

# Making the Most of Available Funds

FINDINGS FROM THE TRANSPORTATION RESEARCH BOARD'S 2009 FIELD VISIT PROGRAM



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. Transportation professionals on the TRB staff meet on site with representatives of state departments of transportation (DOTs) and with representatives of universities, transit and other modal agencies, and industry. In addition, TRB staff is involved with planning and delivering conferences, workshops, and meetings. This report summarizes what the TRB staff learned from visits and activities during the past year.

The economic downturn, which began to affect state revenues during 2008, cut substantial amounts from state budgets in 2009. During fiscal year 2009, states reduced their general fund expenditures by 4.8 percent, according to the National Governors Association and the National Association of State Budget Officers. Reductions of at least 4 percent are expected in fiscal year 2010, as state revenue collections historically lag behind national economic recovery.

With the expiration of the Safe, Affordable, Flexible, Efficient Transportation Equity Act: A Legacy for Users in September 2009, the focus is on how the next bill will be funded and constructed. The expected series of short-term extensions is likely to intensify the funding uncertainties. Despite an \$8 billion cash infusion to the Highway Trust Fund, agencies are grappling with financial shortfalls that have led to staff and service cutbacks, ranging from employee furloughs to the closing of traveler rest stops.

But even while these budget cuts were making headlines, TRB staff on field visits witnessed an untold story behind the scenes—leaders and staff in transportation agencies across the country are working harder than ever to serve their customers despite unprecedented financial challenges. They are applying dedication and innovation to make the most of the available funding and resources.

### Institutional Issues

#### *Policy, Management, and Leadership*

The American Recovery and Reinvestment Act (ARRA), signed into law on February 17, 2009, provided \$787 billion in funding, with \$48.1 billion to U.S. DOT. Included was the Transportation Investment-Generating Economic Recovery Program, which made \$1.5 billion in “TIGER grants” competitively available for capital investments in surface transportation projects that can have a significant impact on the nation, a region, or a metropolitan area.

The Interstate 10–Hassayampa Valley Framework Study, conducted in 2006–2007, launched the Building a Quality Arizona process.



PHOTO: KAMERUV FISHER

U.S. DOT received 1,400 grant applications, requesting a total of more than \$58 billion.

Some state DOTs are taking measures for future improvements. Arizona DOT has invested \$11 million in a comprehensive statewide planning effort called Building a Quality Arizona. The program is a 40-year vision for the future aimed at engaging the public in conceptual thinking about their transportation needs and mobility desires. The effort emphasizes the links between mobility, land use, and economic vitality.

This collaborative effort has used an extensive public outreach process that includes open houses, focus groups, community workshops, website and online workshops, meetings with local elected officials and with representatives of neighboring states, and consultations with regional technical advisory teams.

At the open houses, stakeholders are asked to determine what resources to invest, how to shape the vision into reality, and what investments to make. The three-stage session starts with a video, *Arizona: Then, Now, and Ahead*, which presents a historic journey from the construction of the Interstates to the future of transportation. The next stage features Arizona DOT's recommendations based on the needs and community priorities, illustrated on a state map along with the vision and guiding principles, which include multimodal mobility; economic vitality; sustainability and environment; and safety and security. The last stage invites attendees to provide feedback and comments. Arizona DOT will use the input in long-range planning and in developing transportation infrastructure and services.

#### *Planning*

In recent years, the planning process has incorporated the consideration of such issues as greenhouse gas emissions, sustainable transportation, the failing



PHOTO: BOB HAZLETT, MARICOPA ASSOCIATION OF GOVERNMENTS



Highway Trust Fund, safety, and operations. Other issues have gone through cycles of priority and focus—such as transportation for the elderly who are aging in place, alternatives to the single-occupant vehicle, and high-speed rail.

Successful transportation planning agencies that can respond to critical issues in a timely way have demonstrated similar characteristics—strong connections to their community, a fundamental understanding of their community, and robust tools for the analysis of planning and policy questions. Although difficult to quantify, these three characteristics have served as a good gauge of a planning agency's effectiveness and ability to remain relevant in turbulent times.

Strong working relationships and established communication links with individuals and agencies outside transportation also have proved critical when new issues arise. For example, in many states, strong ties with safety officials have facilitated the inclusion of safety into the planning process.

A fundamental understanding of the community, region, or state also has reaped benefits, spanning economic drivers, demographics, community concerns, travel characteristics, and their evolution. Decision makers and the public usually cannot give a planning agency several years to develop the specific analysis tool or technique to answer an urgent policy issue. Forward-looking programs are developing, maintaining, and improving analysis tools so that agencies can respond in a timely way.

**Legal Issues**

The ARRA has emphasized the expeditious spending of stimulus funds. Many continue to explore and test innovative funding, public-private partnerships, and innovative contract delivery systems. Legal issues involving public-private partnerships seem to have no limit. With all its complexities, the topic again has captured the attention of transportation officials because of completed and pending megadeals.

With the renewed emphasis on infrastructure issues, the transportation legal community has recognized the need for state DOTs to update their manuals on design and construction. The pending release of the Highway Safety Manual will assist in these efforts, along with training related to the manual. Also highly anticipated is the next edition of the *Manual on Uniform Traffic Control Devices*, which promises increased precision in its requirements, as well as limits on the use of discretion in design.

State DOT attorneys are keeping abreast of changes in environmental law and other developments. Of particular interest is the recent decision by the U.S. District Court for the Eastern District of Wis-

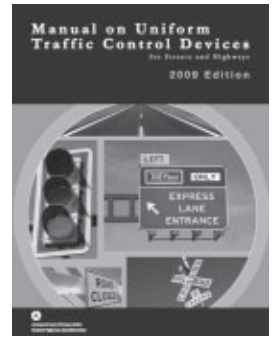
consin in *Highway J Citizens Group v. U.S. DOT*. The ruling found that open house hearings do not satisfy the federal public hearing requirements administered by the Federal Highway Administration (FHWA) [23 USC §128(a)]. If other districts reach similar decisions, transportation projects that use open house hearings may need to modify their practices.

**Energy and Climate Change**

Legislatures at all levels of government are passing bills that require significant reductions in greenhouse gas emissions, cuts in vehicle miles traveled, and a reduction in the reliance on the automobile in the near future. Transportation and energy professionals are working to identify programs and projects to achieve these goals while maintaining and improving the transportation system and providing reasonable alternatives. Transportation agencies recognize that investment at all levels of the nation's transportation infrastructure must involve environmental stewardship and the mitigation of the impacts on global climate change.

Many national and international policy decisions are pivotal, including global policies in response to the 2009 Copenhagen conference on climate change and the cap-and-trade legislation under consideration in Congress. These developments, along with new research findings, may answer the following questions:

- ◆ Should the U.S. transportation sector be prepared to reduce greenhouse gas emissions in pro-



Upcoming edition of the *Manual on Uniform Traffic Control Devices*.



Photo: Oregon DOT

Oregon DOT's equipment (above and below) to measure vehicle miles traveled (VMT) is part of an effort to reduce VMT and greenhouse gas emissions.



Photo: Oregon DOT

portion to its contributions to the problem?

◆ Should solutions specifically address transportation, or should transportation be included in more general policies, such as the carbon tax or the cap-and-trade proposals?

◆ What options offer the most potential—efficiency and technological innovation, alternative fuels, or travel behavior and demand management?

**Environment**

In 2009, state DOTs continued to focus on water quality issues, including total maximum daily load levels in stormwater runoff and treatment options to reduce pollution levels. Agencies are looking at innovative ways to engage and inform the public about the environmental effects of projects, notably concerns about noise and air quality.

With an increased public and federal focus on green issues, state DOTs have explored ways to make projects more sustainable. Some have implemented strategies associated with the Leadership in Energy and Environmental Design certification for construction projects.

Other environmental issues addressed at the state level include the use of alternative fuels in state-owned vehicles, the effects of transportation-related vibration on historic properties, hazardous materials management, and managing and developing effective roadway crossings for wildlife.



PHOTO: ALISON CONLEY



PHOTO: ALISON CONLEY

North Carolina's first sustainable rest area opened in late 2009 on Highway 421 near North Wilkesboro. The building's sustainable features include a small building footprint, 4.5 acres of reforestation, a photovoltaic system, and preferred parking for fuel-efficient vehicles and vanpools.

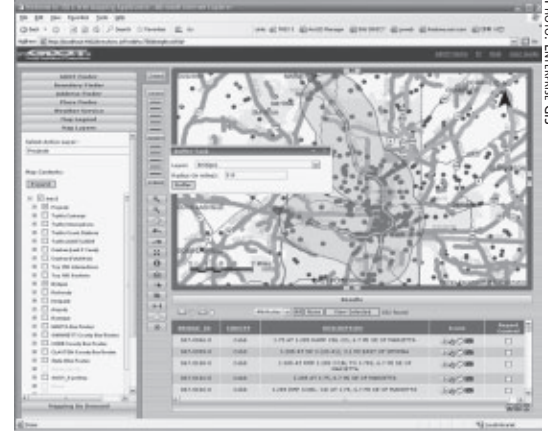


PHOTO: ENTERPRISE GIS

Enterprise Geographic Information Systems applications are used by transportation agencies such as Georgia DOT.

**Data and Information Technologies**

To support increasingly complex decision making, state DOT data departments are moving away from an emphasis on data sets to focus on information. Performance measures are setting data program priorities. To sort out the links from data programs to decisions, many state DOTs are initiating data business plans to determine the data needed for key decisions and the investment required to maintain appropriate data quality.

The emphasis on decision making also drives timeliness requirements. Performance measures demand data more frequently, for the quarterly reports that are replacing annual summaries. Federal data partners also are seeking more frequent data updates to monitor national trends. States are developing data-sharing relationships with local and regional partners and are learning to meet such requirements as web-based tools, well-defined procedures, frequent training, and shared benefits.

To make best use of constrained resources, more real-time data are needed, leading to closer relationships between the state data operations communities, with continued improvement of the Archived Data User Service to capture operational data for decision making. Many DOTs are purchasing private data instead of generating the data themselves. Many have purchased probe data, for example, to identify congestion problems and to support performance measures.

Enterprise geographic information systems (GIS) have become a key tool in integrating data to support departmental decisions, as well as in displaying information. Many third-party software providers are integrating GIS into their products. Decisions on safety improvements, for example, require the integration of location-specific data on crashes, traffic, and road-



ways available in the new generation of safety tools. Balancing the requirements for spatial accuracy, timeliness, and completeness with necessary investment is a major challenge. Choosing the right tools and integrating them across the entire DOT is important.

**Security and Critical Infrastructure Protection**

States and communities, as well as the private sector, are benefiting from the Department of Homeland Security's (DHS) Centers of Excellence, which bring together experts and researchers to conduct multi-disciplinary studies and educational programs. The centers addressing transportation security issues—prevention, protection, preparedness, response, recovery, resiliency, and training—organized and hosted events in several states and cities in 2009, often with participation by TRB.

State and local governments have established 58 fusion centers to gather intelligence on terrorist and criminal activities and to share this information among government agencies. The Department of Justice and DHS have established guidelines for the centers, which focus on research and analysis to identify trends and prevent incidents.

Major security projects in 2009 include the opening of a multimillion dollar security center at the Port of Long Beach, with offices for federal, state, and local enforcement agencies. The center will gather and share information on terrorist and criminal activity in Southern California. A consortium of five deepwater ports on the Mississippi River received a \$75 million DHS grant to establish a security layer along a key



PHOTO: JEFF DOW/RENO-TAHOE INTERNATIONAL AIRPORT

300-mile stretch of the waterway; Louisiana has appropriated the first phase of matching funds.

Caltrans is partnering with the Office of Emergency Services on the Operational Area Satellite Information System (OASIS). Housed in a portable trailer that can be towed to any area of California, OASIS provides around-the-clock coverage in any emergency for which communication services are vital.

Construction crews remodel the Reno-Tahoe International Airport's airport baggage check-in project, which was unveiled in December 2009. All airline ticket counters now operate from inside the newly remodeled ticket lobby.

**Aviation**

The volatile economies worldwide continue to affect the aviation industry, causing airlines and other aviation businesses to continue reductions in schedules and service levels. Revenues are down at airports throughout the country.

The federal government has yet to decide how to fund aviation system infrastructure needs—including technological infrastructure updates—and the pending reauthorization. Concerns remain about how to generate the funds—through changes to fuel taxes, user fees, or other charges, including passenger facility charges. Monies made available through the federal stimulus packages, however, have been put to good use throughout the airport system; many much-needed, shovel-ready projects are under way.

The national focus on green technology has produced an unanticipated consequence—the proliferation of wind turbine farms near airports, often close to critical flight paths. Although the turbines are not tall enough to require notification of the Federal Aviation Administration, the structures may cause safety concerns for pilots navigating around obstacles not shown on aeronautical charts.

Other issues that airports and state DOTs are addressing include wildlife strikes; mitigation of aviation-related effects contributing to climate change; noise levels; the fate of the Essential Air Service program; security at general aviation airports; and the new security program for large aircraft.

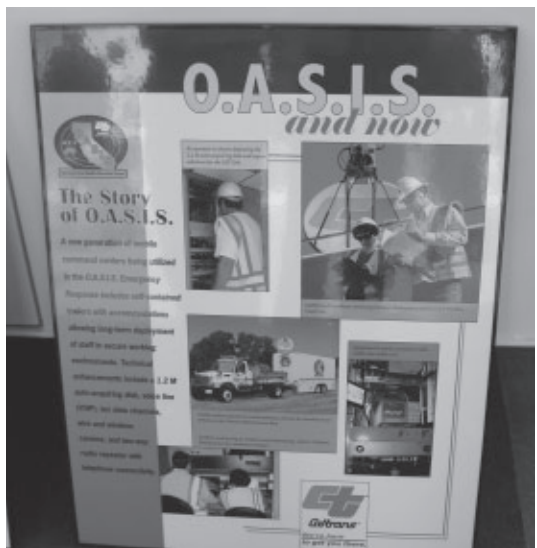


PHOTO: JOSEY CAMBRIDGE

California's Operational Area Satellite Information System, or OASIS—subject of a conference poster display (above)—can be transported anywhere in the state to provide emergency communications.



PHOTO: HANK SUPERMAN

A car carrier travels southbound I-75 just south of Perry, Georgia. The recession has led to a decline in automobile sales.

### Freight Systems

The economic recession has translated into precipitous declines in freight transportation volumes for all modes. In the U.S. economy, personal consumption accounts for roughly 70 percent of gross domestic product. When consumers cut back spending, serious economic consequences follow. Because freight transportation is a derived demand, understanding both consumer behavior and the responses of producers and suppliers is necessary.

Major shifts in consumption patterns have occurred during the recession, with declines in expenditures for automobiles, homebuilding, and discretionary household goods. A reduction in the demand for imported goods caused large declines in import trade, most notably through the West Coast ports. Many factors will determine how and when Pacific trade traffic will rebound. East Coast ports are gearing up for more imports from all water routes, as well as from the shifts anticipated when the Panama Canal expansion is completed.

Public-private partnerships are developing new corridors for more efficient freight movement, including the Heartland Corridor's double-stack route from Hampton Roads, Virginia, to Chicago, a combined effort of Norfolk Southern and the states of Virginia, West Virginia, and Ohio; the competing National Gateway project by CSX, connecting mid-Atlantic ports with the Midwest and Ohio Valley; and the north-south Crescent Corridor, involving Norfolk Southern and five states, with the lead state of Pennsylvania seeking ARRA funds.

States taking a systems view of freight issues include California, building on its 2007 Goods Movement Action Plan to foster freight mobility, economic development, reduced environmental impacts, and public safety; and Maryland, which published a

Statewide Freight Plan in 2009 to guide investments and program changes to accommodate freight transportation demand.

### Highways

#### Design

Despite an unprecedented decline in revenue, state DOTs are trying to accommodate an increased demand for the restoration, renewal, and replacement of critical infrastructure. A reduction in design staff through retirements and other attrition is adding to the difficulties, but many innovative practices, tools, and methods have been developed.

Pavement and bridge management systems have enhanced project selection at the executive and policy levels. The systems are gaining acceptance and use, along with asset management principles. Many state DOTs are looking forward to integrating their pavement and bridge management systems with roadside inventory and maintenance databases to create statewide infrastructure management systems.

Determined to spend limited funds for the most favorable impacts on the environment and the needs of the public, many states are incorporating the newest materials and methods to obtain the safest, most durable, and sustainable designs. These approaches include precast bridge and pavement elements; concrete and asphalt incorporating recycled materials; and preparations to apply the principles of the *Mechanistic-Empirical Pavement Design Guide*.

States are designing accelerated bridge construction projects using high-performance materials, including steel, concrete, and polymers. The Vermont Agency of Transportation is designing bridges with integral abutments to mitigate environmental impacts and to reduce materials, costs, construction schedules, and future maintenance.

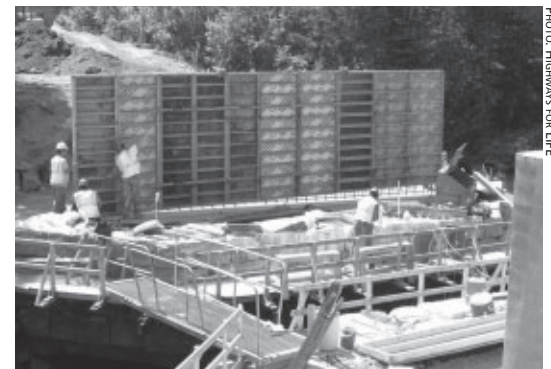


PHOTO: HIGHWAYS FOR LIFE

Placement of the abutment forms in the Lamson Bridge reconstruction project, part of a Highways for LIFE Maine Demonstration Project in Addison, Maine. The project featured a precast concrete back wall; precast, segmental retaining wall panels; and posttensioning duct pockets in the fascia beam.



PHOTO: KAMBERLY FISHER

Theodore Roosevelt National Park in McKenzie County, North Dakota. Route 10, which runs through the park, was rehabilitated in fall 2009 with funds from the American Recovery and Reinvestment Act; the road had not seen repairs since the early 1980s.

**Highway Construction and Materials**

With the economy struggling, major capital improvement projects declined, and most state DOTs focused on infrastructure renewal, congestion relief, and safety improvements. The stimulus funding under the ARRA gave a boost to construction activity, and state DOTs with jobs ready to go were able to take full advantage.

With most construction now under live traffic conditions, state DOTs are continuing to explore ways to improve jobsite safety, particularly for nighttime construction, and to minimize inconvenience to the public. A few states have used accelerated bridge construction techniques, ranging from prefabricated components to moving complete new structures into place during a weekend. States are monitoring the Renewal focus area of TRB's Strategic Highway Research Program 2 (SHRP 2), seeking guidance on rapid renewal.

Warm-mix asphalt has caught the attention of several state DOTs. The National Cooperative Highway Research Program (NCHRP) has sponsored a series of projects on warm-mix asphalt, with the latest project investigating performance characteristics, specifically moisture sensitivity.

Many states are considering raising the percentage of recycled asphalt pavement (RAP) in hot-mix asphalt. An NCHRP project is developing more guidance on high-RAP mixes.

More states are trying self-consolidating concrete on structures and are using recycled concrete as base material in pavement systems. Alkali-silica reactivity continues as a concern for some agencies, necessitating routine checks of aggregates.

**Geotechnical Engineering**

Geotechnical engineers have continued efforts to implement the Load and Resistance Factor Design standards for structural foundations, intelligent compaction, and the geotechnical aspects of design-build.

Some of the most noteworthy activities of 2009, however, related to rockfalls.

The American Association of State Highway and Transportation Officials (AASHTO) has yet to approve guidelines for the design, evaluation, and maintenance of rockfall protection systems, such as barrier fences, hybrid drapery, attenuators, draped wire mesh, and draped cable net, or to approve any available products. The recently released European Technical Approval Guideline may eliminate the variations in results from different procedures for testing rockfall barriers and may facilitate comparisons between products.

Cost and performance are essential considerations in selecting rockfall mitigation measures. Washington State DOT has initiated an experimental project to evaluate the cost and performance of four different types of ring nets as a drapery in place of cable nets. The project is expected to provide useful information on installation and field performance.

Colorado DOT implements field testing of various post foundations and mesh and cable net materials for use in rockfall attenuator systems.



PHOTO: TY ORTIZ, COLORADO DOT

The results of Colorado DOT's field testing of rockfall attenuator systems materials were outlined in Transportation Research Circular E-C141.

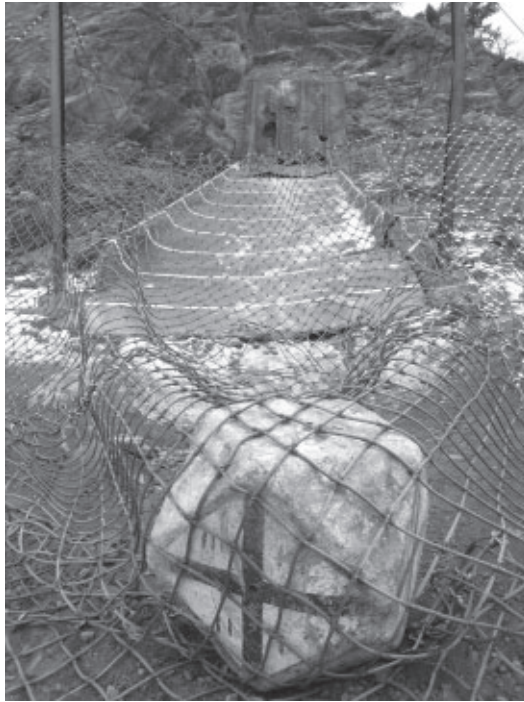


PHOTO: T. ORTIZ, COLORADO DOT

Flexible rock net is another rockfall mitigation measure in frequent use. Proper design and construction of the post foundations for the nets is critical to performance. Caltrans is reviewing the industry's design and construction standards and is investigating the performance of the post foundations in rockfalls. Colorado DOT tested rockfall attenuators to investigate the durability and performance of several mesh and cable net products, as well as of post foundations.

**Highway Operations**

Congestion occurs when traffic demand exceeds available capacity. Causes of recurring congestion include insufficient facility capacity and ineffective

management of capacity—for example, through poor signal timing. Causes of nonrecurring congestion include work zones, incidents, weather events, special events, and emergencies.

Historically, the solution to recurring congestion has been to construct new highways or to widen highways to increase system capacity. Adding new capacity, however, may not be viable because of constrained resources and other factors. State DOTs increasingly are turning to improvements in systems management and operations as an efficient and cost-effective way to reduce delays, ensure travel-time reliability, and increase air quality.

Pricing alternatives—including high-occupancy toll lanes and facilities with toll rates that vary with the level of congestion—are being considered and implemented to improve system performance and to help address funding shortfalls. The implementation of these options—and of others aimed at reducing greenhouse gas emissions—requires operations measures and intelligent transportation systems.

Many agencies are working to overcome jurisdictional boundaries and to develop a regional perspective and approach to managing and operating the transportation system.

**Infrastructure Preservation**

Transportation agencies are applying infrastructure preservation as a management approach, using scientific principles to maintain the functional condition of transportation infrastructure through cost-effective, preventive maintenance actions that safeguard structural integrity and extend performance life. These preventive maintenance actions include treatments for pavements, bridges, roadsides, drainage structures, rest areas, and traffic control systems.

Each dollar invested in applying a preventive maintenance treatment at the appropriate time in the life of a pavement can save \$3 to \$4 in future rehabilitation costs. The approach applies principles of engineering economics—such as benefit–cost and life-cycle cost analyses—in selecting a preventive maintenance treatment. Agencies report higher benefit–cost ratios for projects selected under effective pavement preservation programs than for projects selected on noneconomic factors.

Many agencies are exploring ways to meet the new national requirement to establish and implement methods to assess and maintain minimum levels of sign retroreflectivity by January 2012. In addition, state DOTs must meet the minimum retroreflectivity requirements for regulatory, warning, and ground-mounted guide signs by January 2015 and for overhead guide signs and street-name signs by January 2018.

Transportation Management Center in St. Louis, Missouri.



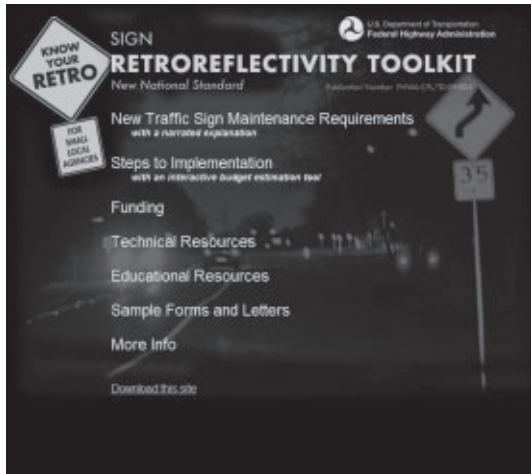
PHOTO: MISSOURI DOT





Winter maintenance decision support systems (MDSS) are being developed and implemented to integrate and coordinate state force and contractor efforts effectively and efficiently in response to changing storm and traffic characteristics. The goals of MDSS are to provide decision makers with information on the current road conditions, the forecast weather conditions and their effects on the roadways, appropriate treatment scenarios with available resources, and an assessment of the effectiveness of the maintenance treatments.

Indiana DOT expanded its MDSS statewide during the 2008–2009 winter season and reported savings of more than \$10 million in material and overtime labor costs. Indiana DOT anticipates an accrual of benefits as it continues to integrate the MDSS into its standard winter operations.



**Highway Safety**

Highway crash fatalities declined in 2008. Nationwide, in 2007, the total was 41,259 deaths, and in 2008, the total was 37,261. The National Highway Traffic Safety Administration projected an additional decline of 7.0 percent for the first half of 2009.

The respective contributions of safety programs and of changes in traffic volume, however, are unclear. Although economic pressures often are considered a prime contributor to the decline in crashes, specific evaluations indicate that safety countermeasures also are making a contribution. Instead of focusing on remediation at locations with high rates of crashes, agencies increasingly are adopting a systems approach to roadway safety, which appears to be successful.

Evaluations of median cable barrier systems in several states found reductions of up to 90 percent in cross-median fatal crashes. Minnesota discovered that rural, two-lane curve radii of 1,500 feet or less were overrepresented in serious crashes and has targeted countermeasures for specific curves statewide.



PHOTO: DAVID GONZALEZ, MINNESOTA DOT

States are implementing and updating their Strategic Highway Safety Plans. Some states, such as Alabama, are incorporating new strategies as original goals are met.

The TRB Task Force on the Development of the Highway Safety Manual (HSM), supported by funding from NCHRP, has completed the first edition, to be published by AASHTO in 2010. States are beginning to apply the approaches suggested in the manual; for example, Illinois is developing safety performance functions. An NCHRP project is developing training and implementation programs for the HSM, as is FHWA.

**Ports and Waterways**

Clean trucks continue to be a focus for major ports around the country. The Houston Port Authority received a \$9 million stimulus grant, and the Port of Baltimore received a \$3.5 million grant from the Environmental Protection Agency (EPA) to finance clean-truck upgrades. The Port of Virginia received \$1 million in stimulus funds to encourage truck-owner participation in a voluntary program. The Port

Minnesota DOT has targeted rural, curved two-lane roads—such as MN TH-3 in Inver Grove Heights, near St. Paul—for safety countermeasures.

In August 2009, the U.S. Environmental Protection Agency awarded \$3.5 million to the Port of Baltimore for the installation of clean-diesel technology into 142 pieces of diesel-powered equipment used at the port, such as harbor craft, locomotives, dray trucks, and on-dock handling equipment.



PHOTO: MARYLAND PORTS ADMINISTRATION

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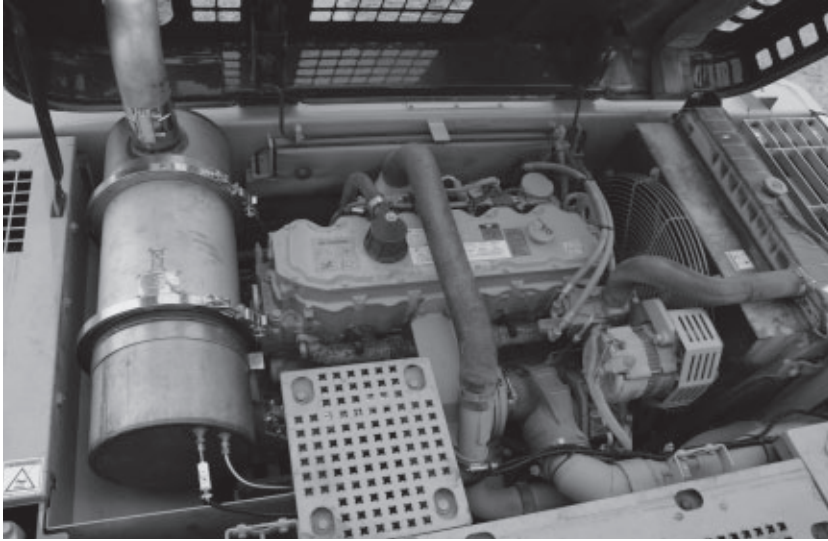


PHOTO: MARYLAND PORTS ADMINISTRATION

Maryland Ports Administration showcased clean diesel equipment at an April 2009 event.

Authority of New York and New Jersey authorized \$23 million to help truckers finance the replacement of more than 600 of the oldest and most polluting trucks serving the port.

The clean-trucks program in Southern California has reduced diesel pollution in San Pedro Bay by 80 percent, two years ahead of the target date. By January 2010, 90 percent of trucks calling at Long Beach and Los Angeles will be clean-diesel trucks or will be powered by clean fuels such as liquefied natural gas.

Texas, Louisiana, Mississippi, and Alabama have launched an initiative, America's Energy Coast, to

raise awareness about activities in the Gulf Coast region that support the nation's offshore energy supply. The initiative also is alerting the public that the coastal wetlands are disappearing at an alarming rate of 25 square miles per year. Coastal wetlands absorb carbon dioxide, which is a major cause of global warming; therefore restoration should be a priority for the region and the nation.

In Puget Sound, efforts are being made to reduce the problems associated with marine debris—specifically derelict fishing gear—which has become a major environmental hazard. Stimulus funds are being used to provide jobs for local fishermen and divers to recover nets and gear that litter the Puget Sound ecosystem.

EPA has established a 230-mile zone to control air pollution from ocean shipping; measures involve switching fuels and reducing vessel speeds. Issues have arisen, however, over the effects of fuel switching on engines and on other vessel machinery.

The ports of Morrow and Umatilla on the Columbia River are investing in innovations to move freight to the coast, including construction of a main line rail siding and container yard at Morrow and the launch of a short sea project at Umatilla for barge service down the Columbia and up to Puget Sound.

The Louisiana Department of Environmental Quality has undertaken the first study to measure tank barge emissions. A study for the waterways industry concluded that inland barge transportation



PHOTO: LYNN BETTS, USDA NATURAL RESOURCES CONSERVATION SERVICE

This remnant of a cypress-tupelo wetland in an oxbow in central Mississippi is now part of the Wetlands Reserve Program. Coastal wetlands continue to disappear at the rate of 25 square miles per year.



PHOTO: HORNBLOWER CRUISE AND EVENTS



The nation's first hybrid ferry, the Hornblower Hybrid, debuted in San Francisco, California, in December 2008.

has occurred in recent years has experienced drastic declines in traffic volumes because of the economic recession, and questions remain about long-term changes in freight flows, as some rail-dependent industries undergo changes. The lower volumes have relieved pressures on rail system capacity; however, increased intercity passenger services will share freight lines and put new pressure on corridor capacity in many areas.

Many states continue to fund rail freight improvements to support their own economies. For example, Pennsylvania recently announced a total of \$24.5 million in capital and transportation assistance grants. Ohio is administering more than \$30 million in ARRA funds for rail freight and economic development projects.

has a much smaller carbon footprint than truck or rail, making the case for maintaining and upgrading the inland waterway infrastructure and promoting short sea shipping.

Hybrid power is on the increase in marine transportation. A hybrid ferry was introduced that uses alternative technology to power the vessel and reduces the amount of particulate matter released into the atmosphere.

**Rail**

The rail story for 2009 can be dubbed “reversals of fortune.” Intercity passenger rail, which has languished for years with limited state-funded plans and improvements and limited funding for Amtrak, is in the ascendancy, with \$8 billion in stimulus funding available under the ARRA and the promise of more to come—\$2.5 billion in the appropriations for fiscal year 2010.

These funds follow the creation of new programs in the Passenger Rail Investment and Improvement Act of 2008. Applications far outpaced the available ARRA funds, for both large high-speed rail corridor programs and for corridor planning and smaller projects. The Federal Railroad Administration will announce the selected projects early in 2010.

In the meantime, many states continue to undertake projects that improve trip times and reliability. For example, a project led by Missouri DOT, working with Union Pacific Railroad and Amtrak, with federal matching funds, has improved passenger and freight services between St. Louis and Kansas City. Many other states, including North Carolina, New York, Illinois, California, and Wisconsin, have invested in improving services in intercity corridors.

At the same time, the rail freight renaissance that

**Public Transportation**

The past year offered financial hope and payoff for long-term capital decisions in public transportation. Transit ridership has continued to increase. The ARRA directed \$7.6 billion in 712 federal grants to transit projects. Previous long-term investments and operational changes enhanced services, expanded systems, and improved productivity.

In the West, the Los Angeles County Metropolitan Transportation Authority opened up the 6-mile extension of the Gold Line light rail transit from downtown to East Los Angeles. Seattle opened its 15-mile light rail line to the airport in December. Many systems replaced older equipment with green buses and locomotives.

Steps were taken at state and local levels to address financial issues. New York City, Chicago,

Secretary of the Interior Ken Salazar (*wearing cap*) views the 33,000-acre park on the Cuyahoga Scenic Valley Railroad in Brecksville, Ohio. Ohio is set to receive \$23 million from the American Recovery and Reinvestment Act.



PHOTO: TAMM HEITEMANN, U.S. GEOLOGICAL SURVEY

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Los Angeles County Metropolitan Transportation Authority opened an extension of its Gold Line in late 2009.



Photo: LACMTA

and Washington, D.C., considered fare increases. Service cuts were necessary in Cleveland, St. Louis, Chicago, and Orange County, California. Some cities—New Orleans, Savannah, Phoenix, Houston, Dallas–Fort Worth, Los Angeles, and Denver—are turning to the private sector to operate parts of their systems. Philadelphia experienced a short but intense transit strike.

The California Legislature adopted a budget elim-

inating support for local transit systems by diverting more than \$3 billion in constitutional and statutory transit funding to the state general fund; the State Supreme Court, however, denied the action.

Aging infrastructure in older big-city systems is experiencing more stress and chronic underfunding for maintenance and replacement. ARRA funding may help somewhat, but the dynamic remains—heavy use, wear and tear, and systems operating beyond design life.

A tragic accident on the Washington, D.C., Metro Red Line, caused by infrastructure failure involving train control technology, has led to manual operation, more track and circuitry inspections, and caution. In November, U.S. DOT announced plans to propose national safety regulations for subways and light rail transit.

### Invaluable Contributions

This sampling portrays some of the many behind-the-scenes advances by dedicated staff at transportation agencies across the country. Their initiatives are supported by a cross-section of colleagues in industry, consulting, contracting, universities, and research.

Despite diminished resources, their combined efforts are yielding progress toward key goals ranging from reducing traffic deaths to improving the environment. Although these efforts may not gain the headlines generated by the latest budget cuts or by short-term reductions in service, their contributions to achieving the longer-term goals of livability and sustainability are invaluable.

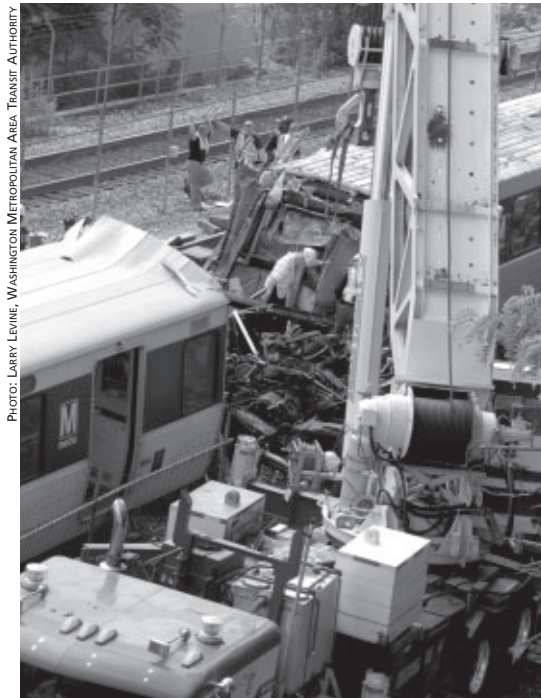


Photo: Larry Levine, Washington Metropolitan Area Transit Authority

Wreckage and debris are removed days after two six-car Red Line trains collided outside of Washington, D.C., in June 2009; nine people were killed, including the operator of the second train—the deadliest crash in Metro's history.

## Did You Know?

◆ One-third of America's freight flows through Arizona.

◆ "From virtually the moment railroad construction began, South Dakota was inundated with eager home seekers. In 1870 the southern half of the Territory had 11,776 residents. By 1880, only two years into the boom, that number stood at 98,268, while five years later the population had mushroomed to 263,411. During the same period, railroad mileage went from zero to 2,456 miles." (From the South Dakota State Historical Society website, <http://history.sd.gov/default.aspx>.)

◆ Indiana's statewide deployment of the Maintenance Decision Support System during the winter of 2008–2009 reduced salt costs by \$12 million and realized more than \$1 million in savings for fuel and overtime. The savings amounts to 27 percent of Indiana DOT's normal total winter budget.

◆ North Carolina DOT opened a rest area on Route 42 that was certified under the standards of Leadership in Energy and Environmental Design—the first such rest area in the country (see photos, page 18). A public website shows the energy and utility savings from the green infrastructure (<http://ncdot.technology-view.com/wilkes>).

◆ The Vermont Agency of Transportation owns—and leases out—nearly 50 percent of the railroad beds in the state, maintaining the property and some of the bridges.

◆ The Maryland State Highway Administration (SHA) relied on turtle-scenting dogs to find box turtles in a highway right-of-way before construction. The hunting dogs—Boykin Spaniels and Labrador Retrievers—located and retrieved the turtles for environmental scientists who recorded the size, weight, gender, and other data before relocating the turtles. (For more information, see page 40.)

◆ In another environmental stewardship initiative, Maryland SHA deployed goats and sheep to provide passive vegetation management along a bypass constructed around Hampstead Town in Carroll County. The goal was to protect a wet sedge meadow that contains shrubs preferred by the federally protected bog turtle.

◆ The communities east of Los Angeles have a new and vital transportation link with the opening of the Metro Gold Line extension on November 15, 2009. Eight new stations serve diverse Los Angeles neighborhoods, including the Arts District, Little Tokyo, and Boyle Heights. The rail extension connects the Eastside with downtown Los Angeles, Pasadena, the San Fernando Valley, South Bay, Long Beach, and dozens of points between.



Image: South Dakota Historical Society

*Railroad construction in South Dakota around 1870 provided the stimulus for population growth; map shows rail routes in the early 1900s.*

◆ Virginia's inland port near Front Royal has been the catalyst for approximately 7,000 new jobs since opening in 1989, according to the state's port authority. Connected to seaports by Norfolk Southern railroad, the inland port has drawn 24 companies to the area and has attracted some \$600 million in investments.

◆ The logistics sector in Memphis, Tennessee, weathered the economic downturn better than many industries in 2009, largely because of railroad investment. BNSF Railway completed a \$200 million expansion of its Memphis intermodal facility, and Canadian National Railway finished a \$100 million renovation of its switching facility.



Photo: Maryland SHA

*The Maryland State Highway Administration deployed sheep and goats for passive vegetation control, as part of an environmental plan to protect the bog turtle population in the construction of the MD-30 bypass.*