



IMPLEMENTERS *of* INNOVATION

Findings from the Transportation Research Board's 2012 State Partnership Visits 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 hundreds of organizations and thousands of individuals provide TRB staff with information from the public and private sectors about 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 with representatives of universities, transit and other transportation 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 "walking school bus" and other GreenDOT initiatives from Massachusetts Department of Transportation (DOT) increased awareness of pedestrian safety and alternatives to automobile transportation.



PHOTO: MASSACHUSETTS DOT

A tunnel-boring machine emerges from the ground, after excavating a section of the Port of Miami Tunnel in Florida. The project, a public-private partnership between the State of Florida and Miami Access Tunnel Concessionaire, LLC, is partially funded with a Transportation Infrastructure Finance and Innovation Act loan.

The year 2012 was a rollercoaster of good news and bad news for the economy in general and for transportation funding in particular. The good news included a slowly improving economy, with increases in tax receipts. The Fiscal Survey of States, released in early December by the National Association of State Budget Officials and the National Governors Association, found that state revenues for the fiscal year surpassed prerecession levels for the first time.¹ In addition, voters approved a majority of the transportation revenue issues on the November ballots. At the national level, the signing of the mul-

¹ www.nasbo.org/sites/default/files/Fall%202012%20Fiscal%20Survey%20of%20States.pdf.

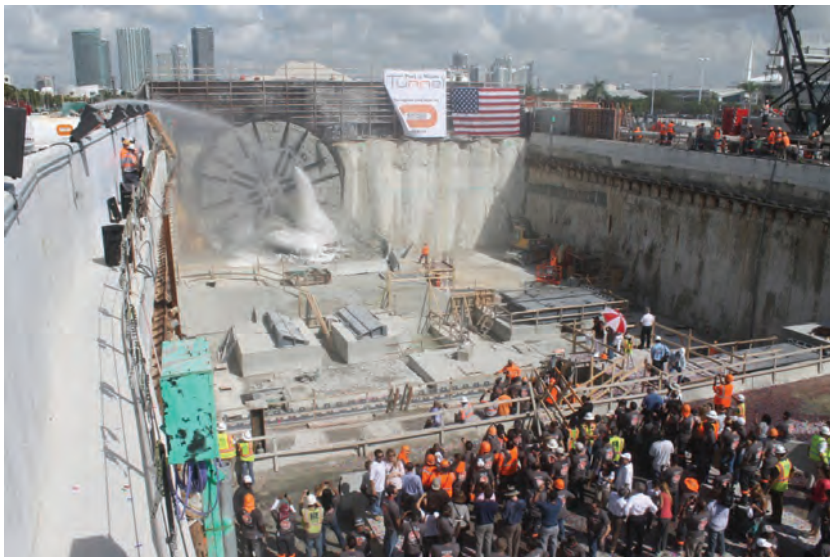


PHOTO: FLORIDA DOT

tiyear transportation authorizing legislation, the Moving Ahead for Progress in the 21st Century Act (MAP-21), established certainties about funding for federal-aid surface transportation programs.

Nonetheless, many uncertainties persist. The MAP-21 legislation only covers two years. As 2012 ended, Congress and the Administration grappled with the potential sequestration of federal funding. Most observers expect a reduced level of federal spending on discretionary programs, including transportation, in the coming years. At the state and local government levels, revenues are growing at a slower rate than health care costs, which could diminish the funding for transportation, infrastructure, education, and public safety.

State DOTs and other transportation organizations are meeting the challenge of these continued economic uncertainties by implementing innovative solutions to transportation problems.

Institutional Issues

Policy, Management, and Leadership

Enacted in July 2012, MAP-21 provides \$105 billion in funding for fiscal years (FY) 2013 and 2014 to address a multimodal surface transportation program of improvements to mobility for passengers and freight, safety, efficiency, and environmental protection.

Among its major provisions, MAP-21 emphasizes a performance-based approach. Rulemaking is still under way, but many states have created and implemented their own performance measures. For example, Massachusetts DOT's GreenDOT Policy features a variety of measures designed to achieve the state's environmental objectives.

MAP-21 significantly increased the funds available under the Transportation Infrastructure Finance and Innovation Act (TIFIA), an innovative finance tool, providing \$750 million in FY 2013 and \$1 billion in FY 2014. The program provides a means for eligible projects to leverage limited federal resources through supplemental or subordinate debt.

States continued to pursue public-private partnerships and establish high-occupancy toll (HOT) lanes. Los Angeles County, California, and the Washington, D.C., area's Capital Beltway were among those opening HOT lanes in 2012.

With the expectation of long-term constraints on federal funding, stagnant or declining revenues from fuel taxes, and other competing demands for scarce dollars, states and local agencies are relying more on their own sources of revenue. In November, voters approved more than 70 percent of the state and local transportation bond issues and referenda on the ballot.



When planning the Milton Madison Bridge project, Indiana DOT analyzed the economic impacts of bridge closure on area businesses as well as the impacts of construction spending.

Planning

Transportation planning historically has considered economic factors in evaluating project alternatives and investment programs. This approach has become increasingly critical, as transportation agencies at all levels work to improve local economic conditions. Agencies have adopted innovative techniques to incorporate economic impacts, competitiveness, growth, and diversification, as well as benefit-cost analysis, development potential, and other related factors, into the decision-making process.

Indiana DOT's economic analysis of the Milton Madison Bridge, a critical connection between Indiana and Kentucky, not only addressed the economic impact of construction spending—a traditional consideration—but also the regional economic impact on businesses and industries during the bridge closure, an innovative approach. The analysis of the impact on regional businesses, which included a discussion of the advantages of ferry service during the construction, was critical in deciding between alternatives.

Florida DOT developed the Strategic Investment Tool (SIT) to select and prioritize projects. The on-line web tool evaluates each project against five goals and 24 measures; “enhanced economic competitiveness and economic diversification” is a sample goal. SIT includes three components—a system viewer, analyzer, and reporter. Florida DOT uses the tool for highway projects but plans to expand use to other modes.

As these examples demonstrate, transportation agencies are employing new tools and evaluations to ensure optimal economic returns from projects.

Legal Issues

Transportation agencies are expanding their use of social media, raising legal and operational concerns about the use of social media to expedite the delivery of transportation programs, particularly for legal notifications and public involvement. Connected and driverless vehicles—especially the challenges and opportunities for highway authorities—are other technologies attracting the attention of the transportation legal community.

MAP-21 includes new provisions that affect the environmental review process, by accelerating project delivery. For example, the new procedures combine the final environmental impact statement with the record of decision under the National Environmental Policy Act. This will permit federally funded advance acquisition of real property before the completion of review and will further integrate the planning and environmental review processes. The full effects of the MAP-21 provisions remain to be seen.

The impact of the 2009 *Manual on Uniform Traffic Control Devices* on state traffic and highway safety operations and the perceived loss of flexibility to

Florida DOT developed its Strategic Investment Tool to evaluate highway projects and plans to extend it to other modes as well.

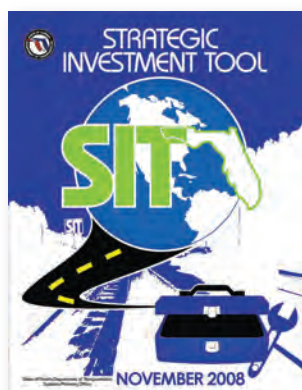




PHOTO: KEVIN STILMAN, TEXAS DOT

Maribel Chavez and Bill Hale, Texas DOT, test a pickup truck powered by compressed natural gas. The agency is piloting a program to determine the cost-effectiveness of natural gas vehicles.

apply engineering judgment in decisions about traffic control devices remain a continuing legal concern for state DOTs.

Environment, Energy, and Climate Change

Managing stormwater runoff remains an issue for states, particularly in evaluating Municipal Separate Storm Sewer System permit requirements and in preparing for audits. Culvert management and providing passages for protected aquatic species, particularly in critical habitat areas, are other water-related areas of focus.

States also are evaluating the effectiveness of programs and policies to reduce greenhouse gas emissions from transportation networks. Some are exploring ways to engage in carbon markets and to integrate climate change considerations into transportation project development.

Other environmental issues that states are addressing include the use of natural gas and hydrogen fuel cell technologies; identifying and evaluating the historic significance of post-World War II housing in compliance with the National Historic Preservation Act; and the effects of transportation-related noise on wildlife.

Critical Infrastructure Protection and Security

Superstorm Sandy provided a compelling example of the devastating impact disasters can have on the nation's transportation infrastructure, with cascading failures crippling freight and passenger transportation, as well as a region's and the nation's economy. Although the area most affected by Sandy is regarded as well-prepared for such situations, flooding shut down virtually every component of the transportation system into and out of New York City. The superstorm issued a wakeup call to officials at all levels in all areas of the country that more must be done to find ways to harden transportation systems against damage and to prevent a disaster from taking systems offline.

Emergency management agencies have connected with nongovernmental organizations, private industry, and supply chain companies to coordinate relief aid, cleanup efforts, and fuel needs. Florida and Louisiana have enacted laws requiring motor fuel facilities—including terminals, wholesalers, and service stations—to be able to switch to an alternative source of energy during a power outage. At West Virginia University, research funded by the Department of Homeland Security is developing an inflatable plug to hold back floodwaters from transportation tunnels—a less expensive alternative to retrofitting tunnels with metal floodgates or other more expensive structures.

Providing real-time observations and data to authorities and responders in affected areas is critical to the resumption of traffic across all modes. Social media are taking on an increasingly important role in preparation, response, and recovery.

Data and Information Technologies

Data to support enterprise approaches such as asset management and performance measurement—as well as investment strategies that consider more than pavement and bridges—are a focus among states. Utah DOT learned from its early asset management work that statewide, automated data collection was necessary to provide the data quality needed to support decisions.

Employees from Metropolitan Transportation Authority–New York City Transit worked to restore the South Ferry subway station after it was flooded by seawater during Superstorm Sandy.



PHOTOS: PATRICK COHEN, METROPOLITAN TRANSPORTATION AUTHORITY



The Hugh L. Carey Tunnel, formerly known as the Brooklyn Battery Tunnel, flooded during Superstorm Sandy. Destruction and severe delays caused many transportation officials to reexamine emergency procedures.

Recent technology advances, such as lidar, have enabled states to inventory more than pavement data by including signs and other roadside features, as well as to incorporate additional functions, such as maintenance. Spreading the cost over several functions also ensures the necessary annual updating of the inventories.

To manage investment levels across assets—including information technology services, fleets, maintenance, bridges, and pavements—Colorado DOT is developing a system that generates life-cycle spending forecasts to support integrated analysis. Colorado policy makers have required that budget presentations include alternative investments.

Demonstrating the critical role of transportation in state economies is a key task. Through the shared use of private-sector supply chain data, for example, public agencies can strengthen freight planning without having to gather new data. The success of such an arrangement depends on the private sector's understanding of the value to be gained from public use of the data and on the public sector's respect for proprietary concerns.

California's program to improve trade corridors demonstrated the importance of key freight gateways for the state and the nation. The efforts also demonstrated that improved use of private supply chain data can support public investment decisions and can minimize supply chain costs for the public and private sectors alike.

Aviation

The passage of the Federal Aviation Administration (FAA) Modernization and Reform Act early in 2012 was intended to provide support for the implementation of NextGen technologies. Although the legislation relieved many uncertainties, anticipated requests for budget and staffing cuts from all facets of the federal government, including FAA, leave the

future of many programs in doubt. States are concerned about the effects of pending budget cuts on local and regional aviation systems, particularly for projects at general aviation airports—even a small budget reduction could prevent the implementation of much-needed improvements.

In the meantime, the industry continues to evaluate new technologies and other opportunities to support aviation. Research continues on the production, use, and distribution of alternative aviation fuels; the development of inventories, registries, and credit systems for greenhouse gas accounting; the integration of the Unmanned Aerial System market into civil, nonmilitary airspace and airports; and the improvement of response and recovery from irregular operations after natural disasters or other events.

Freight Systems

MAP-21 recognizes the importance of the freight system and calls for a national freight policy and strategic plan and for incentives for states to engage in freight planning through dedicated state plans and advisory committees.

In October, Superstorm Sandy exposed the fragility and challenged the resilience of freight systems, affecting 24 states and causing mass disruptions and severe damage in the Northeast. This populous region is a major cargo gateway, consumer market, and energy hub. The storm created a complex array of response and recovery problems, including power outages, fuel shortages, and damaged infrastructure and rolling stock, sending ripple effects throughout the supply chain. Seaports as far south as Norfolk, Virginia; Charleston, South Carolina; and Savannah, Georgia, accepted cargo originally destined for the affected areas.

The effects of climate change on freight systems and infrastructure, as well as on preparedness and recovery practices, remain priority concerns for states.

The retired spacecraft *Discovery* was flown from Cape Canaveral, Florida, to the Stephen F. Udvar-Hazy Center in Virginia in April 2012.



PHOTO: CHRISTINE GRECHER



PHOTO: TREVOR WARTON, VIRGINIA DOT

Virginia DOT has implemented innovative technologies such as quiet pavements, here on Route 199 near Williamsburg.

Highways Design

Design engineers at state DOTs are key players in the development and deployment of innovation—defining research needs, implementing new codes and specifications, learning about innovations via conferences and webinars, and assisting field personnel in implementing new products and processes.

Engineers and scientists at the Virginia Center for Transportation Innovation and Research, for exam-

ple, identify opportunities for implementing innovation by working through Virginia DOT district offices. The center provides funding to help cover additional construction costs, offers technical support during implementation, and assists with troubleshooting during implementation. Recent efforts to implement innovation include warm-mix asphalt, quieter pavements, and road kill composting.

Similarly, Oklahoma has taken an innovative approach in implementing the *Mechanistic-Empirical Pavement Design Guide*; Utah has taken the lead in accelerated bridge construction innovations; Minnesota has had success with living snow fences; and Montana has produced a new design guide that improves the environmental impact and decreases the cost of rest areas.

In all cases, the state DOTs note that the implementation of innovation begins during the scoping of the research; that collaboration between designers, researchers, field personnel, and industry partners is necessary; and that someone in the field has to champion the innovation.

Highway Construction and Materials

State agencies are facing the challenge of replacing or improving their deteriorating infrastructure despite the uncertainty in revenue. Many states recognize that construction of larger projects is changing, with an assortment of alternative project delivery methods, with techniques that are faster and less inconvenient to the public, and with increasing use of intelligent construction systems and technologies.

Several states have adopted accelerated bridge construction and are developing a statewide policy for selecting appropriate projects. A few states have applied intelligent compaction for pavement projects.

The acceptance of recycled and reclaimed materials in pavement structures is increasing. Caltrans is moving to a statewide standard that allows asphalt pavements with up to 25 percent recycled asphalt pavement, taking advantage of the high-quality aggregate. Michigan has developed a guide for the use of recycled concrete aggregate in various paving layers. A national pooled-fund study is under way on the use of processed recycled asphalt shingles. Warm-mix asphalt is gaining momentum as research on its long-term performance continues.

Alkali-silica reactivity in new and existing concrete structures remains an issue; research is exploring prevention and mitigation. Research also is under way to improve concrete curing products and application methods; Arkansas is experimenting with a lithium cure on bridge decks. Interest is growing in the application of nanotechnology in asphalt and concrete materials.



PHOTO: MISSOURI DOT

In Missouri, roofing shingles are recycled into pavement aggregate. State DOTs increasingly are incorporating reclaimed and recycled materials into pavement structures.



PHOTO: LEE GALVAN, FHWA

Intelligent compaction density evaluation in Utah.

Geotechnical Engineering

Geologic hazards such as landslides and rockfalls that affect transportation corridors are a concern for state DOTs. In 1996, TRB published Special Report 247, *Landslides: Investigation and Mitigation*; in 2012, TRB published a companion volume, *Rockfall: Characterization and Control*, prepared by a task force of experts. These two resources offer a wealth of practical information.

Aggregates comprise a major volume of the asphalt and concrete mixes used for the construction of transportation infrastructure; aggregate properties—such as shape, size, chemistry, and surface characteristics—influence the performance of infrastructure and are subjects of ongoing research. With state DOTs concerned about protecting the environment, reducing transportation's carbon footprint, and increasing sustainability, interest has increased in using marginal aggregates or recycled material found close to the construction sites. These approaches

offer economic and sustainability benefits by reducing greenhouse gas emissions, energy use, congestion, and stress on pavements.

More states are using the lightweight deflectometer (LWD) in construction quality assurance. The LWD provides in situ measurements of the properties of soil and layered systems for the design and construction of transportation facilities. A recognized standard for interpreting the load and deflection data obtained during construction quality assurance testing is needed, however, as well as guidance relating the measurements to the material properties used for pavement design. A pooled-fund study is addressing this gap in knowledge in 2013, with Maryland DOT in the lead.

Highway Operations

Vehicle-to-vehicle and vehicle-to-roadway technologies may yield the next major breakthrough in operations and safety. Federal and state agencies, the automobile industry, and other private-sector partners have been researching the effectiveness and feasibility of connected vehicle technology, which allows vehicles to communicate with other vehicles, to traffic signals, and to other roadside devices via short-range wireless communications.

Deployment of this technology could enable cooperative solutions to advance real-time operations and prevent crashes. Drivers who have participated in field tests have given the connected vehicle technologies an overwhelmingly positive response.

Managing demand and optimizing system operations are cost-effective solutions to reduce delays and improve travel-time reliability. Many state DOTs are working to use the entire roadway to improve the



PHOTO: BRIAN DIFENDERFER, VIRGINIA CENTER FOR TRANSPORTATION INNOVATION AND RESEARCH

A core sample from an in-place pavement recycling project on I-81 near Staunton, Virginia. Virginia DOT combined full-depth reclamation, cold central-plant recycling, and cold in-place recycling in the project. Many states are experimenting with recycled pavement material for environmental sustainability.



PHOTO: NATIONAL PARK SERVICE

Road crews remove debris from a rockfall in January 2012 that closed Highway 120 in Yosemite National Park for more than a month.

Photo: U.S. DOT



Research into connected vehicle technology, incorporated into the dashboard and console above, could lead to safer roads and reductions in travel delays.

performance of specific lanes or of the entire freeway or highway. This management of the cross section and operation of a freeway or arterial is becoming commonplace.

An active management approach distinguishes this new focus on managed lanes from the traditional

forms of freeway management—the operating agency proactively manages demand and available capacity on the facility by applying new operational countermeasures or by modifying strategies. These strategies could include dynamic speed limits; restricted lanes—for example, for high-occupancy vehicles or trucks only; variable pricing based on the level of congestion; access controls such as express or reversible lanes; motorist information—for example, through electronic variable messaging and lane control signs; temporary shoulder use; ramp metering, and more.

Infrastructure Preservation

Preservation of the transportation infrastructure and operating systems requires expertise in management, engineering, and economics, as well as the establishment of strategic performance goals. An assortment of routine maintenance, preventive maintenance, and minor rehabilitation activities also is needed to progress toward network goals for pavements, bridges, drainage structures, roadsides, traffic control systems and devices, rest areas, and more.

Infrastructure preservation is a management approach based on scientific principles. The goal is to maintain the functioning of infrastructure ele-

ments through the timely application of cost-effective preventive maintenance designed to safeguard the integrity of each element and to extend performance life.

A recent AASHTO report advocated for national-level performance measures that reinforce an asset management approach in implementing MAP-21; specifically to be avoided are measures that promote or support a “worst-first” approach.² Many studies in the past 20 years have documented that a preservation project can provide up to a 14-fold difference in benefit–cost ratio, depending on the condition of the element and the preservation action selected.

A balanced, three-pronged approach of preventive maintenance, rehabilitation, and reconstruction synergistically can improve network condition, optimize available funds, and balance the remaining service life of the network features. Successful implementation requires extensive training for staff to develop a good understanding of how the preservation approach works and to increase confidence throughout the organization in the effectiveness of an infrastructure preservation program based on asset management. The intent is to minimize the cost of ownership and operations in providing the short- and long-term benefits of safety and mobility to users.

Highway Safety

Early estimates for the first six months of 2012 show increases in U.S. highway fatalities compared with the numbers for the previous five years. The increases do not constitute a trend, but states are interpreting the findings as a call to strengthen efforts to update and implement Strategic Highway Safety Plans, a goal reinforced by MAP-21. Many states are employing new methods to identify problems and to develop solutions with the greatest potential for reducing fatalities and serious injuries.

To achieve the goal of improving safety on all public roads, federal legislation enhances states’ roles and interests in local roads. Through a unique three-year program, Minnesota DOT developed a crash data and analysis guidebook for every county in the state. With this resource, plus technical assistance on request, each county created its own SHSP and is now working on implementation with Minnesota DOT and the Governor’s Office for Highway Safety. Iowa DOT provides local agencies with data on crashes and locations, along with assistance in conducting data analysis and interpretation. A “circuit rider” program offers on-site assistance in safety program development and implementation.

² SCOPM Task Force Findings on National-Level Performance Measures, AASHTO, Washington, D.C., November 9, 2012.

A vehicle involved in a rollover collision is pulled upright. Vehicle safety technologies, such as electronic stability control, can increase highway safety.



Photo: MATTHEW FERN



Vehicle safety is another part of the highway safety equation and continues to contribute to saving lives. Electronic stability control (ESC), for example, saved an estimated 863 lives in 2010, according to the National Highway Traffic Safety Administration, a substantial increase over recent years. Additional increases are expected as ESC penetrates the vehicle fleet. Other vehicle safety systems—for example, vehicle connectivity—are being field-tested in Ann Arbor, Michigan.

Ports and Waterways

The Panama Canal's third set of locks is scheduled to open in 2015; states with deep-draft ports along the East and Gulf Coasts are investing in landside and waterside infrastructure capacity to qualify as gateways for the new cargo. Some states are increasing contributions to expedite dredging projects and are complementing these investments with intermodal connectivity projects.

In Florida, Miami has embarked on an innovative multimodal investment strategy—a dredging project has received \$70 million in state funding; the Miami Tunnel, which connects the seaport to Interstate 95, has benefited from a TIFIA loan from U.S. DOT; and an intermodal rail yard is funded in part with a U.S. DOT Transportation Investment Generating Economic Recovery grant. Georgia has committed \$231 million to the Savannah Harbor Expansion Project, has expanded Savannah's main intermodal container transfer facility, and has funded multiple, intermodal

connector road projects for the port. West Coast states and ports continue to make investments to enhance their market share of cargo by balancing expansion projects with environmental stewardship.

In addition to the perennial funding challenge of maintaining the aging system of locks and dams on the inland waterways, drought conditions in the Midwest have created extremely low water conditions on the Mississippi River. Without assistance from the U.S. Army Corps of Engineers in removing rock formations and in releasing additional water from the Missouri River reservoirs, barge traffic between St. Louis, Missouri, and Cairo, Illinois, risks a shutdown.

Construction continues on the Panama Canal expansion project. Coastal states with deep-draft ports are investing in increased infrastructure capacity for the larger ships enabled by the expansion, as well as dredging and intermodal connectivity projects.



Some rail corridors offer high-speed service such as *Acela*; policy makers are debating the future of high-speed rail in the United States.

Double-stacked freight trains travel Norfolk Southern's Crescent Corridor, a 2,500-mile rail network from Memphis, Tennessee, and New Orleans, Louisiana, to New Jersey.



PHOTO: NORFOLK SOUTHERN

Rail

Passenger Rail

As passenger rail ridership increases, state and national leaders continue to debate over high-speed rail (HSR). Is HSR the next great transportation investment for the United States? Is the vision of a nationwide network achievable? What roles should the federal government, state governments, and the private sector play? Where should the funding come from? Do the costs outweigh the potential benefits? Should investments in HSR be limited to a few high-payoff corridors? Should expectations about speeds be scaled back? The answers will determine the vision for passenger rail transportation in the United States.

Freight Rail

States continue to form gateway and corridor partnerships with the freight rail industry. The CSX National Gateway and Norfolk Southern's Heartland and Crescent Corridors are examples of projects to create capacity for double-stacked container movements to distribution and transfer sites in the Mid-

west. In California, BNSF and the Port of Los Angeles are partnering on the Southern California International Gateway Project, which promises to eliminate more than 1.5 million truck trips from Interstate 710 each year.

Public Transportation

With increased interest in active transportation—walking and bicycling—and changes in travel preferences, many transit agencies are forming bicycle partnerships to balance the needs of all riders. Customers seek choices, convenience, flexibility, speed, affordability, safety, and fun. The integration of transit and bicycles expands mobility, increases ridership, and improves connections.

Sound Transit and King County Metro in Seattle, Washington, for example, have installed bike racks on buses and hooks and racks inside vehicles and have launched bike-sharing programs. In Portland, Oregon, Tri-Met has developed Bike & Ride for bicycle parking at transit stations. North Carolina DOT is leveraging technology and partnerships to knit together public transportation, ferry terminals, pedestrian and bicycle access, and rail.

Transit agencies across the country are launching innovative campaigns to promote ridership through social media, ads on buses and vehicles, television commercials, and improved communications with customers. To increase revenue, transit agencies are partnering with companies to provide innovative advertising to entertain and surprise customers. On Southeastern Pennsylvania Transportation Authority's regional rail, for example, transit riders can travel in full-wrap Jazz Age interiors and décor, installed to



PHOTO: JENNIFER ROSALES



The Southeastern Pennsylvania Transportation Authority decorated the interiors of *Silverliner* rail cars to promote an exhibit on the Prohibition era at Philadelphia's National Constitution Center. Organizations are forming advertising partnerships with transit agencies across the country.

promote a Philadelphia museum exhibit. Raleigh's Capital Area Transit System and the City of Raleigh Arts Commission have partnered to leverage advertising resources for an art-in-transit program.

Transit agencies are looking to apply results from research on emergency preparedness. Of particular interest are the tests of inflatable plugs similar to



airbags to hold back floodwaters from transit tunnels, noted earlier.

A bus stop in Long Beach, California, features a bike station.

Smarter, Better, Faster

Inspired by these and other examples, TRB chose "Deploying Transportation Research: Doing Things Smarter, Better, Faster" as the spotlight theme for its recently concluded 2013 Annual Meeting in Washington, D.C. More than 40 sessions explored the theme—a testament to the spirit of innovation that pervades the transportation community. TRB salutes these implementers of innovation.

Did You Know?

◆ North Carolina ranks second among states with ferry operations; Washington State ranks first.

◆ Desert tortoises are an endangered species found in Arizona, California, Nevada, and Utah. The desert tortoise population in Nevada is listed as threatened. Because desert tortoises move slowly and have a limited home range, attaching tracking tags or passive integrated transponders to their shells was fairly easy. Powered with a solar battery, the tags helped track the tortoises' use of underpasses along state facilities.



◆ State Routes 1804 and 1806 in South Dakota trend north-south in various segments along the east and west banks, respectively, of the Missouri River. The routes were designated in 1976 to commemorate Lewis and Clark's 1804 expedition up the Missouri River to the Pacific Ocean and the return in 1806. North Dakota also uses the route numbers.

◆ California's approximately 1,400 miles of high-occupancy vehicle lanes are the most in any state.

(Far left:) Motor Vessel Sea Level, the North Carolina Ferry Division's newest vessel, was christened in Cedar Island in May 2012.

(Above, left:) Before heading to an underpass, a desert tortoise stares down a Nevada DOT attempt to attach a transponder.

