Reports from the Transportation Research Board's
2005 FIELD VISIT PROGRAM

LABORATORIES FOR ADDRESSING CRITICAL ISSUES

State Departments of Transportation Test Out Solutions





Specialists in the Transportation Research Board's Technical Activities Division identify current issues, collect and generate information on the issues, and disseminate the information throughout the transportation community. The TRB Annual Meeting, TRB-sponsored conferences and workshops, standing committee meetings and communications, publications, and contact with thousands of organizations and individuals provide TRB staff with information from the public and private sectors on all modes of transportation.

A major source of this information is the TRB annual field visit program. TRB staff meet on-site with representatives of each state's department of transportation and also with representatives of universities, transit and other modal agencies, and industry.

This report presents a summary of what the TRB staff learned from these visits and activities over the past year.

State departments of transportation (DOTs) and other transportation organizations are dealing directly with the challenges identified in TRB's recently released edition of *Critical Issues in Transportation*. These critical issues include

- Congestion: increasingly congested facilities across all modes;
- Emergencies: vulnerability to terrorist strikes and natural disasters;
- Energy and environment: extraordinary challenges;
- Equity: burdens on the disadvantaged;
- Finance: inadequate revenues;
- Human and intellectual capital: inadequate investment in innovation;
- Infrastructure: enormous, aging capital stock to maintain;
- Institutions: 20th century institutions mismatched to 21st century missions; and
- Safety: lost leadership in road safety.

More details on these critical issues are available in the special insert in this issue of *TR News* and on the TRB website.[1] The 2005 field visits yielded many examples of how transportation organizations view these critical issues, including perspectives from a variety of disciplines and modes. The field visits found that state DOTs and other organizations already are at work to address these issues.

[1] www.TRB.org/publications/general/CriticalIssues06.pdf

Institutional Issues

Policy and Organization

The graying of America has affected the transportation sector. State DOTs are grappling with the problem of workforce succession.

By 2020, 25 percent of all Americans will be age 65 or older. Providing transportation services for those who are no longer able to drive will require advance planning and significant funding. Moreover, the wave of retirements by baby boomers has created the need to recruit, educate, train, and retain qualified transportation professionals as successors.

In the past three years, an estimated 1,400 Pennsylvania DOT employees have retired—10 percent of the department's staff. Other state transportation agencies across the nation face similar challenges, with large numbers of staff expected to retire in the next 10 years.

Training suitable replacements for senior staff has begun. Pennsylvania DOT's Lead Program, for example, recruits, trains, and provides opportunities for female transportation professionals. South Carolina is developing a Resident Engineering Academy to offer training modules in seven subject areas: intelligent transportation systems; construction management; administration; environment; materials; hydrology and draining; and project management. Also offered are online training tools for maintenance workers.

In addition to educating and training staff for succession to senior-level management, DOTs are seeking ways to capture the institutional memory and knowledge of veteran employees to pass along to the next generation of leaders. In 2006, TRB is planning a forum for state DOT CEOs to address this and other issues.

New York State DOT is completely reorganizing under a process called "the transformation." The emphasis is on the DOT's role as an operator instead of as a builder of the transportation system. In addition, the transformation takes into account the continually shrinking workforce—the number of full-time employees has dropped from 13,000 to 9,000 in the past 10 years.

Pennsylvania DOT's Lead Program has had success in creating a leadership path for women on staff. Participation in the program facilitated the promotions of Jill Reeder (*left*), a management analyst supervisor, and Erin Sodan (*right*), a human resource analyst in labor relations, shown with the mentoring program's project manager, Elizabeth Threnhauser (*center*).

IOWA STATE UNIVERSITY

Civil engineering students gain first-hand instruction at a highway reconstruction site in Iowa.

Legal Issues

Transportation lawyers have ongoing concerns about agreements for the design and construction of projects. Transportation agencies are relying increasingly on design–build and on public–private development strategies, whether to complete projects quickly or to gain the funding to make a project feasible.

Design–build legislation is in effect or is pending in 28 states. The laws are diverse, and many questions are unanswered, creating many issues to be addressed by the resolution mechanism for contract disputes.

Another pressing issue is contracting with disadvantaged business enterprises. In *Western State Paving, Inc. v. Washington State Department of Transportation et al.*, the United States Court of Appeals for the Ninth Circuit upheld the constitutionality of the disadvantaged business provisions of the Transportation Equity Act for the 21st Century (TEA-21). The prevailing policy in several federal judicial circuits is that Congress must make a finding of discrimination to support the need for a disadvantaged business program as a component of the Congressional program, or a state or local government must collect data and make its own finding of need. The disadvantaged business program must be tailored to the need of the jurisdiction in which it is established.

Did You Know?

In Florida, 18 percent of the population is 65 and older. By 2020, 25 percent of the population will be 65 or older, and of these, almost one-half will be 75 or older. More than 80 percent of trips made by those 65 and older are made in cars.

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State law mandates that the Idaho Transportation Department maintain a staff of 1,833. As staffers retire, the department must have suitable replacements available.

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In 2005, Missouri DOT started MoDOT Tracker, a comprehensive management performance measurement program (www.modot.gov/about/general_info/Tracker.htm) "to assess how well we deliver services and products to our customers."

JAMIE L. FOX, JACOBS CIVIL, INC.

Design-build arrangements, which produce projects like the Peace River Bridge in Florida, are subjects of diverse legislative proposals around the states.

In the Western State Paving case, the court ruled that that the State of Washington was justified in relying on the Congressional finding; however, the state had not collected data to determine the extent of discriminatory treatment of minorities within its jurisdiction and therefore could not have tailored a program to remedy the problem. The decision highlights the differences between federal circuit courts on whether states can rely on Congressional evidence of discrimination or must establish their own.

The security of our nation's transportation system also raises legal issues. Despite heightened security measures, officials must conduct the routine business of constructing, maintaining, and operating transportation systems. Agencies are concerned about preserving the confidentiality of security-sensitive plans and specifications for public works and transportation projects. Many believe that the legal processes are not sufficient to protect the information.

Contracting team with Washington State DOT's Disadvantaged Minority and Women's Business Enterprise Program work on the new Tacoma Narrows Bridge.

ZOE ESTRUS, WSDOT

Planning

Transportation planners are becoming more creative in communicating with stakeholders. Techniques span a variety of media and include website postings, face-to-face meetings, and printed reports. Planners and other transportation professionals rely on these techniques to present technical information to different and diverse audiences, including the general public, staff within the agency and at other agencies, and decision makers.

Communication with the public ranges from explanations of how tax dollars are being spent to briefings on specific transportation issues, such as bicycle safety. Virginia DOT and Washington State DOT have developed popular web pages and periodic status reports to inform the public. Virginia's "Dashboard" provides a graphic performance report on the department's projects and programs.[2] Washington State DOT's Accountability web page details the department's progress on issues of interest to the public, including congestion and construction schedules.[3]

Residents who completed the Frederick 101 course gather for a reception with Mayor Jennifer P. Dougherty (*center*).

Frederick City, Maryland, offers "Frederick 101," a six-week seminar for city residents. City department heads lead the seminar, which gives residents an opportunity to learn how the city is governed and to meet the officials who keep the city operating.

Brown bag lunches and training courses for staff and consultants are other important communication tools. New goals and procedures increase the need for communication within agencies. For example, context-sensitive design programs and the new stormwater management requirements necessitate communication among DOT staff in all offices and with contractors.

Resource agencies, other transportation agencies—such as metropolitan planning organizations (MPOs) and transit providers—and local agencies have become partners in providing transportation. The partnerships are critical to achieving the state DOT mission, and communication is critical in forging strong partnerships. The communication can be formal, as with a signed memorandum of understanding, or informal—for example, with regular lunch meetings.

[2] http://dashboard.virginiadot.org/default.aspx
[3] www.wsdot.wa.gov/accountability/default.htm.

LOUIS A. BARKER

New Hampshire DOT promoted bicycling and bicycle safety in conjunction with the state fair.

Energy and Environment

Transportation agencies are striving to become better stewards of the environment. Approaches to air quality, wildlife crossings, stormwater control, and other environmental issues are changing with new research and practical experience.

Noise is one of the most pervasive environmental impacts. To control transportation noise, the profession has embraced a "three-pronged approach" that involves (*a*) control of the source, (*b*) land use planning and control, and (*c*) mitigation at the receiving point—or path control.

Quiet pavements—asphalt rubberized with recycled tires—are among the promising techniques for controlling highway noise at the source and are being tested across the country. Arizona DOT, for example, has a Quiet Pavement Pilot Program under way in Maricopa County for resurfacing 115 miles of freeway. Early tests show a reduction in noise levels of about 4 decibels or more.

In addition to the benefits of noise reduction, the program will recycle 1,500 tires for every lane-mile constructed. Research on the project will examine the long-term noise reduction effectiveness, the maintenance requirements, and the durability of the rubberized pavement.

"Heat islands"—urban air and surface temperatures that are higher than surrounding rural areas—and their effects on urban residents and vegetation are an emerging environmental issue. Heat islands form when cities replace natural land cover with pavement, buildings, and other infrastructure; the temperatures can reach up to 10°F (5.6°C) warmer than the surrounding natural land cover.

Cities experience higher rates of heat-related illness and death than rural areas do. The heat island effect can contribute to raising summertime temperatures to levels that pose a threat to public health. Under certain conditions, excessive heat also can increase the rate of ground-level ozone formation—that is, smog—presenting an additional threat to health and ecosystems within and downwind of cities.

Communities can take several steps to decrease the impacts of heat islands. Heat island reduction strategies include

- Installing cool or vegetated green roofs;
- Planting trees and vegetation; and
- Switching to cool paving materials.

The U.S. Environmental Protection Agency's Heat Island Reduction Initiative (HIRI) supports research programs to develop heat island reduction strategies for U.S. cities. HIRI-supported research aims to improve understanding of the impacts that heat island reduction strategies have on urban meteorology, air quality, energy demand, and human health.[4]

Data and Information Technologies

Statewide data programs are realigning to reflect department priorities and to demonstrate the value of data for the delivery of programs. Initiatives such as transportation system performance measurement and asset management accentuate the need for data sharing and integration.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-

[4] www.epa.gov/heatisland/index.html.

Did You Know?

With fire dangers from dry, overgrown brush along roads, California DOT (Caltrans) is getting its goats. In a pilot program, Caltrans sent a herd of 600 goats to munch on the dry brush along Interstate 880 and Highway 238 in San Leandro. The goats were able to manage the rocky terrain without generating the noise and fumes of mowers and weed trimmers.

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When Arizona DOT improved roads in the Organ Pipe Cactus National Monument, the construction plan required salvaging and storing the top 6 to 8 inches of excavated soil during construction. The soil and seed collected in the park were used to revegetate disturbed areas.


KIM FISHER


KIM FISHER

(*Far left:*) Pioneer road built within the footprint of the new US-60 near Phoenix, Arizona, to provide access to geotechnical and archaeological sites and testing. (*Left:*) Stormwater management treatments installed before roadway construction.

NATIONAL CENTER OF EXCELLENCE ON SMART MATERIALS

Interstate 17 in Phoenix, Arizona, is paved with asphalt rubber, which reduces levels of tire–pavement noise, as well as pavement-generated heat.

(*Top left:*) Special vehicle for thermal readings of surface and ambient temperatures. (*Bottom left:*) Thermal sensors placed into a conventional portland cement concrete blend. (*Right:*) Handheld infrared thermography of cool pavement designs under testing at the National Center of Excellence on SMART Materials, Arizona State University.

LU) includes requirements for relating data from several programs and organizations, especially for safety analysis; this has heightened interest in integrating data. The revised pavement design guide of the American Association of State Highway and Transportation Officials (AASHTO) also is prompting the reevaluation of traffic data programs to ensure the availability of relevant data.

Many DOTs are taking a more systematic approach to the capture, archiving, and analysis of intelligent transportation systems data to improve understanding of traffic flows and to make extrapolations. Recent disasters have confirmed the need for good inventories of physical assets and for strong analysis tools like geographic information systems (GIS) for evaluating a disaster's impact and planning the response.

The state data community is concerned about the continuation of key national data sources—the National Household Travel Survey (NHTS), the Commodity Flow Survey (CFS), and the decennial census.

JAY GOLDEN AND KAMIL KALOUSH

Funding for the NHTS and CFS is uncertain under SAFETEA-LU.

The transportation planning community is cautiously optimistic about the transition from the decennial census to the American Community Survey (ACS) for journey-to-work data. The ACS offers the potential for annual population updates for large areas and for improvements in the tracking of trends.

But the federal commitment to adequate annual funding for the ACS is also a concern. Although much data collection is oriented to traditional travel demand forecasting, new requests for data to evaluate policy alternatives are leading many agencies to reexamine their models and their supporting data programs.

Obtaining and using freight transportation data are substantial challenges for state DOTs, MPOs, and metropolitan areas. Uses of freight data are varied and complex. Two national data sets became available in the past year—the Commodity Flow Survey (CFS) and the Vehicle Inventory and Use Survey.

The CFS provides multimodal freight activity patterns every five years. Some agencies will purchase private-sector freight data from companies, although the geographic detail often is not sufficient for ready application to traffic and planning models. Some mode-specific data sources—such as maritime and railroad freight data—provide adequate detail for intermodal planning, but data for trucking, which is the largest mode of freight transportation, are least available.

State DOTs are increasing the use of GIS, often with agencywide units that manage departmentwide applications. Most state DOTs are moving to an enterprise organizational structure, and staffs formerly oriented to mapping are evolving to provide technical support.

Aviation

State aviation officials are concerned about the state of the airline industry and its future, as well as the challenges of funding the national aviation system, with state and federal budgets shrinking and regulatory requirements increasing in complexity.

Airlines are facing financial crises, and the aviation system infrastructure is straining under levels of traffic that are reaching historic highs. The business and general aviation communities also are reaching record levels of traffic. As the new "very light jets" begin to enter the market in 2006, this segment of the industry is primed for major changes.

The federal government is reviewing ways to fund the infrastructure needs of the national aviation system. Fuel taxes, user fees, and other charges now in place are not sufficient to cover future needs, and their equitability for users of the system is a subject of debate.

(Eclipse Aviation)

New very light jets, entering the market in 2006, will introduce major changes in business and general aviation.

Many airports are under financial strain trying to accommodate fluctuating levels and types of operations under increasing regulatory controls. Environmental regulations present challenges to airports and users, particularly the Environmental Protection Agency's Spill Prevention, Control, and Countermeasure requirements and the guidelines on effluent limits. Some state aviation agencies continue to support Airport Land Use Compatibility programs to reduce urban encroachment on already constrained airport systems.

Freight Systems

General Freight Issues

Freight system capacity issues have made headlines in recent years, so that the general public is more aware of the impacts of growing freight volumes, and public agencies at all levels are pressured to play a role in relieving freight bottlenecks. Much of the growth stems from international trade, particularly from China, which puts pressure on West Coast ports and then on the highway and rail system connections as the goods flow across the country.

As highway infrastructure providers, states must partner with private-sector carriers and shippers to provide adequate system capacity. Critical needs at the state level include management and staff capabilities to deal with freight issues; institutional capabilities to deal with the private sector and with other public agencies; and funding for improvements in freight flow.

AASHTO is identifying a key freight official in each state DOT who understands what the freight job is and who knows the parties that perform it. The Federal Highway Administration (FHWA) is providing freight training for state DOT staff, and AASHTO is focusing on freight education at the executive level.

The flows among ports, major intermodal, rail, and trucking hubs, and major market areas define freight corridors. SAFETEA-LU reauthorization did not provide the expected support for a corridor approach to improving freight flows. In general, funding for freight improvements, particularly from a combination of public and private sources, remains a major concern as international and domestic freight volumes increase.

Trucking

Trucks provide vital links in the freight transportation system, including the critical "last mile" in many deliveries and pickups. Increases in truck traffic are the result of growth in domestic and international freight. International freight flows translate into congestion on the highways that provide port access—for example, the highways that serve the ports of Los Angeles and Long Beach.

Marine terminals in Los Angeles and Long Beach have collaborated to launch the PierPass program, which imposes a peak-hours fee. The program has shifted almost one-third of port-related truck traffic to off-peak hours.

Concerned that fuel taxes will not raise adequate funds for rebuilding and expanding highway capacity, many states are considering tolls or congestion pricing to improve the use of capacity. The impacts of tolling and congestion pricing on the trucking industry are subjects of debates and studies.

A Georgia study surveyed various groups of stakeholders to determine the value point at which truckers would use a toll road. The study concluded that truck-only lanes could produce up to 20 percent more relief than would high-occupancy toll or high-occupancy vehicle lanes.

These issues also illustrate the need for mutual education and dialogue between the trucking industry and public agencies. Planning activities in many states have focused on identifying major truck routes, measuring truck traffic, and forecasting truck flows. The need for truck flow data at the state and local levels and for appropriate modeling tools is critical.

Freight volumes—and bottlenecks—are increasing nationwide.

Did You Know?

Massachusetts Department of Public Works is scanning old mylar design drawings and converting them to an electronic graphic format for archiving.

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Nevada DOT has conducted research on the viability of tilted signs. The signs are installed at an angle to avoid snow sticking to the surface.

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Construction of the new Woodrow Wilson Bridge, spanning the Potomac River between Virginia and Maryland at the southernmost tip of Washington, D.C., will use more than 140 million pounds of steel, more than the total weight of all the new cars sold each year in Virginia and Maryland.

Highways

Design

An aging infrastructure and a heightened public awareness of the importance of a reliable and safe transportation system are creating a demand for the redesign of roadways, the rehabilitation of pavements and bridges, and a reliance on innovative materials and techniques to get the job done more efficiently.

States are depending on contractors for the design and inspection of infrastructure projects. Contractors often must perform quality control, with quality assurance by inspection service providers. Several states are researching automated inspection, data collection, and reports to compensate for a reduced in-house inspection work force.

States that are developing implementation plans for the recently piloted AASHTO pavement design guide are conducting related calibration and training efforts. Many states are looking for additional information from the National Cooperative Highway Research Program (NCHRP) to assist in training.

Use of the load and resistance factor design method for bridges and other structures has increased as the 2007 implementation deadline approaches. The level of adoption among the states varies from full to none. Many states are working on substructure calibrations.

States are using innovative materials such as high-performance concrete and structural fiber-reinforced plastics and are relying on innovative design and construction techniques such as precast pavement and bridge members to build structures more efficiently and more durably. The goal is to reduce work zone construction and maintenance activities in travel lanes.

The draw spans, or bascules, of the new Woodrow Wilson Bridge, near Washington, D.C., feature eight opening leaves composed of more than 14 million pounds of steel.

ACTT Workshop team develops a cost-efficient construction strategy.

Highway Construction

Infrastructure renewal, congestion relief, and safety improvements are the goals for most state DOT construction projects. Contracting options and public information campaigns are among the strategies to minimize the inconveniences of roadway construction to motorists and the disruptions to adjacent property owners.

Construction in the midst of traffic requires planning for the safety of the motorists and of the project personnel. Utility work is the major source of delay on projects. Many states are concerned about construction quality because of a diminished and untrained work force.

States are improving their environmental stewardship in construction. At least one state has implemented an environmental management system, and others have added environmental positions in their construction divisions.

More than one-half of the states have applied the project development procedures from the Accelerated Construction Technology Transfer (ACTT) workshop conducted by FHWA and AASHTO. FHWA estimates that ACTT—conceived by the TRB Task Force on Accelerating Innovation in the Highway Industry—may be saving state DOTs millions of dollars and many years of construction time.

Highway Materials

Improved performance, durability, and environmental considerations are the watchwords for materials. Most states are investigating self-consolidating concrete for structural members. Recycled and waste materials and byproducts are acceptable for use in most states as long as specifications are met and costs are competitive.

Several states have worked with industry on warm-mix asphalt demonstration projects. The technology offers the advantage of laying asphalt pavement at lower mix temperatures, reducing

odors and emissions.

Construction and materials issues throughout the states include quiet pavements, moisture sensitivity and segregation of asphalt pavements, and the constructability and durability of concrete mixes.

Geotechnical Engineering

Ohio DOT has taken the lead in developing a geotechnical management system (GMS) in a pooled fund study with 10 other state DOTs, several U.S. federal agencies, and the United Kingdom Highway Agency. Every state DOT has archived vast amounts of geotechnical engineering information and gathers and adds new information each year, which makes the development of data management systems essential. Yet without standardization of the database, the systems may become unwieldy.

The pooled fund study will develop frameworks, standards, and protocols to accelerate development of the GMS. Collaboration and information sharing should minimize redundancy. The project is scheduled for completion in mid-2007.

State DOT experience with the use of geophysics for transportation projects is varied, but general interest has increased. An NCHRP synthesis report on the topic—slated for publication this year—will assemble useful information for practitioners on geophysical methods, applicability, and limitations.

Many states are outsourcing some geotechnical exploration. The percentage of the work that is outsourced varies from state to state.

The effects on aquatic life from the vibrations related to pile driving has emerged as an environmental problem. California, Washington, and Oregon are conducting a study of ways to eliminate or minimize the adverse effects.

Highway Maintenance

In line with asset management, a preservation approach is being developed to improve the level of service and to extend the service life of transportation infrastructure. Successful transition from a reactionary to a preservation approach depends on the commitment and support of the agency's top management and of the political oversight body; a repeatable measurement system that can appraise conditions and monitor progress toward achievable goals; flexibility in the selection of the preservation actions appropriate to the project conditions; and champions working throughout the agency to keep the programs on track.

Many DOTs are developing and implementing integrated management systems, employing advanced technologies to develop infrastructure inventories, monitor roadway element conditions, and forecast workloads within the context of asset management and environmental stewardship. The new performance-based maintenance management systems retain planning, budgeting, and resource management functions but have added roadway feature inventory and condition assessment, customer input, workload planning and forecasting, statistical sampling of roadway conditions using maintenance quality assurance, customer-driven benchmarking, and performance measures.

Rob Thompson, South Carolina DOT

South Carolina DOT maintenance employees attend a classroom training exercise to improve skills; some training is offered online.

Integrating these management systems requires common data definitions, several types of location reference systems, and commitments from upper management to support the costs. With decreases in employees, agencies are entering into public–private partnerships under a variety of procurement approaches, from short-duration contracts for labor, equipment, and materials to longer-term, lump-sum contracts for a corridor or a network, with stated outcome measures.

Safety for the traveling public, contractors, and agency workforces remains a priority. Many DOTs are deploying new technologies to provide real-time infor-

Daktronics Vanguard

Timely, informative signage systems contribute to highway safety.

Did You Know?

Ohio has 37 safe community programs. Each program examines highway crash trends, has access to crash data, and analyzes the data to develop safety programs.

mation to drivers approaching and moving through work zones and to the general public in rest areas and via the Internet for trip planning. Speeding and aggressive driving continue to counter efforts to make construction and maintenance work areas safer.

Succession planning for skilled maintenance employees is a critical need. The recruitment and training of employees is affected by the increases in contracting, outsourcing, and privatization; the technological complexity of maintenance and operations equipment; the changing mix of cultural characteristics, such as nationality, heritage, language, and generations; and an emphasis on security. Security requirements are evolving but can affect the scope of work and the ability to respond to manmade or natural disasters.

Highway Operations

Traffic operations professionals are concentrating on the management and operation (M&O) of the road system to improve the reliability of travel times by addressing the causes of congestion. According to FHWA, these causes include insufficient road capacity (40 percent); ineffective management of capacity, for example through poor signal timing (5 percent); work zones (10 percent); incidents (25 percent); weather events (15 percent); and special events or other causes (5 percent). FHWA estimates that improving M&O can increase regional systemwide capacity by 10 to 20 percent.

Recent M&O strategies include the following:

◆ Maryland DOT has developed an incident management program, the Coordinated Highway Action Response Team (CHART). Initially a strategy to improve travel times to and from the state's beaches, CHART has evolved into a statewide operations tool that collects, processes, and broadcasts traffic information to motorists.

◆ Wisconsin, Illinois, Michigan, Minnesota, Washington, Texas, and other DOTs have implemented freeway management and incident management systems. The systems include freeway management centers, vehicle detection equipment, dynamic message signs, ramp meters, freeway service patrols, and central computer systems. By combining innovative technology, policies, and allocation of resources, the DOTs are providing travelers with more reliable travel times on freeways that are more efficiently managed and safer.

◆ The Road Commission of Oakland County has implemented advanced traffic signal coordination, known as FAST-TRAC (for Faster and Safer Travel through Traffic Routing and Advanced Controls). The key component is an advanced adaptive traffic signal system that dynamically adjusts signal timing to vehicle demand at individual intersections or corridors.

◆ Texas DOT is adding a four-lane toll road in the middle of the Katy Freeway in Houston. Innovative construction and financing techniques will complete what was originally a 12-year construction project in 6 years. The toll road will incorporate value pricing, with travel lanes for high-occupancy vehicles with three or more passengers and tolls for other vehicles.

Construction of a four-lane toll road in the middle of Katy Freeway is part of Texas DOT's management and operation strategy. Photo shows the demolition of the former I-10 inner connector.

Highway Safety

Traffic safety statistics have yielded a combination of positive and negative news. Traffic deaths decreased slightly, from 42,884 in 2003 to 42,636 in 2004. With an increase in vehicle miles traveled, the fatality rate was 1.46 per hundred million vehicle miles, down from 1.48 in 2003.

Motorcycle fatalities rose again in 2004, from 3,661 to 4,008. Pedicycle-related fatalities increased from 629 to 725, and pedestrian fatalities declined from 4,749 to 4,641. Injuries from traffic crashes declined again: 2,788,000 compared with 2,884,000 in 2003.

Implementation of the AASHTO Strategic Highway Safety Plan continues; 16 of the 23 guidebooks have been published as NCHRP Report 500, and the series will be complete in 2006. Developed to complement the guidebooks, NCHRP Report 501, *Integrated Safety Management Process*, presents an approach for identifying safety problems within a state and for coordinating the various agencies and organizations that address the issues.[5]

[5] www.TRB.org/publications/nchrp/nchrp_rpt_501.pdf

SAFETEA-LU legislation has mandated that each state develop a strategic highway safety plan (SHSP). Many states started the process more than one year ago. In fall 2005, staff from 48 states met in a peer exchange on successes and on ways to overcome barriers. Successful programs were committed to coordination within and across the agencies and organizations that have roles in highway safety; were comprehensive, giving consideration to engineering, education, enforcement, and emergency medical services; and were data-driven and goal-directed.

Safety-conscious planning (SCP), a requirement under TEA-21, continues to develop. By the end of 2005, 25 states had organized and conducted SCP forums, which bring together representatives of highway safety and transportation planning to learn about each other's activities, to discuss data and resources, and to create an action plan that includes safety in the long-range transportation planning process.

The interaction and coordination of SCP and the SHSP has been beneficial in several states. For example, as part of the SHSP process, Ohio State DOT and the Governor's Representative for Highway Safety are working to conduct SCP forums with each of the MPOs within the state.

Marine and Intermodal

In the Gulf region, ports are reeling from the devastation caused by the 2005 hurricanes, especially in Mississippi and Louisiana. Recovery and rebuilding at many of the ports require extensive efforts.

Just before the hurricane disaster, Louisiana had launched an aggressive approach to the growth and development of maritime commerce by creating the Governor's Maritime Advisory Task Force and the Louisiana Waterways Infrastructure and Development Fund. The goal was to expand trade by financing waterside infrastructure and development projects.

DAVID L. RYAN, REUTERS

Fishing boats are pressed along a pier in Port Arthur, Texas, in the aftermath of Hurricane Rita, September 24, 2005.

JUDITH ADAMS, ALABAMA STATE PORT AUTHORITY

Site for the construction of Choctaw Point Terminal, Mobile, Alabama.

New port terminal development is under way at several locations. The Alabama State Port Authority is moving forward on plans to build a container terminal at Choctaw Point, which would boost the container capacity at the Port of Mobile 14-fold; financing comes from state funds and private investments. The Virginia Port Authority is seeking state funding to build a new container terminal at Portsmouth's Craney Island.

Landside congestion and infrastructure are challenges for many ports. In Southern California, a public–private partnership will be needed to finance a $20-billion rail-and-highway access infrastructure for the Los Angeles–Long Beach port complex.

Short sea shipping has been promoted as a solution to landside congestion in the United States, and some operations are now successfully under way or are in development along the East and Gulf Coasts. Challenges to the wide use or availability of short sea shipping, however, include conditions of the Jones Act, U.S. manning requirements, financing, and the harbor maintenance tax.

The inland waterways sector awaits approval and funding for major infrastructure improvements, with debate continuing over commodity forecasts and market demand. The 2005 hurricanes also affected inland waterway operations, as many barges were lost or damaged. On the Great Lakes, environmental issues are a primary concern, particularly preventing the introduction of nonindigenous invasive species.

The ferry sector is devoting considerable attention to new and proposed services, and to security, safety, and the environment. Liquefied natural gas terminals

Did You Know?

North Carolina DOT owns and operates a shipyard.

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A recent study reported that Georgia's deepwater ports and inland barge terminals support more than 275,000 jobs and contribute nearly $11 billion in income, $35 billion in revenue, and $1.4 billion in state and local taxes to the state's economy.

◆

The Port of Portland, Oregon, has a research branch to support air, rail, and maritime activities.

Connecticut DOT continues to invest in expansion and modernization of the heavily used New Haven rail terminal.

ROBERT MOORE, CONNECTICUT DOT

and transport have raised concerns in most areas of the country. In the Gulf region, a major focus is the impact of offshore terminals on fish populations.

Rail

Many states regard intercity and commuter rail passenger services as important elements of the transportation network, relieving demand on the more congested modes. Approximately one-quarter of the states provide financial support for Amtrak passenger services. The debate over federal funding for Amtrak is perennial.

Many states are investing their own funds or supplementing federal funds to improve rail passenger services. For example, Connecticut plans to spend more than $600 million on new self-propelled rail cars for the New Haven line and $300 million for new rail-maintenance facilities, as part of a major initiative to prevent roadway congestion in the southwestern corner of the state.

Commuter rail is coming to Utah as part of a congestion relief solution that includes highway improvements in the rapidly growing Salt Lake City area. With a combination of federal and local sales tax funds, the Utah Transit Authority is buying a portion of right-of-way from the Union Pacific Railroad to accommodate the commuter rail services.

The demand for rail freight services is straining rail capacity nationwide and has limited the ability of freight railroads to share facilities with passenger services in many areas. Choke points have developed where freight railroads receive large volumes of cargo—for example, at West Coast ports.

System velocity, capacity, and service reliability remain problematic despite many operational improvements. After more than two decades of shrinking, the rail system infrastructure, equipment supplies, and work force—as well as operations—must build up again to meet growing demand.

Public Transportation

For public transportation, 2005 was the best of years financially in terms of federal investments.

Valley Metro light rail will link Phoenix, Tempe, Mesa, and Glendale, Arizona.

Deniz Durmus, Los Angeles County MTA

Interior of an Orange Line bus rapid transit vehicle, serving Los Angeles and San Fernando Valley.

SAFETEA-LU reauthorization guaranteed $52.6 billion in funding for transit through FY 2009, which included 31 full-funding grants, 38 final design and construction projects, and 264 preliminary engineering projects. In addition, in the November elections, voters in New York, Washington, Texas, and Colorado approved ballot measures totaling more than $8.5 billion for public transportation projects. In all, 22 of 27 measures for public transportation investment gained approval throughout the country during 2005.

Light rail construction started in Phoenix, Tempe, and Mesa, Arizona. The Denver, Santa Clara Valley, and St. Louis systems added new lines. In Los Angeles, a bus rapid transit line—the Orange Line—opened in the San Fernando Valley, and the Tren Urbano began heavy rail service in San Juan, Puerto Rico.

December 1 marked the 50th anniversary of Rosa Parks's act of personal bravery, which opened equal bus service to all users. But not all the news was good:

◆ Hurricanes Katrina, Rita, and Wilma hit the Gulf Coast. Even with advance weather information and hurricane warnings, many were unable to or chose not to evacuate. Transit helped with the prestorm evacuations and with the recovery efforts, although most vehicles and facilities were destroyed or damaged. Of special note were many acts of personal valor and altruism. Using air mattresses, New Orleans transit staff helped to evacuate 150 people across more than 1 mile of floodwater. Emergency convoys of buses evacuated citizens stranded at the New Orleans Superdome and Convention Center; most of the 1,000 buses, emergency crews, and equipment came from out of state.

◆ The vulnerability of transit to terrorist attacks was exposed again on July 7. In London, England, three bomb blasts targeted trains and one ripped the top off a double-decker bus, killing 56 and injuring more than 700. A second attack was attempted on July 21.

David J. Phillip, Reuters

Buses line up outside the convention center near New Orleans, Louisiana, to evacuate people affected by Hurricane Katrina, September 3, 2005.