management and international management areas. These forums might be very useful in the future to share experiences and knowledge about Asset Management.

**ARTBA Perspectives:** (A summary from an interview with Brad Sant, Vice President of Safety and Education, ARTBA)

ARTBA realizes there is a growing need to shift from policies in construction to management and preservation. ARTBA is helping facilitate the knowledge of this shift, but believes Asset Management research and development should not precede needed funding for the construction industry. The focus of ARTBA and construction industry is changing, and therefore the organization is changing as well.

**Partial List of ARTBA Publications**

*PRIDE In Transportation Construction Newsletter:* The PRIDE effort concentrates on building public and political support for capital improvement to federal and state transportation infrastructure. The Newsletter summarizes these efforts as well as acknowledges best practice efforts in design and planning.

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**American Society of Civil Engineers (ASCE) & Civil Engineering Research Foundation (CERF)**

**(<http://www.asce.org/>)**

**(<http://www.cerf.org/>)**

**Significant Past Efforts:**

**CERF - Partnership for the Advancement of Infrastructure and Its Renewal Through Innovative Products and Processes (PAIR)** (March 1998 – Washington DC). CERF president Harvey M. Bernstein introduced the PAIR Initiative, a partnership between industry and government to research and restore the nation's infrastructure. The effort focuses on R&D and especially technology transfer to state and local governments.

**CERF - Partnership for the Advancement of Infrastructure and Its Renewal Through Innovative Products and Processes – the Transportation Component (PAIR-T)** (April 1998 – Washington DC). The result of collaboration between President Clinton's National Science and Technology Committee on Technology and the Department of Transportation. PAIR-T promoted, "the increased use of innovation, particularly advanced materials and processes in new construction, repair retrofit, and maintenance of the transportation infrastructure". However, since the PAIR-T initiative was developed, no other agencies have collaborated with CERF to further investigate these concepts.

**Current ASCE and CERF Efforts:**

**CERF - Managing Infrastructure Assets Conference:** (Spring 2001) – A collaborative effort sponsored by the National Science and Technology Committee on Technology, Research and Special Programs Administration (RSPA) of the U.S. Department of Transportation and the Naval Facilities Engineering Command (NAVFAC) convened to discuss the new concepts of Asset Management. The Conference's purpose was to gather insight from each of the above organizations, encourage further understanding, and heighten awareness by developing partnerships and increasing dialogue. No specific tasks or partnerships resulted from the Conference and CERF has not taken a role specifically in Asset Management since.

**ASCE - 2001 Civil Engineering Conference and Exposition:** A session met entitled "New Developments in Asset Management for Civil Infrastructure" dealing with economic and operations theories behind Asset Management. Speakers from the FHWA, Office of Asset Management, Virginia DOT, and various consulting groups were present to describe successful efforts in federal, state, and local government programs in the roadway and transit fields.

**ASCE Report Card on America's Infrastructure:** The Report Card is an initiative by ASCE to raise public awareness of the condition of America's infrastructure. Powerfully presented over the web, the Report Card calls for proactive management of all infrastructure assets. Several strategies related to Asset Management are supported by ASCE, including improved life cycle cost analyses, increasing funding for long term highway management research, and multi-year budgeting for state and federal capital projects.

**CERF Highway Innovative Technology Evaluation Center (HITEC) Innovation Center:** One of CERF's most successful innovation centers is the Highway Innovative Technology Evaluation Center (HITEC). Based on a fee-for-service approach, the Center conducts performance evaluations on high and low-tech highway technology innovations. These innovations can be in any aspect of the highway community including design, construction, operation, or maintenance. While this Center is not directly involved in promoting Asset Management, some of the innovations it tests, such as Bridge Management System software, are examples of technologies that could be used in Asset Management systems in the future.

**CERF Perspectives:** (A summary from an interview with Peter Kissinger, Director of the Highway Innovative Technology Evaluation Center (HITEC) Innovation Center)

CERF's role in Asset Management is really as a facilitator of testing and marketing new technologies for use in highway design, construction, operation, or maintenance. CERF supports the concept of Asset Management and is willing to participate as projects develop.

**Partial List of ASCE Publications:**

*ASCE Journals:* Topics related to management of transportation systems are frequently discussed in ASCE journals, especially the *Journal of Management in Engineering*. There are several other examples such as the *Journal of Infrastructure Systems* and *Leadership and Management in Engineering*. Since the mid-1980's articles have appeared on subjects of Asset Management, especially in managing and integrate data. A recent article in the January 2001 *Journal of Computing in Civil Engineering* by D.J. "Dana" Vanier focuses on why municipal infrastructure planning needs Asset Management tools.

*Civil Engineering:* A monthly publication, articles are frequently published on management system related to design, construction, operation and maintenance of transportation assets.

**Partial List of CERF Publications:**

*The PAIR Implementation Plan: A Partnership for the Advancement of Infrastructure and its Renewal through Innovative Products and Practices*

*Partnership for the Advancement of Infrastructure and Its Renewal through Innovative Products and Processes (PAIR) White Paper*

*Partnership for the Advancement of Infrastructure and Its Renewal through Innovative Products and Processes Transportation Component (PAIR-T) White Paper*

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**Federal Highway Administration (FHWA)**  
(<http://www.fhwa.dot.gov/infrastructure/asstmgmt/>)

**Current Efforts:**

**Office of Asset Management:** The Office of Asset Management is one of four offices within the FHWA Infrastructure Core Business Unit (CBU). The Office was established in February 1999 with a broad scope to provide leadership and expertise in the management of highway infrastructure assets. To approach this mission, the office contains three areas to help develop policy, provide leadership and pursue public/private partnerships:

1. *System Management and Monitoring Team:* This team develops management systems for different types of infrastructure assets, most specifically pavement and bridge programs. However, this division is also looking at management approaches to other assets where tools to monitor performance currently do not exist, such as with tunnels and road hardware. The team is split into two groups:
  - Bridge Management Group: This group is responsible for developing bridge management systems, and is currently involved in developing software. In a partnership with AASHTO, the Group distributes and offers technical assistance in POINTIS and AASHTOWARE to take regular maintenance data on bridge systems and predict the optimal long-term life of the structures, with and without preventative maintenance. Versions of these programs are available through the FHWA website.
  - Pavement Management Group: This group is developing multiyear prioritization methods and technical applications that use pavement management data to monitor roadway quality. The group is involved with several other research efforts in AASHTO, TRB, and ASCE.
2. *Construction and System Preservation Team:* This team provides leadership to promote national quality initiatives to improve pavement quality and management. Like the other teams, they also collaborate with states and national efforts, such as AASHTO, to inform a broad audience on methods to improve roadway quality. A result of this effort is the National Quality Initiative (NQI), a partnership with AASHTO and related industry to provide greater visibility of highway quality improvement initiatives on local, state, or federal scales. This team has also concentrated on disseminating new specifications on highway construction and maintenance standards. They are in the process of developing a website to serve as an electronic link to efforts in the 50 states as well as guidance from the Asset Management Guide (NCHRP Project SP20-24[11]) on quality construction and management.
3. *Evaluation and Economic Investment Team:* This team is devoted to developing a number of tools to help evaluate transportation investments from an economic standpoint, with a focus on Asset Management. This includes developing guidance on the economic requirements for developing and maintaining state highway system (referred to as the "HERS/ST" program), life cycle cost analyses, data integration, and GASB 34. The types of guidance and assistance the team provides are in narrative form (such as "fact sheets" or "primers", which are quick guides

to what a subject is how it is important), holding workshops and meetings, and developing software.

### **Partial List of FHWA Publications:**

*Primers:* These pamphlets introduce Asset Management and why the concept is important. Because the field of Asset Management is still relatively new for most organizations, these publications are providing initial leadership to define the issues most relevant to interested parties and foster dialogue on the subject. The following is a list of current *Primers* distributed by the Office:

- Primer on Asset Management*
- Primer on GASB 34*
- Primer on Data Integration*
- Primer on Pavement Management*

*FOCUS:* A monthly periodical from FHWA with frequent stories on Asset Management.

*Annual Report 2000: Office of Asset Management:* This report summarizes the activities of the Office from 1999-2000, specifically detailing the accomplishments of the three Teams. As well, the report gives an update on broader efforts the Office is involved with, such as the Asset Management Guide (NCHRP Project SP20-24{11}).

*Asset Management Folder:* The Primers, Annual Report, and other general pamphlets describing efforts in Asset Management are available in one folder that the Office regularly distributes by request or at workshops. The folders are a good idea to consolidate the many articles the Office has produced to create a "one stop" approach.

### **Conferences & Workshops:**

FHWA has been involved in many of the workshops to date on Asset Management. These meetings are essential in facilitating idea sharing and raising awareness about Asset Management. Commonly, the Office is a partner in funding the effort as well as supplying expertise and/or leadership. The interests of these meetings can be on the broader policy implications of Asset Management or specific technical questions, such as pavement data management or GASB 34. A partial list of the conferences/workshops held to date is:

- *Executive Workshops in 1996 and 1997:* FHWA and AASHTO sponsored these workshops to raise awareness and explore application of Asset Management in transportation agencies.
- *Data Integration Workshop:* FHWA held this workshop in 2001 to discuss why data integration is important for Asset Management systems and offer insights such as best practice examples from other transportation agencies around the nation.
- *National Pavement Preservation Forum II:* The Foundation for Pavement Preservation received assistance from FHWA to develop a conference discussing the importance of maintaining pavement assets.

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**Foundation for Pavement Preservation (FP<sup>2</sup>)**  
(<http://www.fp2.org>)

**Background:**

The Foundation for Pavement Preservation (FP<sup>2</sup>), established in 1992, provides resources to advance knowledge for managing and preserving pavements. FP<sup>2</sup> supports research to educate government and industry professionals in the economical, safety, and performance advantages of pavement preservation. The Foundation encourages education, research, international education and public-private partnering.

One of the primary efforts of the Foundation is to reinforce the theme of "Applying the Right Treatment, for the Right Pavement, at the Right Time." This approach is reliant upon the adoption of strategies that focus on movement from a "worst first" strategy for applying pavement treatments. FP<sup>2</sup> aggressively markets the idea of applying treatments to pavements while they remain in good condition.

Another guiding principle of the Foundation's efforts is that pavement preservation is more than a list of techniques or a series of options. The movement towards a collective pavement management and Asset Management system is a new way of doing business.

**Current Efforts:**

**2<sup>nd</sup> National Conference on Pavement Preservation:** The Foundation was the host of the 2<sup>nd</sup> National Conference on Pavement Preservation in November 2001 entitled, "Protecting our Investment." This workshop brought together mostly members of the industry and state Departments of Transportation in the Western United States to discuss the current status quo regarding pavement preservation technologies. Sessions emphasized the importance of data collection and management for implementation in pavement management systems and strategies for compliance with GASB Statement 34. These sessions focused on the current state of the practice, including the management and data systems used in California and Colorado.

**Toolboxes:** Assembled jointly through the FHWA and FP<sup>2</sup>, these "toolboxes" contain videos, CD-ROMs, reports, brochures, manuals, and other materials on the state of the practice for pavement preservation. The materials included incorporate

**Research Agenda:** FP<sup>2</sup> has also adopted a formal research agenda in pavement preservation topics ranging across six strategic areas: construction practices, materials selection and mix design, treatment and selection strategy, performance, training, and policy options. These areas include 22 specific topics that the Foundation has prioritized for research execution. This effort was also coordinated through FHWA.

**Development of NHI Courses**

With the assistance of FHWA, FP<sup>2</sup> is developing a series of training courses administered through the National Highway Institute. NHI No. 131504 on Pavement Preservation: The Preventative Maintenance Concept (introduced in late 2000). In the fall of 2001, NHI No. 131058 was introduced: Selecting Pavements for Preventative Maintenance. These courses focus on the

selection of the right treatment, for the right pavement, at the right time. NHI No. 131056 is in development on the technical aspects of specific preventative maintenance techniques. In-field videos will be the key element of this course. FP<sup>2</sup> is also supporting the development of a long-term pavement maintenance course. The course is under development at the University of Illinois-Urbana Champaign through Dr. Sam Carpenter who is a member of the FP<sup>2</sup> Board of Directors.

### **Partial List of FP<sup>2</sup> Publications**

*Pavement Preservation Today*: A quarterly publication focusing on pavement preservation activities nationwide. The Foundation often focuses on AASHTO, FHWA, and state DOT efforts. The 2001 publications mention several national research efforts and conferences in Asset Management.

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**Governmental Accounting Standards Board (GASB)**  
(<http://www.gasb.org/repmoel/index.html>)

**Background:**

*GASB: An independent financial reporting group:*

GASB is independent of any state or federal agency and is not a professional association. It is the successor to the National Council on Governmental Accounting and is under the wing of the Financial Accounting Foundation. The Foundation contributes charitable, educational, scientific, and literary knowledge to the finance industry and the public. GASB's primary purpose is to establish standards of financial accounting and reporting for all entities of government. Because GASB exposes the government to review and requires justification for all expenditures, the organization had to evolve independently to be effective.

The Statement 34 standards were issued in July 1999. The Government Accounting Standards Advisory Council (GASAC), composed of government, financial, public interest, accountant, and auditor groups, was the main group that developed the Statement. The Council's responsibility today lies in consulting with GASB on Statement 34 issues and concerns. The Council also developed a task force (comprised of officials from AASHTO, FHWA, APWA, etc) to approach specific issues with implementation of GASB 34. As well, the GASB organization developed the Management Discussion and Analysis Section (MD&A), which is a section of the report that consolidates financial information on government assets (modeled after private companies that do the same in Annual Reports). This was to ensure the public could easily interpret Statement 34 reports.

**Theory behind Statement 34:**

Specifically related to transportation, GASB is important because if governments choose the preservation reporting approach, it requires calculation of the *original* value of infrastructure. The report includes all elements constructed or improved from 1980 to 1999.

*Depreciation or Preservation Approach:* Governments can opt to either apply depreciation to measure the financial value of assets over time, or a preservation approach, which accounts for expenditures on operation and maintenance of the asset. The preservation approach is the most desirable because it shows the public how much Departments of Transportation are spending to maintain built systems. The depreciation approach does not show this diversity and leaves the public less informed about large expenditures, possibly concluding there are no efforts in maintenance or preservation.

However, agencies can qualify for using the preservation approach only they have:

1. A current inventory of eligible assets.
2. Documentation of the asset's condition.
3. Demonstrated preservation efforts.
4. An estimate of the funds needed for preservation and maintenance.

These four areas advocate for an Asset Management system approach to managing infrastructure.

As this list shows, government will be required to provide the "full cost of servicing the public". Before this time the reports only detailed short term assets and "cash on hand". Now the long term, even "indefinite" – like roadway infrastructure – assets are considered.

Organizations of varying size will be phased in at different periods. The largest (100+ million) first, which is by June 15, 2001. 2002 and 2003 are the next years for progressively smaller organizations.

**Motivation behind GASB 34:**

Public perception and its effect on municipal bond ratings is the main motivation for agencies to adopt GASB 34 and develop Asset Management systems. Through the Statement, the public will achieve a deeper understanding of agency expenditures. If a DOT is shown as not complying with GASB or some erroneous expenditures are reported, the bond rating for the agency could be affected. However, the Statement could also be an opportunity for agencies that have comprehensive management systems to justify the efficiency of their programs and expenditures. Overall, the policy is a tool to foster awareness of the need to maintain the built environment in the agency and the public.

**GASB Outreach Efforts:**

The GASB Website is well organized to inform public on the purpose of Statement 34 through best-case examples, technical documentation, and other forms of outreach. As well, the organization collects and distributes many articles to increase awareness of what the program means and/or specific items of interest. The GASB organization has several training courses as well as guidance publications for sale on implementation.

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**NACE (National Association of County Engineers)**  
**(<http://www.naco.org/affils/nace/index.htm>)**

**Significant Past Efforts:**

**“County Perspective on Pavement Preservation”** (October 1998 speech by past Director, Duane Blanck). A non-technical perspective on benefits of pavement preservation, the article emphasized the importance of “keeping all roads in full service with minimum expense and the least inconvenience to traffic.” Most relevant was his discussion of preservation issues such as development of a pavement management program with condition rating schemes, ability to weigh alternatives, and establishment long-term programs. Other issues approached are choice in the type of preservation activity and the quality of preservation work. He also outlines several challenges, including level of service and cost of resources.

**NACo/NACE GASB 34 Informational Website** – A forum where recent lessons learned from GASB 34 are posted. Some technical advice offered on developing the accounting standards as well as county best-practices documentation.

**Current Efforts:**

**NACE 2002 Conference (March 2002):** This Conference featured a session entitled, “Asset Management and GASB 34 in Public Works” as part of the technical program track. This focus serves to update county officials on the status of GASB 34 implementation across the nation and report on some best-case examples.

**Partial List of NACE Publications**

**NACo/NACE Issue Brief: Performance Measurement – A tool for managing county government** (July 1999) In relation to Asset Management, this brief details guidance for performance budgeting and maintenance of county assets. There are several best-case examples to demonstrate programs currently in use.

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**TRB (Transportation Research Board)**  
(<http://www.trb.org>)

**Background:**

TRB is a research consortium mainly composed of committees that sponsor research and discuss many disciplines of transportation. Transportation Asset Management is recognized by TRB as an important area of research, and there are several Committees that address Asset Management generally or are developing awareness and research on specific components of Asset Management, such as Pavement Management Systems. The TRB Asset Management Task Force is designing a research agenda to investigate a variety of issues that relate to implementation of Asset Management in transportation agencies, cities, the private sector and other groups.

**Current Efforts:**

**Committee A1T50, Task Force on Asset Management:** The Committee outlined several areas in their December 2001 First Report of Activity. Some of their key responsibilities are listed below:

*Coordination:* To bring disparate aspects of Asset Management generated in a wide number of other Committees at TRB under one framework. The Task Force will work on bringing them and many other interests in public and private agencies across all modes under the following sub-areas of Asset Management:

- Goals and Objectives
- Planning and Programming
- Data Management and Analysis
- Implementation
- Internal Alignment
- External Communications

A key effort will be to coordinate efforts through meetings, workshops, conferences, and publications.

*Address Emerging Issues:* The Task Force will address emerging issues related to Asset Management. The concept is to realize Asset Management is a holistic approach to management of the transportation system and that many concerns need to be addressed that fall out of the niche already carved for Asset Management.

*Internal Alignment:* Also the Task Force is really the first effort to date that is approaching the human or soft issues of Asset Management. Phrased as "Internal Alignment" in the report, discussion of organizational structure will initiate research on how to structure an organization to implement Asset Management.

*Research Agenda:* The Task Force is also developing a set of recommendations for further research in Asset Management. This list is comprehensive and extends to all areas of the management theory, such as defining Asset Management and its benefits, technical aspects, and measures needed to sustain practice and demonstrate its effectiveness.

**Partial Listing of Other Committees working in the concept of Asset Management:** In reference to the Task Force recommendation of Coordination with other TRB Committees, a partial listing of possible Committees:<sup>1</sup>

*A1A07: Strategic Management:* Emphasis on cooperative planning and transportation decisions. Several examples of current applications of technology involving several interests to develop a system that works better. Asset Management is not a research area, but its concepts of implementation are discussed, such as inter-departmental agreements, public/private partnerships, etc.

*A2B01: Committee on Pavement Management Systems:* This group realizes the importance of integrating pavement management into Asset Management techniques and outlines several strategies to make this happen. As well, there is also discussion on strategies to develop more comprehensive pavement management systems.

*A3C06: Committee on Structures Maintenance and Management:* This group recognizes the need to integrate bridge management with Asset Management. They outline several steps to develop comprehensive BMS and future improvements/applications.

*A1D01: Statewide Multi-modal Transportation Planning:* A good perspective on how transportation planning on a regional scale will call for greater collaboration, integration of new technologies, performance-based contracting and planning, etc. This Committee also acknowledges that Asset Management systems can facilitate the implementation of operation and maintenance programs.

**National Highway Research and Technology (R&T) Partnership:** Effort produced a report to (1) identify highway R&T needs for sponsoring organizations (sponsoring organizations were federal agencies, state DOTs, and several associations, foundations, and institutes) and (2) demonstrate value of partnership efforts to carrying out R&T. The lead organizations developing the report were FHWA, AASHTO, and TRB. Four R&T areas were discussed:

1. Safety,
2. Infrastructure Renewal,
3. Operations and Mobility,
4. Policy Analysis, Planning and Systems Monitoring.

Asset Management was one of the subset areas discussed under the Infrastructure Renewal area. Some general costs of implementation are summarized here as well as some specific themes that should be explored: Information Management, Decision Support Tools, Implementation, and Education.

**TRB Research Projects (in collaboration with AASHTO & NCHRP):**

*Review of GASB 34 Compliance in DOTs (NCHRP proj. 19-04)*

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<sup>1</sup> Much information on these Committees is contained on a CD developed by TRB entitled, "Transportation in the New Millennium", which is available through [www.trb.org](http://www.trb.org).

*Analytic Tools to support Asset Management (NCHRP proj. 20-57)*

*Asset Management Guide (NCHRP proj. 20-24[11])*

*Multimodal Tradeoffs (NCHRP proj. 08-36 Task 7 to be used in proj. 20-57)*

### **Partial List of TRB Publications**

*What We Know About Asset Management* – Latest research agenda from the TRB Asset Management Task Force (A1T50)

*Partial List of Papers/Presentations from TRB 80<sup>th</sup> Annual Meeting (January 2001):*

- The Role of Pavement Management in Comprehensive Asset Management Contracts (Authors: Kathryn A. Zimmerman Angela S. Wolters, Howard Kallman,)
- Consultant's Perspective of Highway Network Asset Management Practice in England (Author: Jason Schirnack)
- Using Common Elements of Asset Management and Pavement Management to Maximize Overall Benefits (Authors: Lynne Cowe Falls, Ralph Haas, Sue McNeil, Susan Tighe)
- Applying the Government Accounting Standards Board Statement 34: Lessons From the Field (Authors: Anthony J. Kadlec, Sue McNeil)

*Partial List of Papers/Presentations from TRB 81<sup>st</sup> Annual Meeting (January 2002):*

- Actors and Directions in U.S. Transportation Asset Management (Authors: Odd J. Stalebrink, Jonathan L. Gifford)
- Framework of Regional Transit Asset Management System (Authors: Supin L. Yoder, John DeLaurentiis, Richard J. Bacigalupo)
- Managing Geotechnical Assets – A New Perspective for Dealing with Geotechnical Issues (Authors: Kristen L. Sanford Bernhardt, J. Erik Loehr)
- Prototype Hybrid Configuration/Asset Management System to Support
- Transportation Management Systems (Authors: Brian L. Smith, Dave Hodgins)
- Multipurpose asset valuation for civil infrastructure: Aligning valuation approaches with asset management objectives and stakeholder interests (Authors: Adjo Amekudzi, Pannapa Herabat, Shuchun Wang, Creighton Lancaster)
- Applying the Cost Approach for Pavement Valuation and Asset Management (Authors: Pannapa Herabat, Adjo A. Amekudzi, Poovadol Sirirangsi,

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EDUCATIONAL ORGANIZATIONS  
WITH AN EMPHASIS IN ASSET MANAGEMENT



**Local Technical Assistance Program (LTAP)**  
(<http://www.ltap.org>)

**Background:**

LTAP is a conduit established by FHWA for transferring technological innovation into the local government sector. There is a national center which distributes information about each LTAP center and is a centralizing effort of LTAP goals and missions. However, the real strength of LTAP are the individual offices in each state.

**Current Efforts:**

**Asset Management Awareness Building:** Each LTAP is unique in this regard. Most centers currently have management system training of some kind. This could be in a specific component of transportation systems, like bridge management software, or on the human side, such as advice on effective leadership. As the visibility of Asset Management grows, LTAP is an ideal place to transfer information to local government. It has a history of technology and information sharing between the federal government, private industry and academia to local municipalities.

**Roadway Management Conference** (Virginia LTAP, March 2002): An all-day workshop at this conference highlighted Asset Management and why it is important to local government. Discussion revolved around implementation issues, technical considerations, policy implications, and GASB 34.

**Perspectives** (A summary from an interview with Doyt Bolling, Director of the Utah LTAP Center)

Several LTAP efforts around nation are actually assisting local governments setup the first phases of an Asset Management system. Utah, Michigan, New Hampshire have some relatively significant efforts. LTAPs are responding to local government's most pressing needs, mainly in data integration and interagency collaboration. LTAPs can help "jump start" an organization into starting Asset Management systems, but it is not referred to as "Asset Management". An incremental approach is needed to build the blocks necessary for an Asset Management system of the future. No municipalities can secure the funding or resources to implement a full Asset Management system all at once. Instead, most agencies are phasing the most relevant components in first.

**Partial List of LTAP Publications**

Most state LTAPs have a newsletter. Often these publications, such as the Iowa LTAP, have information related to GASB 34 compliance, pavement and bridge management issues (specifically the New Hampshire LTAP), and in rare instances Asset Management (Utah LTAP).

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**Midwest Transportation Consortium (MTC) & Center for Transportation Research and Education (CTRE) – Iowa State University, Ames, Iowa**  
**(<http://www.ctre.iastate.edu/mtc>)**  
**(<http://www.ctre.iastate.edu>)**

CTRE sponsors most of the efforts in the MTC and Iowa LTAP to disseminate research and educate transportation officials in the area of Asset Management.

**Current Efforts:**

**Courses:** MTC helped develop four courses in transportation management issues, with a general introduction to Asset Management concepts. The four universities involved were: Iowa State University, Lincoln University, Univ. of Missouri – St Louis, and the University of Northern Iowa. Course themes ranged from public policy/administration and marketing to transportation geography and planning.

**Co-sponsored the 2001 4<sup>th</sup> National Transportation Asset Management Workshop:** The MTC was a co-sponsor of the September 2001 Workshop held by the Midwest Regional University Transportation Center (MRUTC) in Madison, Wisconsin. Many of the sessions in the Workshop focused on publicizing the efforts of AASHTO, FHWA, and TRB in the field as well as the practical lessons learned from city, county, state, and transit agencies implementing Asset Management techniques. In addition, curriculum and course development in Asset Management received considerable attention.

**GASB 34 Implementation:** MTC and CTRE have sponsored GASB 34 Workshops, which a large amount of Iowa municipalities attended. As a result, MTC and CTRE assisted Iowa County Finance Committee developing guidelines for counties to use in implementing GASB 34. A part of the response to this effort is a small website developed by MTC on GASB 34 (<http://www.ctre.iastate.edu/gasb34/index.htm>).

**Current Research:** MTC is currently conducting several projects in the field of Asset Management. They are:

- Addressing Integration Issues and Developing a Protocol for Integration of Global Positioning Systems Data with Linear Referenced Data in an Asset Management System
- GIS-Based Integrated Rural and Small Urban Transit Asset Management System
- Decision-Support System for Management of Slope Construction and Repair Activities—An Asset Management Building Block
- Roadway Asset Management System Manual for Local Governments
- Artificial Intelligence-Based Optimization of Management of Snow Removal
- Development of a Model Asset Management Strategic Plan

**TREXPO Website:** Produced to facilitate sharing of Asset Management and other transportation related topics over the web, especially for rural Consortium member state communities. Available on the internet at: <http://www.trexpo.org>

**Partial List of CTRE & MTC Publications:**

*MTC Asset:* A quarterly newsletter that reports on current MTC activities in Asset Management as well as nationwide conferences and research

*Technology News:* A shared publication between Iowa LTAP and CTRE with occasional articles in Asset Management. The March-April 2001 publication summarized GASB 34 and the implications for local government. The article succinctly stated the differences between the depreciation and preservation approach to Statement 34 and the considerations for agencies in both approaches.

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**Midwest Regional University Transportation Center (MRUTC) – University of Wisconsin, Madison, Wisconsin**  
**([www.mrutc.org](http://www.mrutc.org))**

### **Background**

The MRUTC is a University Transportation Center sponsored through the Department of Civil Engineering at the University of Wisconsin, Madison. The Center sponsors several Asset Management research and course development efforts. Many of these efforts are developed at the following universities: University of Wisconsin– Madison, University of Wisconsin– Milwaukee, UW– Superior, Marquette University, Northwestern University, University of Illinois - Chicago, University of Cincinnati, University of Dayton, University of Minnesota, Wayne State University, Lac Courtes Oreilles Ojibwa, Community College, Richard J. Daley College.

### **Significant Past Efforts:**

**4<sup>th</sup> National Transportation Asset Management Workshop, “Taking the Next Step in Asset Management”** (September 2001): This workshop was the largest ever held in North America on the subject of Asset Management. Many of the US groups involved in Asset Management, such as AASHTO, APTA, APWA, FHWA, MTC, NACE, TRB, and UTC, co-sponsored the Workshop. The Workshop structure intended to bring different groups and their members together to foster information and idea sharing. Many of the sessions in the Workshop focused on publicizing the efforts of AASHTO, FHWA, and TRB in the field as well as the practical lessons learned from city, county, state, and transit agencies implementing Asset Management techniques. In addition, curriculum and course development in Asset Management received considerable attention.

### **Current Efforts:**

**Course Development:** The MRUTC is helping develop several courses on transportation management and policy. Some of the courses considered are:

- Civil and Environmental Engineering Decision-Making
- Management of Infrastructure Systems
- Transportation Management and Policy
- Summer Forum: Contemporary Issues in Wisconsin Transportation
- Deterioration and Rehabilitation of Transportation Facilities

**Master's Degree in Transportation Management and Policy** (Possible availability to students by Fall 2003): Several Departments at the University of Wisconsin, Madison are developing an interdisciplinary program in transportation management and policy. The program will recognize the broad perspective of Asset Management and offer courses that consider the political, societal, environmental, technical, and economic considerations in developing and/or maintaining transportation infrastructure. The program would be available to students with diverse backgrounds, including but not limited to public policy, business, land management, engineering, economics, and planning.

**Research Projects:** There are several projects currently sponsored by the MRUTC. They are as follows:

- Synthesis of National Transportation Asset Management Practices (this report)
- Evaluation of Near-Transportation Private Sector Asset Management Practices
- Evaluation of Transportation Organization Outsourcing: Decision Making Criteria for Outsourcing Opportunities
- Optimal Resource Allocation for the Purchase of New Buses and the Rebuilding of Existing Buses as a Part of a Transit Asset Management Strategy for State DOTs
- Develop a Multi-objective Decision Support Framework for Transportation Investments
- Optimizing Transportation Investments within the Lac Courtes Oreilles/ Sawyer County Transit System
- Long- Range Optimal Deployment of ITS Strategies: Concept Definition
- Best Practices for Linking Strategic Planning to Resource Allocation and Implementation Decisions Using Elements of a Transportation Asset Management Program
- Evaluation of Shipper Requirements and Potential Cargo Required to Establish a Rail–Truck–Marine Intermodal Terminal in the Twin Port of Superior, Wisconsin and Duluth, Minnesota

The MRUTC also sponsored projects in local government Asset Management practices and is developing future projects in capital preventive maintenance techniques, the economic benefits of maintenance, and a summary of data collection and integration best practices.

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**University of Illinois, Chicago – Urban Transportation Center (UTC) – University of Illinois – Chicago, Chicago, Illinois**  
**(<http://131.193.92.223/>)**

**Background:**

The UTC has a broad focus in research efforts to improve the current transportation systems surrounding the Chicago area and throughout the United States. They support faculty and courses to develop individuals who are interested in developing and maintaining efficient transportation networks. Within these broader goals, the UTC recognizes the need for enhanced management of transportation infrastructure and has several projects and coursework related to Asset Management.

**Current Efforts:**

**Research Projects:** There are several current projects related to Asset Management at the UTC:

- Evaluation of Near-Transportation Private Sector Asset Management Practices: Sponsored by the MRUTC, this project focuses on sharing private sector activities that will benefit public agencies developing Asset Management systems.
- Best Practices for Linking Strategic Planning to Resource Allocation and Implementation Decisions Using Elements of a Transportation Asset Management Program: Also sponsored by the MRUTC, this project will survey transportation agencies that are developing strategic plans and using them to influence funding and resource allocation.
- Maintenance and Management of Transit Infrastructure: Sponsored by the Great Cities University Consortium (in collaboration with the University of Alabama at Birmingham).

**Course Offerings:** The UTC Director, Professor Sue McNeil teaches a course in Transportation Infrastructure Management which significantly investigates Asset Management theory and implementation concerns. Professor Joe DiJohn also teaches a course in Transportation Management. The Center is continuing to develop management courses and training as their focus evolves.

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**City College of New York – University Transportation Research Center (UTRC)  
& New York University – Rudin Center for Transportation Policy and Management (NYU) –  
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(<http://tid1s0.engr.cuny.cuny.edu/utrc/index.html>)**

**Background:**

Due to the location of UTRC and the Rudin Center in New York City, these organizations tend to focus on large city transportation issues. The UTRC has a broad focus, but mostly sponsors technical research in regional transportation management issues. The Rudin Center conducts research and education in urban transportation policy and management.

**Significant Past Efforts:**

**UTRC: Regional Transportation Research Initiatives Conference:** Several research organizations and national agencies met in November 2001 to discuss the major research needs of the New York region. Pertaining to Asset Management, there were discussions on planning, policy, human management, and new technologies for efficient operation of transportation systems. The Rudin Center was involved in these research discussions, especially in “turning research into policy” - the implementation phase of Asset Management that many organizations are struggling with today.

**Rudin Center: “Inter-Jurisdictional Coordination for Traffic Management”:** This research project surveyed the implementation of traffic management systems in several major cities of the United States. The study discovered some main barriers to developing this multi-agency management group was on the “human” side of the organization. Technology and data sharing were not the greatest obstacles as long as intentions were clearly stated and roles/responsibilities understood. The study emphasized the need for a strong leader, to build the system incrementally, and develop in-house technical expertise. Overall, these management systems are very effective today and a positive sign that application of Asset Management techniques to the public sector is possible.

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INTERNATIONAL ORGANIZATIONS  
WITH AN EMPHASIS IN ASSET MANAGEMENT



## **Brief Summary of Canadian Organizations Working in Transportation Asset Management**

**National Research Council of Canada (NRCC)** (<http://www.nrc.ca>)

**Federation of Canadian Municipalities (FCM)** (<http://www.fcm.ca/english/>)

**Transportation Association of Canada (TAC)** (<http://www.tac-atc.ca/>)

Asset Management in Canada typically means more than management of roadways. Discussion focuses on all public infrastructure assets, including buildings, sewer, etc. The process is heavily dependent on service life prediction and emphasizes modeling, probability methods, and information technology as the basis of Asset Management.

### **Significant Canadian Efforts in Asset Management:**

**National Guide to Sustainable Municipal Infrastructure** ([www.infraguide.ca](http://www.infraguide.ca)): This Guide will consist of two items: (1) A decision making and investment planning tool and (2) case studies and best practices for sustainability. The Federation of Canadian Municipalities and the National Research Council of Canada sponsor the effort.

**Municipal Infrastructure Investment Planning Project:** This is a three-year project, starting in 2001, to develop an inventory of case studies and best practices in infrastructure investment planning. The Program will evaluate current technical tools and develop long-term investment planning approaches, specifically with service life predictions and maintenance prioritization models. The final product will be an assimilation of several guidelines and manuals for use in local government in Asset Management implementation.

### **Partial List of Canadian Publications:**

*Transportation Asset Management Primer:* Developed by the Transportation Association of Canada, this Primer introduces the concept of Asset Management and outlines a general framework to help municipalities start envisioning systems of their own.

*Measuring and Reporting Highway Asset Value, Condition and Performance (February 2000):* This report explores three areas of Asset Management: capital assets valuation, performance measurement, and executive information systems. Outlined are several implementation strategies as well as a general Asset Management framework.

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**International Road Federation (IRF)**  
**(<http://www.irfnet.org/IRFMID.HTM>)**

**Current Efforts:**

**Roads and Highways Division:** A unit within the Transport Department of the World Bank. The Division researches development of management systems in different countries and offers technical assistance. Their outreach emphasis is in assisting an agency to manage resources more efficiently and restructure current divisions to accommodate increases in demand. All of these efforts are Asset Management concepts, but not referred to as such by the Division.

**First International Seminar on Asset Management (November 2001):** The IRF has been holding conferences in the past on management techniques, but this is the first in Asset Management. The Seminar was developed primarily for transportation agency managers from other countries to become acquainted with Asset Management principles and techniques. It was a five day workshop that focused on the three main areas: strategic goal setting, data generation, and planning and implementation.

**Organization for Economic Co-operation and Development (OECD)**  
(<http://www.oecd.org>)

**Current Efforts:**

**Road Transport Research (RTR):** Within the Transport Division of OECD, this group is the primary investigator of Asset Management systems and research. They have been working in Asset Management over the past decade and the while concept is still relatively new, listed below are several reports and other efforts:

- *Road Transport and Intermodal Linkages Research Program:* Developed publication entitled, "Asset Management for the Roads Sector" (July 2001). This was the first report to come out of OECD specifically detailing what Asset Management is, how administrations achieve Asset Management practices, and what the implications are for data collection and management. Gives advice on how to integrate performance modeling and other techniques into an Asset Management systems for enhanced decision-making. Some important topics covered in the report include:
  - A listing of current Asset Management efforts in different countries.
  - An Appendix detailing an Asset Management framework with attention to the variety of planning and strategizing that will be necessary to develop comprehensive management programs.

**Partial List of OECD Publications:**

*Asset Management for the Roads Sector (July 2001)*

*Advanced Road Transport Technologies (1994)* – Highlights the need for optimum application of advanced technologies and for systematically developing policies for maximum efficiency.

*Road Tunnel Management (1992)*

*Road Maintenance Management Systems in Developing Countries (1995)*

*Road Maintenance and Rehabilitation: Funding and allocation strategies (1995)*

*Bridge Management (1992)* – Highlights that improved inspection techniques paired with comprehensive data banks should be used to rationalize current and future bridge funding and rehabilitation.

*Road Monitoring for Maintenance Management in Developing Countries (1991)* – presents a manual to streamline the road monitoring process.

*Appraisal of the Social and Economic Affects of Road Network Improvements (1988)* Concludes that policy measures for large scale projects should take into account the effectiveness of public resource allocation and the potential for private enterprise involvement in roadway improvements.

**World Road Federation (PIARC)**  
(<http://www.piarc.org>)

**Background:**

The vision of PIARC is to “be a world leader in providing information on roads and road transport policy and practices within an integrated sustainable transport context.” Related to Asset Management, PIARC has many efforts in research to distribute and develop knowledge of roadway management techniques.

**Current Efforts:**

**HDM-4:** Highway Development and Management System – A software system for investigating choices in investing in road transport infrastructure. The objective of development was to investigate the economic viability of multiple road projects to help develop a system of prioritization for development and maintenance. Cost-benefit and life cycle analyses are some of the techniques discussed to improve planning and programming road maintenance.

**Road Management Committee:** At the 21<sup>st</sup> PIARC World Road Congress (October 1999), the Road Management Committee identified future needs to share relationships with OECD, FHWA, AASHTO, and Austroads to develop Asset Management systems. They also see a responsibility to track implementation of HDM-4 (described above) and research how the private sector should be involved in operation and maintenance of roadway assets.

**Partial List of PIARC Publications:**

**“Routes/Roads” Periodical:** A journal documenting some Asset Management techniques used in other countries (especially Australia) and progress of Committees like the Road Management Committee.

**Save Your Countries Roads** (October 1999): A very informative introduction to Asset Management techniques and why they are important.

**Technical Report Documentation Page**

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16. Abstract  Several national groups research and disseminate information about Asset Management. As of 2001, AASHTO and FHWA are two of the well-known organizations working in the field. An informal survey was conducted in late 2001 to determine if there are other groups also researching or pursuing Asset Management strategies. Results show many professional, governmental, and educational groups are pursuing Asset Management concepts and research. However, while many groups are interested in Asset Management, there are currently limited venues (conferences, committees, workshops) to share information and ideas. As the concept of Asset Management grows, the authors suggest enhancing collaboration efforts, researching how Asset Management can align with competing community goals, reinforcing the nature of Asset Management as an interdisciplinary concept, and emphasizing the need for communication and leadership as Asset Management systems are implemented.			
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