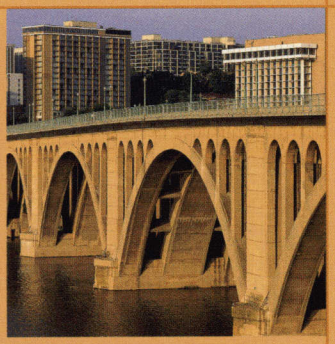
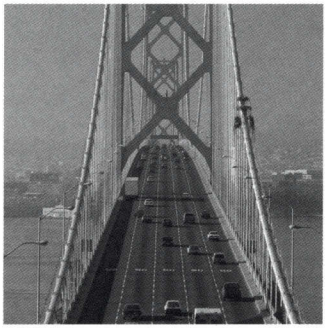
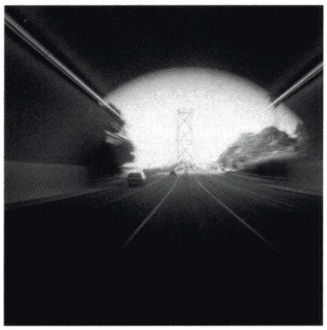


Office of Asset Management

ANNUAL REPORT 2002

Office of Asset Management





ANNUAL REPORT 2002

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

OFFICE OF ASSET MANAGEMENT

SEPTEMBER 2003

U.S. Department of Transportation

Federal Highway Administration

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NOTE FROM THE DIRECTOR

Office of Asset Management, Infrastructure, Federal Highway Administration

On behalf of the Federal Highway Administration's (FHWA's) Office of Asset Management, I am pleased to present this *2002 Annual Report.* It is the third in a series of Annual Reports published by the Office since its inception. The report explains the mission, goals, and strategies of the Office and describes our activities and accomplishments during 2002.

Since the Office of Asset Management was created, it has been providing tools, techniques, information, and support to transportation agencies throughout the country as they strive to provide a transportation system that is responsive to its users and maintained to the highest and most cost-effective standards. The Office looks at the performance of the highway system from agency and user perspectives. It develops and applies transportation management and investment principles at the strategic and operational levels to improve the productivity of the highway infrastructure.

Fiscal year 2002 saw the Office of Asset Management making significant accomplishments and strides in a broad range of programs. We successfully piloted a training course on Asset Management based on the guidelines being developed for the National Cooperative Highway Research Program. We completed a guide and prototype database system and conducted a number of workshops on tunnel management. We rolled out the new version of a highway investment requirements model, HERS-ST, and distributed it to the States. We helped establish two expert task groups on performance-related specifications in the areas of concrete and pavement preservation. We organized and conducted workshops and conferences, developed and delivered training courses, software, and analytical tools, and produced informative materials on infrastructure data integration, engineering economic analysis, management systems, highway construction, and transportation system preservation. The report describes all these initiatives and more.

I invite you to look inside and see what the Office of Asset Management is about and what made 2002 a very successful and productive year for us.

David R. Geiger

David R. Geiger
Director, Office of Asset Management

The Office of Asset Management serves as an advocate for Asset Management; for pavement management and analysis; for bridge management and inspection; for construction and preservation activities; for engineering economic analysis applications; for data integration; and for technology development, outreach, and partnering activities.

OFFICE OF ASSET MANAGEMENT: MISSION

The Office of Asset Management was established to provide leadership and expertise in the areas of transportation resource allocation, construction, and system preservation. The Office is committed to advancing Asset Management, a strategic approach to maximize the benefits from resources used to operate, expand, and preserve the transportation infrastructure. (Please see page 8 for a more detailed explanation of Asset Management.) In addition, the Office has developed aggressive programs to promote best-practice construction and system preservation practices and technologies. These activities will lead to reductions in the total life-cycle costs of providing transportation services and to improvements in safety, system reliability and condition, and financial performance.

The Office is organized into three teams: System Management and Monitoring, Economic Evaluation and Investment, and Construction and System Preservation. The activities of the first two teams focus on building and applying the Asset Management framework. Specifically, work is advanced in the following program areas: management systems (e.g., pavement and bridge), economic analysis tools and techniques (e.g., life-cycle cost analysis), data management and comparability, and Asset Management training and outreach. The Construction and System Preservation Team focuses on four major elements: construction management, transportation system preservation, quality management, and customer satisfaction.

The Office relies greatly on its cooperative arrangements with other organizations, such as the American Association of State Highway and Transportation Officials (AASHTO), the Transportation Research Board (TRB), academia, and industry associations to carry out its activities.

Four tracks comprise the Office's strategy for moving forward in its various program areas:

People

The Office provides information and training to ensure that the workforce will know what can and should be done, and how to do it. For example, the Office of Asset Management, with its partners, has waged promotional campaigns designed to increase awareness of the benefits of Asset Management and system preservation. A high priority in fiscal year 2002 was the production and distribution of educational materials such as the Primer series, fact sheets, Web-based information exchanges, videos, CDs, and focused courses. In addition, we have developed an extensive array of training options.

Information

Key to the Office's success is providing for reliable and comparable data to support better decision making. Work in this area includes the development of data collection standards and protocols as well as identifying innovative ways of using management systems as engineering tools to track the real-life performance of assets.

Technology

The Office is improving current technology and advancing the state of the art with respect to the decision-support capabilities required for good-practice Asset Management. We have developed or refined many of the technical and analytical components of Asset Management. For example, we delivered a new management system for tunnels and economics-based software packages to support program- and project-level decisions.

Deployment

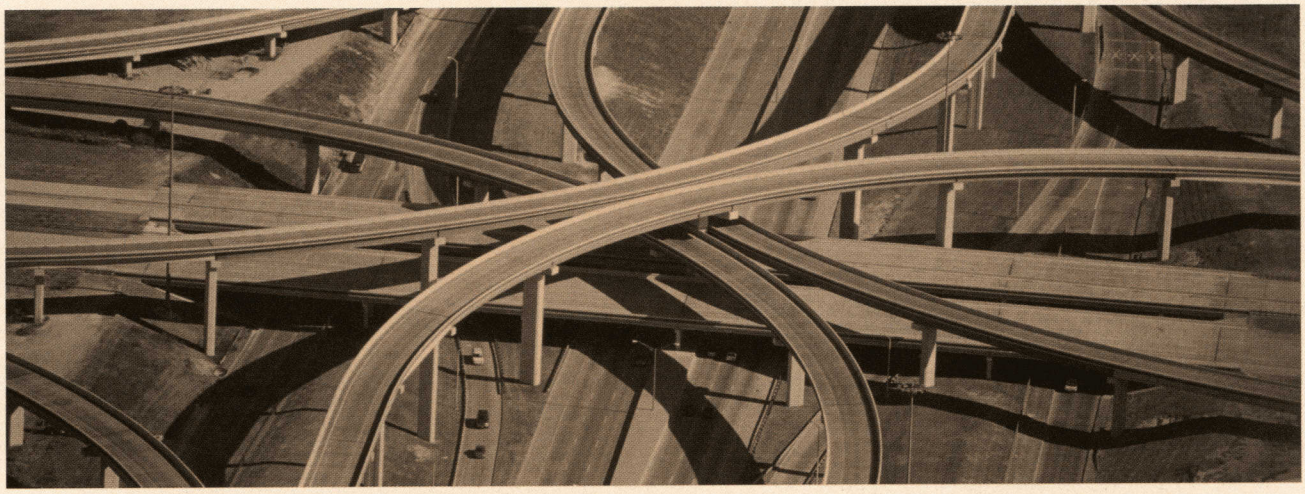
The Office serves as consultant to transportation agencies as they work to integrate new concepts and principles into their decision-making processes. We are committed to deployment because that's the only way to realize real-world benefits.

TRANSPORTATION ASSET MANAGEMENT

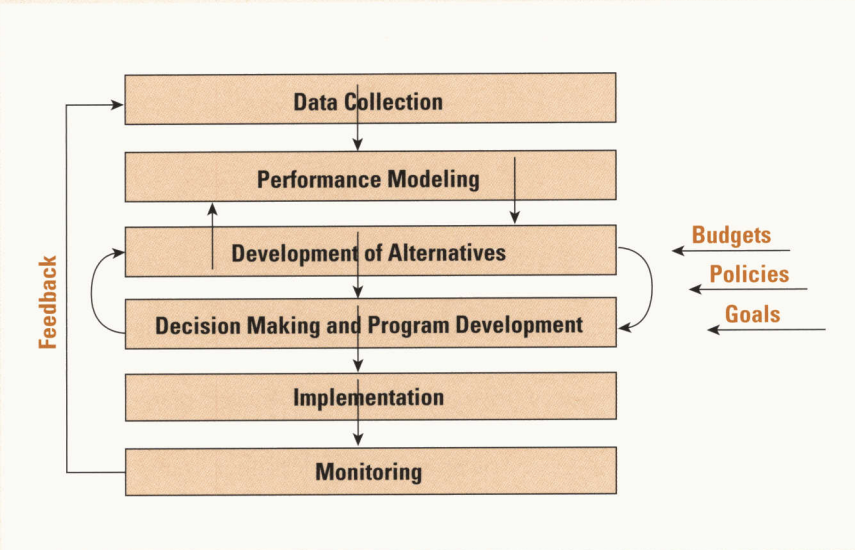
Transportation Asset Management (TAM) will allow an agency to answer important questions, such as: Are an agency's resources being allocated in a way that will maximize customer satisfaction? Do agency decisions reflect the total cost of maintaining and operating the transportation system over its lifespan? For any given level of funding, what is the most effective mix of programs to achieve an agency's performance targets? What would be the impact of a 10 percent reduction or increase in funding on system performance?

TAM provides a strategic approach to allocating resources—dollars, people, and data—for the operation, expansion, and preservation of transportation system infrastructure. It's a way of thinking that enables agency leadership to comprehensively view the big picture before making decisions as to where specific resources should be deployed. TAM relies on tools and information to make investment-performance tradeoffs between alternative investment options. This decision-making process recognizes that the assets of interest have not just a physical, or engineering, dimension, but also a user aspect. Therefore the focus is not on how much money has been spent or how many miles have been improved, but rather on how the system is performing. TAM also assumes that the transportation system will be viewed in its entirety, rather than component by component. Another key feature of TAM is that it looks at the performance of the system over its life cycle.

TAM applies a discipline to decision making that suggests to transportation agencies what they should do, when they should do it, and why they should do it. For this reason, it provides effective support for engaging agency staff, legislators, and citizens in the decision-making process. An example of the difference this can make is seen in the area of preventive maintenance, which can save substantial resources by taking corrective actions before problems are evident. However, without a TAM approach to decision making it is difficult to convince stakeholders—particularly the public—that an asset requires treatment when there are no visible signs of deterioration. TAM provides the framework to demonstrate the benefits of preventive maintenance because it assumes a shift in thinking from spending to investing.



Many of the building blocks for TAM already exist in transportation agencies. Pavement and bridge management systems as well as other management information systems are solidly in place and provide the inputs necessary for TAM's hallmark tradeoff analysis. And, most transportation agencies have begun the transition to TAM-based thinking through performance-based management and strategic planning.



TAM may be described as a logical, decision-making framework that incorporates principles from the disciplines of engineering, economics, and business. Results reflect a systematic, organized, logical, and reproducible approach. The diagram on this page provides a generic illustration of the TAM decision-making process.

The steps are as follows:

- Establish performance expectations that are consistent with goals, available budgets, and organizational policies. These expectations guide the analytical and decision-making processes.
- Inventory the assets and determine their current condition and performance.
- Predict the condition and performance of the assets over time and identify deficiencies.
- Compare investment alternatives, accounting for agency and user life-cycle costs and benefits, to find the optimal mix of projects satisfying an agency's performance goals given policy and budget constraints.
- Determine how to deliver the program most effectively.
- Monitor the results and make necessary refinements to the decision-making process.

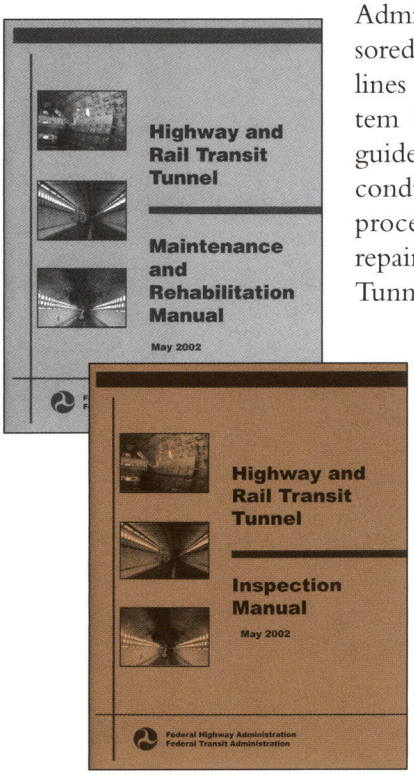
Increasingly, transportation agencies are looking to TAM as a way of addressing the new challenges they face in the 21st century. Agencies today are called to make difficult decisions involving tradeoffs between preserving what is already in place, adding new capacity, improving system operations, enhancing environmental quality, improving safety, and ensuring security. They must make these choices in the context of budget constraints and the spotlight of accountability. In these challenging times, the necessary computing power, data, and analytical tools to make TAM work are, for the first time, available and within reach.

The reasons for adopting TAM are compelling. First, TAM will lead to improved customer satisfaction because each unit of available resources will be put to its best use, generating the highest possible return. TAM also has great potential to translate public policy goals into actions, quality funding requirements, and project performance outcomes. Transportation officials can use TAM findings to demonstrate the impact of alternative funding commitments on transportation system users and the community in general. Additionally, TAM allows an agency to envision where it wants its transportation system to be in the future and to develop a roadmap to chart its course for getting there. Along the way, transportation agencies applying TAM will have the information and analytical system in place to easily design and evaluate ad hoc ideas. Finally, TAM provides the information and documentation necessary to articulate a picture of an agency's transportation system program. Based on this picture, an agency can persuasively make the call not only for funding programs, but also for implementing specific activities.

OFFICE OF ASSET MANAGEMENT: INITIATIVES 2001–2002

As stated earlier, the Office is organized into three teams: System Management and Monitoring, Economic Evaluation and Investment, Construction and System Preservation. During fiscal year 2002 each team contributed extensively to the Office's goals, taking on a variety of research, development, training, technology deployment, technical support, and outreach initiatives. While each team works on specific aspects of Asset Management, from the strategic framework to field implementation and operations, the teams work jointly on many initiatives and programs. Following is a summary of our products, services, and activities in fiscal year 2002 by program area.

Tunnel Management



FHWA and the Federal Transit Administration have jointly sponsored the development of guidelines and a prototype database system for tunnel management. The guidelines involve preparing and conducting tunnel inspections, and procedures for maintaining and repairing tunnel components. The Tunnel Management database system is a computer software program designed to aid in collecting tunnel data and planning corrective and preventive actions. Three of five planned workshops presenting the guidelines and database system were conducted in fiscal year 2002.

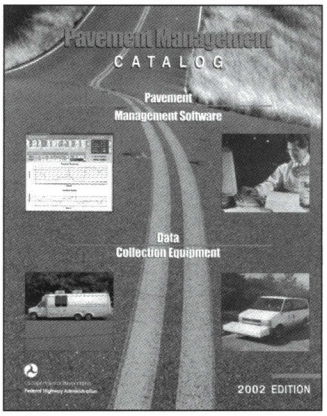
Bridge Management

FHWA, in cooperation with AASHTO, developed and piloted a three-day National Highway Institute (NHI) training course for the Pontis Bridge Management software program. The pilot course was presented in Santa Fe, New Mexico, and was well attended and enthusiastically received. The course is designed for bridge program managers, maintenance engineers, inspectors, and project planning and programming personnel. It includes an overview session for Federal, State, and local executives and upper and mid-level highway agency professionals who are responsible for an agency's highway bridge program. The training class illustrates the many benefits of the Pontis program and how it can be effectively used to analyze bridge needs and select projects for an agency's transportation improvement plan.

Roadway Hardware Management

The FHWA Office of Safety Research and Development, Office of Safety, and Office of Asset Management have collaborated with AASHTO in initiating a research project titled "Development of Guidance Material for Roadside Asset Management." The project's objective is to develop guidance materials to increase the use of state-of-the-practice hardware management systems by State departments of transportation (DOTs). A recent survey conducted by AASHTO found that a third of State DOTs use a system for managing signs, guardrails, and other roadside assets. The research project will investigate and document existing systems and design a prototype system that can be easily adopted by the other States.

The Office serves as consultant to transportation agencies as they work to integrate new concepts and principles into their decision-making processes. We are committed to deployment because that's the only way to realize real-world benefits.



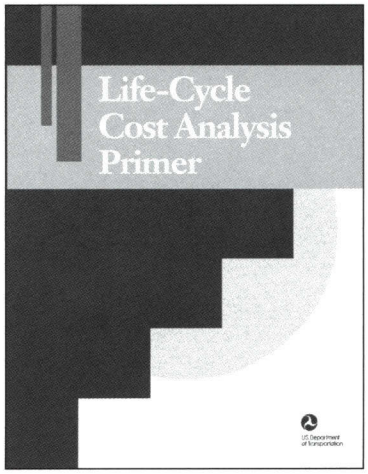
Pavement Management

The Office recently completed a research study on the use of pavement management system (PMS) data for pavement performance monitoring. The project examined how existing pavement management and materials-related data in various State DOTs can be used to evaluate the performance of new materials and practices, and to validate new design methods. Superpave was used as an ideal example. The study also identified PMS data elements collected by State DOTs that could be combined and used for multi-State data analysis. The research team visited Maryland, Indiana, Florida, Arizona, and Washington to discuss aspects of the PMSs in those States and the status of their use and recordkeeping for Superpave materials.

The Office also continued to conduct other pavement-related research and to provide technical assistance and information to States and other organizations. We updated the "Pavement Management Software and Equipment Catalog," last published in 1997. Recently, we demonstrated the use of the Rolling Wheel Deflectometer for pavement strength determination. An ongoing activity includes implementation of the AASHTO Provisional Standards for measuring pavement smoothness, faulting, and cracking.

Life-Cycle Cost Analysis

The Office completed the new pavement Life-Cycle Cost Analysis (LCCA) software and training materials. LCCA is an important tool for pavement design and for overall asset management because it promotes consideration of initial and future expenditures for highway agencies and for road users. The new software represents a significant step forward in LCCA because it accounts for uncertainty in pavement performance and costs in evaluating alternative pavement designs. A number of workshops using the training materials and software have been held in various States. The FHWA LCCA Developers' Group has been behind all these efforts. The group consists of staff from FHWA headquarters and resource centers. The LCCA software and workshop are follow-on products to Demonstration Project 115, "Life-Cycle Cost Analysis in Pavement Design," which has been presented to more than 40 State DOTs since 1998. The Office also published a Primer on LCCA that explains what it is, why it is important, and the steps involved in the process.



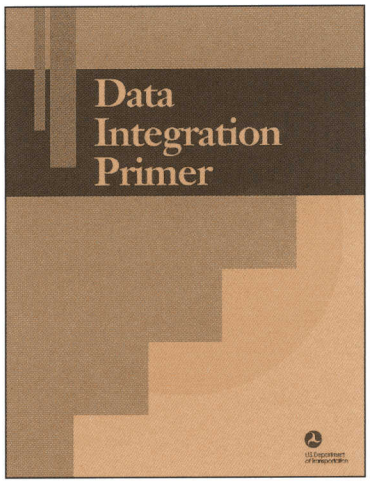
Highway Economic Analysis

The Office of Asset Management, in partnership with FHWA's Office of Policy, upgraded the Highway Economic Requirements System–State Version (HERS-ST), a software model that evaluates the impacts of alternative highway improvement strategies on cost and performance. The new version is significantly more user-friendly than the prototype. Some of the new features of this version include a Windows-based graphical user interface, enhanced analytical capabilities, and a geographic information system viewer. The software was rolled out during a national conference held in September 2002 in Charlotte, North Carolina. Approximately 100 individuals from 28 States participated in the conference to learn about and test the new software.

Engineering Economic Analysis

A pilot course on engineering economic analysis (EEA) was presented by the Office of Asset Management to six FHWA division administrators. The course is intended to inform the leadership in FHWA field offices regarding principles and tools for EEA, a key element in Asset Management. Feedback received from the pilot is being used to restructure the course materials to ensure effective presentations to FHWA field managers and staff.

Data Integration

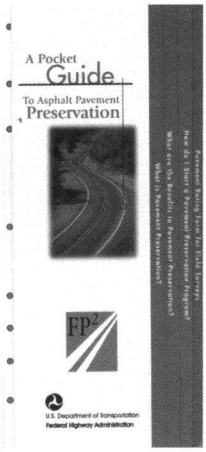


In partnership with AASHTO, the Office successfully hosted a Data Integration Forum and Peer Exchange in December 2001 that drew close to 100 professionals from 26 State DOTs and other agencies. The forum highlighted the importance as well as the challenges of data integration for Asset Management and other transportation applications. The proceedings of the forum have been published and distributed to transportation agencies. A Data Integration State Working Group was also created to help FHWA provide guidance and leadership on Asset Management Data Integration. The group recently met to discuss FHWA's long-term data integration research and technical assistance plan, which will serve as a roadmap for our future activities and initiatives in this area. The Office also initiated a research contract to conduct a review of data integration practices and their applications to Asset Management. This project will identify best practices and recommend specific agencies for detailed case studies of data integration experiences.

Maintenance Management

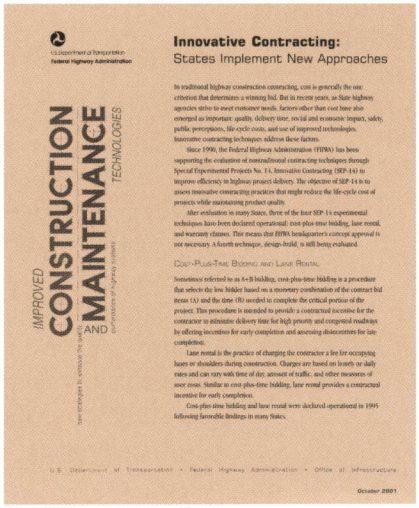
FHWA and AASHTO sponsored the summer meeting of the Highway Subcommittee on Maintenance in July 2002 in Orange Beach, Alabama. The meeting, which included formal presentations and focus group discussions on various maintenance topics, provided networking, exchange of technical issues, and the introduction of new ideas and concepts for State maintenance engineers, researchers, and our industry partners. A Web site is also being developed to provide a venue for information and

discussions on maintenance management. Also in partnership with AASHTO, the Office of Asset Management initiated a contract to develop guidelines and a training course outline for maintenance management systems. The guidelines will include information on how these systems fit within the strategic framework of Asset Management.



Transportation System Preservation

In November 2001, the California Department of Transportation, the Foundation for Pavement Preservation (FPP), and FHWA co-sponsored the second National Pavement Preservation Forum in San Diego, California. The conference included sessions on defining Asset Management, integrating pavement preservation into pavement management systems, and establishing partnerships for innovative contracting, improved pavement performance, and education and outreach. The importance of system preservation in protecting our economic investment in the transportation infrastructure is evidenced by the fact that 23 States now have preventive maintenance programs and 10 have dedicated funding for that purpose. The national forum was followed by a two-day workshop for State and local governments on pavement preservation techniques.



Construction and Quality Management

The Transportation Curriculum Coordination Council (TCCC) held its semiannual meeting in June 2002 in Santa Fe, New Mexico. The Council helps State highway agencies and contractors with their construction training needs, and is supported by the FHWA, NHI, five Regional Training and Certification Groups, industry associations, and three AASHTO Subcommittees. Led by the Office of Asset Management, the TCCC recently launched a national pooled-fund project for training development. Eight States have committed to the pooled fund to date. Six working groups were formed to develop curricula tracks for training courses on Construction, Materials, Maintenance, Employee Development, and Safety Features, Work Zones, and Worker Safety.

The Office also participated in the national Construction Quality Improvement Team (CQIT) meeting to discuss the CQIT work program with various field representatives. The team evaluated program and technical guidance in construction management to ensure consistency with the stewardship and oversight policy issued last year. When completed, all policy and field technical guidance will be current and readily available. A Construction Program Management and Field Inspection Guide for FHWA field engineers is also under development. Finally, we continued to work with the National Partnership for Highway Quality, which is the successor organization to the National Quality Initiative.

Work Zone Mobility and Safety

FHWA and the Maryland State Highway Administration (MDSHA) sponsored the second in a series of workshops on "Making Work Zones Better" in September 2002. The purpose of the workshops is to promote the use of innovative strategies to reduce congestion and crashes in and around work zones. At the workshop, representatives from FHWA, MDSHA, and other Federal, State, and local transportation and law enforcement agencies discussed advanced technologies and identified the challenges involved in making work zones function better for motorists and highway workers. Specific topics addressed at the workshop were innovative contracting, traffic management, traveler information, worker safety, and work zone strategies.

The Office of Asset Management also supported TRB in sponsoring a pilot workshop that demonstrated various opportunities to accelerate highway construction in order to reduce its impact on the traveling public. The workshop was held in March 2002 in Indianapolis, Indiana. Experts in construction technology, contracting, alternative financing, and other areas brainstormed the Interstate 465 Corridor and offered recommendations for Indiana DOT's consideration.

Asset Management Education and Outreach

A pilot training course on Asset Management based on the draft AASHTO Asset Management Guide was delivered in Lansing, Michigan, in June 2002. Forty-eight people attended the pilot, including four State DOT CEOs and four FHWA Division Administrators. FHWA's Office of Asset Management developed the course in partnership with AASHTO, the National Cooperative Highway Research Program (NCHRP), and NHI to present executives and senior managers with an overview of the AASHTO Guide. Suggestions offered by pilot participants for improving the Guide and the course are being used to revise the course.

The Office continued to support the Community of Practice Web Site on Asset Management Implementation. Operation of this Web site is sponsored by AASHTO, FHWA, and TRB. The site provides readily accessible information about Asset Management and facilitates discussions and collaboration among experts and practitioners on various topics including GASB Statement 34, management systems, transportation system preservation, and engineering economic analysis tools. The site also provides links to other relevant Web sites including FHWA's Asset Management site.

In addition to these activities, the Office published numerous information and outreach materials including reports, videos, CDs, and other items to increase awareness of Asset Management. We also developed and delivered training courses on specific areas of Asset Management, conducted State visits, and delivered presentations at various conferences and meetings to provide technical assistance and to promote Asset Management concepts and tools.

OFFICE OF ASSET MANAGEMENT: PARTNERSHIP ACTIVITIES

In our 2001 report, we stressed the importance of partnership in accomplishing our goals. Again, in 2002, partnership was a key factor in ensuring the success of our activities and in delivering products and services to our customers. The activities described above illustrate our commitment to cooperation and partnership within FHWA and with external organizations including AASHTO, TRB, State DOTs, academia, and other public and private industry groups.

The Office worked on various activities with the AASHTO and TRB Task Forces on Asset Management. A joint meeting of the two task groups and FHWA was held in Providence, Rhode Island, in July 2002. Thirty individuals participated to develop a two-year action plan to advance Asset Management. The plan includes focused action on four major categories: *research,* specifically on measuring and communicating the benefits of Asset Management; *outreach* to inform agency professionals about Asset Management and to assist them in adopting the concept; *support mechanisms* for Asset Management activities including Web site development; and *education* of current and future transportation professionals in identifying, documenting, and disseminating Asset Management concepts and best practices.

Office of Asset Management staff also provided technical assistance and support to various AASHTO committees and subcommittees in coordinating and conducting technical conferences, committee meetings, and workshops. We also participated in NCHRP by serving on panels, providing reviews and technical inputs on ongoing and proposed research projects, and helping to develop research topics.

Within FHWA, the Office of Asset Management worked with other offices in the Infrastructure Division and the Turner-Fairbank Highway Research Center to develop and disseminate the Infrastructure Research and Technology (IRT) Program. An FHWA-sponsored IRT stakeholder workshop is planned for October 2002 in Chicago, Illinois, in which stakeholders representing State DOTs, AASHTO, TRB, industry, and academia will have the opportunity, through facilitated breakout sessions, to offer their input on the overall direction and content of the proposed FHWA IRT Program, including Asset Management. The workshop represents the next step, following the National Highway Research and Technology Partnership initiative, in building a structured, systematic process to involve external stakeholders in the development of FHWA's IRT Program.

For further information on FHWA Asset Management initiatives, contact:

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