

LEADING IN LEAN TIMES

Findings from the Transportation Research Board's 2011 State Partnership Visits Program



Specialists in the Transportation Research Board's (TRB) 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 hundreds of organizations and thousands of individuals provide TRB staff with information from the public and private sectors on all modes of transportation.

A major source of this information is TRB's annual state partnership visits program. Transportation professionals on the TRB staff meet on site with representatives of state departments of transportation (DOTs) and of universities, transit and other transportation agencies, and industry. In addition, TRB staff is involved with planning and delivering conferences, workshops, and meetings throughout the country. This report summarizes what the TRB staff learned from visits and activities during the past year.

“Leading in Lean Times”—the theme of the 2011 annual meeting of the American Association of State Highway and Transportation Officials (AASHTO)—was an appropriate rallying cry for state DOTs and other transportation organizations during 2011. State DOTs were called to invest in transportation infrastructure even as state governments faced unrelenting economic pressures, including uneven economic growth, reduced federal assistance, and appeals from hard-pressed local governments.

In late 2011, the National Governors Association and the National Association of State Budget Officers released that annual Fiscal Survey of States, noting the state government budgets have improved since the worst of the recession, but that the states face a myriad of economic challenges. Although state general fund revenue increased in 2011 and is expected to continue increasing in 2012, the totals are \$21 billion below the 2008 levels, according to the report. In addition, states face further reductions in federal aid as a result of efforts to slow the growth of the deficit.

State and local governments have cut a total of 455,000 jobs since the beginning of 2010, including many from transportation agencies. The TRB state partnership visits to almost every DOT in 2011, as well as to other transportation agencies, institutions, and organizations, found that staff and leadership were more committed than ever to the mission of providing a safe and reliable transportation system for travelers and freight. This commitment was supported with hard work and innovation. The following summary offers a sampling of these extraordinary efforts.

Cofferdam installation at Exit 5 on I-93 from Salem to Manchester, New Hampshire. This section of the I-93 rebuilding project is financed with GARVEE bonds, one of the funding strategies employed by state DOTs to deal with the delay of long-term federal transportation reauthorization.

Institutional Issues

Policy, Management, and Leadership

The continued inability at the federal level to pass long-term reauthorization legislation for surface transportation and aviation generated uncertainty at all levels of government. Massachusetts, New Hampshire, and Rhode Island offer examples of how state DOTs are managing without a long-term federal transportation reauthorization, moving critical projects forward with such strategies and initiatives as the use of Transportation Infrastructure Finance and Innovation Act loans, Grant Anticipation Revenue Vehicle (GARVEE) bonds, Transportation Investment Generating Economic Recovery (TIGER) grants, pricing initiatives, and Interstate tolling.

Many DOTs are spending a larger portion of their budgets on maintenance instead of on major new projects. But because maintenance is less visible to the public and elected officials, DOTs are having a difficult time gaining public support for funding, especially when competing with education, health care, and other critical needs.

The completion of the Interstate Highway System has changed the roles of state DOTs and their personnel needs. Some state DOTs have reduced their workforce by almost half during the past 10 to 20 years. Although many DOT staff view the most recent reductions as a temporary downsizing, others consider the changes a preparation for the long term.

Many states are downsizing through attrition and retirements, but employees who are eligible are more reluctant to retire during uncertain economic times and with prospects of rising health care costs. The retirement incentives offered by some states can be affected by union contracts.

States are focusing on performance management, succession planning, and knowledge management to facilitate the transition to the future workforce. Strategic management is applying information technology and tools to identify, collect, and analyze data on customer needs.

Planning

Limited and uncertain financial resources have led some agencies to question the role of planning, especially when money for new construction is not readily available. Nevertheless, planners are finding that their skills are increasingly in demand.

Transportation planners are working with engineering staff to identify and fund projects to operate the system with maximum efficiency. The Thurston Metropolitan Planning Organization (MPO) in Olympia, Washington, for example, has worked with local transportation agencies to coordinate the traffic signals along major traffic routes.



PHOTO: NEW HAMPSHIRE DOT

Operational projects are becoming a major part of transportation plans.

In addition, to strengthen their economies and to create jobs, Indiana, Washington, and many other states are working to remove barriers to freight traffic—for example, by including railroad crossings in statewide models and identifying freight bottlenecks to be addressed in short- and long-term transportation plans. In almost every state, job creation is a major criterion in project selection; planners are working with state economists to understand the connections between transportation projects and job creation.

Legal Issues

Issues of interest in transportation law during 2011 involved civil rights and employment, particularly in relation to the Americans with Disabilities Act; environmental justice in transportation planning; and tribal relations. With budget constraints, most states are struggling with such operational issues as maintaining a strong workforce and high morale; ensuring compliance with federal requirements, such as the antidiscrimination Title VI of the Civil Rights Act of 1964; working with Native American tribes in acquiring rights-of-way; and completing National Environmental Policy Act documents.

Tort liability and risk management agencies of state and local governments continued implementation of the 2009 edition of the *Manual on Uniform Traffic Control Devices* (MUTCD). Of particular concern was the perceived loss of flexibility to apply engineering judgment in decisions about traffic control devices, as well as the effects on state risk management programs. By the end of the year, the Federal Highway Administration (FHWA) had proposed changes to the MUTCD to address this problem.

Fallout continues from the U.S. Supreme Court's 2005 eminent domain decision in *Kelo v. City of New London*. Because the court determined that property could be condemned for economic development, state legislatures have enacted provisions to make the use of eminent domain more burdensome or to give property owners more rights. In January 2012, TRB's National Cooperative Highway Research Program (NCHRP) released a report on the *Ramifications of Post-Kelo Legislation on State Transportation Projects*.¹

Environment, Energy, and Climate Change

Many states are responding to directives to address the impacts of climate change through planning, investing in alternative-fuel vehicles for state fleets, and incorporating the concepts of livability and sustainability into all projects. Many current perfor-

¹ NCHRP Legal Research Digest 56, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_lrd_56.pdf.

PHOTO: WASHINGTON STATE DOT



With roundabouts designed for large trucks and with other accommodations for freight traffic, Washington and other states are implementing plans to encourage economic growth by removing freight transportation barriers.

mance metrics, however, do not incorporate social and environmental factors; to help focus investments on sustainability and the highest triple-bottom-line return on investment, agencies in Oregon and Canada and the Boston Redevelopment Agency have developed approaches to benefit-cost analyses that include these important elements.

The biggest challenge in meeting these directives may be the application to rural environments, which have limited transportation options; difficulties also may arise on small construction projects. The additional planning requirements may cause delays in

Approximately 29,000 miles of public roads in the Indian Reservation Roads program are under the jurisdiction of the U.S. Department of the Interior's Bureau of Indian Affairs and of tribes; 73,000 miles fall under state and local ownership. Many tribes seek legal assistance to acquire rights-of-way.

PHOTO: POKAGON BAND OF POTAWATOMI





PHOTO: WASHINGTON STATE DOT

Construction crews work on the wildlife undercrossing on I-90 at Gold Creek in Washington State. In planning and constructing transportation facilities, many state DOTs are addressing the connectivity of animal habitats.

completing small but important projects.

Water-related issues—such as stream mitigation initiatives, wetland banking, and stormwater runoff and permitting—also continue as state-level concerns. Other important environmental issues at the state level include the application of the new FHWA noise policy, environmental justice considerations, the safety and ecological management issues in protecting animal habitat connectivity, and managing

conflicts with other regulations. For example, complying with certain ADA requirements in rehabilitating a sidewalk sometimes may conflict with requirements to maintain historic viewsheds.

Data and Information Technologies

State information specialists have been helping DOTs face constraints on resources through a variety of approaches, such as mapping data requirements to assist organizational decision making. Analyzing decision makers' use of information often reveals a need to array the data in a timely way in a format that decision makers can understand; often the solution is to combine information from many sources. For example, Utah DOT's UPlan is an interactive, web-based tool that brings together data from various state agencies, utility companies, cities, counties, and others to streamline data access and analysis.

State DOTs are seeking to relate their activities to the economy and job creation. To gain support for transportation funding, Kansas DOT has applied information from stakeholders in economic analyses to determine likely project impacts on the economy and jobs, as well as to prioritize projects.

Understanding the evolving DOT customer base also has been a focus. DOTs have pooled funds to obtain special tabulations of Census Bureau data to examine demographics and predict trends. The Census Transportation Planning Products provide household, workplace, journey-to-work, and flow data for policy and planning studies, travel demand modeling, environmental justice analyses, and transit evaluations.



PHOTO: WIKIMEDIA COMMONS

A sidewalk built by the Works Progress Administration during the Great Depression now retrofitted with wheelchair-accessible ramps (*foreground*). State DOTs often must balance environmental or historic concerns with other requirements, such as ADA compliance.

These data often are used in conjunction with data from other sources, such as the National Household Travel Survey (NHTS). Twenty states and MPOs have signed up to receive increased samples of NHTS data. In addition to these collaborative funding efforts, states are partnering with private data vendors to add value to internal data collections, gaining timely information on traffic flows and patterns.

Aviation

With Congress unable to agree on budgets for surface and air transportation, the Federal Aviation Administration (FAA) received an additional blow earlier in the year when an agreement could not be reached for a temporary budget extension. As a result, the agency shut down some activities not related to safety and air traffic control for approximately two weeks.

At the same time, many of the taxes and fees collected for the trust fund that supplies most of FAA's budget were suspended, resulting in the loss of approximately \$30 million per day, according to the U.S. Treasury. The ramifications were significant for federally funded airport construction projects throughout the nation—not only in the loss of revenue to support the projects, but also in the suspension and loss of many construction industry-related jobs associated with the projects.

The lack of stable federal funding sources has many states and airports struggling to manage their capital infrastructure plans. Other programs also face uncertain futures—for example, the Essential Air Service Program could be eliminated, and financial commitments to the Next-Generation Air Trans-

PHOTO: ORAN VERVINCY



portation System (NextGen) are in doubt.

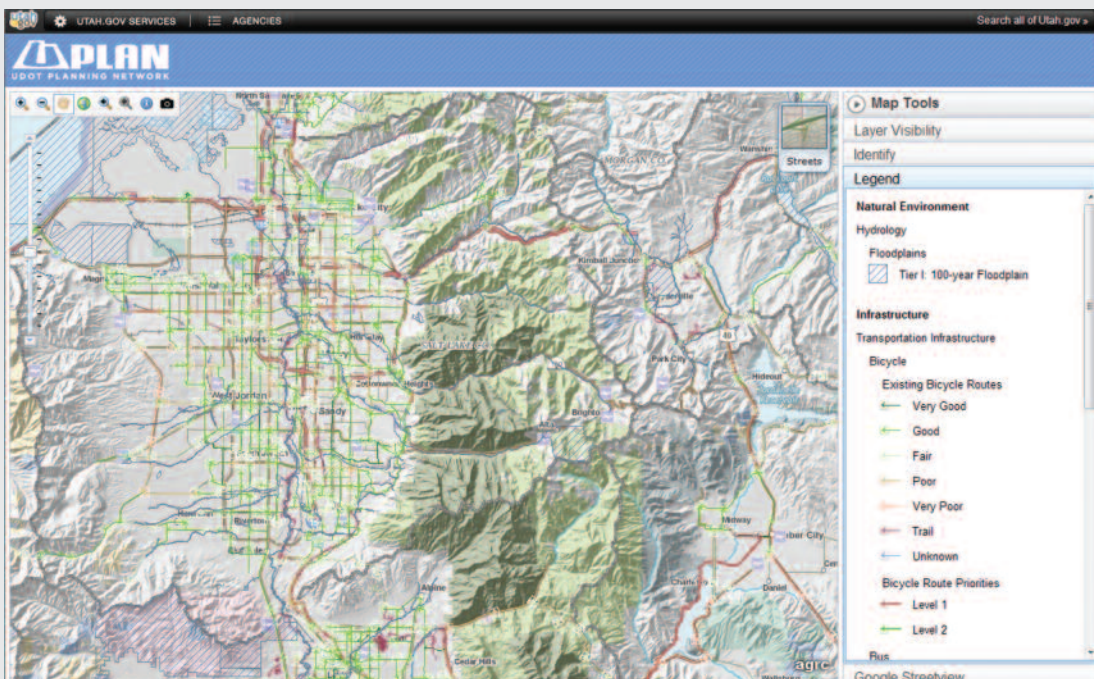
FAA and Congress determined that the agency requires internal changes to answer the future needs of the nation's air transportation system—for example, realigning some functions to manage the transition to NextGen. Congress has approved FAA's organizational changes.

Demonstrations by Alaska Airlines, Southwest Airlines, and UPS have shown that NextGen performance-based navigation and procedures—such as Area Navigation and Required Navigation Performance—can save millions of gallons of fuel, cut noise, and decrease greenhouse gas emissions.

Freight Systems

Freight systems stakeholders—shippers, carriers, private investors, and public agencies—continue to confront economic uncertainty as freight trans-

Passengers wait for the Sounder train in Seattle, Washington. State DOTs apply commuter and other household travel data from the U.S. Census Bureau to planning studies, travel demand modeling, and other analyses.



Utah DOT's UPLAN provides a comprehensive portal to data from cities, counties, state agencies, utility companies, and more.

PHOTO: BOEING



A Southwest Airlines 737 in a paint hangar. Southwest and other airlines have demonstrated the benefits of NextGen performance-based navigation systems.

portation demand has increased for some sectors, modes, and regions, but declined in others. In addition, cataclysmic events disrupted the global and domestic supply chain—for example, the earthquake and tsunami in Japan; flooding in Thailand; and hurricanes, the Midwest floods, and the October snowstorm in the United States.

These disruptions highlight the supply chain's vulnerability, its importance to industries around the world, and the interdependence of national

economies. As business enterprises reassess their operations, “reverse globalization” is moving some manufacturing and distribution closer to key markets to reduce supply chain costs and risks.

Stakeholders also are exploring measures to enhance freight systems. More states have undertaken the development of statewide freight plans, drawing on input from advisory boards with private-sector participation. At all levels, public agencies are more conscious of the benefits of integrating freight systems and facilities into transportation planning and land use planning. Innovations in technology and operations are gaining attention as a means to create capacity at lower cost.

Environmental concerns are playing an increasing role in freight. The private sector is viewing initiatives to reduce its carbon footprint as good business, affecting shippers' mode choice and carriers' operations. Public agencies' efforts to reduce emissions and roadway congestion raise such considerations as truck size and weight and the diversion of freight from trucking to rail or water modes.

Highways

Design

Designing structures to withstand future changes in weather patterns—such as increased storm intensities—is a challenge facing many DOTs. This includes bridge foundation designs to account for more severe scour from increased precipitation and flooding;

Many states are developing strategies to integrate freight systems efficiently into transportation and land use plans.



PHOTO: PORT OF SEATTLE



(Left:) In 2011, the Souris River flooded levees in Minot, North Dakota, cresting at nearly 13 feet over flood stage. Transportation agencies must adapt bridges and other infrastructure to changing weather patterns and the effect of increased flooding.

(Right:) Inspectors survey reconstruction of NC-12 in coastal North Carolina. An NCHRP project will assist DOTs in determining staffing needs for construction projects.



establishing pavement, bridge deck, retaining wall, culvert, and tunnel elevations to account for rising water levels in coastal areas; and taking into account storm surge and wind velocity forces from extreme tornados and hurricanes. Also of concern to many states in designing for the future are increases in seismic activity, possibly from the movement of the North American and adjacent tectonic plates and fault lines.

Maine DOT, for example, is designing facilities along the coast subject to an increased annual and 100-year peak stormwater flow, storm surges, and 12-foot tides. In combination with a potential rise in sea level, the increased stormwater runoff from more precipitation poses a significant design challenge. The University of Southern Maine is studying the effects on bridges; when Maine DOT replaces bridges, the new designs will account for the compounding risks.

In California, the Caltrans Division of Engineering Services manages a multimillion dollar, problem-focused research program to investigate ways to meet project delivery goals and encourage innovation through research deployment. Recent research start-ups include seismic loading on hinge shear keys, performance of column-to-shaft pin connections, seismic performance of accelerated bridge construction systems, and seismic assessment of cut-and-cover tunnels.

Highway Construction and Materials

The transportation infrastructure is deteriorating, but because of budget constraints, many states are delaying major construction and reconstruction projects and are focusing instead on resurfacing, rehabilitation, and minor improvement projects. A few states are using public-private partnerships or tolling agencies to build major facilities—Maryland's recently completed Intercounty Connector, north of Washington, D.C., for example, operates as a toll road.

With the uncertainty of funding for construction, many agencies are having difficulty ascertaining in-house staffing needs, raising concern about the abil-

ity to provide adequate construction inspection. A new NCHRP project should provide guidance.² State DOTs also are under pressure to deliver projects faster, at less cost, and at higher quality with alternative project delivery methods.

State agencies are using recycled materials and industrial byproducts with increasing frequency in transportation applications, tapping valuable resources and reducing materials costs. Reclaimed asphalt pavement (RAP) in hot-mix asphalt (HMA) is the most widely used recycled material. Most states have an abundance of RAP; an NCHRP project is looking at increasing the percentage of RAP in HMA without loss in the pavement's long-term performance.³

² NCHRP Project 10-89, Best Practices Guidebook for Optimal Construction Inspection, <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3168>.

³ NCHRP Project 9-46, Improved Mix Design, Evaluation, and Materials Management Practices for Hot-Mix Asphalt with High Reclaimed Asphalt Pavement Content, <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1624>.

Two-way traffic on Route 105 in Newport News, Virginia, is moved to new lanes while the old lanes are being resurfaced. Resurfacing and rehabilitation are favored by many DOTs as cost-effective projects in a tight economy.





PHOTO: OREGON DOT

Contractors for Oregon DOT install rockfall-mitigating wire mesh along U.S. 97 near Klamath Falls. The Rockfall Hazard System was developed in Oregon and now is used by more than 25 transportation agencies throughout North America.

Some states have tried warm-mix asphalt. Researchers in Louisiana and Washington are evaluating the application of photocatalytic compounds on asphalt and concrete pavement surfaces to remove harmful air pollutants.

Geotechnical Engineering

Rockfalls occur along transportation corridors all over the world, and the United States is no exception. In North America, more than 25 transportation agencies are using the Rockfall Hazard Rating System, developed in Oregon and supported by FHWA since 1990, indicating interest in the characterization, investigation, monitoring, and control of rockfalls for safety and economic reasons. A TRB task force on Rockfall Characterization and Control has prepared a comprehensive, textbook-style report, scheduled for publication in 2012, that should provide a wealth of information to practitioners.

Flexible rockfall fence systems are common control measures. An NCHRP project is developing recom-

mendations for testing flexible fence systems, as well as for establishing a related asset management plan.⁴

Findings from national, regional, and local research on intelligent compaction technology have encouraged several state and FHWA demonstration projects. Some states have conducted pilot implementation of the technology for the quality assurance of earthworks; others are planning tests. The studies are expected to assist in bringing the technology into the mainstream, which should benefit the construction of earthworks and improve industry practice.

Dust generated from lightly surfaced and gravel roads can have adverse impacts on safety, health, the economy, and the environment. Efforts are under way to eliminate or minimize dust generation and its effects.

Highway Operations

State DOTs are focusing on strategies to operate and maintain the transportation network more efficiently. Managing demand and optimizing the operation of the system are cost-effective solutions to reduce delays and improve travel-time reliability.

Proactively managing the cross section and operation of a freeway or arterial is common practice in several states. Agencies are attempting to optimize use of the entire roadway to improve the performance of specific lanes or of the entire freeway or highway.

The operating approach known as active traffic management blurs the distinction between managed lanes and traditional forms of freeway management. With active traffic management, the operating agency proactively manages demand and available capacity on the facility by applying new operational countermeasures or modifying the in-place strategies.

Active traffic management strategies include dynamic speed limits, adjustable to conditions; restricted lanes, for high-occupancy vehicles or for trucks; access controls, such as express lanes or reversible lanes; motorist information, via electronic variable messages or lane control signs, for example; temporary use of the shoulders for traffic; ramp metering; and priced or managed lanes.

Real-time traffic information was once the purview of state DOTs, but the private sector increasingly is becoming the main source of real-time traffic information for the driving public. Several applications for smart phones and Global Positioning System (GPS)-based personal navigation devices can help users avoid congestion by providing trip-



PHOTO: WASHINGTON STATE DOT

Recommendations for testing rockfall fences, such as this one on I-90 over the Snoqualmie Pass in Washington State, are being developed in an NCHRP project.

⁴ NCHRP Project 23-35, Guidelines for Certification and Management of Flexible Rockfall Protection Systems, <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2985>.



PHOTO: WASHINGTON STATE DOT

Restricted lanes and other active transportation management strategies assist DOTs in efficient operation of transportation networks.

routing and real-time travel and congestion information—often crowd-sourced, that is, based on reports from other mobile-device users on the scene.

Infrastructure Preservation

Among the maintenance and preservation activities to support a transportation agency’s mission of providing for the safe and efficient movement of people and goods, two stand out: the integration of management systems under asset management, and the increased use of preservation techniques and procedures.

Many state DOTs are developing and implementing preservation programs under a comprehensive asset management approach to improve performance and extend the useful life of the transportation infra-

structure components such as pavements, bridges, drainage structures, roadsides, traffic control devices and systems, and rest areas. Successful transition to a preservation program depends on the commitment and support of an agency’s top management and political oversight body; on measurement systems that can appraise asset conditions accurately and that can monitor progress toward achievable goals; on flexibility in the selection of preservation actions appropriate to project conditions; and on champions throughout the agency who can keep the program on track.

Asset management reports on preservation efforts provide agency and public decision makers with project-level indicators of the engineering benefits or life-cycle costs, to support an effective balance of expenditures between new capacity and improvements. Typically the new capacity and improvement projects represent less than 2 percent of the network, with maintenance and preservation projects serving the remaining 98 percent. Investments in preservation activities provide a six- to 14-fold benefit directly to the public, a key advantage in a time of financial constraints.

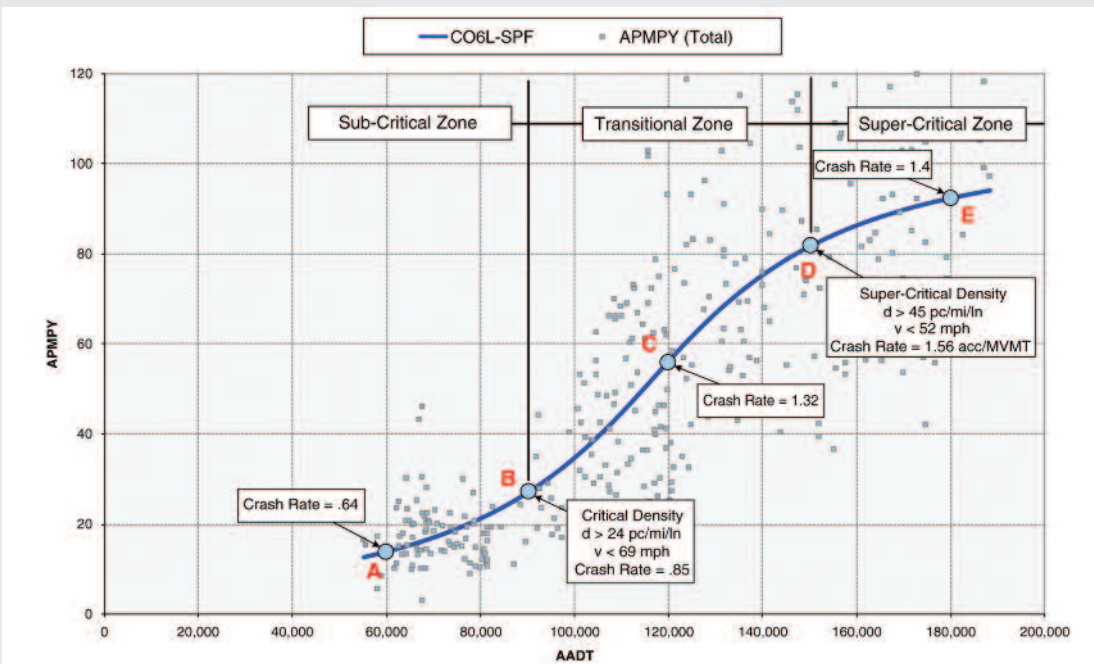
Highway Safety

From 2005 through 2010, annual traffic fatalities in the United States dropped approximately 25 percent, from 43,510 to 32,788, according to the National Highway Traffic Safety Administration (NHTSA). The number of fatalities is the lowest since 1949 and translates to a rate of 1.09 per 100 million vehicle miles traveled—the lowest on record (1).



PHOTO: TOASTYKEN

Asset management approaches are improving the maintenance of traffic lights and other transportation infrastructure components.



Recent research by Kononov et al. (2) has linked traffic volume, speed, and crashes and found that managing urban Interstate traffic may lead to a reduced crash rate.

Construction to expand the Panama Canal (*under way in photo below*) will facilitate the travel and use of container ships that are three times the size of current vessels (*right*), and will require expanded accommodations at Gulf and East Coast ports.



PHOTO: PANAMA CANAL AUTHORITY

The last highway reauthorization legislation mandated that each state DOT develop a multidisciplinary, multiagency Strategic Highway Safety Plan (SHSP) for all public roads—not just those that are state-owned. States that developed and implemented SHSPs are seeing positive results. Many states are updating or revising their SHSPs to continue addressing highway safety issues proactively.

The current economic conditions also may have contributed to the decline in fatalities by discouraging the amount of driving. Preliminary data from FHWA, however, show that vehicle miles traveled in 2010 increased by approximately 20.5 billion miles, or 0.7 percent (1).

Research in Colorado has discovered a relationship between traffic volume or density, speed, and

crashes. The plotted curve revealed a surprising breakpoint; managing traffic to avoid the breakpoint may result in fewer crashes in urban Interstate settings (2).

Ports and Waterways

By 2014, the expansion of the Panama Canal will enable the transit of containerships nearly three times the size of current vessels. This development has become a major focus for coastal ports, particularly on the U.S. East and Gulf Coasts, as well as for the supporting infrastructure, including the inland waterways, railroads, and roads and highways. The Port of Baltimore is building a new 200-acre terminal; the Port Authority of New York and New Jersey is deepening its harbor and looking to raise the Bayonne Bridge; the Port of Savannah is seeking funds to dredge a deeper channel; at least three ports in Florida—Miami, Fort Lauderdale, and Jacksonville—also are looking to deepen channels; and the Port of Houston is doubling its capacity with the Bayport development. West Coast ports, in contrast, are working to limit any loss of market share; Southern California ports have undertaken a 10-year, \$7 billion capital expansion program.

Major Midwest floods challenged the nation's inland waterway system, which needs to recapitalize its lock and dam infrastructure. The inland system is vital for the transport of coal, grain, steel, aggregate, and petroleum and is essential to the goal of expanding exports. In the Gulf region, for example, a public-private partnership is investing in a major new grain export facility at Lake Charles, Louisiana, to handle rice, wheat, corn, and soybeans from across the nation, and Ohio and Kentucky are considering creation of a regional body to oversee river commerce and freight issues and to advocate for the river freight industry.



PHOTO: INFOSTRADA.COM

Rail

Passenger Rail

The Federal Railroad Administration (FRA), state agencies, and freight railroads made progress on the use of American Recovery and Reinvestment Act rail grants to promote intercity and high-speed passenger rail service. Federal funding, however, is clouded by local funding constraints and by concerns about the value of public investment in passenger rail. Intercity and high-speed passenger rail will receive no federal funding for Fiscal Year (FY) 2012 but may qualify for funding under other grant programs, such as TIGER.

The U.S. House of Representatives Committee on Transportation and Infrastructure has proposed privatizing the Northeast Corridor and ending Amtrak's state-supported service. Although the proposals have been tabled, long-term federal funding for Amtrak remains at issue. For FY 2012, Amtrak will receive \$1.42 billion—\$64 million less than it received in FY 2011.

Freight Rail

Freight railroads reported continuing increases in revenue, particularly in intermodal traffic, although volume remains below 2007 levels.

The Surface Transportation Board convened several public hearings on freight rail competition and freight rail rate relief. Shippers complained that the freight rail market has become increasingly non-competitive, because of railroad mergers and inadequate rate relief. These matters remain under consideration.

Railroad operators, including Class I freight and

passenger railroads, continue efforts to implement positive train control (PTC) systems, which must be in place by 2015. FRA is reviewing regulations to address concerns about PTC implementation.

Public Transportation

Many public transportation initiatives are moving forward to decrease operating expenses, increase capacity, and help reduce dependence on oil. South Dakota DOT has employed new technology in transit routing and management to increase efficiency in operations and to save costs. The software can route and dispatch rides, record ridership and maintenance, develop reports, and track the locations of buses.

The Illinois Center for Transportation is developing a variety of transportation solutions and innovations to encourage the use of public transportation. One project uses GPS surveying techniques to help Chicago's mass transit agencies improve service to the elderly. In addition, smart phone technologies are being explored to monitor traffic, provide travelers with updates, and encourage public transportation.

The Oregon Transportation Research and Education Consortium assisted Portland's TriMet in improving its operations by examining and finding the causes of bus bunching. The Portland–Milwaukie light rail project is under way in a major growth corridor, connecting the Oregon Health and Science University, Portland State University, Oregon Museum of Science and Industry, Portland Community College's Workforce Training Center, and Southeast Portland.

PHOTO: MARK FISHER



Northeast Corridor Amtrak 66 boards in Williamsburg, Virginia. Long-term federal funding for Amtrak is a concern; Amtrak will receive less funds in 2012 than in 2011.

PHOTO: WIKIMEDIA COMMONS



Oregon's Lane Transit District added 14 new stations to Emerald Express, a bus rapid transit line between Eugene and Springfield.

In addition, Oregon's Lane Transit District expanded its bus rapid transit system, constructing 14 new stations to support the Emerald Express, a 4-mile line between downtown Eugene and downtown Springfield. The system operates on a combination of dedicated transitways and lanes and a block-signal system, to provide fast and efficient service.

Overcoming Constraints

State DOTs and other transportation organizations are employing a myriad of tools and approaches to overcome funding constraints. Examples cited include strategic management systems, technology tools, innovative funding approaches, and more. By leading in lean times, transportation organizations and their staff are deploying innovations that will serve the traveling public well for years to come.

References

1. *Traffic Safety Facts*. DOT HS 811 451, National Highway Traffic Safety Administration, April 2011.
2. Kononov, J., C. Lyon, and B. Allery. Relating Flow, Speed, and Density of Urban Freeways to Functional Form of a Safety Performance Function. In *Transportation Research Record: Journal of the Transportation Research Board*, No. 2236, Transportation Research Board of the National Academies, Washington, D.C., 2011, pp. 11–19.

Did You Know?

◆ **The nighttime lighted airway beacon system is unique to Montana.** In the 1920s and 1930s, radio navigation for aircraft was virtually nonexistent—pilots relied on a system of federally operated airway beacons. Some of the beacons were bonfires, lighted and stoked by hardy patrons. Electric bulbs replaced the bonfires, lighting airway corridors across mountains and plains at night and during inclement weather. As technology improved, the beacons became a thing of the past. Montana is the only state that still uses its part of this historic network through the rugged western mountains. The original lease required the state to maintain the beacons or return the land to its previous condition. Taking the beacons down would cost more than \$250,000 each, making maintenance the more cost-effective alternative. Division personnel climb and maintain 19 beacons on a regular schedule, and the local and vocal pilot population continues to rely on the guidance.^a

◆ **To encourage activity at general aviation airports,** Kentucky's Division of Aviation created a passport stamp program—pilots collect stamps by visiting the state's airports and become eligible to win prizes.

◆ **In response to research needs statements** received and evaluated as important, the Division of Research and Innovation at California DOT initiated a preliminary investigations report program in 2009 and has posted 29 reports in 11 subject areas, including information about related national and international efforts.

◆ **The Penobscot Narrows Bridge is home to the Penobscot Narrows Observatory.** The cable-stayed bridge over the Penobscot River near Bucksport, Maine, is the first bridge observation tower in the United States and at 420 ft is the ^a <http://www.mdt.mt.gov/aviation/beacons.shtml>.



Although it sometimes requires tall climbs in mountain weather, regular maintenance of Montana's unique, historic network of lighted airway beacons is more cost-effective than taking the beacons down.

tallest public bridge observatory in the world. The bridge opened to the public on May 19, 2007.

◆ **South Carolina has the fourth largest state highway system in America,** although the state ranks 25th in population and 29th in land mass.

◆ **The CEOs of eight state DOTs report to commissions,** instead of reporting directly to the state governors.

◆ **In the three months after Hurricane Irene,** the state of Vermont repaired and reopened some 500 miles of damaged road, replaced a dozen bridges with temporary structures, and repaired approximately 200 bridges, according to a December 6, 2011, *New York Times* article.