



Partnerships for Progress in Transportation

Specialists in the Transportation Research Board's (TRB'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. Senior program officers in TRB's Technical Activities Division meet on site with representatives of state departments of transportation (DOTs) and also with representatives of universities, transit and other modal agencies, and industry. In addition, TRB staff members are involved with planning and delivering many conferences, workshops, and meetings. This report presents a summary of what the TRB staffers learned from visits and activities in the past year.

“Partnerships for Progress in Transportation” was the spotlight theme of the TRB 2008 Annual Meeting, January 13–17, in Washington, D.C. Progress in addressing the critical issues in transportation will require joint efforts and collaboration, and partnerships were a high-priority topic at the state DOTs and other agencies visited by TRB staff in 2007. The following report presents many examples of the ways that transportation agencies are forging partnerships to address and resolve such issues as aging infrastructure, congestion, safety, funding, energy, environment, security, and infrastructure protection and preservation.

Institutional Issues

Policy, Management, and Leadership

A surge of initiatives that could increase the role of the private sector in financing and operating trans-

portation facilities marked 2007. Following the lead of Chicago in leasing the Chicago Skyway and of Indiana in leasing the Indiana Toll Road, many states pursued agreements or conducted studies of leasing or concession arrangements between public-sector transportation agencies and the private sector. The monetization of public-sector transportation facilities has prompted debates and studies of the financing, roles, and responsibilities of the public and private sectors in transportation.

The aging population and a changing workforce are affecting state DOTs throughout the country. Anticipating an increase in employee retirements, New Jersey DOT is preparing productive younger employees for management and leadership. In 2002, the agency established an Office of Succession Planning, which administers a voluntary program, limited to 60 participants, to match mentors with mentees. A “lunch and learn” series offers younger professionals the opportunity to meet with experienced senior staff in an informal setting to exchange information. The transfer of knowledge, the sharing of experiences and expertise, and the retention of institutional memory are the objectives of the program.

Virginia DOT also has established a Core Development Program to shape young rising-star employees into future leaders. In addition, Virginia DOT has started a knowledge management program to capture and preserve the institutional and professional knowledge of experienced employees.

Planning

In an environment of constrained financial resources, rapidly changing construction costs, heavily congested facilities, and concerns about disaster response, the

The Virginia Department of Transportation's 24-month Core Development Program prepares new hires and young employees for assuming critical roles within the department.



PHOTO: VIRGINIA DOT

planning community is adopting tools from other fields. One tool that has gained attention for improving the transportation planning process is risk assessment.

Risk assessment is a systematic examination of a task, job, or process to identify the hazards or problems that could arise, assess the likelihood of their arising, estimate the consequences, and identify measures to reduce the risk to an acceptable level. Many professions apply risk assessments, and transportation planners are finding many uses for the technique.

The planning risks associated with a project include problems with the project itself and problems with the cost estimates. Assessing project risks—such as exposure to unexpected hazardous materials—has long been part of the construction process but is now being included, in more approximate terms, during the planning process. The project risks become an input into the risk analysis for the project costs. At each step, the risk assessment and the measures identified to mitigate the risk are refined.

Legal Issues

Transportation attorneys at public agencies are responding to diverse issues:

- ◆ Highway and bridge design—Facing environmental concerns, challenges involving cultural and historical sites, and budget shortfalls, transportation professionals are looking to develop new tools for innovative design that also minimize the potential for tort liability.

- ◆ Highway construction claims disputes—The highway construction contract law community is fostering discussion of state-of-the-art, alternative dispute resolution practices and is applying these in many states to address and resolve multimillion-dollar construction claims. Strategies include the establishment of dispute resolution boards and the use of project realignment, an aggressive partnering practice.

- ◆ Eminent domain—In the 2005 decision on *Kelo v. New London*, the U.S. Supreme Court held that local governments can condemn property solely for economic reasons. The decision has no direct effect on state transportation agencies but has influenced nearly every state legislature to explore the extent of the state's eminent domain powers, including use in public-private partnerships.

Transportation lawyers also must keep informed about the ever-changing environmental laws and related developments. With the U.S. Supreme Court's 2007 decision in *Massachusetts v. Environmental Protection Agency*, climate change and air emissions from transportation have become major environmental issues. The Supreme Court accepted that carbon diox-

ide is a pollutant that should be regulated under the Clean Air Act. The decision also accepts the relationship between carbon emissions and climate change. The U.S. Environmental Protection Agency (EPA) now must determine how to regulate carbon dioxide emissions—a task that could take years. Moreover, the decision has spawned claims and lower court decisions that states preparing documents for roads in accordance with the National Environmental Protection Act now must address the contribution of automobile emissions to global warming.

Energy and Environment

Increasing public pressure and more rigorous environmental documentation requirements are shaping transportation agencies' approaches to environmental stewardship. Storm water management, wetlands mitigation, and air quality—including climate change—are among the key environmental challenges.

The measurement of storm water quality and the methods of mitigation for a network of highways are testing the resources of many state agencies. In highly populated states that have minimal amounts of land to spare, finding suitable wetland mitigation sites is delaying construction-related activities, sometimes indefinitely. In states with more rural or semirural communities, the effects of changes in the transportation system are gaining scrutiny, particularly in relation to cultural impacts on communities that no longer benefit from direct highway, rail, or aviation access.

Public pressure on the topic of local and global emissions levels is continuing to spur research into alternative fuel sources and ways to reduce fuel consumption, including increased use of public transportation. Biodiesels, hydrogen fuel cells, ethanol, and solar and electric fuel options for private and public vehicles are being looked at to reduce emissions that affect local air quality and human health and to reduce emissions that affect the global climate.

In 2005, New Jersey Gov. Jon Corzine mandated that the state's agencies must reduce energy consumption by 20 percent by 2020. New Jersey DOT commissioned the Voorhees Institute at Rutgers Uni-



CT Transit, which provides public transit for Hartford, New Haven, and Stamford, Connecticut, has tested a hybrid passenger bus that uses a zero-emission hydrogen fuel cell.

New York State is promoting a Clean Air School Bus Program: (right) compressed natural gas powers school buses in the Long Beach Public School system, Long Island; (below:) a diesel closed-crankcase filter retrofit on a school bus engine in the Cobleskill Central Schools system, Schoharie County, near Albany.



versity to undertake an innovative study to estimate the effect of transportation control measures on energy consumption.

The study concluded that the governor's 2020 target was attainable with a mixture of 10 percent ethanol added to the gas supply; adoption of California's vehicle emissions standards by 2009, including a mandated percentage of zero-emission vehicles; continued investment in public transit; and implementation of a "feebate" program. Under the proposed feebate, the state would set a miles-per-gallon average; motorists whose vehicles performed better than the average would receive a rebate on their registration rates.

New York State DOT supports and funds the state's Energy Research and Development Authority, with approximately 200 projects under way, including the management of the state's Clean Air School Bus Program, which has converted 3,000 buses to alternative fuels. The program has funded the purchase of 10 clean-fuel buses for the New York Metropolitan Transit Authority and has deployed 1,500 additional clean-fuel buses nationwide.

Infrastructure Preservation

Infrastructure preservation is a comprehensive management approach to maintain the functional condition of the transportation infrastructure through cost-effective treatments that safeguard structural integrity and extend performance life for the safety, mobility, and benefit of users. In contrast to the "worst-first" approach, preservation programs optimize proj-

ects according to the engineering benefit-cost.

Transportation agencies have developed infrastructure management systems along traditional engineering lines, but managers are finding the need to merge these approaches into an enterprisewide system that focuses the limited funds on areas of higher benefit-cost. By integrating management systems through coordination and cooperation among agency divisions, agencies can improve the effectiveness of limited funding.

Agencies can assess the effectiveness of their program by determining the portion of the total network involved in major rehabilitation and reconstruction projects in any year. If 2 percent of the network is involved in these activities, the preservation program must extend the performance life between rehabilitation and reconstruction projects to an average of 50 years; if 3 percent, then 33 years; and if 4 percent, then 25 years.

If the performance life between major rehabilitation and reconstruction projects averages less than the durations cited, the network is deteriorating faster than it is being maintained. A holistic approach applies a combination of actions over many years by

- ◆ Implementing high benefit-cost engineering projects within a comprehensive preservation program to extend the performance life of 96 percent to 98 percent of the network;
- ◆ Incorporating infrastructure preservation actions into design-life considerations for major rehabilitation and reconstruction projects applied to the remaining 2 percent to 4 percent of the network; and
- ◆ Applying ordinary maintenance actions.



A California Department of Transportation bridge rehabilitation project on Route 39.

Data and Information Technologies

Resource constraints continue to affect investment in data and information technology programs and tools. The complexity of the issues and a reduced workforce, however, are leading to the realization that improving the availability, access, and use of data to evaluate programs and inform policy development is important.

Many DOTs are aligning data resources with departmental priorities—evaluating the resources and developing investment strategies to assure relevant data quality. A key to cost-effective data programs is the development of cooperative programs to share data. In Pennsylvania, state and regional agencies share responsibility for much of the traffic data development. Carefully defined responsibilities, guidelines, and tools to facilitate data sharing contribute to data quality assurance.

Improved understanding of freight flows is a recognized need, as freight-related traffic is projected to grow at a faster rate than passenger traffic. States seek a better understanding of freight issues at the regional, state, and metropolitan levels, and timely data are a major challenge. States and consultants are looking for new ways to combine national data sets with proprietary data and targeted local data collection, to support projects and to gain a better understanding of the role of freight-related traffic. The current Freight Analysis Framework provides valuable information and tools to support regional work.

Aviation

Funding for the national aviation system and the future of the aviation industry are continuing concerns for state aviation officials. Officials are searching for innovative solutions to support the aviation network—especially general aviation airports.

Fuel costs and the related instability of the airline market, the loss of U.S. DOT subsidies, and the fate of the Essential Air Service program contribute to the uncertainty at most airports throughout the country. The new very light jet market is slowly taking off, but



PHOTO: JOHN MICHAEL ENTERPRISES, LLC

The Federal Aviation Administration certified the first very light jet—or entry-level business jet—in September 2006 for single-pilot operation, day-night operations, visual and instrument flight rules, and operations in reduced visual separation minimum airspace.

its potential to change the national airspace system and its airports remains a subject for speculation.

The federal government is reviewing funding for such major needs as air traffic control and airport infrastructure throughout the aviation system. Fuel taxes, user fees, and other charges now in place may not be sufficient to cover these needs, and their equitability among users of the system has become a topic of debate.

Freight Systems

Freight has become a critical issue for most states, with growth in freight volumes evident in congested highways, ports, intermodal facilities, and rail lines. Adequate freight capacity in all modes is needed to sustain business and to foster new economic development, adding urgency to the involvement of public agencies with private industry.

To facilitate the dialog between public and private interests in freight and to educate elected officials, Maryland DOT conducted the Maryland Freight Summit, highlighting the importance of freight to the state's economy and putting the state's freight-related challenges and opportunities into a national and international perspective. Iowa DOT held a combined economic development and transportation conference, bringing rail and truck carriers and users together to explore interactions that support the econ-



PHOTO: DUNCAN MCHINTOSH, CALTRANS

Dedicated truck lanes merge onto I-5 near the SR-14 Interchange, north of Los Angeles, California.

omy. Such efforts can bridge the gulf between the public and the private sectors, shifting the focus to shared concerns and interests.

As large metropolitan areas experience the effects of increased truck flows, officials are exploring alternatives to improve mobility. The Atlanta Regional Commission, for example, has undertaken a comprehensive mobility study, working closely with public and private stakeholders. In a related effort, Georgia DOT is studying the possibility of truck-only lanes in sections of the Interstate and limited-access highways in Atlanta and in other major freight corridors across the state.

Freight transportation has been described as “the economy in motion,” and the public sector’s roles and responsibilities are evolving with greater understanding of the implications for the economy, the environment, and quality of life.

Highways

Design

In pavement design, TRB’s National Cooperative Highway Research Program (NCHRP) developed the *Mechanistic-Empirical Pavement Design Guide* for the American Association of State Highway and Transportation Officials (AASHTO). The guide represents a longstanding collaborative effort by the states, AASHTO, the Federal Highway Administration (FHWA), NCHRP, and countless researchers in the United States and abroad.

The AASHTO Standing Committee on Highways adopted the guide in 2007 as an interim specification, and states are now conducting field and laboratory calibrations to develop computer input data and to run computer trials to test the sophisticated design tool. The guidelines should enable engineers to design more durable, longer-lasting pavements that will reduce the need for pavement repairs, including the

time spent by maintenance and construction crews in resurfacing and rehabilitating the nation’s highways.

The promotion and implementation of accelerated bridge construction with prefabricated bridge elements and self-propelled modular transporters is another significant result of collaboration among the states, AASHTO, FHWA, and NCHRP. Projects in Florida and Utah have demonstrated the feasibility of these design and fabrication methods and construction technologies to construct bridges rapidly with minimal disruption to the motoring public or to freight transport. With load and resistance factor design (LRFD) standards applied to bridge superstructures, substructures, and high-performance materials, bridges are being designed for greater durability and service life.

In addition, context-sensitive design and solutions for pavements and bridges allow for projects that are more closely related to community values and aesthetic preferences. The design approaches require much more community outreach and public involvement than in the past but are being adopted quickly and successfully by many states.

Highway Construction and Materials

The deteriorating and congested infrastructure remains a construction challenge for state DOTs faced with materials shortages, increasing construction costs, reduced competition, widening gaps in funding, and a depleted workforce. States are looking for cost savings and innovative ways to deliver construction projects.

One state is controlling project costs through practical design, value engineering, competitive alternate bidding, and employee incentives for mitigating contract growth. Another state has established a recruitment program with community colleges to address the shortage of construction labor.

With most work now performed under heavier traffic conditions than in the past, state DOTs must apply methods that minimize disruptions and produce long-lived facilities. States are anticipating the results from studies under the Strategic Highway Research Program 2 dealing with rapid renewal.

States are striving for good environmental stewardship with construction materials. Most allow hot-mix asphalt with a content of 10 to 25 percent recycled asphalt pavement (RAP). This may increase to 50 percent, helping to reduce the accumulating stockpiles of RAP. States also are evaluating the viability of warm-mix asphalt, which produces fewer emissions. Some states allow fly ash, a byproduct of coal combustion, in concrete, but others are awaiting the results of an NCHRP project on recommended specifications and test protocols.

Construction on the I-64-I-70 interchange outside St. Louis employed Missouri DOT’s practical design approach.



Photo: Missouri DOT

Geotechnical Engineering

All state DOTs were required to convert to the LRFD method for the design of structural foundations as of October 1, 2007. The mandated conversion should produce consistent levels of reliability, as well as cost savings. States are at different stages in implementing LRFD.

Several state DOTs have developed or updated their soil investigation and geotechnical design manuals, and others are in the process. Interest in nondestructive testing—such as seismic, electromagnetic, and electric methods—has increased.

Cross-hole sonic logging (CHSL), a test of the integrity of drilled shafts, is becoming a common practice among state DOTs. Some test all the shafts, others test a required minimum percentage of the shafts, and others test only if problems develop. Most DOTs hire consultants who are certified to perform the tests. California DOT (Caltrans) routinely conducts its own gamma-gamma logging to test the integrity of drilled shafts; but when anomalies are detected, CHSL is used to determine the details.

For quality assurance and quality control of earthworks, states have tried many devices but most still rely on the nuclear gauge to determine the density of compacted material. The search for nonnuclear devices has not revealed any with the required accuracy, repeatability, or ability to correlate the measured property with the density.

Rock fall-related issues are a concern for most states. A new TRB report, *Rock Fall Characterization and Control*, prepared by a task force chaired by A. Keith Turner, is expected to serve as a single source of



PHOTO: CALTRANS

Technician with Caltrans Foundation Testing Branch inserts a gamma-gamma logging probe over rebar cage for a drilled shaft.



PHOTO: U.K. HIGHWAYS AGENCY

information on many aspects of rock falls. Publication of the report is expected later this year.

Highway Operations

According to surveys, highway users are frustrated by the lack of reliability in their journey time. Traffic operations professionals are focusing on new strategies to improve travel time reliability.

Active traffic management (ATM) is a toolbox of countermeasures that can be used in various combinations to manage congestion dynamically in response to prevailing traffic conditions, by maximizing the use of road space. As traffic congestion increases, various countermeasures are applied—not necessarily all at once—including improved detection, dynamic speed limits, electronic variable message and lane control signs, temporary shoulder use, ramp metering, managed lanes, and dynamic rerouting. These countermeasures are all controlled and implemented as needed from the traffic management center (TMC).

The TMC continually monitors the traffic congestion information from detectors and surveillance cameras. When the traffic data indicate that the traffic flow is about to break down, variable speed limits are introduced to smooth out the traffic flow and allow traffic to travel closer together, so that more vehicles can use the roadway. If congestion increases, ramp metering will go into effect to regulate how many vehicles can merge into the mainline traffic and to minimize the impact of traffic merging all at once. If congestion still increases, then the shoulders will be opened to traffic to provide an additional travel lane until the congestion dissipates.

As part of an active traffic management strategy, a hard shoulder is opened on the M42 highway near Birmingham, England. U.S. agencies are adopting the approach of applying a toolbox of countermeasures to manage roadway congestion.

A motorcycle-car collision near the township of Oshtemo, Kalamazoo, Michigan. Motorcycle fatalities increased by 9 percent in 2007 and now exceed pedestrian fatalities.



ATM has been deployed in Europe and other parts of the world and is now being tried in California and is being considered by other states.

Highway Safety

The number of traffic deaths declined to 42,642 in 2006 from 43,510 in 2005. This resulted in a fatality rate of 1.42 per 100 million vehicle miles, down from the 2005 rate of 1.46. Motorcycle fatalities rose for the ninth year in a row, up 9 percent in 2006, from 4,576 to 4,810, exceeding pedestrian fatalities (4,784) for the first time.

Although crash numbers, rates, and costs are reported annually, the magnitude of the highway safety problem becomes more apparent when the numbers are considered across several years. First, the change in the numbers is not encouraging—44,599 fatalities in 1990 to 42,642 in 2006. With 43,000 fatalities as a rough annual average, approximately 731,000 people have died on U.S. roads since 1990. The National Highway Traffic Safety Administration estimates the annual crash cost at \$230 billion; that yields a cumulative cost of more than \$3.9 trillion since 1990. Systematic and focused efforts to reduce the numbers of crashes, therefore, have a large potential to save lives, prevent injuries and suffering, and decrease costs.

A few states have made progress in the past three to five years. NCHRP and FHWA prepared case studies of four states—Iowa, Michigan, Minnesota, and Washington—that have reported continuing trends in reducing fatalities. The case studies highlight management processes, data reporting, and multidisciplinary techniques. Other states, such as Missouri and Colorado, are developing similar trends.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) mandated that each state develop a strategic highway safety plan (SHSP) to focus multiagency and multidisciplinary efforts to reduce crash rates. All states

have completed the SHSPs. A few states—such as Missouri and Oregon—are updating their plans. Most states report that translating the plans into specific actions with the necessary resources has been a challenge.

Ports and Waterways

The nation's rivers and intracoastal waters are receiving consideration throughout the country for the relief of congestion and as an alternative to highways. Marine highway developments include barge service between Port Elizabeth, New Jersey, and Bridgeport, Connecticut; a service linking the ports of Hampton Roads, Virginia, with smaller ports; barge service between the Ports of Oakland and Sacramento, California; and a service connecting ports in Texas and Mexico.

The California Air Resources Board has approved measures to reduce pollution from commercial harbor craft, such as dinner cruise and tour boats, tugs, and towboats in California waters. The Ports of Los Angeles and Long Beach jointly launched the San Pedro Bay Clean Air Action Plan to cut emissions of diesel particulate matter in half by 2011 and to reduce nitrogen oxides, sulfur oxides, and other pollutants.

APL, the global container shipping line, has teamed with regional, state, and federal agencies to test new marine technologies to reduce exhaust pollution. Several ports are testing or are operating technology to cut exhaust emissions from docked cargo ships. Through a pilot program at Hampton Roads, the Virginia Port Authority is supporting EPA's SmartWay Transport Partnership, which enables truckers to obtain low-cost loans to purchase trucks with cleaner-burning engines.

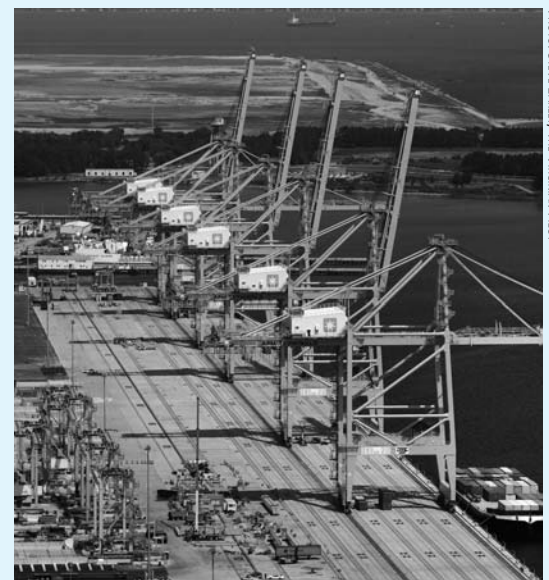


PHOTO: STEVE EARLEY, THE VIRGINIAN-PILOT

New APM Terminals container facility in Hampton Roads, Virginia, was built on a greenfield site.

The Alabama State Port Authority has implemented a biodiesel program to reduce greenhouse gas emissions at public seaport terminals. In Washington State, Foss Maritime plans to introduce a new hybrid harbor-assist tug, the Eco-Tug, capable of operating on batteries in standby mode, reducing main engine idling, fuel consumption, and air emissions in port.

Major new port terminals have opened or are in development. Collaborative efforts among local, state, and federal agencies, the Virginia Port Authority, and the International Longshoremen's Association contributed to the development and opening of a new APM Terminals facility in Hampton Roads. Located on a greenfield site, it is the most highly automated container terminal in the United States.

The Port of Houston, Texas, opened the first phase of the Bayport Container Terminal, which is likely to attract more Asian cargo to the region. Recognizing that this will expand the port farther inland, the Texas legislature approved a bill to create a freight rail district.

The Port of Tacoma, Washington, plans to build a 168-acre container terminal on the Blair Waterway, to be leased to Yusen Terminal, Inc., a subsidiary of NYK Line, a major international ocean carrier. The port also will develop a redesigned terminal with expansion capabilities for Totem Ocean Trailer Express, a major domestic shipping line.

SSA Marine and the Native American Puyallup Tribe have partnered to build a 180-acre container terminal at the Port of Tacoma on jointly owned land. A major new container facility is under construction at the Port of Mobile, Alabama, and will connect to the inland waterway system.

Rail

Most states have an active interest in rail transportation as a solution to passenger and freight transportation demands. Many areas seek commuter rail services to relieve traffic congestion, and states are developing funding mechanisms and relationships with freight railroads to initiate new services.

Successful partnerships can benefit the freight railroads by alleviating rail congestion and improving freight capacity. For example, Florida DOT is using the state's transportation trust fund to finance a comprehensive project that includes purchasing a 61-mile line in the Orlando area from a freight railroad for commuter service, enhancing other lines owned by the freight railroad, and relocating intermodal freight facilities to a new integrated logistics center.

Many states are supporting rail freight services in various ways. For example, Georgia is the buyer of last resort for rail lines in the state and owns 540 miles, most of which are leased to operating railroads. Geor-



PHOTO: DALLAS AREA RAPID TRANSIT

gia DOT serves as a conduit for state funds for improvements to rail lines and facilities, which are viewed as tools for economic development.

Intercity rail passenger ridership is increasing, but plans for improved and higher-speed services in several corridors are stymied by a lack of funding.

To make productive investments in freight rail projects and to establish constructive partnerships to improve the transportation system, states are seeking to understand which benefits accrue to the public and which to the private sectors.

Public Transportation

Public transportation was not immune to several trends much in the news this past year, such as rapid urban population growth and congestion, aging infrastructure and equipment, global warming, increasing operating costs, and petroleum prices reaching almost \$100 a barrel.

As transit ridership nationwide increases, deteriorating infrastructure and equipment are a concern in major rail cities, such as New York City, Chicago, Washington, D.C., Boston, and Philadelphia. Service disruptions, accidents, and delays can occur. Some jurisdictions—for example, New York City, Chicago, and Washington, D.C.—have implemented or are considering fare increases, and others are proposing tax increases.

Several major transportation tax and bond measures passed on the November 6 ballot in such jurisdictions as Charlotte and Mecklenburg County, North Carolina; Fairfax County, Virginia; Toledo, Ohio; San Francisco; Kalamazoo and Saginaw, Michigan; and Weber and Box Elder counties, Utah. Four counties in Washington State—Kitsap, King, Snohomish, and Pierce—defeated a major transportation funding measure. Pennsylvania earlier approved a public transportation trust fund of \$1.08 billion.

Both the public and private sectors have developed

Construction on a Dallas Area Rapid Transit light-rail station at Fair Park, September 2007.

new transit services. Light rail systems are adding lines in Portland, Los Angeles, Salt Lake City, Dallas, and St. Louis; and commuter rail is expanding in San Diego North County, Seattle, Salt Lake City, and South Florida. Bus rapid transit was added in Eugene, Oregon, and in Seattle, Denver, and Boston. Private-sector carsharing has expanded in Washington, D.C., Boston, and San Francisco.

Transit-oriented development is occurring in Denver, Portland, Baltimore, Seattle, and Charlotte. The easy access to transit has attracted office, retail, and residential developments.

Transit services have made a positive impact on the physical and human environment also. Transit fleets are "greening" by adding energy-efficient, low-polluting vehicles. In addition, transit vehicles were

used to evacuate hundreds during the horrific mountain brush fires in the Southern California and San Diego areas in October.

Partnership Potential

Progress in addressing the critical issues in transportation will not be possible without joint efforts and collaboration. Resolving issues such as the aging infrastructure, congestion, safety, funding, energy, environment, intellectual capital, security, and infrastructure protection and preservation will require partnerships among a myriad of players. The role that partnerships can play inside and outside of the transportation community and around the world was on display repeatedly for TRB staff during field visits to the states in 2007.

Did You Know?

◆ Texas DOT has created a state grant program, the Routine Airport Maintenance Program (RAMP). Individual grants do not exceed \$50,000 per year per airport and require a local government to match 50 percent of the actual costs plus any costs that exceed a total of \$100,000. These grants enable airports to make lower-cost airside and landside improvements, such as constructing airport entrance roads, paving airport public parking lots, installing security fencing, and replacing rotating beacons. The grant program has been a success, and the state has seen a dramatic improvement in safety at smaller airports that have taken advantage of the program. More information is available at www.txdot.gov/services/aviation.

◆ Carson City, Nevada, is west of Los Angeles.

◆ Snowmobiles often are criticized as sources of air and noise pollution. Across the country, park managers are studying the impact of snowmobiles on the environment, and some have called for a ban on snowmobiles in some national parks. The Society of Automotive Engineers issued the Clean Snowmobile Challenge, a collegiate design competition, bringing together teams of engineering students to reengineer a stock snowmobile to reduce emissions and noise while maintaining or improving performance. Utah State University won the 2006 Challenge's



Hybrid snowmobile competes in the Clean Snowmobile Challenge.

new zero-emissions division with an electric sled. The competition often has led to offers of industry jobs for students on the teams.

◆ Utah DOT has partnered with Utah State University to explore the possibility of growing biodiesel-producing plants along state highways. Nearly one-half of the 6,000 miles of roads maintained by Utah DOT have adjacent ground that can be cultivated, to produce approximately 500 gallons of biodiesel per mile. Utah DOT started by planting almost 4 miles of right-of-way with canola, safflower, and perennial flax, which do not require irrigation. A full planting could enable Utah DOT to fuel its entire fleet with homegrown biodiesel, save on maintenance costs, and aesthetically improve rights-of-way.

◆ New Jersey was the first state to purchase variable message signs powered by fuel cells.

◆ New York has the most school buses of any state in the nation—50,000 vehicles.

◆ Louisiana Department of Transportation and Development and Virginia DOT each manage more than 56,000 miles of roadway and Interstate lanes—more roadway lane miles than Caltrans manages.

◆ As directed by the Code of Virginia, the state is outsourcing 1,200 miles of Interstate maintenance by July 1, 2009.