Every Day Counts:
Building a Culture of Innovation for the 21st Century

EDC-2 Final Report

March 2015

U.S. Department of Transportation
Federal Highway Administration

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Foreword

"As all of you know, probably the biggest challenge facing American infrastructure is how we pay for it. At the U.S. Department of Transportation, we've been hard at work urging Congress to pass a long-term bill that boosts funding for all modes of transportation. But that's not the only thing we can do to secure funding. We shouldn't just focus on investing more. We should also work to make projects cost less.

Getting more projects done for the same price tag has been one of my top priorities at the U.S. Department of Transportation. And that's exactly what our Every Day Counts initiative does. You've done it through innovations like warm-mix asphalt—which I know doesn't sound exciting, but it does generate an exciting $3 billion by the end of the next decade.

EDC innovations cut costs, delays and paperwork in building infrastructure. These innovations not only save time and money, they can also help us save lives. Not all of these will be flashy inventions. Most travelers will never notice them, but I will and I know you will too.

Thank you for helping to make America's transportation system the finest in the world and for saving the American people money in the process."

Anthony R. Foxx
Secretary
U.S. Department of Transportation
EDC-3 Regional Summits • Fall 2014

In partnership with state and local transportation agencies, as well as the private sector, Every Day Counts is part of a comprehensive strategy to deliver a transportation system that will serve our country today—and well into the future. Through the EDC initiative, innovations are identified and rapidly deployed to shorten the highway project delivery process, enhance roadway safety, reduce congestion, and improve environmental sustainability. Safety is our number one priority at the U.S. DOT and efficiency in project delivery is also a top priority for Secretary Anthony Foxx.

The legacy we've built so far is impressive. During the first two rounds of EDC, we collaborated with transportation stakeholders in every state to deploy two dozen proven innovations that are making a difference. We're saving money, saving time and saving lives—exactly the results we said were possible if we made innovation a standard industry practice. And we're making a strong case to Congress for future investments in transportation.

I believe the state-based approach to deploying innovation has been critical to the success we've had so far—and will have in the future. In most cases, the State Transportation Innovation Council (STIC) has been the model for bringing together stakeholders charged with selecting and quickly deploying the innovations that address each state's unique needs. STICs have become an essential part of the national innovation network we're building together.

This report documents the results of the second round of EDC, which involved implementing 13 innovative technologies and practices during 2013 and 2014. I invite you to review this report to not only see the progress we've made in accelerating the deployment of these innovations, but also to learn about the successes of transportation agencies across the nation. Take note of where these innovative solutions are working and reach out to your peers to capture those lessons learned, improve transportation in your community, and continue to build on our great progress.

Together we're creating an exciting future, one that promises greater efficiency in project delivery and greater value for the American people.

Gregory G. Nadeau
Deputy Administrator
Federal Highway Administration

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"Every Day Counts is a mindset. It's a culture of innovation. We're certainly advancing the EDC innovations, but we're also having conversations on how else we can be innovative."

— Malcolm Dougherty, California Department of Transportation Director

Accelerating Innovation Use to Make Every Day Count

Every Day Counts is the Federal Highway Administration's vehicle to collaborate with the American Association of State Highway and Transportation Officials and other stakeholders on deploying innovations that enhance the nation's transportation system. Since its launch in 2009, the EDC initiative has encouraged the adoption of proven technologies and business practices that enable state and local agencies to do more with less. The name "Every Day Counts" captures the driving public's need for better transportation facilities delivered faster.

EDC uses a focused, state-based approach to rapidly deploy innovation. Through the EDC process, FHWA works with state transportation departments, local governments, tribes, private industry and other stakeholders to identify a new collection of market-ready innovations to champion every two years. The innovations share common goals of shortening project delivery, enhancing the safety and durability of roads and bridges, cutting traffic congestion and improving environmental sustainability.

After the process of selecting EDC innovations for deployment is completed, transportation leaders from across the country gather at regional summits to discuss the innovations and commit to finding opportunities to implement those that best fit the needs of their state highway programs. Information gathered at the summits is brought back to State Transportation Innovation Councils consisting of public and private transportation stakeholders to evaluate the innovations and spearhead deployment within the state. FHWA provides technical assistance and resources to help states implement their chosen innovations.

The EDC initiative has made a significant positive impact on the highway community's adoption of new technologies and practices. Every state transportation department has used two or more of the innovations promoted under the initiative, and some have adopted dozens. Several of those innovations are now mainstream practices in many states, enhancing the highway system and benefiting travelers. They include advances such as accelerated bridge construction methods, energy-saving warm-mix asphalt and the Safety Edge℠ paving technique to prevent roadway departure crashes. The initiative has also fostered a transportation workforce that is adept at putting innovation to work to address transportation challenges.

Every Day Counts Round Two

The innovations FHWA promoted during the second round of EDC in 2013 and 2014 focus on shortening project delivery by reducing development time in the planning, environmental and design stages of project delivery, as well as by cutting project construction time. They also can lower project-related and user costs through increased mobility, safety and economic development and improve environmental outcomes.

FHWA used a collaborative process to select the EDC-2 innovations. The agency asked the transportation community to suggest new technologies and practices based on two key questions: What areas need work? What solutions already being used successfully could be applied nationally?

***"FHWA reached out not only to state departments of transportation, but to many other partners in transportation and involved us in the process of developing this initiative,"* said Bud Wright, AASHTO executive director.**

"Every Day Counts creates the desire to be better, faster and smarter. There is so much we can do to improve processes."

— Mike Hancock, Kentucky Transportation Cabinet Secretary

"As an enterprise, we have to operate as efficiently and effectively as possible. The public expects us to be innovators and make every day count."

— Janet Oakley, South Carolina Department of Transportation Secretary

Stakeholders in public agencies and the private sector responded with some 250 ideas that, after extensive consultation, were narrowed to 13 innovations in six focus areas:

Shortening Project Delivery

- **Programmatic agreements** improve environmental outcomes and save time and resources by establishing streamlined approaches for handling routine environmental requirements.
- Strategies for **locally administered Federal-Aid projects** are designed to help local public agencies navigate the complexities of the Federal-Aid Highway Program.
- **Geospatial data collaboration** uses cloud-based geographic information system services to improve data sharing among project delivery stakeholders.

Reducing Construction Time

- **Three-dimensional engineered models for construction** allow for faster, more accurate and more efficient planning and construction.
- **Accelerated bridge construction** techniques—including geosynthetic reinforced soil-integrated bridge systems, prefabricated bridge elements and systems, and slide-in bridge construction—allow highway agencies to replace bridges faster, more safely and sometimes at lower cost.
- **Intelligent compaction** uses modern vibratory rollers and Global Positioning System technology to improve the quality, uniformity and performance of pavements.

Innovative Contracting

- The **design-build** contracting method combines the design and construction phases of a project in one contract, accelerating project completion.
- The **construction manager/general contractor** project delivery method, in which the project owner hires a general contractor to provide feedback during the design phase, fosters innovation and mitigates risk while speeding project delivery.
- The use of **alternative technical concepts** enables contractors to propose innovative options that are equal to or better than the contracting agency's criteria during the project procurement process.

Safety

- **High-friction surface treatments**, pavement technologies that use high-quality aggregates with friction values exceeding conventional pavement, help reduce crashes and fatalities.
- Innovative **intersection and interchange geometrics**—including roundabouts, diverging diamond interchanges and intersections with displaced left turns or U-turn variations—enhance safety for road users.

Environment

- **Implementing quality environmental documentation** promotes recommendations to improve the quality of and streamline National Environmental Policy Act documents developed for construction projects.

Mobility

- **National traffic incident management responder training,** also a second Strategic Highway Research Program product, offers the first national, multidisciplinary traffic incident management process and training program.

Summits Launch EDC-2

More than 1,300 transportation professionals gathered at eight regional summits in fall 2012 to learn about the EDC-2 innovations. The summits were targeted to frontline professionals responsible for highway project delivery. Each day-and-a-half event was designed to create synergies among highway stakeholders in neighboring states and encourage long-term networking and information exchange. They allowed participants to interact with colleagues in working sessions and strengthen partnerships with others in the highway community.

The summits gave the participants the opportunity to explore eight of the EDC-2 strategies in detail so they and their colleagues could make informed choices about which to implement in their states. They also enabled FHWA to seek feedback from participants on proposed strategies to help states implement the EDC innovations so the agency could tailor those strategies to state needs.

"Every Day Counts is not about inventing the next big thing. It's about taking effective, proven and market-ready technologies and getting them into widespread use,"* Deputy Federal Highway Administrator Gregory Nadeau told EDC-2 summit participants. *"By advancing 21st century solutions, we can improve safety, reduce congestion and keep America moving and competitive."

Information on the remaining five EDC-2 innovations was disseminated in a series of virtual summits in spring 2013. Conducting the spring summits via Web conferencing enabled FHWA to reach a broad range of stakeholders at lower cost than traditional meetings. More than 2,400 people participated in the virtual summits, which were held in each state so participants did not need to travel far to attend, but had the opportunity to network with peers about their innovation implementation plans.

After learning about the 13 EDC-2 innovations, members of state innovation groups met to evaluate which technologies and processes would best meet their state's unique needs and requirements and choose the innovations they wanted to implement. State highway agencies and their partners developed strategies to deploy their selected EDC-2 innovations in 2013 and 2014, evaluate their performance and make them standard practices in their transportation programs.

FHWA Support for Innovation Implementation

In addition to recommending proven innovations the transportation community can use to enhance the nation's highway infrastructure, FHWA offers assistance and incentives to ease the way in implementing the innovations and making them mainstream practices.

FHWA assembled teams of experts to provide technical assistance to help the transportation community deploy innovations on the EDC-2 roster. The assistance included training sessions, briefings, Web conferences, workshops and peer exchanges that enabled stakeholders to become knowledgeable about the innovations. The technical teams also coordinated events to demonstrate the use of innovations on actual projects for stakeholders to observe and learn from the successes and challenges of other states' implementation efforts.

Additional assistance is available through FHWA's *State Transportation Innovation Council*, *Accelerated Innovation Deployment Demonstration* and *MAP-21 Section 1304 - Innovative Project Delivery* incentive programs. The STIC Incentive program provides resources to help STICs make innovations standard practice. States can apply for up to $100,000 a year to support activities such as implementing system process changes, organizing peer exchanges and developing specifications. The AID Demonstration program offers incentives of up to $1 million per project to use proven innovations on any aspect of highway transportation, including planning, financing, environment, design, construction, materials, pavements, structures and operations. Refer to pages 69-72 for additional information about these resources.

"We embrace these innovations because they allow us to deliver projects on time and under budget. And that's a very good investment for the citizens of the state of Oregon."

— Matthew Garrett, Oregon Department of Transportation Director

"The work we're doing together is having an impact in every state and across the country. We're saving lives, saving money and saving time—exactly the kinds of results we said we'd deliver if we made innovation a standard industry practice."

— Gregory Nadeau, Deputy Federal Highway Administrator

EDC-2 Innovation Accomplishments

Every state adopted one or more of the 13 innovations deployed during the EDC-2 two-year deployment cycle. Many of those technologies and processes are now widely used to shorten project delivery, enhance roadway safety, reduce congestion and improve environmental sustainability.

The maps on the following pages illustrate the current stage of implementation of the respective innovations in each state as of December 2014, the end of the EDC-2 cycle. The bar charts illustrate the advancements made in deployment of the respective innovations through a comparison of the number of states in each stage of implementation at the beginning and end of EDC-2. Highlights of deployment activities and associated impacts are also provided. "State" is used as a general term to include the state transportation department, local governments, tribes, private industry and other stakeholders within the boundary of a state or territory. Information is provided for all 50 states, Washington, D.C., Puerto Rico, the U.S. Virgin Islands, and Federal Lands Highway, for a total of 54 entities reporting.

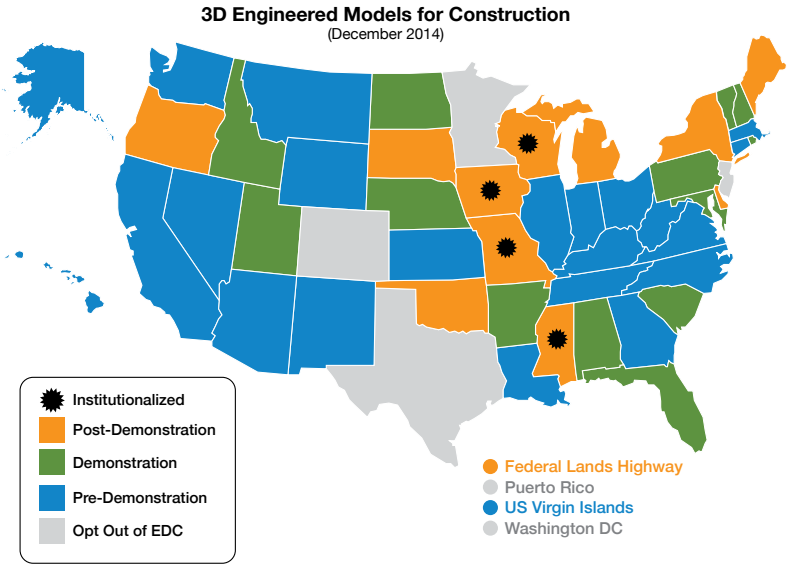
The following table defines the innovation deployment stages and associated color coding displayed on the maps and charts.

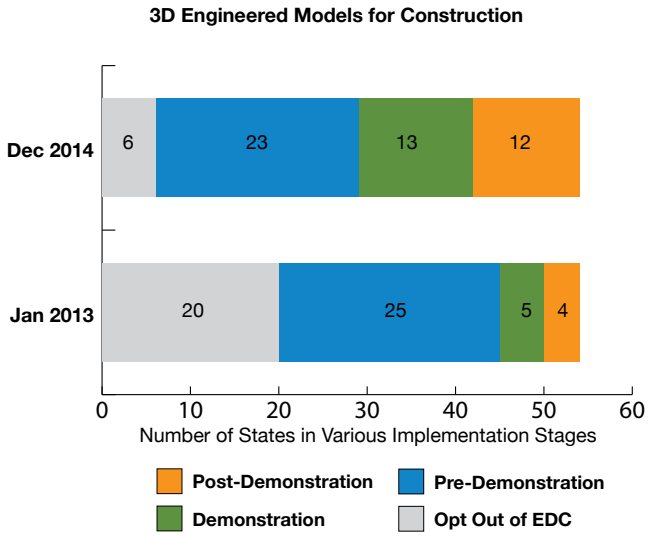
Color Code	Innovation Implementation Stage
Opt Out	***Opt Out:*** The state may have deployment activities underway, but is not pursuing the innovation under EDC.
Pre-Demonstration	***Initiation Stage:*** The state wants to know more about the innovation and is taking steps to increase awareness.
	Development Stage: The state is collecting guidance and best practices, building support with partners and stakeholders, and developing an implementation process.
Demonstration	***Execution Stage:*** The state is deploying and piloting the innovation.
Post-Demonstration	***Assessment Stage:*** The state is assessing performance and the process for carrying out the innovation and making adjustments to prepare for full deployment.
	Integration Stage: The state is Integrating the innovation into standard procedures and practices for use on applicable projects.
	Institutionalization Stage: The state has adopted the innovation as a standard process or practice and uses it regularly on projects.

3D Engineered Models for Construction

Three-dimensional models are a basic building block for the modern-day digital highway project. Using 3D technology allows for faster, more accurate and more efficient planning and construction. Through EDC-2, FHWA encouraged a transition from traditional two-dimensional design to 3D modeling as a strategy for shortening project delivery and improving quality and safety on the construction site.

With 3D modeling software, design and construction teams can connect virtually to develop, test and change project designs throughout the design and construction phases. Intricate design features can be viewed geospatially from multiple perspectives, and simulations can be run to detect design clashes such as utility conflicts before construction begins. Data exported from 3D models can be transferred to automated machine controls that help the equipment operator place the material correctly the first time.





During EDC-2, the number of states implementing 3D engineered models nearly tripled from 9 to 24 plus Federal Lands Highway. The use of 3D engineered models for construction is now a standard practice in four states. A few states have taken the use of 3D modeling beyond typical excavation and pavement applications to bridge design and construction also. Building on the success of EDC-2, 3D engineered models are part of the next cycle of EDC.

Innovation *Spotlight*

Michigan

The Michigan DOT increased its use of 3D models nearly 50 percent in 2014. The agency collaborated with peer agencies, the construction industry and others to develop 3D design model requirements and publish them on the MDOT Development Guide wiki page. The 3D model information, delivered through the agency's eProposal process at the project advertisement stage as part of the reference information documents, has been used on 15 projects to perform quality assurance.

Project Highlights

Arkansas

The **Arkansas** Highway and Transportation Department hosted the first EDC-2 workshop on 3D engineered models for construction. The event helped galvanize AHTD leadership to pursue a formal deployment plan for this technology. As part of the effort, AHTD is training staff on how to use 3D modeling more effectively and has begun providing model data to contractors during bidding.

Florida

The **Florida** DOT has created developmental specifications for using 3D models and automated machine guidance on projects. FDOT has designed 34 projects with 3D data and plans to provide the data to contractors who elect to use 3D modeling and automated machine guidance on the projects. The agency used automated machine guidance with 3D models on State Route 417 on the Orlando–Orange County Expressway project, reducing the amount of asphalt used from an anticipated 8,200 tons to 2,500 tons and saving $350,000.

Illinois

Knox County, **Illinois,** used GPS and 3D modeling technology to eliminate the need for grading stakes and real-time surveying on projects, significantly reducing the time it takes equipment operators to complete the grading process. Using the technology on the $4.9 million County Highway 4 project saved 20 percent on time and $50,000 to $100,000 on the cost of the cut-and-fill work.

Iowa

The **Iowa** DOT now provides 3D models to contractors on all of its grading and paving reconstruction projects. The agency is also pursuing the use of 3D engineered models for bridge projects and is applying STIC Incentive funds to development of an implementation plan for using 3D tools for structural detailing.

Maine

The **Maine** DOT has used 3D modeling to advertise and construct at least five projects. In 2014, MaineDOT collected terrestrial laser scanning data on a bridge project in Kennebunk and Kennebunkport and a highway project in Hallowell to further enhance the 3D models for these projects. Based on the success of the projects, the agency expects to increase its use of scanning for data collection in the future.

Nebraska

The **Nebraska** DOT is designing 14 projects using 3D modeling. The agency will consider using 3D modeling on more projects in the future as designers gain experience and train others to assist.

North Dakota

During EDC-2, the **North Dakota** DOT bid two projects using 3D modeling and for the first time required contractors to use automated machine guidance for earthwork and grading. Using 3D modeling with automated machine guidance reduced the time needed for and cost of survey staking. The agency now supplies 3D engineered models to contractors during the bidding process for all projects that are automated machine guidance candidates.

Oklahoma

The **Oklahoma** DOT awarded six projects in 2014 that used 3D engineered models with automated machine guidance specifications.

Pennsylvania

The **Pennsylvania** DOT hosted two statewide workshops, formed a task force and is revising survey specifications to take full advantage of 3D modeling. PennDOT used a 3D model approach to advertise the State Route 56 United High School Curve project to identify multiple utility conflicts, identify earthwork waste sites, and calculate and quantify waste.

Rhode Island

The **Rhode Island** DOT used 3D modeling on the Apponaug Circulator bypass, Magnolia Bridge removal and Central Bridge replacement projects. The 3D approach assisted with stakeholder involvement, reduced costs and construction time, and minimized traffic-related construction conflicts. RIDOT also received STIC Incentive program funding to develop and implement 3D standards for its highway and transit business lines.

Utah

The **Utah** DOT provided 3D model information to contractors on 15 projects in 2014. In-house training is helping staff use 3D capabilities more fully for design optimization and construction planning. UDOT has identified at least one construction manager/general contractor project that it will deliver using the 3D model as the legal document instead of two-dimensional paper plans. This will be a breakthrough in collaborating with contractors to achieve maximum project delivery benefits because contractors will be able to use a DOT model to plan their work and reduce time and costs.

Wisconsin

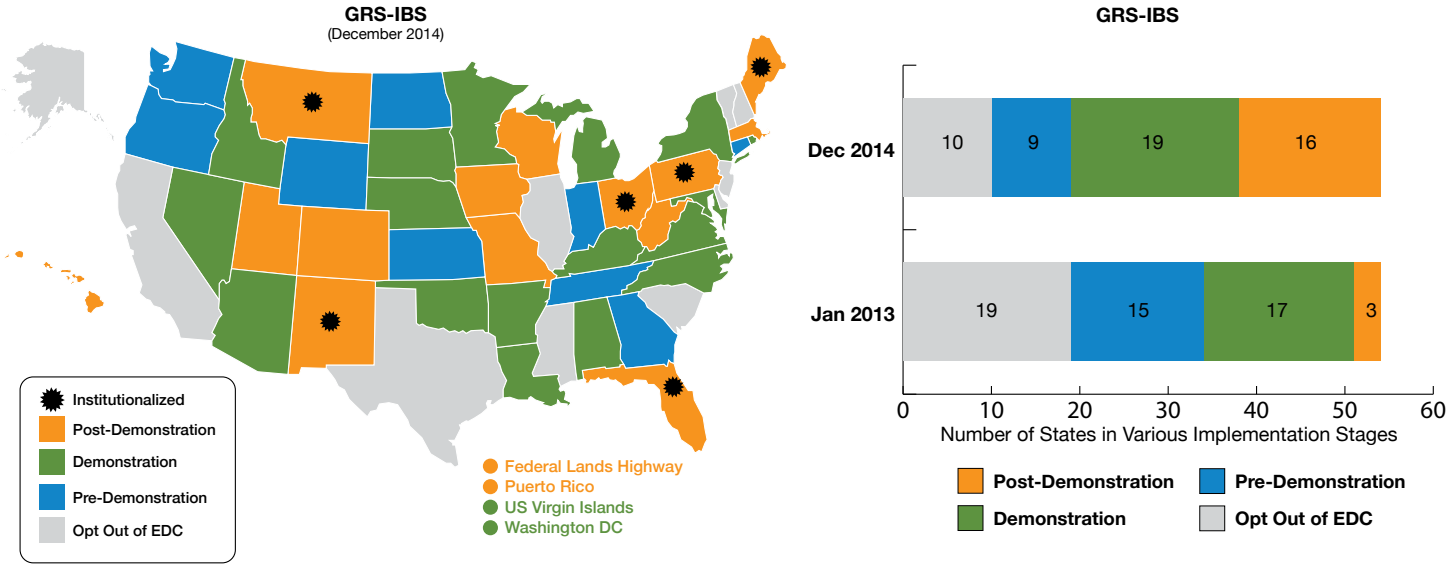
Since 2010, the **Wisconsin** DOT has successfully delivered 3D models to contractors on 12 projects across the state, both before the bidding process and during construction. On the Zoo Interchange Project, WisDOT used 3D models and components that allow users to view schedule and cost information along with the 3D design. The 3D models identified physical conflicts or collisions between elements before construction, eliminating a significant number of contract change orders and design issue notices during construction. WisDOT now requires 3D development for all new projects entering the design phase.

Accelerated Bridge Construction

Accelerated bridge construction technologies enable highway agencies to replace bridges in hours and reduce planning and construction efforts by years. These accelerated project times significantly reduce traffic delays and road closures and can lower project costs. ABC planning and construction methods, designs and materials produce safer, more durable bridges with longer service lives than conventional bridges. The opportunity to expand use of these innovative technologies comes at a time when about 25 percent of the nation's bridges need repair or replacement. FHWA promoted three ABC technologies in EDC-2: geosynthetic reinforced soil-integrated bridge systems, prefabricated bridge elements and systems, and slide-in bridge construction.

Geosynthetic Reinforced Soil-Integrated Bridge Systems

Geosynthetic reinforced soil-integrated bridge system technology, also promoted in EDC-1, uses alternating layers of compacted granular fill and geosynthetic reinforcement to provide support for a bridge. A GRS-IBS structure is easy to build and maintain and is 25 to 60 percent cheaper than conventional construction.

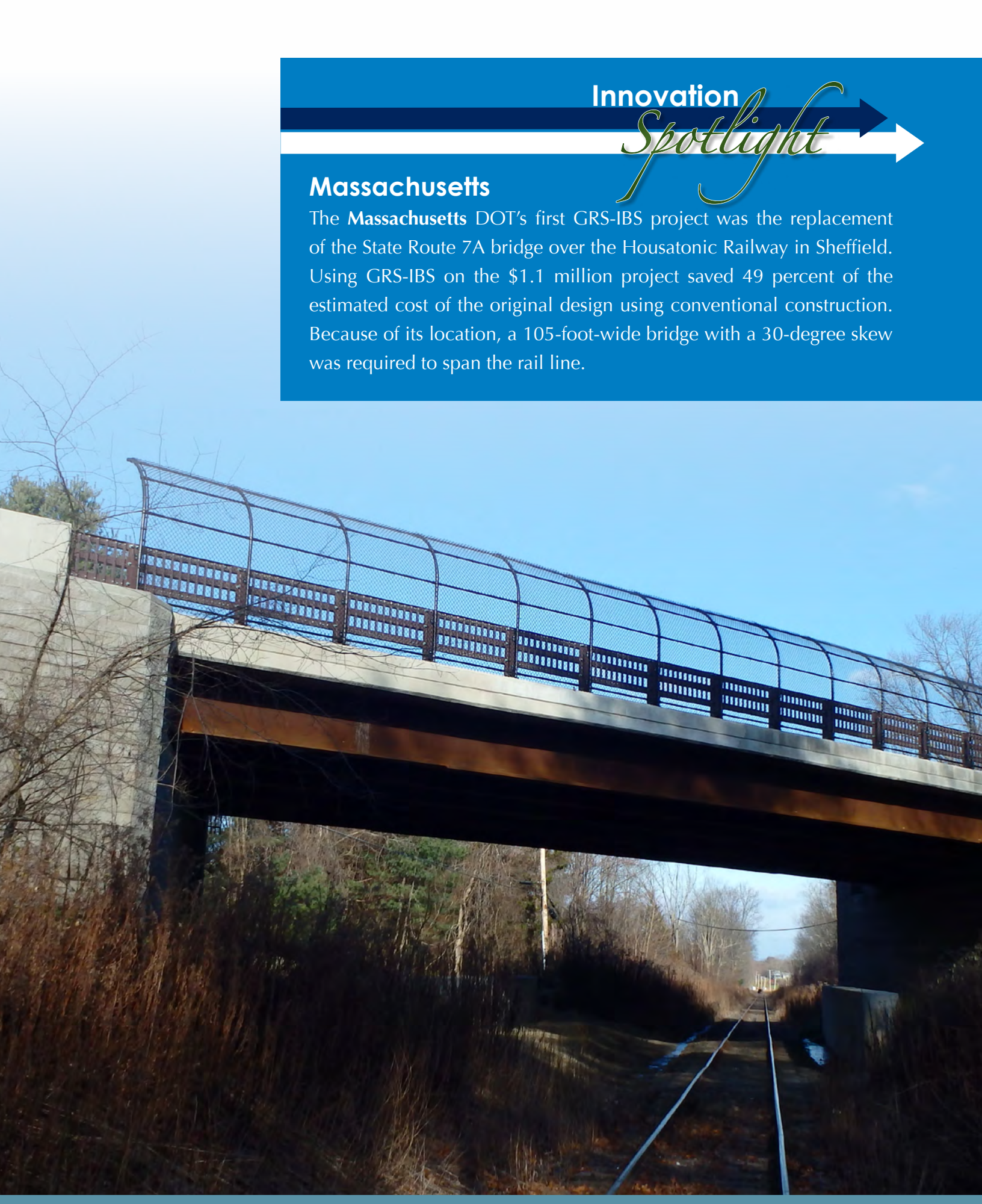


By the end of EDC-2, 31 states, Washington, D.C., Puerto Rico, the U.S. Virgin Islands and Federal Lands Highway had used GRS-IBS, up from 20 at the beginning of EDC-2. Six states now consider GRS-IBS use a mainstream practice. GRS-IBS use has spread from mostly low-traffic roads to more heavily traveled highways. GRS-IBS structures have been designed for use in active seismic regions, on projects over waterways and on grade-separation projects such as crossings over rail lines. FHWA continues to encourage GRS-IBS deployment in EDC-3, with a focus on helping agencies develop standard plans, details and specifications for using GRS-IBS.

Innovation *Spotlight*

Massachusetts

The **Massachusetts** DOT's first GRS-IBS project was the replacement of the State Route 7A bridge over the Housatonic Railway in Sheffield. Using GRS-IBS on the $1.1 million project saved 49 percent of the estimated cost of the original design using conventional construction. Because of its location, a 105-foot-wide bridge with a 30-degree skew was required to span the rail line.



Project Highlights

Colorado

The **Colorado** DOT is constructing the nation's first GRS-IBS multispan bridge on an interstate. The project on I-70 over Smith Road and the Union Pacific Railroad in Aurora will be completed by early 2016.

Hawaii

The **Hawaii** DOT's first GRS-IBS project, on the Lahaina Bypass, resulted in a 15 percent cost savings. The agency expects the savings to increase as it applies the technology on future projects.

Maine

The **Maine** DOT used GRS-IBS for the first time on a bridge in the island community of North Haven. The agency decided it was the best choice for the project because access to the construction site is limited for large equipment and the cost was nearly 11 percent below the engineer's estimate. MaineDOT also built a bridge in Bremen using GRS-IBS. The agency used GRS-IBS for this project to facilitate fish passage at the location. The Maine Audubon Society is promoting GRS-IBS as a viable low-cost option to address fish passage concerns.

Nebraska

In 2014, the **Nebraska** Department of Roads constructed its first GRS-IBS bridge for a local agency in Boone County, finishing the project in 30 days. NDOR worked with its Local Technical Assistance Program to promote GRS-IBS throughout the state. The LTAP invited local public agencies to a GRS-IBS showcase to observe the construction of the Boone County project firsthand.

South Dakota

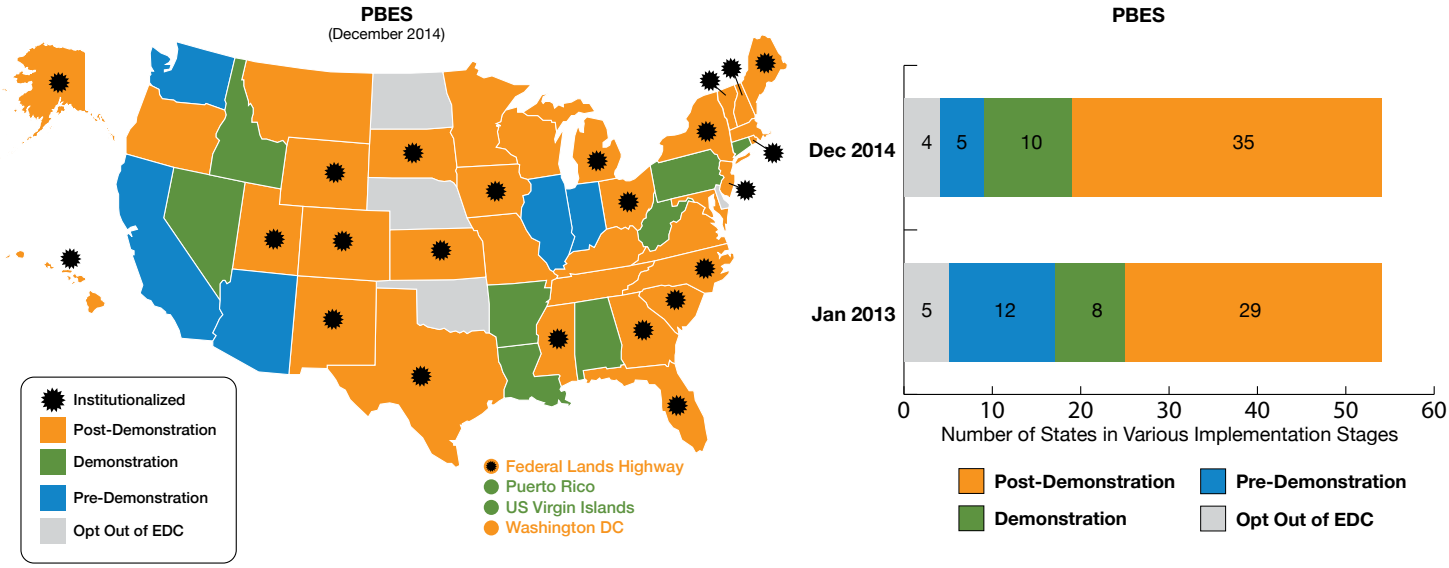
Custer County in **South Dakota** completed construction of the 8th Street Bridge using GRS-IBS in April 2014. Benefits of using GRS-IBS on the $317,000 project included the elimination of pilings, which enabled crews to build the project during the winter.

West Virginia

The **West Virginia** DOT incorporated a special provision for use of GRS-IBS on a Veterans Health Administration hospital bridge in Clarksburg. Lessons learned from the 2013 pilot project were used to revise the special provision. To help make the use of GRS-IBS a common practice, WVDOT is distributing information at district bridge engineer meetings, developing guidance for its *Bridge Design Manual* and planning to make the special provision a standard specification.

Prefabricated Bridge Elements and Systems

Prefabricated bridge elements and systems, also part of EDC-1, are structures or components built offsite or next to an existing structure. They include features that reduce onsite construction time and mobility impact and improve quality and safety.



Four years as an EDC technology has helped make PBES a standard practice for 23 states and Federal Lands Highway—nearly half the country—and a significant EDC success story. By the end of EDC-2, 41 states, Washington, D.C., Puerto Rico, the U.S. Virgin Islands and Federal Lands Highway had all used PBES to accelerate bridge construction, up from 37 states at the beginning of the two-year cycle.

Innovation Spotlight

Rhode Island

The **Rhode Island** DOT replaced the 57-year old Frenchtown Brook Bridge using a prefabricated superstructure, substructure and foundation systems. The new bridge was prefabricated away from the construction site before installation. This innovative approach increased safety, enhanced quality and allowed the contractor to replace the bridge during a 33-day road closure instead of the six months required for traditional methods. A comprehensive economic analysis including user costs shows that the project saved road users about $2 million.

Project Highlights

Florida

The **Florida** DOT has made PBES a standard practice and implemented a policy that the technology be considered for all bridge projects. PBES has been used for substructure components on major bridge projects, such as the Long Key Bridge in Florida Key, the Edison Bridge in Ft. Myers and the 118th Avenue Bridge in St. Petersburg. FDOT also built a demonstration project featuring four bridges on U.S. 90 in Gadsden County with full-depth precast deck panels and a precast intermediate bent system.

New Mexico

The **New Mexico** DOT constructed four bridges in 2014 using PBES, including precast deck panels, wing walls, and pier and abutment caps. One of the bridges was built in just 45 days and is expected to have a service life of 100 or more years if properly maintained. NMDOT requires a bridge type selection report for each bridge project, which ensures that the bridge engineer considers PBES.

Texas

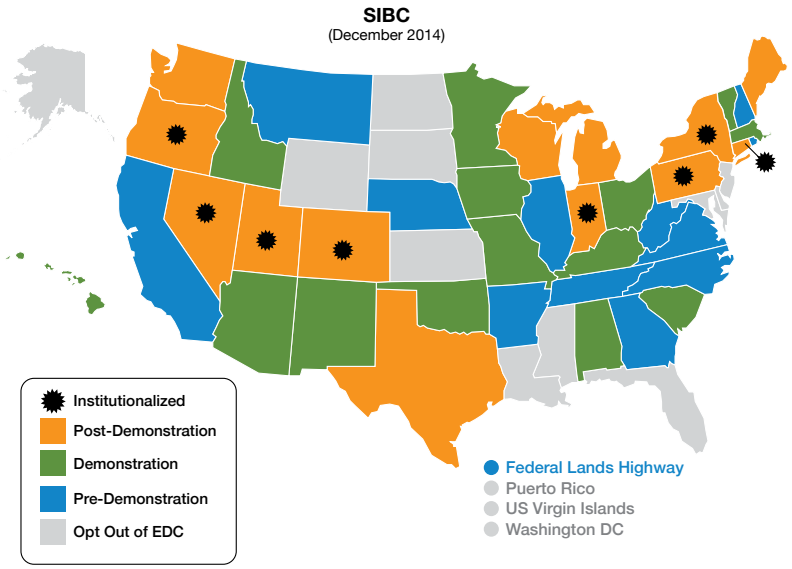
To further the development of PBES, **Texas** DOT collaborated with the precast industry to form the Texas Precast Concrete Council, which meets annually. TxDOT is now addressing precast columns, footings and wing walls for bridges and precast pavement for highway rehabilitation and repair and is designing curved precast spliced tub girders for four bridges. In 2014, AASHTO named Texas the lead state for its sandwich plate system bridge decks.

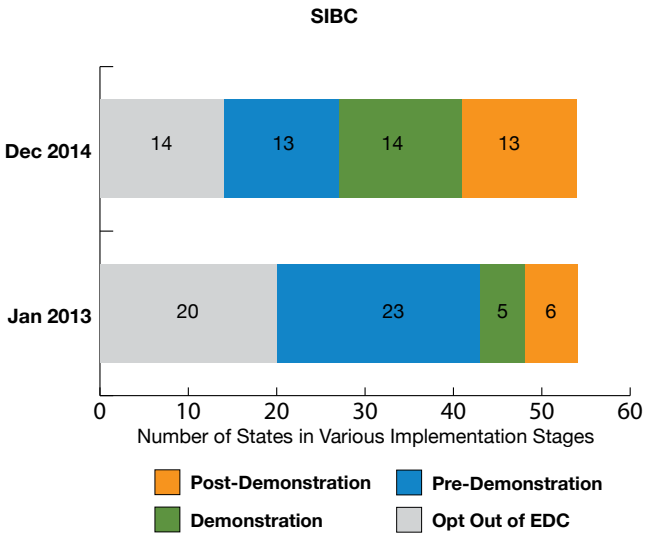
Virginia

The **Virginia** DOT used prefabricated bridge elements to deliver a $90 million, 11-bridge rehabilitation project on I-95 $16 million under budget. The agency saved 12 to 18 months of construction time on the project by using ABC techniques instead of conventional construction methods.

Slide-In Bridge Construction

Slide-in bridge construction involves building a bridge on temporary supports next to an existing structure and sliding it into place after the old bridge is removed. The bridge is installed and the road reopened to traffic—often over a weekend—reducing traffic disruption and improving safety.





Use of slide-in bridge construction to complete bridge projects more safely and with less traffic disruption expanded from 11 states at the beginning of EDC-2 to 27 by the end. The practice is now institutionalized in eight states.

Innovation Spotlight

Indiana

The Indiana DOT, in collaboration with the **Kentucky** Transportation Cabinet, used accelerated bridge construction and the design-build delivery method for the $103 million Milton-Madison Bridge Project to allow the old bridge to stay open to traffic while the new one was built. The 2,428-foot-long structure was slid laterally 55 feet from temporary piers onto the refurbished original piers, making it the longest bridge in North America to be slid laterally into place. The 30-million-pound steel truss bridge over the Ohio River is 40 feet wide with two 12-foot lanes and 8-foot shoulders—twice as wide as the 1929 structure it replaced. Use of the bridge slide approach required the river crossing to be closed for only 41 days instead of the one year estimated for conventional construction.

Photo: Million-Madison Bridge Project

Project Highlights

Connecticut

The **Connecticut** DOT replaced twin structures on I-84 in Southington using slide-in bridge construction. Instead of inconveniencing the public for two construction seasons, CTDOT shut down I-84 over a weekend to replace both structures and opened them to traffic 13 hours ahead of schedule. CTDOT's new policy requires staff to use a decision matrix on all bridge projects to determine whether ABC is applicable.

Iowa

The **Iowa** DOT estimates that its first bridge slide project, constructed in 2013, saved the agency 43 percent compared to a cast-in-place bridge. The Highway 92 replacement bridge increased capacity, improved roadway conditions and enhanced driver safety by providing a wider bridge and approaching roadway.

Nevada

The **Nevada** DOT replaced two bridges in Mesquite using slide-in bridge construction. The roadway was shut down for just 56 hours before traffic resumed, compared to the months of construction zone delays under traditional construction methods. The slide-in approach saved an estimated $12.7 million in time and fuel costs for commuters.

New York

The **New York** State DOT replaced two bridges on I-84 in 20 hours over a weekend using the slide-in bridge construction method. Under conventional construction methods, the project would have taken two years to build and would have required the construction of a temporary roadway and bridge to channel traffic during construction. The innovative technology resulted in savings of $900,000 in construction costs and $1.37 million in user delay costs. Together, the savings represent 22 percent of the project's $10.2 million construction cost.

Ohio

The **Ohio** DOT has awarded and begun construction on its first lateral bridge slide project. It consists of parallel bridges on I-75 in Bowling Green. The first bridge is schedule to be slid into place in June 2015 and the second a month later.

Innovation Spotlight

Washington

In 2013, part of the I-5 Skagit River Bridge collapsed into the river after being struck by an oversized load, severing a major north-south artery used by more than 71,000 drivers daily. The **Washington** DOT used an emergency contract to install two temporary spans, and crews built the replacement span next to the temporary spans. Less than three months later, the permanent span was slid into place in less than a day. In addition to replacing the collapsed span, WSDOT upgraded the remaining spans, raising the arched overhead structural support system to allow a consistent 18 feet of vertical clearance.

Photo: Washington Department of Transportation / VERG

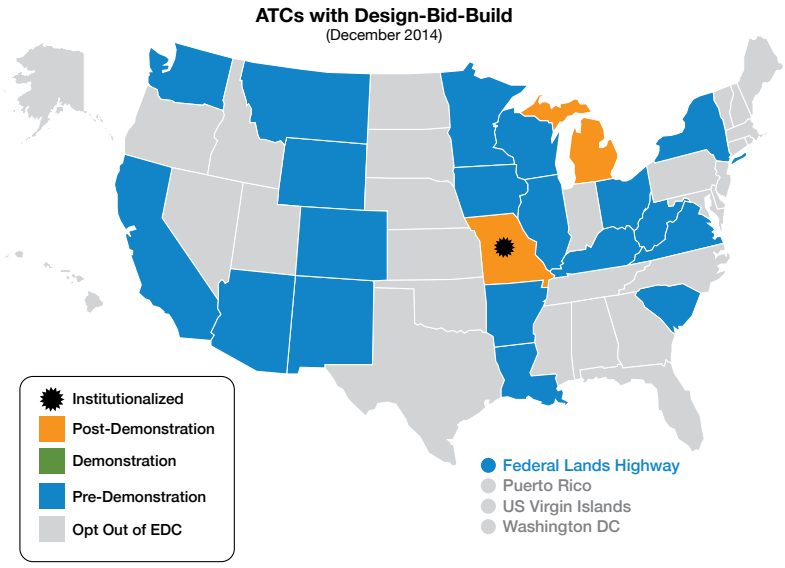
Alternative Technical Concepts

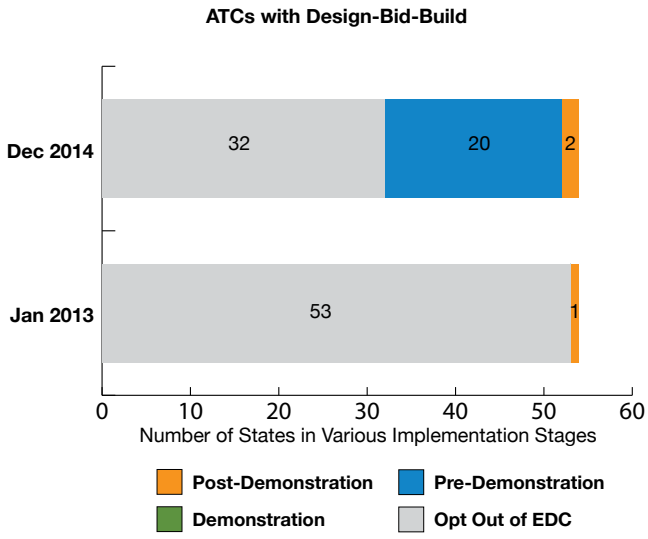
The use of alternative technical concepts gives contractors the opportunity to propose innovative, cost-effective solutions that are equal to or better than the contracting agency's design and construction criteria for a project. This contracting approach promotes competition and enables highway agencies to choose design and construction solutions that offer the best value.

Allowing contractors to provide alternative solutions to projects during a competitive procurement process offers strong potential for lowering project costs. Using ATCs also encourages innovation and flexibility, advances new technologies and construction methods, fosters early contractor involvement in projects and promotes construction solutions that increase the value of highway projects to the public.

ATCs with Design-Bid-Build

Before EDC-2 began, Missouri was the only state in the nation that used ATCs as a standard practice on projects constructed with the design-bid-build contracting method. As a result of EDC-2, Michigan has also institutionalized ATCs on design-bid-build projects.





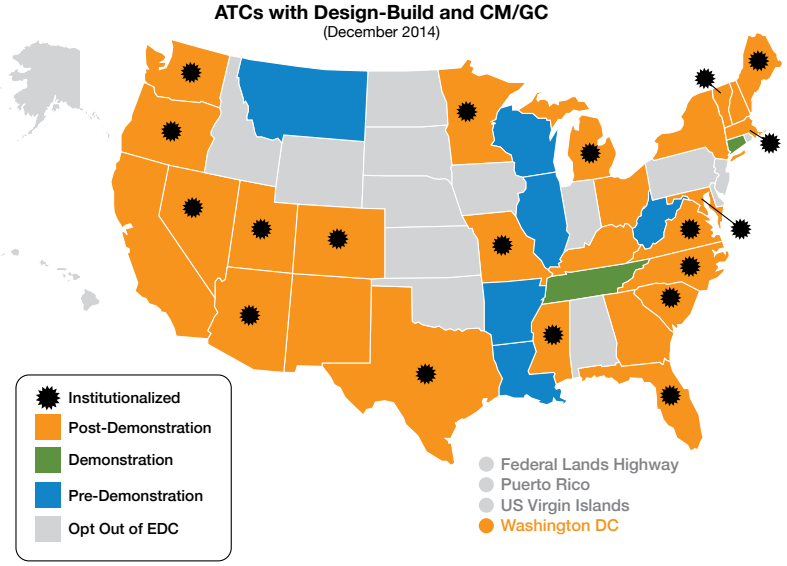
Project Highlights

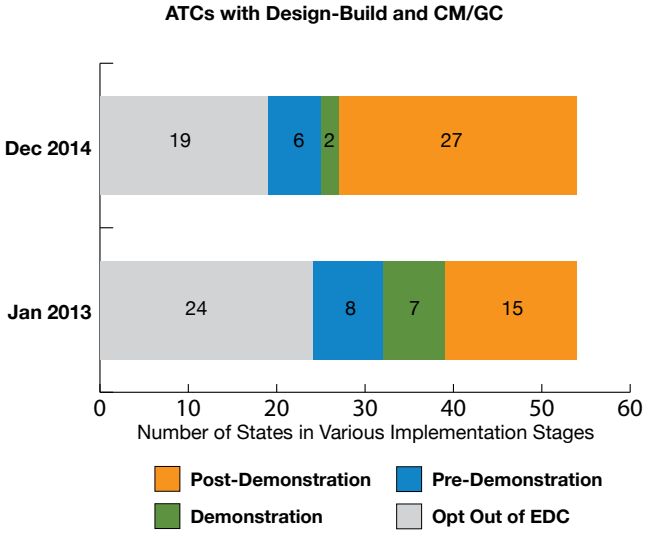
Michigan

The **Michigan** DOT used the ATC process on two design-bid-build projects that focused on maintaining traffic and staging. When the agency used alternative pavement bidding on a U.S. 10 reconstruction project, it reduced project time from two construction seasons to one, a significant benefit to the public. Using alternative pavement bidding on an I-75 project resulted in an 8.76 percent savings over the engineer's construction estimate.

ATCs with Design-Build and CM/GC

Use of ATCs on projects delivered with the design-build and CM/GC contracting methods grew from 22 to 28 states and Washington, D.C., during EDC-2. Nineteen states, nearly two-thirds of the states that have tried alternative technical concepts on design-build and CM/GC projects, have made their use a standard practice.





Project Highlights

California

The **California** DOT received legislative authority to build up to 10 projects under a design-build demonstration program. ATCs were allowed on eight of the projects, generating a 50-to-1 return on investment. Caltrans paid $3.39 million in stipends on a total value of $568.3 million in approved ATCs, incorporating $168.05 million in ATCs in the projects.

Georgia

The **Georgia** DOT used ATCs on the Northwest Corridor project, its first public-private partnership design-build-finance project. GDOT promoted the use of life cycle ATCs, in which initial construction costs are higher but operational costs are lower over the life of the asset. Thirteen of the 61 approved ATCs were life cycle ATCs. The use of ATCs on the project resulted in about $60 million in cost savings and five months of schedule savings.

Michigan

The **Michigan** DOT has used the ATC process on all 17 of the design-build projects it has awarded. MDOT developed a design-build guide that includes information on using ATCs.

Minnesota

The **Minnesota** DOT used the ATC process on its Highway 61 Hastings Bridge project to mitigate geotechnical risk. MnDOT relied on one-on-one meetings to create an open environment in which proposers and the agency could discuss innovative ideas and clarify any project risks during proposal preparation. This gave MnDOT the opportunity to consider technical solutions it previously had not and resulted in a $100 million savings on the project.

Innovation *Spotlight*

District of Columbia

The **District** DOT used ATCs during its first river bridge replacement in 40 years and the largest project in its history. ATCs reduced the total cost of replacing two 11th Street bridges with three new bridges by $80 million and accelerated construction by nine months. The project, set to be completed in late 2015, has already been recognized with eight awards.

Photo: District Department of Transportation

Mississippi

The **Mississippi** DOT used ATCs with design-build to foster design innovation on two challenging projects. The Woodrow Wilson Bridge over Mill Street in Hinds County involves the rehabilitation of a structure over a highway and multiple railroad lines. The I-269 corridor and bridge in Marshall County are being built using a top-down approach to minimize impact on wetlands.

New Mexico

The **New Mexico** DOT used ATCs on the Paseo del Norte and I-25 interchange reconstruction project. All three short-listed construction teams agreed that without ATCs, the project could not be built for less than the project's guaranteed maximum price of $75 million. The winning contractor finished the project nine months ahead of schedule. NMDOT developed a legislative proposal on design-build and CM/GC for introducing in the 2015 state legislative session.

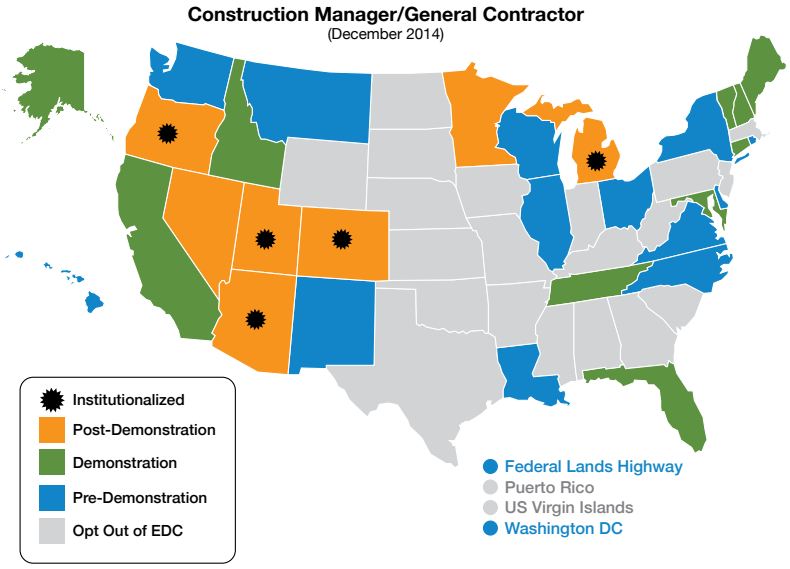
New York

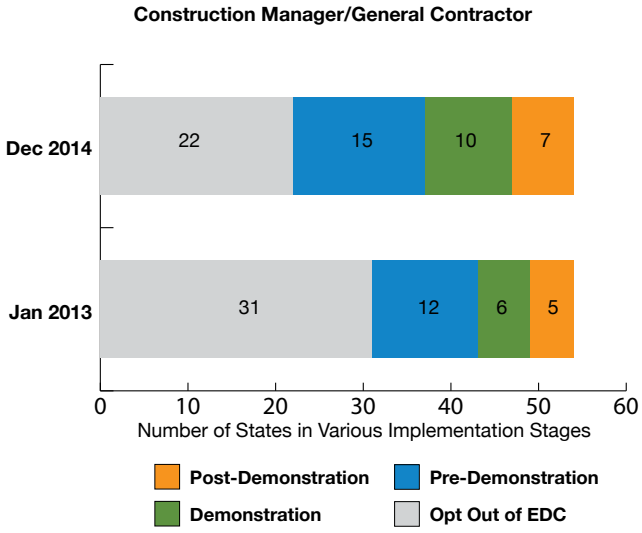
The **New York** State DOT and the New York State Thruway Authority used ATCs on the Tappan Zee Hudson River Crossing project. Four teams submitted a total of 58 ATC proposals. An ATC process was also incorporated into the Kosciuszko Bridge replacement project, resulting in 49 ATC submittals.

Construction Manager/ General Contractor

In the construction manager/general contractor project delivery process, the project owner hires a contractor to provide feedback during the design phase. Once the design phase is complete, the contractor and project owner may negotiate a price for the construction contract. This process allows the contractor to offer suggestions during the design phase on innovations, cost and schedule savings, and constructability issues. It helps the project owner make informed design decisions and manage projects with shortened construction schedules and greater cost benefits.

Using the CM/GC method offers the potential for lower project costs, primarily because risks are identified early in the project development process. CM/GC saves time because the contractor is engaged in the project before the design phase is completed. The combined knowledge of the owner, designers and contractors fosters a partnership that can result in more successful projects with lower risk, improved designs, greater cost certainty and optimized construction schedules.





Use of CM/GC to deliver projects spread from 11 to 17 states during EDC-2. It is now an institutionalized practice in five states to allow transportation agencies to evaluate innovations and consider new approaches to reduce time, cost and overall risk on projects.

Innovation Spotlight

Oregon

Multnomah County, **Oregon,** is using CM/GC to replace the 88-year old Sellwood Bridge over the Willamette River with a seismically sound structure. The new bridge is scheduled to open in January 2016. Contractor innovations include a bridge detour concept that resulted in $10 million in cost savings, a 12-month schedule reduction, improved worker safety and lower environment impacts.

Photo: Oregon Department of Transportation

Project Highlights

Alaska

The **Alaska** Department of Transportation & Public Facilities used CM/GC on the Parks Highway Riley Creek Bridge replacement. The project crosses a seismic fault, so having the contractor involved in the design phase enabled the agency and contractor to evaluate alternatives for costs, functionality, safety and seismic stability. CM/GC also helped save a year of construction time in a state where the construction season is limited to May through September.

Arizona

The **Arizona** DOT has used CM/GC successfully on more than half a dozen projects. The state is comfortable with this method of procurement, and it is now being used on state and local projects throughout Arizona.

Arizona

The Gila River Indian Community Department of Transportation awarded its first CM/GC contract for the replacement of the Sacaton Road Bridge over the Gila River on Route 7 near Phoenix, Arizona. The alternative contracting method did not reduce the overall construction time schedule, however the proposed slide-in construction sequencing was a huge benefit to the traveling public where the originally proposed 6-month closure with a fifteen-mile detour was reduced to just 10 days.

California

The **California** DOT has awarded five CM/GC contracts totaling $934 million. They include the State Route 99 realignment, State Route 140 Ferguson slide restoration, San Francisco-Oakland Bay Bridge East Span marine foundation removal, I-5 North Coast corridor and I-215/Barton Road interchange projects. Caltrans plans to develop CM/GC standard procedures if the legislature allows broader use of CM/GC in the future. So far, CM/GC use on the San Francisco-Oakland Bay Bridge East Span project has saved about $10 million. The city of Los Angeles is piloting CM/GC on the $419 million Sixth Street Viaduct project to replace the viaduct over the Los Angeles River, railroad corridors, industrial properties and the 101 Freeway.

Connecticut

The **Connecticut** DOT is using CM/GC contracting for a $464 emergency project to replace the 118-year-old Walk Bridge in Norwalk. The structure serves about 150 trains a day, and CM/GC contracting is being used to minimize disruption to critical rail service between New York City and Boston. Early contractor involvement will also be used to address project issues related to utilities, barge traffic, a sewer treatment facility, a marina and a maritime center.

Louisiana

The **Louisiana** Department of Transportation & Development is now authorized to use CM/GC contracting on highway construction projects. The governor signed the new law in August 2014.

Maine

The **Maine DOT** is using CM/GC contracting to replace the Sarah Mildred Long Bridge spanning the Piscataqua River. The bridge replacement is a joint project between the Maine and New Hampshire DOTs, with MaineDOT serving as the lead. The $200 million project received an FHWA TIGER grant. The bridge provides a regional link between Maine and New Hampshire, including access to the Portsmouth Naval Shipyard.

Maryland

The **Maryland** State Highway Administration piloted CM/GC on a project for slope stabilization on Maryland Route 24. The goal is to increase roadside safety, protect endangered species and limit disturbance to Deer Creek. Coordination between Maryland SHA and the contractor resulted in the elimination of one retaining wall and minimal work in the stream. The project is scheduled to be complete in spring 2015.

Michigan

The **Michigan** DOT successfully used CM/GC 10 times during EDC-2. MDOT applied the process to encourage innovation use and increase the constructability of projects such as a slope improvement, bridge slide, riverwalk and playscape, light rail, and passenger ship terminal and wharf. Using CM/GC improved project schedules, public outreach efforts and construction methods and generated time and cost savings. CM/GC enabled the agency saved an estimated $4 million on replacement of the bearings of the Zilwaukee Bridge using contractor innovations.

Minnesota

The **Minnesota** DOT has executed one CM/GC contract and is in the selection process for a second. The first CM/GC contract was for a $175 million project to rehabilitate the Winona Bridge over the Mississippi River, which carries an average of 11,300 vehicles per day. MnDOT is also advancing a CM/GC contract to relocate a section of Highway 53 between Duluth and International Falls, a major transportation corridor serving northeastern Minnesota.

Nevada

The **Nevada** DOT has used CM/GC on four federal projects and two state projects and plans to use the delivery method on local projects as well. The state legislature has extended CM/GC authority through June 2017.

New Hampshire

Although **New Hampshire** DOT does not have legislative authority to use CM/GC, the city of Concord used it for its Main Street improvement project, a TIGER grant recipient, after advertising the project twice with low response from bidders. Using CM/GC allowed the project to move forward at a modified scope and within the city's available funding. Construction began in fall 2014.

Tennessee

The **Tennessee** DOT is using CM/GC for the first time on the rehabilitation of four I-40 bridges in downtown Nashville to save time and money and reduce crashes. The bridges are on a major interstate with significant traffic flow issues, including the need to schedule around a professional sports team's events. Construction will begin in 2015.

Utah

The **Utah** DOT has used CM/GC contracting on more than 20 projects during the past 10 years, achieving significant cost savings through risk mitigation, schedule reduction and application of contractor-furnished innovations. These CM/GC contracting innovations resulted in new construction technologies in Utah, including the development and mainstreaming of the state's Accelerated Bridge Construction program.

Vermont

The **Vermont** Agency of Transportation is working on four CM/GC projects. Construction has begun on the first project, which includes use of the slide-in bridge construction technique. The second, a bridge replacement and rail lowering project, is in the design stage. The third and fourth projects are in the scoping phase. VTrans chose the CM/GC process for the projects to improve the quality of the designs and reduce the impact of construction on drivers.

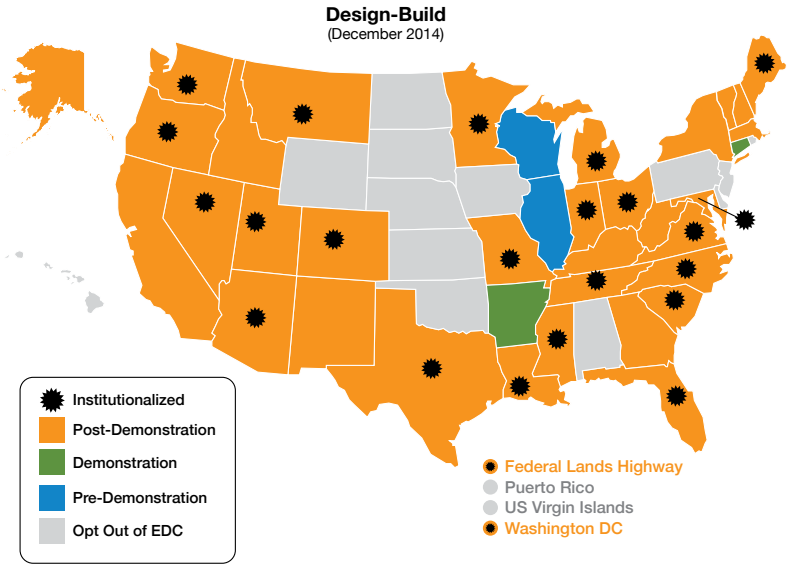
Washington

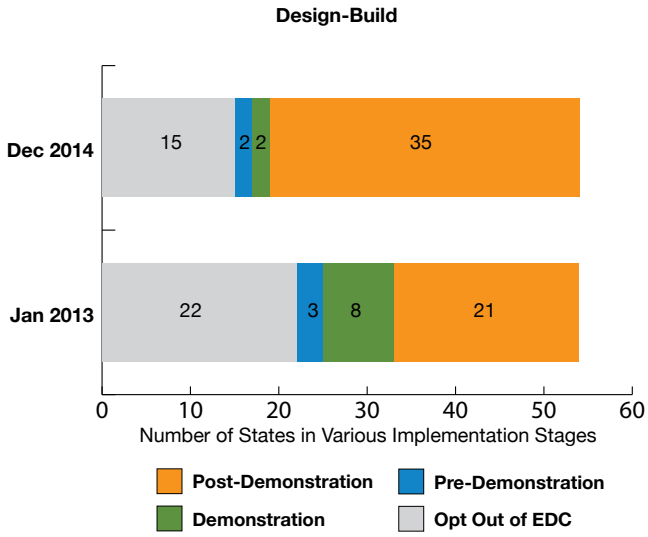
The **Washington** DOT and Washington State Ferries are using the CM/GC delivery method on the Seattle Multimodal Terminal at Colman Dock project, which has a budget of $268 million. The state passed CM/GC enabling legislation in June 2014.

Design-Build

The design-build project delivery method combines the design and construction phases of a project in one contract, which can dramatically accelerate project completion over the traditional design-bid-build process, in which design and construction occur sequentially. In D-B, a highway agency identifies what it wants constructed, accepts proposals and selects a contractor to assume the risk and responsibility for both the design and construction phases. Part of EDC-1, D-B was included in EDC-2 to expand use of this contracting method.

In addition to accelerating project delivery, D-B offers opportunities to save money while maintaining the same quality level as achieved in traditional project delivery. D-B allows transportation agencies to assign project risks to the entity—agency or designer-builder—best able to manage them. It allows contractors the maximum flexibility to innovate in the selection of design, materials and construction methods.





Since FHWA introduced D-B as an EDC innovation in 2010, transportation departments in close to half the country—including 22 states, Washington, D.C., and Federal Lands Highway—have made D-B a standard project delivery practice. During EDC-2, D-B use expanded from 29 to 35 states, Washington, D.C., and Federal Lands Highway.

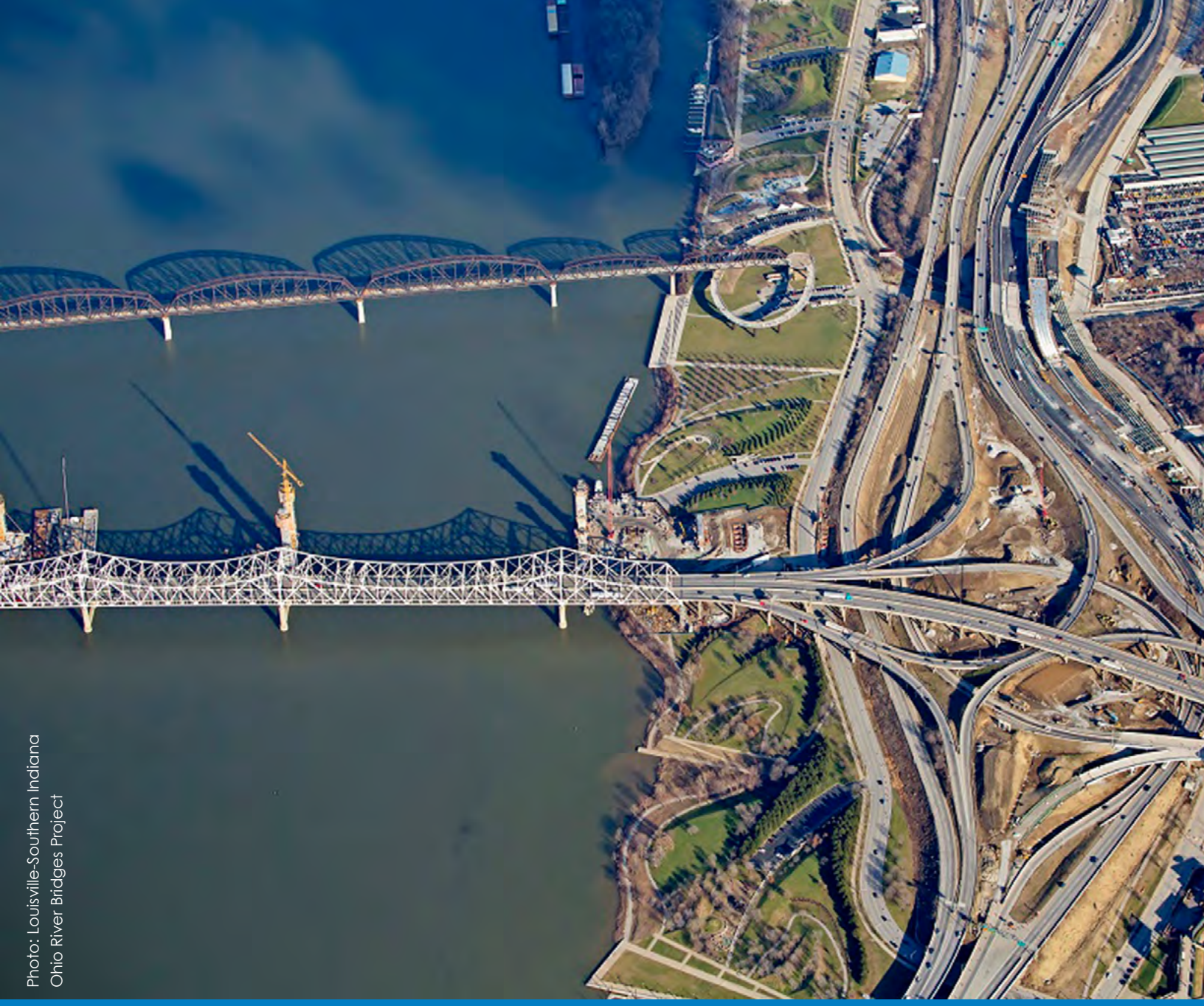


Photo: Louisville-Southern Indiana Ohio River Bridges Project

Innovation *Spotlight*

Kentucky

The **Kentucky** Transportation Cabinet worked with the **Indiana** DOT and FHWA to save $1.8 billion and reduce the construction schedule by eight years on a major project involving downtown Louisville and East End bridges over the Ohio River using design refinements, D-B and public-private partnership contracting with alternative technical concepts. The KYTC has received legislative authority for 16 D-B projects to date. D-B project delivery is institutionalized in Indiana.

Project Highlights

Alaska

The **Alaska** Department of Transportation & Public Facilities is using D-B to deliver the Glenn Highway Eagle River Bridge replacement project. ADOT&PF is also developing two D-B projects on the George Parks Highway, one to build two railroad overpasses and another to replace the Sheep Creek and Montana Creek Bridges.

District of Columbia

The **District** DOT *Design-Build Manual*, published in May 2014, describes the agency's procedures and recommended best practices to effectively and successfully procure and administer projects using the D-B project delivery process.

Florida

The **Florida** DOT has a mature D-B process with comprehensive procedures, guidelines and specifications in place. FDOT has used D-B on more than 440 projects. The agency used the D-B project delivery method on 59 percent of its projects in 2014 and is on track to use it on 45 percent of its projects in 2015.

Georgia

The **Georgia** DOT had limited legislative authority that allowed competitive bidding only when EDC-2 started, but in April 2013 it gained approval to use a best-value or single-phase procurement process under D-B. GDOT awarded its largest D-B project by competitive bidding in June 2013. Completion of the first single-phase, low-bid project is scheduled for 2015. The first best-value project is set for completion in March 2017.

Kansas

The **Kansas** DOT was provided legislative authority to use D-B on one project, the Johnson County Gateway interchange project. The $288 million project will reconstruct the I-435/I-35/K-10 interchange, one of the state's most congested interchanges. One of the largest projects KDOT has ever funded, it is also the agency's first experience with the D-B project delivery method. Construction began in 2014.

Massachusetts

Since 2013, **Massachusetts** DOT has issued eight D-B contracts valued at $950 million. MassDOT is the first state to procure a project to convert a cash and electronic toll system to an entirely electronic system. This D-B project includes 124 miles of the Western Turnpike.

Michigan

In 2014, **Michigan** DOT developed a section on D-B for its *Innovative Construction Contracting Guide* that includes recommendations for use and implementation steps.

Mississippi

By state law, **Mississippi** DOT can deliver two D-B projects a year worth up to $10 million each and one additional D-B project per year over $10 million. Since 2012, MDOT has awarded three bridge widening D-B projects, a bridge replacement and an interstate construction project in Pike and Lincoln counties.

New Hampshire

The largest project ever awarded in **New Hampshire**, the Memorial Bridge project, was completed in 2014 using the D-B delivery method. Engineers believe the method helped them open the bridge to the public six months early. The project has won numerous national and local awards. NHDOT averages one D-B project a year and uses it for emergencies, intelligent transportation system implementation and other projects.

Vermont

The **Vermont** Agency of Transportation has gained full legislative authority for D-B use and is working to complete a D-B manual with support of STIC Incentive program funds. VTrans has used D-B on four bridge replacements and a culvert replacement.

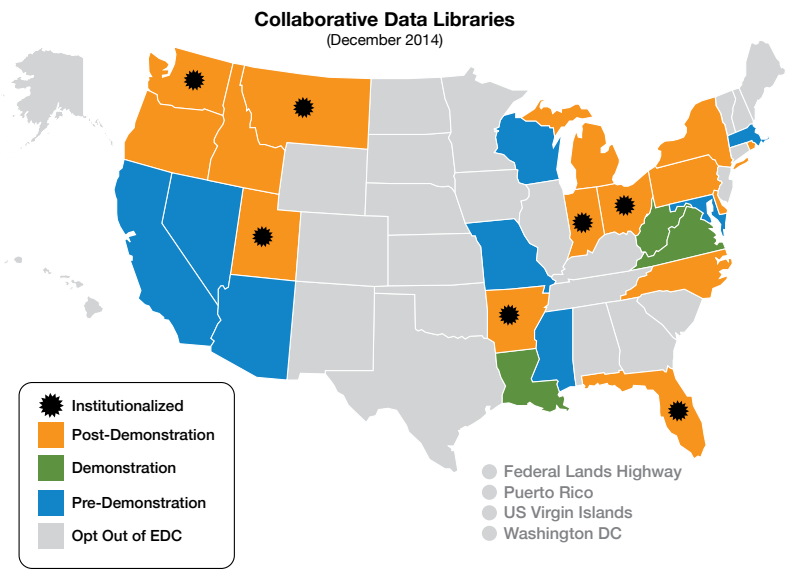
Geospatial Data Collaboration

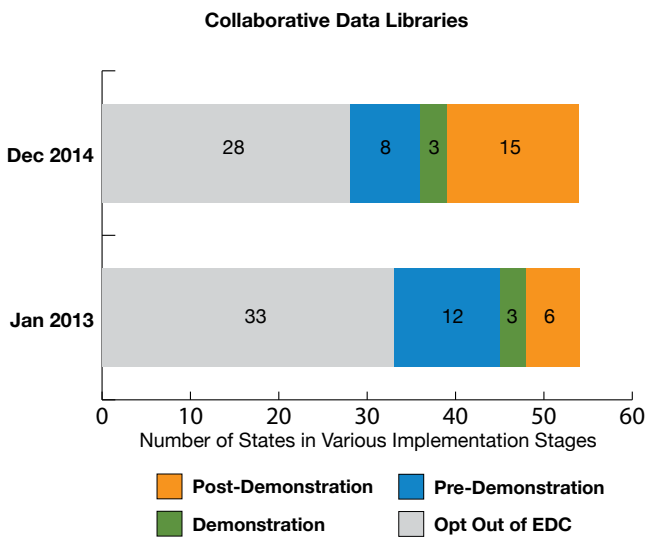
Geospatial data collaboration facilitates information sharing among project delivery stakeholders and improves the quality and speed of project decisions. In the past, geographic information system tools at many federal, state and local agencies were housed separately, making partnering on projects a challenge. Through EDC-2, FHWA recommended the use of technology that facilitates project collaboration by making tools, data and maps accessible on the Web.

Geospatial data collaboration can improve working relationships between organizations, simplify data sharing among project participants and enhance information flow in the environmental process. It can also reduce the time required to assemble and manage data, automate repetitive analyses and improve the quality and timeliness of decision-support documents. Web-based technology offers project participants the flexibility to access data and tools anytime and anywhere, while enabling organizations to control data access and share only the information they wish to provide to partners.

Collaborative Data Libraries

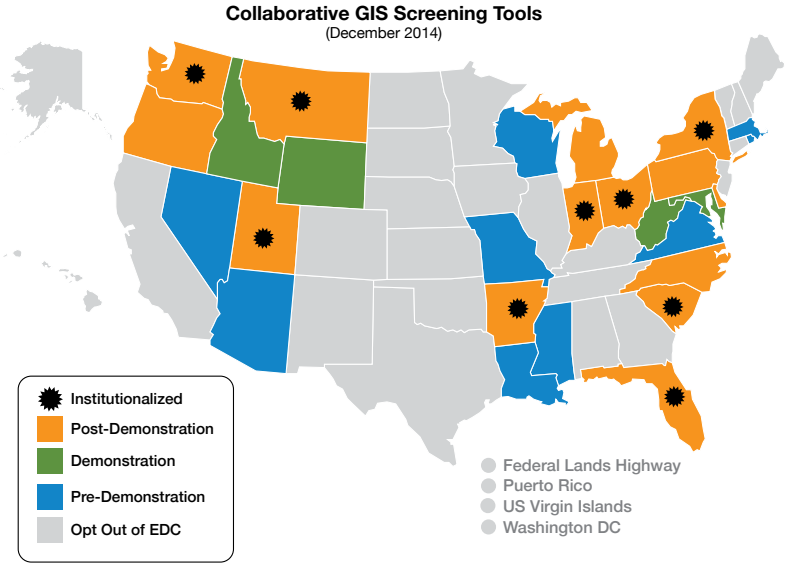
The number of states that are collaborating on development of geospatial data libraries doubled from nine to 18 during EDC-2. Maintaining collaborative data libraries is now an institutionalized practice in seven states.

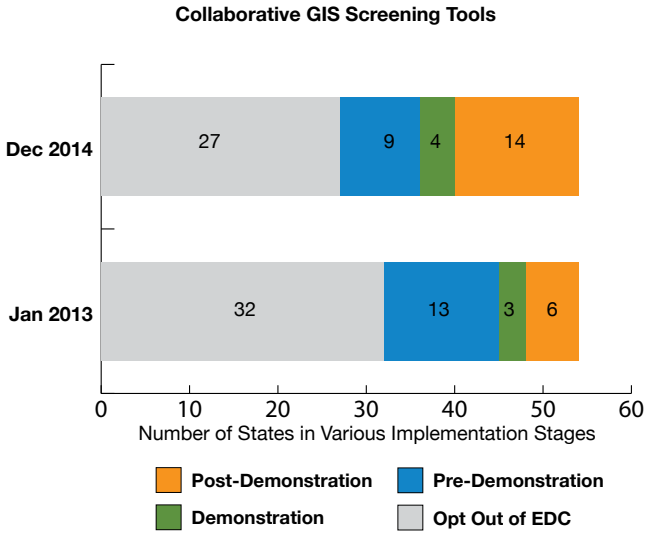




Collaborative GIS Screening Tools

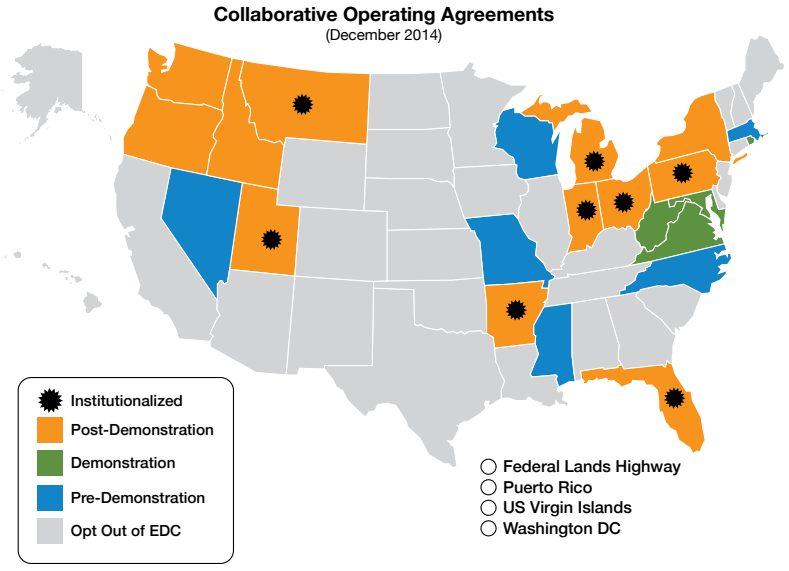
During EDC-2, the adoption of collaborative GIS screening tools more than doubled from nine to 18 states. Nine of those states have made using GIS screening tools a standard practice to enhance information sharing among project delivery stakeholders.

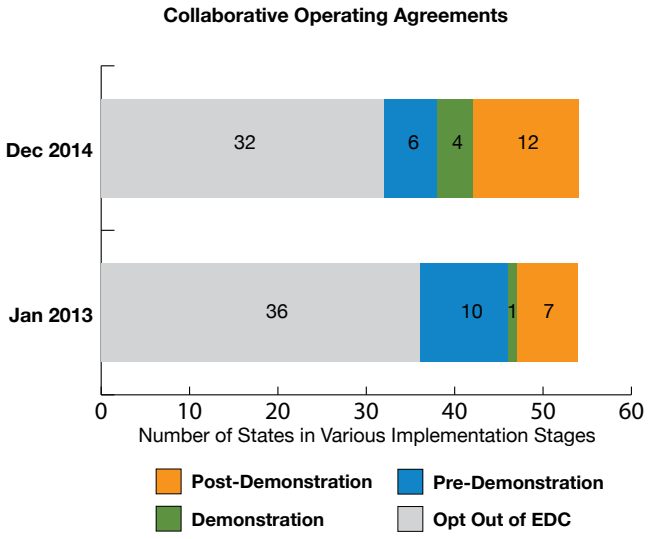




Collaborative Operating Agreements

The number of states incorporating collaborative tools into the environmental process through operating agreements doubled during EDC-2, increasing from eight to 16. Eight states are using operating agreements as collaborative tools in the environmental process as a mainstream practice.





Innovation Spotlight

AASHTO UPlan Innovation Initiative

AASHTO sponsored UPlan under the AASHTO Innovation Initiative, formerly the Technology Implementation Group, in collaboration with the geospatial data collaboration effort under EDC. States participating in the AII UPlan initiative evaluated a web-based, collaborative GIS technology for a year. Idaho and Utah served as the lead for states participating in round one, while Minnesota, North Carolina and Pennsylvania led the round two state efforts.

Project Highlights

Delaware

The **Delaware** DOT worked with the Delaware Department of Technology and Information to launch the FirstMap project. It provides a central data warehouse where common statewide GIS data sets can be stored, updated and used by various state agencies and the public.

Idaho

The **Idaho** Transportation Department will complete work in 2015 on IPLAN, a collaborative GIS screening tool that provides ITD and its stakeholders with a virtual workplace to collaborate on planning and departmental efforts. In the past, data were siloed in departments, in some cases accessible to just one or two people.

Louisiana

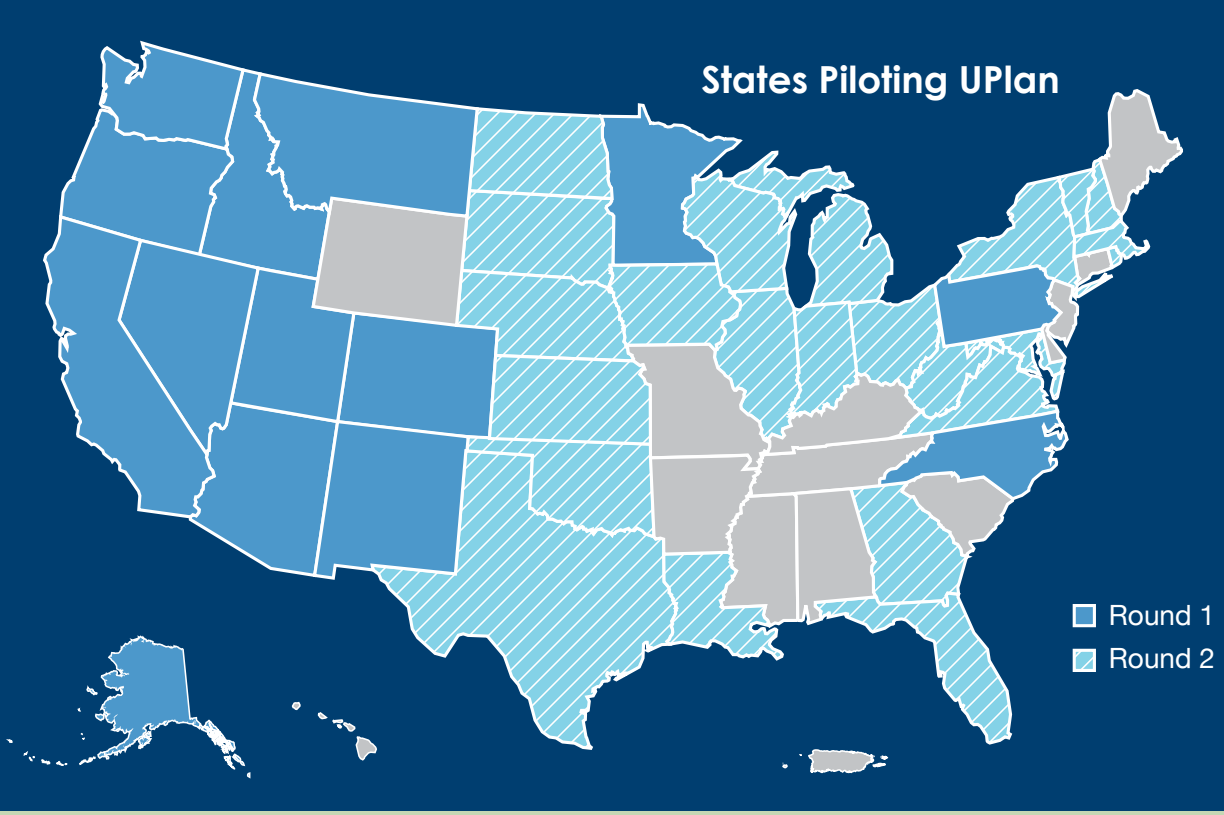
The **Louisiana** Department of Transportation & Development is collecting local road data for its Road and Highway GIS Management System. It is also developing a library of financial, environmental, safety and roadway data. These efforts will transition into the GIS state portal for all data.

Massachusetts

The **Massachusetts** DOT and FHWA are coordinating with agencies such as the Division of Marine Fisheries, Department of Environmental Protection and U.S. Environmental Protection Agency on using collaborative data and getting buy-in for early environmental reviews. They are working on a regional environmental analysis and ecological framework and memorandums of agreement with the agencies.

Montana

The **Montana** DOT implemented interactive Web mapping platforms and collaborative content management systems to improve communication. MDT piloted the tools for a year while developing an implementation plan for using them. The agency continues to explore further application of the tools in its daily activities.



Nevada

The **Nevada** DOT is building a collaborative data library and multiuse dashboard. The tool will integrate data stored in separate NDOT databases to create an interface that can be more efficiently used by staff who handle GIS, asset management and project scoping.

New York

The **New York** State DOT is engaged in several efforts to integrate GIS information for agency staff, partners and the public. NYSDOT is establishing an enterprise linear referencing system to house all of its asset management- and roadway-related geospatial data.

Utah

The **Utah** DOT developed a tool called UPlan that makes tools and data accessible on the Web, allowing internal and external project partners to create maps and share data.

West Virginia

The **West Virginia** DOT developed an interagency agreement with the U.S. Fish and Wildlife Service that outlines a process to expedite the Endangered Species Act and Bald and Golden Eagle Protection Act informal consultation process for minor transportation activities that meet FHWA's categorical exclusion criteria. The process includes the use of a GIS database to screen qualified transportation projects and special provision requirements to avoid and minimize impacts to protected species.

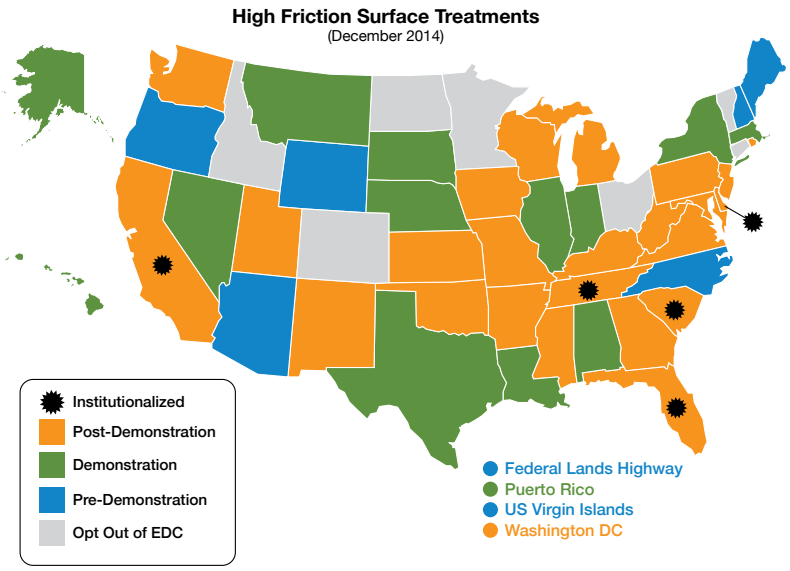
Wyoming

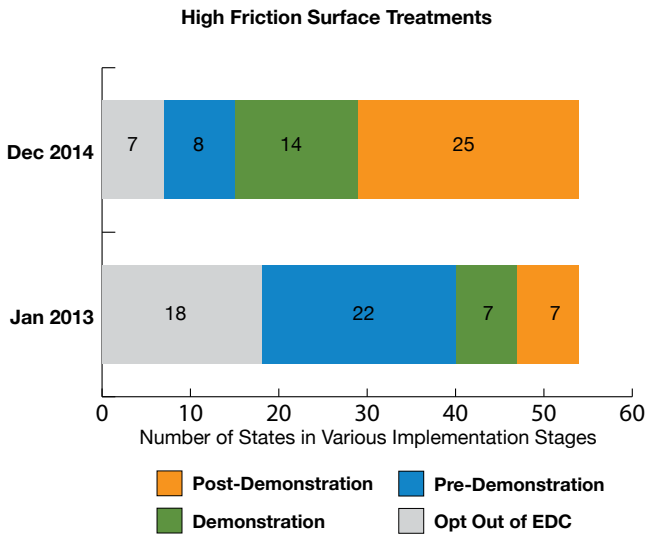
The **Wyoming** DOT and Wyoming Technology Transfer Center are working on a pavement monitoring system for county roads. The data collected, accessible through a web-based application, will be shared with various stakeholders. The data will lead to more accurate planning and help decision makers develop risk-based solutions to pavement improvement.

High-Friction Surface Treatments

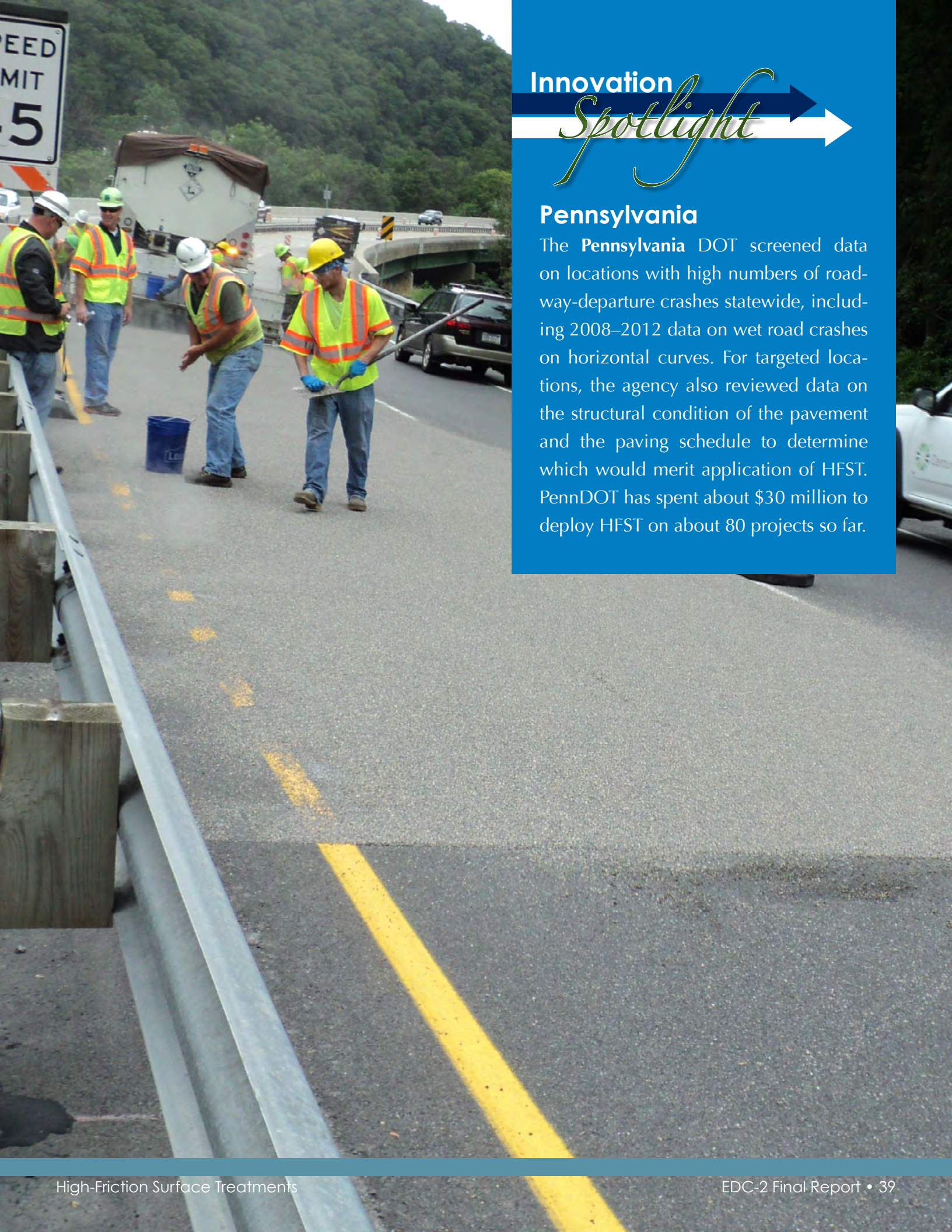
High-friction surface treatments are pavement overlay systems with exceptional skid resistance not typically provided by conventional materials. They involve applying high-quality, durable aggregates with a binder to provide long-lasting skid resistance at high-crash locations, such as horizontal curves, intersection approaches and downgrades. FHWA highlighted the technology in EDC-2 to encourage highway agencies to mainstream it as a safety countermeasure at spot locations.

High-friction surface treatments help motorists maintain better control in dry and wet driving conditions, reducing crashes, injuries and fatalities. They are relatively low in cost compared to geometric roadway improvements. The treatments, which can be applied manually or by machine, can be installed quickly with minimal impact on traffic and negligible effect on the environment. The treatments are customizable, enabling agencies to use them where they are most needed.





High-friction surface treatments generated widespread interest during EDC-2. By the end of the two-year cycle, 37 states, Washington, D.C., and Puerto Rico were implementing them, up from 14 at the beginning. Five states have made the use of the treatments a standard practice for reducing crashes at critical locations.



Innovation Spotlight

Pennsylvania

The **Pennsylvania** DOT screened data on locations with high numbers of roadway-departure crashes statewide, including 2008–2012 data on wet road crashes on horizontal curves. For targeted locations, the agency also reviewed data on the structural condition of the pavement and the paving schedule to determine which would merit application of HFST. PennDOT has spent about $30 million to deploy HFST on about 80 projects so far.

Project Highlights

Alabama

The **Alabama** DOT is using HFST on a demonstration project at the Alabama State Route 152 and I-65 interchange because of the number of wet weather crashes occurring on the ramps. In addition to crash history, pavement friction values will be checked periodically to evaluate the durability of HFST. ALDOT is developing guidelines for HFST, including when, where and how to use the technology.

Arizona

HFST is one of the low-cost countermeasures to address crashes included in the **Arizona** DOT's *Roadway Departure Safety Implementation Plan*. To prepare for HFST implementation, AZDOT has researched best practices.

Arkansas

The **Arkansas** State Highway and Transportation Department plans to award three HFST projects before June 2015. They include two non-interstate projects with 26 locations and one interstate ramp project with 25 locations. AHTD plans to evaluate the projects as part of a state research project.

California

The **California** DOT has completed 33 HFST projects. About 30 local agency HFST projects were completed in 2014. Caltrans estimates that more than 250 locations, state and local, will be treated with HFST by the end of 2015. HFST is referenced as a countermeasure in both the state's Highway Safety improvement Program Guidance and the Local Roadway Safety Manual.

Federal Lands Highway

Federal Lands Highway has developed a decision support tool for selecting HFST projects. Full use of the tool will be possible when federal land management agencies have national crash databases in place with automated analysis capabilities to identify sites conducive to HFST.

Florida

The **Florida** DOT has used HFST on 20 projects in 30 locations, including bridges, and has six HFST projects in development. FDOT saw an 83 percent reduction in crashes on the I-275 ramp to State Route 60 in Tampa after installing HFST, from an annual crash rate of 17.6 between 2007 and 2011 to just three.

Kentucky

The **Kentucky** Transportation Cabinet has installed HFST at 94 locations since 2010, including 31 locations during EDC-2. In 2013, the agency conducted a crash analysis of 43 HFST installations on ramps and horizontal curves from 2009 to 2012. For horizontal curve installations, yearly wet-weather crash averages declined 86 percent, dry-weather crash averages dropped 47 percent and total crashes fell 73 percent. For ramp installations, wet-weather crash averages declined 85 percent, dry-weather crash averages were down 66 percent and total crashes were 78 percent lower.

Missouri

The **Missouri** DOT received AID Demonstration funds to install HFST at nine locations. The work will be completed in 2015 with the goal of accelerating the HFST program in the state.

Nebraska

The **Nebraska** Department of Roads will install HFST on a curve on I-680 and on bridges on U.S. 77 and U.S. 275. These locations have a history of frequent icy and wet surface-related roadway departure crashes.

New Jersey

The **New Jersey** DOT is developing screening tools to use HFST on two pilot projects, one project that potentially involves high-volume jug handles and one project that includes horizontal curves. Hudson County now uses HFST as a safety countermeasure at critical locations across its roadway system.

Oklahoma

The **Oklahoma** DOT received AID Demonstration funds to install HFST at three high-traffic locations on the interstate in the Oklahoma City metropolitan area.

South Carolina

The **South Carolina** DOT updated its specification to meet the AASHTO HFST specification and institutionalized HFST during EDC-2. An assessment of SCDOT's initial HFST trial projects found a before-and-after crash reduction of 57 percent for total crashes and 68 percent for wet-weather crashes over the three-to-five-year period after installation.

South Dakota

The **South Dakota** DOT received AID Demonstration funds to install HFST at four locations and completed the work in September 2014. The goal is to reduce roadway departure crashes by 25 percent. An evaluation, now underway, will determine statewide implementation of the technology.

Tennessee

The **Tennessee** DOT created its HFST program in 2013. Using a systemic approach, TDOT identified 100 horizontal curves where at least four crashes occurred. These locations will receive HFST in 2015. TDOT was the lead agency in developing the AASHTO specification for HFST.

U.S. Virgin Islands

The **U.S. Virgin Islands** Department of Public Works developed a draft specification for HFST. The department began talks with the **Puerto Rico** Highways and Transportation Authority about testing and sharing accumulated data on pavement surfaces. PRHTA has pilot sections for testing the technology on PR-110 in Moca and PR-26 in San Juan. PR-26, with average daily traffic of more than 150,000 vehicles, provides access to Luis Muñoz Marín International Airport.

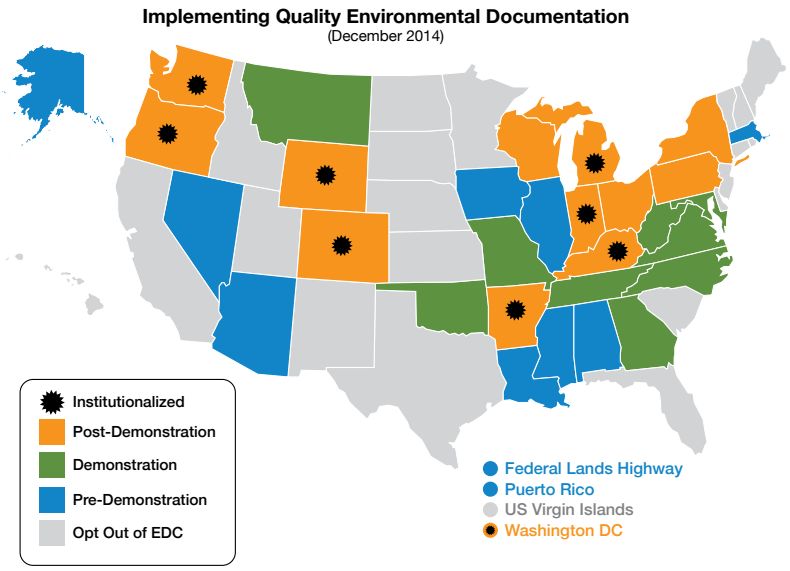
Wisconsin

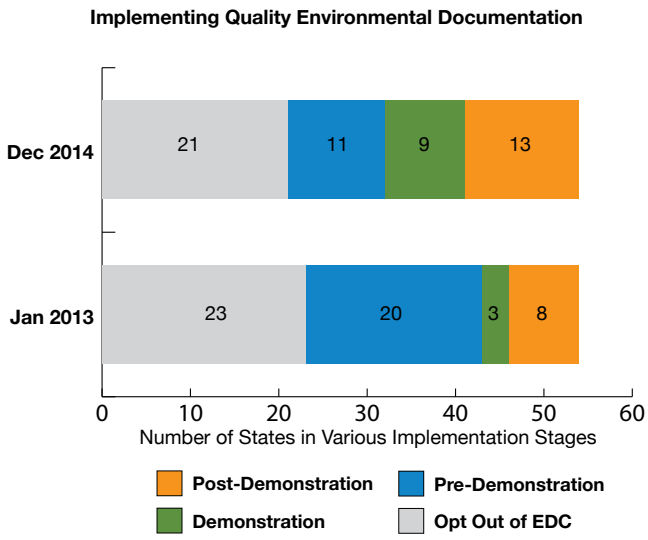
The **Wisconsin** DOT installed HFST at the Marquette interchange ramp from I-94 to I-43 in Milwaukee in 2011. In the year following installation, only two crashes occurred—well below the average of 79 crashes per year for the three years before installation. Only nine crashes have occurred in the three years following installation.

Implementing Quality Environmental Documentation

The EDC-2 effort on implementing quality environmental documentation promoted recommendations to improve the quality and reduce the size of National Environmental Policy Act documents developed for construction projects. The effort was designed to make NEPA documents more effective in disclosing the information used in making project decisions to the public and participating agencies. That, in turn, helps project proponents accelerate project delivery and achieve better environmental outcomes.

Producing higher-quality, less-cumbersome documents increases efficiency and effectiveness by reducing the amount of work and resources required to produce them. It also makes them more accessible to the stakeholders who read them. Through EDC-2, FHWA encouraged adoption of the core principles of quality environmental documentation: telling the project story, keeping the document succinct and ensuring that it meets all legal requirements.





The number of states implementing quality environmental documentation techniques nearly doubled from 11 to 21 states and Washington, D.C., during EDC-2. Nine states now pursue quality environmental documentation as a standard practice on transportation projects. FHWA is building on the success of the quality environmental documentation effort in EDC-3 by incorporating eNEPA, an online collaboration forum FHWA created for transportation projects that require an environmental impact statement or environmental assessment.

Innovation Spotlight

Georgia

The **Georgia** DOT used IQED principles to develop an environmental assessment for the project to widen State Route 144 in Bryan County. The environmental assessment, approved in June 2014, received an Honorable Mention Award from the American Planning Association and a NEPA Environmental Enhancement Award from the Georgia Partnership on Transportation Quality.

Project Highlights

Alaska

The **Alaska** Department of Transportation & Public Facilities revised the *Alaska 6004 Program Environmental Procedures Manual* to make it easier to read while spelling out process and legal requirements. ADOT&PF also revised the *Alaska FHWA Program Environmental Procedures Manual* to incorporate IQED principles for streamlining and improving environmental documents.

Colorado

The **Colorado** DOT is using an experimental base document for environmental assessments that reduces document size by 75 percent. The experimental document was used on the U.S. 50 West project in Pueblo and the State Highway 9 Iron Springs project in Summit County in 2014.

Maryland

The **Maryland** State Highway Administration used IQED principles to develop the Maryland Route 5 Leonardtown finding of no significant impact document. The project is needed to address public safety concerns and operational issues. The corridor also serves the area's Amish and Old Order Mennonite communities, who need shoulders to accommodate horse-drawn carriages.

Missouri

The **Missouri** DOT worked with FHWA to select a project and significantly reduce the size of its environmental assessment document. The environmental assessment for the I-55 interchange project in Scott County came in at 35 pages, compared to 100 or more pages for traditional environmental assessments.

Montana

The **Montana** DOT and FHWA incorporated IQED principles in the development of the final environmental impact statement and record of decision for the Billings Bypass project. The record of decision was issued in August 2014. Using IQED principles on the final environmental impact statement helped make the document more understandable to the public when it was used in outreach efforts.

New York

The **New York** State DOT improved its NEPA checklist and design approval documents. It partnered with FHWA to provide training to its project development staff on developing a project's purpose and need and writing an environmental assessment.

Ohio

The **Ohio** DOT used STIC Incentive funds to develop guidance on how to improve the quality and streamline the production of two environmental documents that are important in project development: feasibility studies and alternative evaluation reports.

Oregon

The **Oregon** DOT worked with FHWA to develop IQED tools and principles that were highlighted as examples in AASHTO's *Practitioner's Handbook: Preparing High-Quality NEPA Documents for Transportation Projects*.

Tennessee

The **Tennessee** DOT completed a review of its programmatic categorical exclusion documentation process using LEAN, a process improvement philosophy that helps agencies create more value for customers with fewer resources. As a result, TDOT instituted process improvements and established consolidated and more predictable time lines for developing documents.

Virginia

The **Virginia** DOT used IQED principles in the I-64 Peninsula study environmental impact statement. A reader-friendly document with high-quality graphics, it combined the "Affected Environmental" and "Environmental Consequences" chapters to aid readability and incorporated technical material by reference.

West Virginia

The **West Virginia** DOT and FHWA collaborated to modify the environmental assessment format for the project to replace the PFC Abraham G. Sams Memorial Bridge in Clay County, decreasing document development time by two months and producing a document that is easier for the public to read and understand.

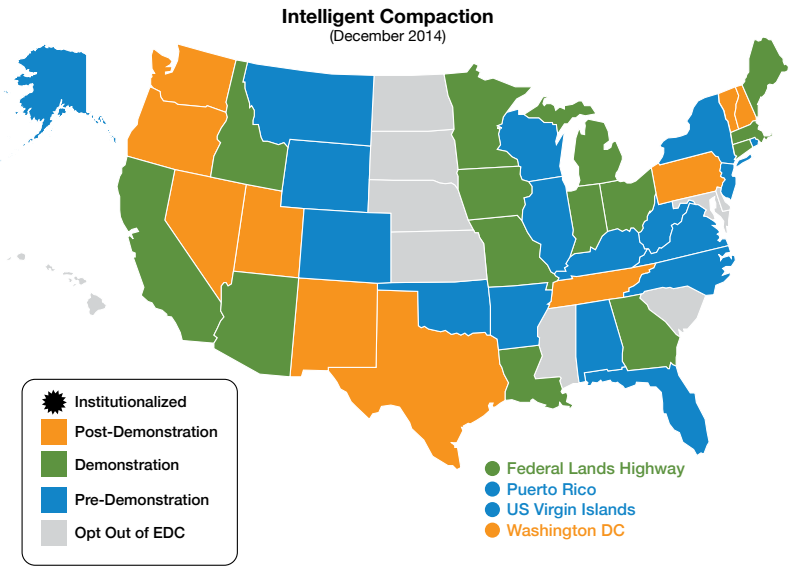
Wisconsin

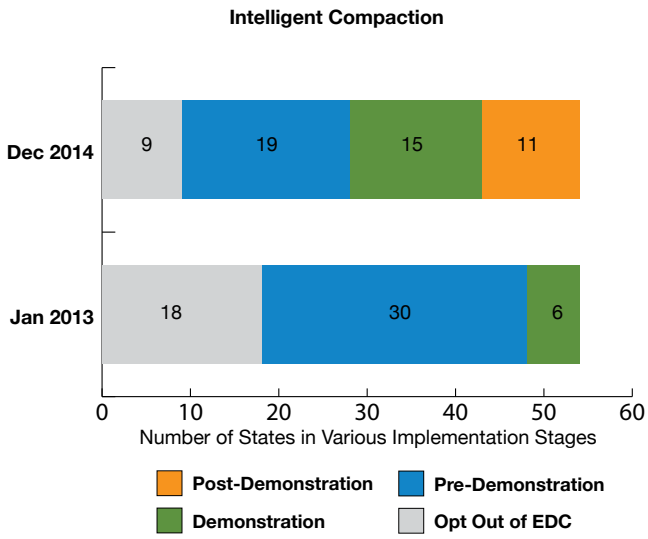
The **Wisconsin** DOT focused on process improvement training by developing NEPA document training modules, conducting statewide training for using WisDOT's NEPA/WEPA worksheets and sponsoring three National Highway Institute environmental document-related courses.

Intelligent Compaction

Intelligent compaction is a modern approach to compaction of pavement materials, an important construction process that enhances pavement quality and performance. IC uses modern vibratory rollers equipped with accelerometers, a continuous measurement system, GPS-based mapping and an onboard computer reporting system. The EDC-2 effort focused on expanding IC use as a cost-effective way to accelerate highway pavement construction and improve roadway quality.

IC technology delivers multiple benefits, including improved quality, uniformity and long-lasting performance of pavements. Using vibration and a system to collect, process and analyze measurements in real time, IC rollers can compact more pavement with fewer passes than traditional rollers. IC efficiencies can produce time, cost and fuel savings.





The opportunity to try IC to enhance quality control on and accelerate construction of highway projects piqued the interest of many states during EDC-2, when implementation of the technology more than quadrupled from six to 24 states, Washington, D.C., and Federal Lands Highway. Twenty-three states have developed specifications for the use of IC technology in the field.

Innovation Spotlight

California

The **California** DOT completed one IC pilot project in September 2013 and identified 16 additional pilot projects before the 2014 construction season. Seven of the projects involved asphalt overlays, while the other nine used cold in-place recycling. By the end of 2014, three projects had been completed, three were near completion and the remaining 10 were waiting to be advertised for construction.

Project Highlights

Arizona

The **Arizona** DOT developed a specification for implementing IC on an upcoming 12-mile pavement rehabilitation project on I-40, just east of Flagstaff.

Connecticut

The **Connecticut** DOT incorporated IC into two pilot projects in 2014, including a pavement preservation project on I-84 in Vernon and another on I-95 in Groton. Both projects required the use of GPS on the vibratory rollers as part of a modified IC specification.

District of Columbia

The **District** DOT completed its IC final specifications in 2014 and plans to use IC on two paving projects in 2015.

Florida

The **Florida** DOT continues to do extensive IC research. The agency plans to team up with a manufacturer to retrofit equipment for a contractor to use on a pilot project.

Idaho

IC, GPS, temperature readings, field point tests and coring occurred at 60 locations in **Idaho** as part of ongoing analysis of IC technology. IC manufacturers from the United States, Japan and Germany were on hand for a field demonstration in May 2014.

Iowa

The **Iowa** DOT has completed multiple IC pilot projects, including a U.S. 65 grading project in Polk County. Iowa State University's Center for Earthworks Engineering Research and the Iowa DOT are involved in the Technology Transfer Intelligent Compaction Consortium to identify, support, facilitate and fund IC research and technology transfer.

Maine

The **Maine** DOT used IC on three projects in 2014 and is evaluating the results. The agency plans to choose additional projects in 2015 and complete a formal evaluation by the end of the year.

Michigan

The **Michigan** DOT has compiled a lessons-learned document from an IC pilot project in 2013 in Iron River and will apply it to another pilot project planned for 2015.

Minnesota

The **Minnesota** DOT completed four projects using IC in 2013 and an additional 14 in 2014. MnDOT is the lead state proponent for the development of Veda software, a map-based tool for viewing and analyzing geospatial data, and is hosting a Transportation Pooled Funded Program study for further development of the software.

Oregon

The **Oregon** DOT has developed IC specifications. ODOT also completed the largest IC project to date in the United States, using IC to place 217,000 tons of asphalt on an I-84 paving project.

Pennsylvania

The **Pennsylvania** DOT has worked with four construction contractors to use IC on six projects. An additional 10 projects are planned for the 2015–2016 construction seasons.

Texas

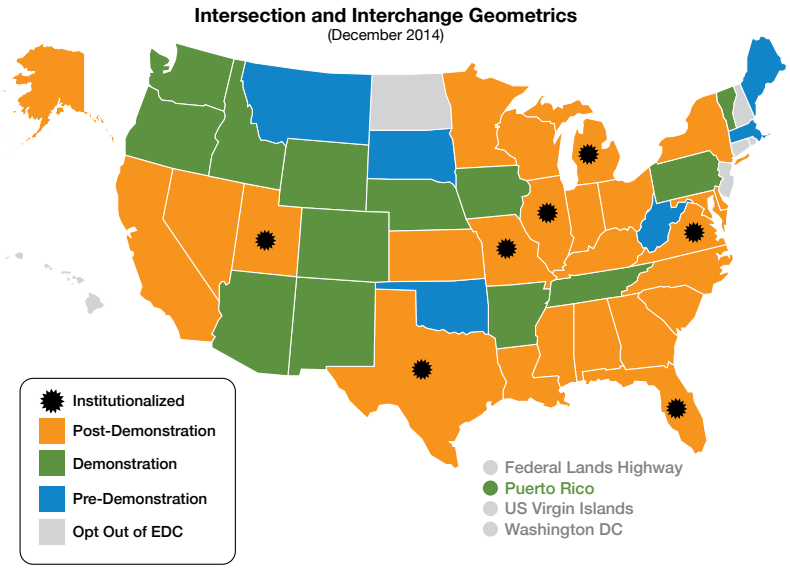
The **Texas** DOT completed five projects using IC in 2013 and 20 projects in 2014. Most of the projects involved IC for soil compaction. TxDOT developed and revised a standard specification based on lessons learned. TxDOT also sponsored an FHWA research project to evaluate the effectiveness of IC retrofit kits for construction equipment. The University of Texas at El Paso is completing a research report on the project.

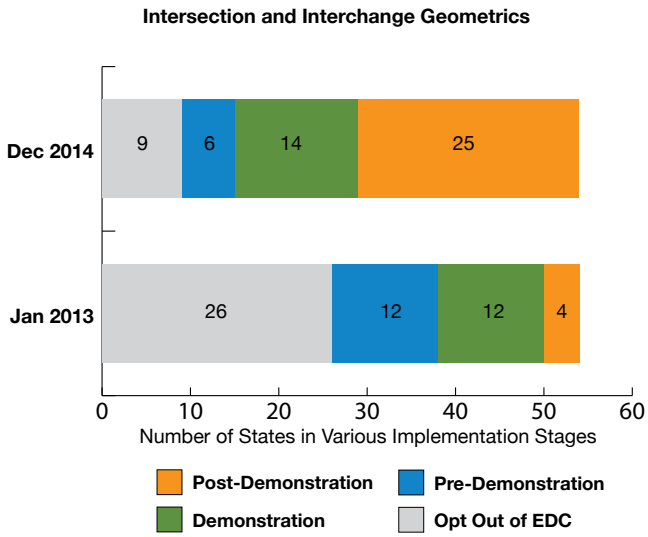
Intersection and Interchange Geometrics

Innovative intersection and interchange geometrics can accommodate traffic volumes more efficiently while improving the safety of intersections—where about half of all severe crashes in the United States occur—by minimizing the intersection conflicts that can cause significant problems. FHWA recommends that highway agencies include these designs in their evaluation processes for intersection and interchange projects and use them where appropriate.

EDC-2 focused on five design configurations, including diverging diamond interchanges, displaced left-turn intersections, median U-turn intersections, restricted crossing U-turn intersections and modern roundabouts. All are specifically designed to reduce or eliminate left-turn conflicts, allowing safer travel for motorists, pedestrians and bicyclists.

Strategically modifying the geometric design of an intersection or interchange can redistribute traffic volumes to reduce the number of conflict points, simplify signal operations and in some cases eliminate the need for additional lanes. The EDC-2 effort has helped transportation professionals solve safety and mobility challenges by considering an expanded array of intersection and interchange designs. Not only do the designs enhance safety and traffic movement, they often can be built at lower cost and in less time than traditional designs.





Intersection and interchange geometrics generated significant interest among states during EDC-2, when implementation of the technology more than doubled from 16 to 38 states and Puerto Rico, all of which implemented two or more of the five promoted designs. Seven states have made it a standard practice to consider the use of intersection and interchange geometric designs as an alternative on projects. More than 50 diverging diamond interchanges have been built or are under construction across the country.

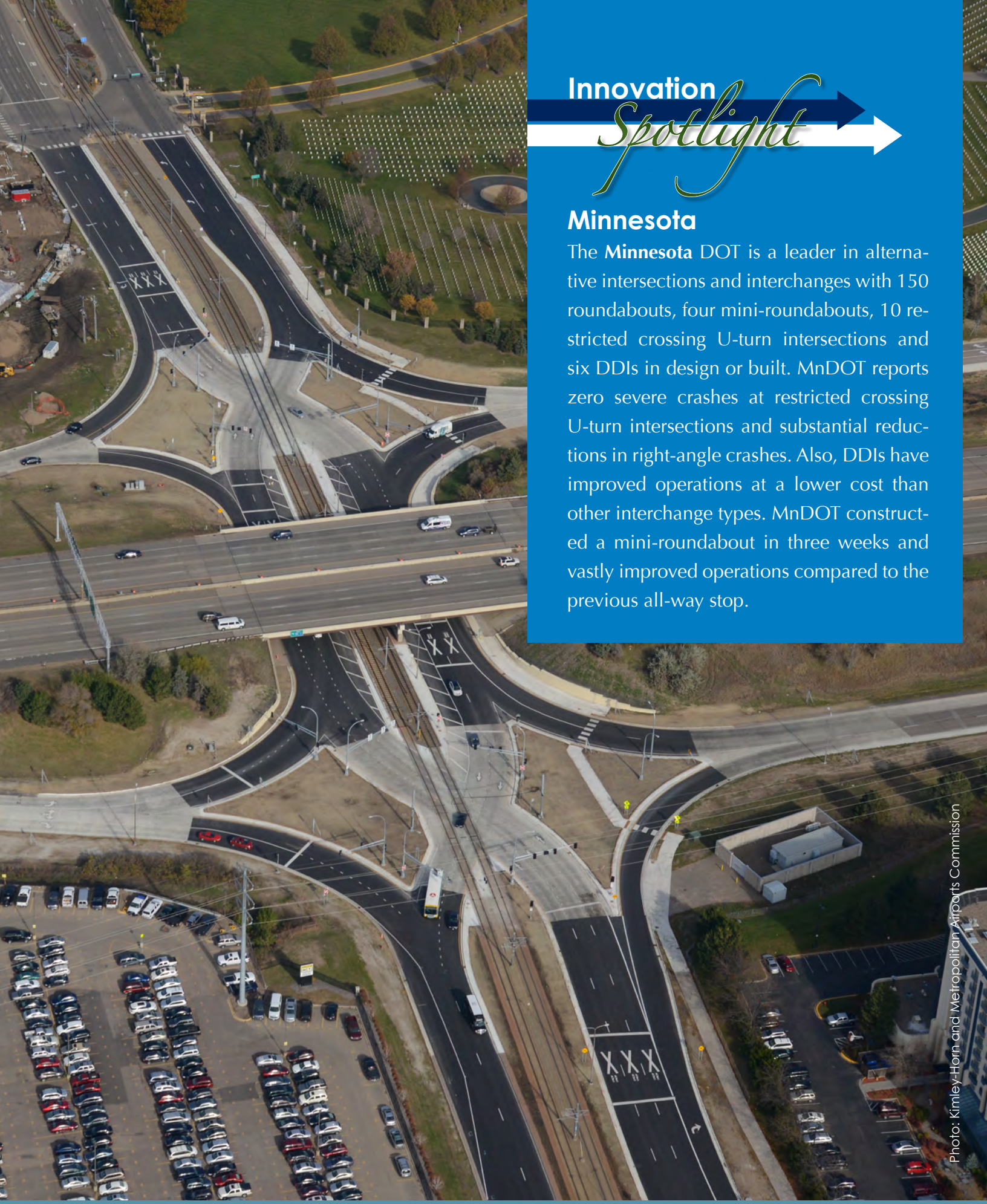


Photo: Kimley-Horn and Metropolitan Airports Commission

Innovation Spotlight

Minnesota

The **Minnesota** DOT is a leader in alternative intersections and interchanges with 150 roundabouts, four mini-roundabouts, 10 restricted crossing U-turn intersections and six DDIs in design or built. MnDOT reports zero severe crashes at restricted crossing U-turn intersections and substantial reductions in right-angle crashes. Also, DDIs have improved operations at a lower cost than other interchange types. MnDOT constructed a mini-roundabout in three weeks and vastly improved operations compared to the previous all-way stop.

Innovation Spotlight

Michigan

The **Michigan** DOT has built 25 roundabouts, with nine more planned for construction in 2015. According to MDOT, roundabouts have reduced severe crashes more than 50 percent. Meanwhile, local agencies in Michigan have built about 100 roundabouts.

Project Highlights

Alabama

The **Alabama** DOT is designing a DDI and its first three roundabouts. ALDOT has used displaced left-turn, median U-turn and restricted crossing U-turn intersections at several locations. The cities of Huntsville, Mobile and Montgomery have also built roundabouts.

California

The **California** DOT issued an intersection control evaluation policy directive that establishes a process and framework to provide a balanced approach to considering and selecting intersection control strategies and innovative design concepts. As a result, Caltrans districts now regularly consider roundabouts and DDIs in their evaluation of alternatives.

Colorado

The **Colorado** DOT and the city of Grand Junction partnered on a project to build the state's first DDI at I-70 and U.S. 6/50. The project cost $4 million, much less than alternatives with price tags of up to $15 million.

Florida

The **Florida** DOT has 23 DDIs in various stages of planning, design and construction, including its first on I-75 in Sarasota and Manatee Counties. By the end of EDC-2, more than 200 roundabouts had been built on city, county and state roadways. FDOT has scheduled 17 more roundabout projects for the next five years. FDOT created a statewide roundabout support network that hosts quarterly webinars for staff to discuss project-specific issues and share best practices.

Georgia

The **Georgia** DOT delivered the state's first DDI at I-285 at Ashford-Dunwoody Road a month earlier than planned through a unique partnership between state and local governments and private business. This project won an AASHTO American Transportation Award in 2013. GDOT has several more DDIs in planning, design and construction. GDOT and local road agencies have also been aggressively pursuing roundabouts and so far have built more than 200 statewide.

Idaho

The **Idaho** Transportation Department constructed its first DDI project at a new interchange on I-86 in Chubbuck. Construction cost was $10.8 million, $2.1 million under the programmed amount. The Ada County Highway District's *Countywide Roundabout Preservation Plan* identifies intersections where roundabouts are feasible future traffic control solutions based on a planning-level screening analysis.

Illinois

The **Illinois** DOT has 10 DDIs in planning, design or construction. In one project, the number of lanes required was reduced from 10 to six, resulting in significant cost savings. The DDI configuration was selected as the preferred alternative on another project because it provides 20 percent more capacity and 60 percent less delay and costs 50 percent less than the next best alternative. IDOT is studying restricted crossing U-turn intersections for northwestern and southern areas of the state. About two dozen roundabouts are in operation in Illinois, with many more planned.

Indiana

The **Indiana** DOT constructed its first DDI on I-69 at DuPont Road in Fort Wayne. The agency chose a DDI for the location to reduce congestion. The state's second DDI is planned for 2015 near Greenwood. INDOT developed an *Intersection Decision Guide* to support its policy to expand use of alternative intersections across the state.

Kentucky

The **Kentucky** Transportation Cabinet constructed a DDI at U.S. 68 and New Circle Road in Lexington, Kentucky. Since opening, the DDI has reduced crashes 45 percent and increased mobility. The KYTC has received three national awards for the project. Two additional DDIs are in design.

New Mexico

The **New Mexico** DOT received STIC Incentive funds to provide additional public outreach before opening its first DDI on I-25 at Cerrillos Road. The interactive approach included a smart phone application, website, video simulation and mobile kiosk. The website includes a virtual driving tour accessible on home computers.

New York

The **New York** State DOT constructed the I-590 and Winton Road DDI project at a cost of $8 million, $4.9 million less than the partial cloverleaf configuration alternative. Construction of the DDI took only seven months, achieving a 50 percent reduction in total construction time. NYSDOT, which established one of the country's earliest "roundabouts first" policies, continues to build roundabouts regularly.

North Carolina

The **North Carolina** DOT opened a DDI over I-85 north of Charlotte as part of a widening project. NCDOT is a lead state in implementing signalized restricted crossing U-turn corridors, known locally as Superstreets, and its projects are featured in several FHWA informational videos and publications. Also, the Eastern Band of the Cherokee completed work on a roundabout with assistance from NCDOT.

Pennsylvania

The **Pennsylvania** DOT is building a DDI on I-70 in Washington and Westmoreland Counties. PennDOT has built 21 roundabouts, with five more under construction and 25 in design.

Puerto Rico

In June 2015, the **Puerto Rico** Highways and Transportation Authority plans to start construction on its first DDI on PR-30 in Gurabo. The $15 million project includes the replacement of a bridge using prefabricated arches. PRHTA also plans to build a roundabout on PR-1 in Caguas.

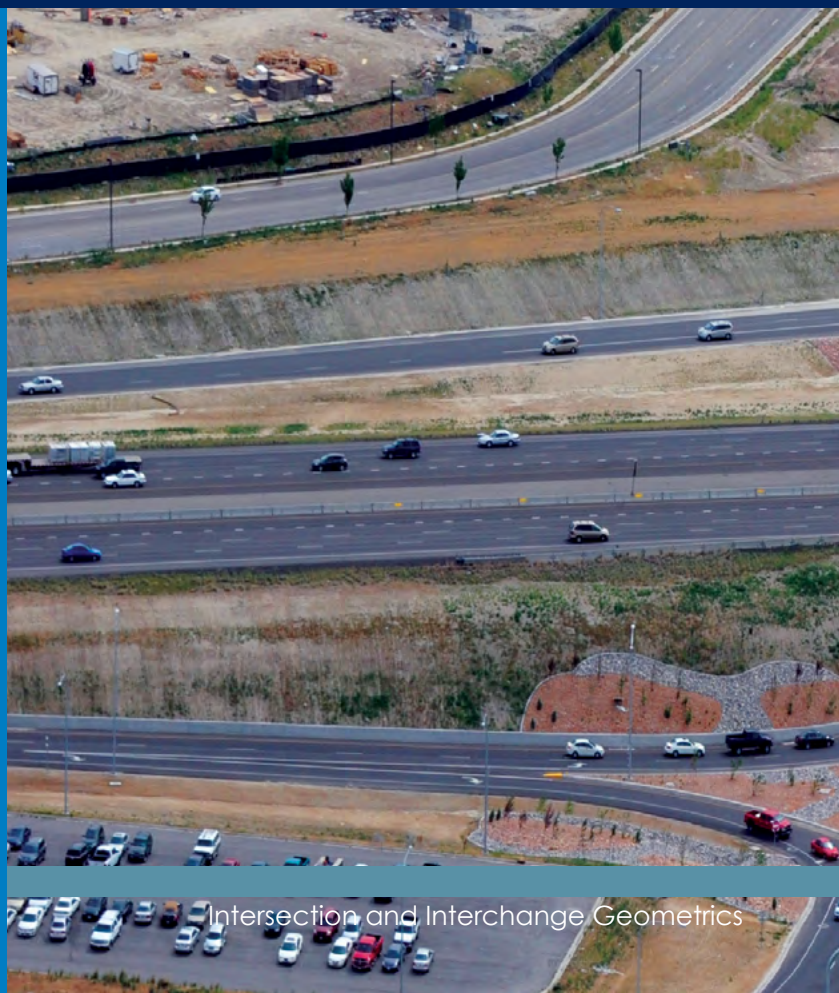
South Carolina

The **South Carolina** DOT has completed 17 alternative intersections, including 14 roundabouts, two restricted crossing U-turn intersections and one indirect left-turn intersection. Preliminary analysis of before-and-after crash data at these intersections indicates a 68 percent reduction in crashes, 72 percent decline in injury crashes and 100 percent drop in fatal crashes. Twenty-three more alternative intersections are in planning, design or construction.

Innovation *Spotlight*

Utah

Since opening its first DDI in August 2010, the Utah DOT has had great success with this innovative tool. At the start of 2015, DDIs have been constructed in seven Utah locations and several more are in development or under study. The DDI has proven effective and has economically reduced congestion at key interchanges by improving safety and mobility to and from Utah highways and interstates.



Tennessee

The first DDI in **Tennessee** opened in 2010 in Alcoa. The Tennessee DOT is now building a DDI on I-40 in Sevier County. TDOT has a roundabout policy and has constructed roundabouts at various locations around the state. The agency has also built four restricted crossing U-turn intersections, earning it a National Roadway Safety Award in 2013.

Vermont

The **Vermont** DOT finished the design of its first DDI and is in the scoping phase for another. The purpose of the projects is to reduce congestion and crashes in two of Vermont's busiest areas. Proactive in implementing roundabouts, Vermont has a state statute requiring the consideration of roundabouts for safety purposes at hazardous intersections.

Wyoming

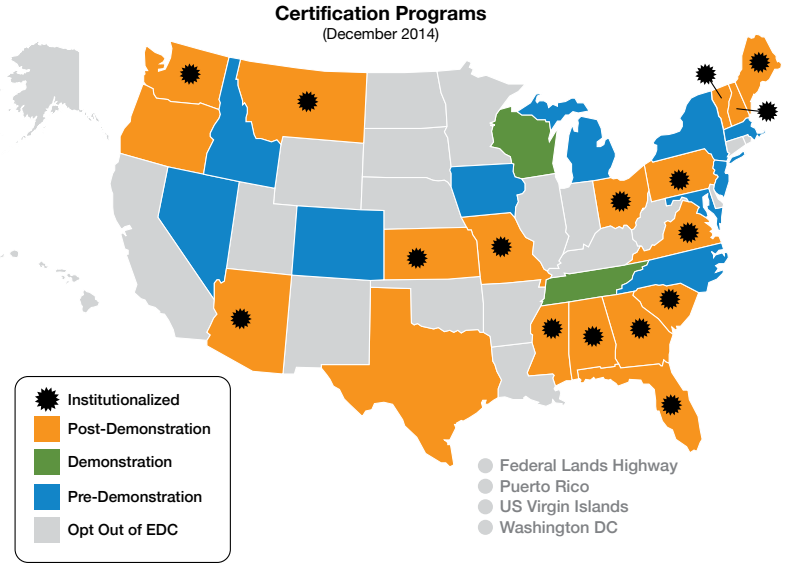
The **Wyoming** DOT opened its first DDI on I-25 south of Cheyenne. The agency, which chose the design as an efficient and cost-effective solution to the heavy traffic at this interchange, earned the Wyoming Engineering Society's Presidential Project of the Year award for the project.

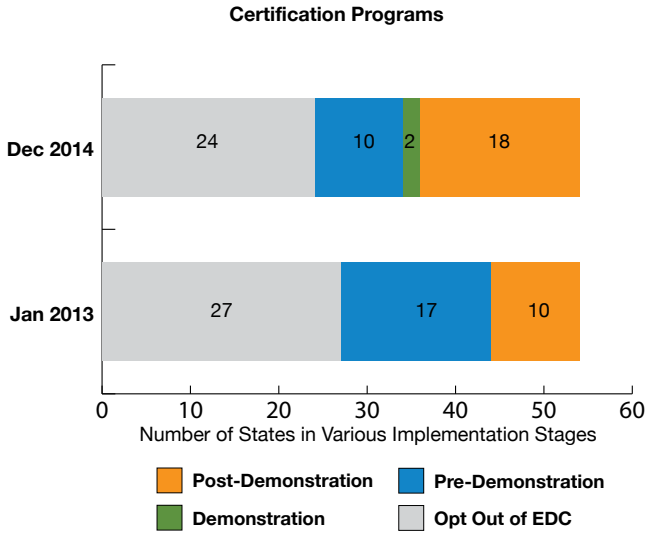
Locally Administered Federal-Aid Projects

Under EDC-2, FHWA promoted a three-pronged strategy to help local public agencies navigate the complexities of the Federal-Aid Highway Program. These strategies for locally administered Federal-Aid projects include certification and qualification programs, consultant services flexibilities and stakeholder partnering. Using these strategies can reduce the amount of oversight states need to provide and make it easier for local agencies to follow federal regulations and guidelines.

Certification Programs

Through certification programs, state agencies confirm that local agencies have the ability to manage all or part of the project development and implementation process. Benefits of certification programs include fostering interagency partnerships, creating evaluation and streamlining processes, and providing outreach and education.





Twenty states had established certification programs for local agencies by the end of EDC-2, up from 10 at the beginning. Sixteen states have made certification programs a standard practice to improve delivery of local projects.

Innovation Spotlight

Ohio

The **Ohio** DOT developed online training modules for local agencies through its Local Technical Assistance Program Center and made them a key part of the qualification program it started in 2014. The agency used STIC Incentive funds to hold Local Public Agency Days throughout the state to introduce the program.

Project Highlights

Colorado

The **Colorado** DOT created a local public agency coordinator position in its Project Development Branch. The agency also participated in two peer exchanges on locally administered projects with Oregon, Washington and Utah.

North Carolina

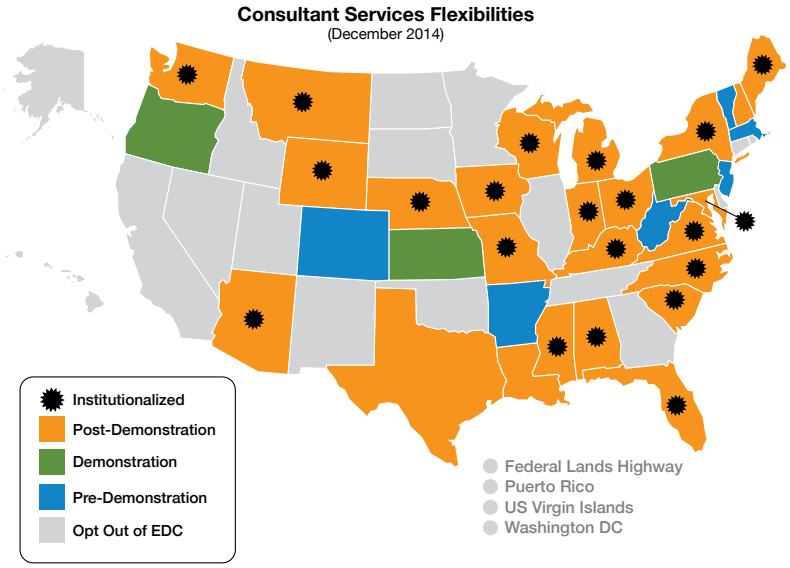
The **North Carolina** DOT is developing a two-part process to deliver locally managed projects. The first part is a prequalification process for local agencies to ensure their basic understanding and knowledge, and the second part is a certification process to ensure proper training and knowledge are maintained. The prequalification process will be implemented in 2015 using STIC Incentive funds.

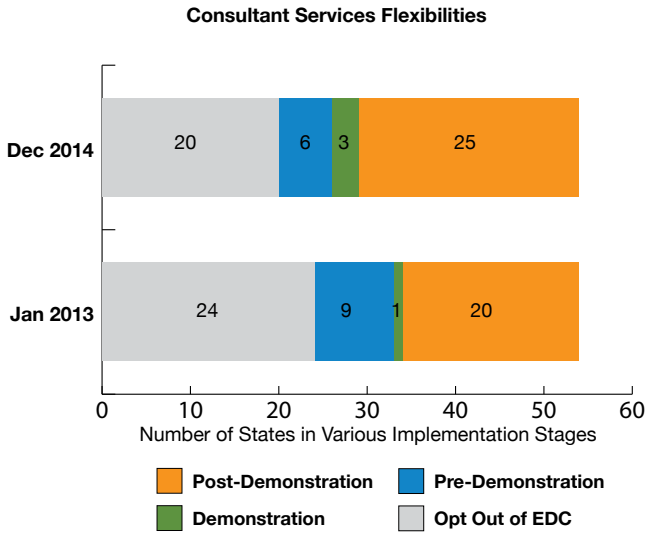
Texas

The **Texas** DOT Local Government Projects Office has grown from one person to a staff of six and has initiated a local public agency certification training program that includes two classes a month.

Consultant Services Flexibilities

Using consultant services helps agencies with limited staff and resources manage locally administered Federal-Aid programs and projects. Among the practices state agencies can adopt are establishing procedures to help local agencies manage consultant services effectively, developing contracting options for local agencies and using consultants to manage local programs.





The strategy to enhance local project delivery that has become most institutionalized across the country is the use of consultant services flexibilities for local projects, which is now a standard practice in 21 states. The number of states that have implemented consultant services flexibilities increased from 21 to 28 states during EDC-2.

Project Highlights

Michigan

The **Michigan** DOT has four consultants on contract for statewide use to conduct local program development oversight, grade inspections and plan reviews. MDOT is also developing a program for oversight of construction engineering.

New York

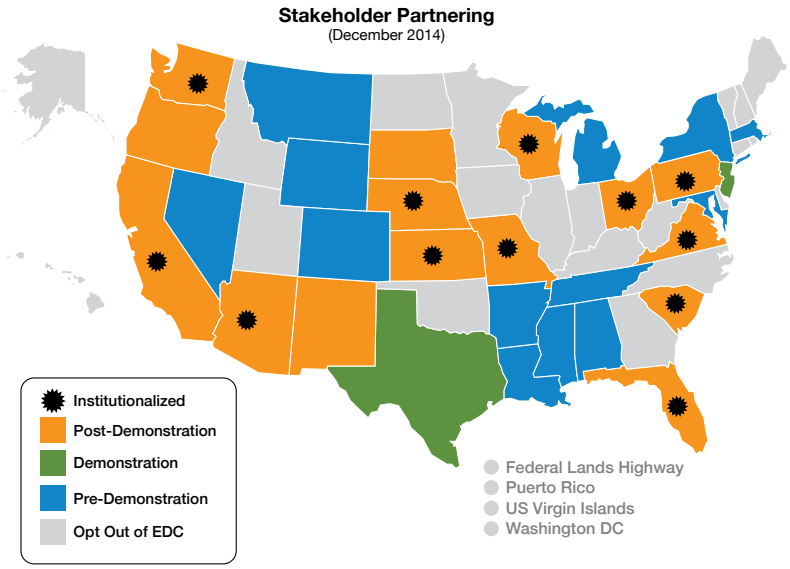
The **New York** State DOT created a regional list of 15 consulting firms procured by an open request-for-qualification process that met state and federal qualifications for engineering, architectural and survey professional services. The list will be used for three years and then the RFQ process will be repeated.

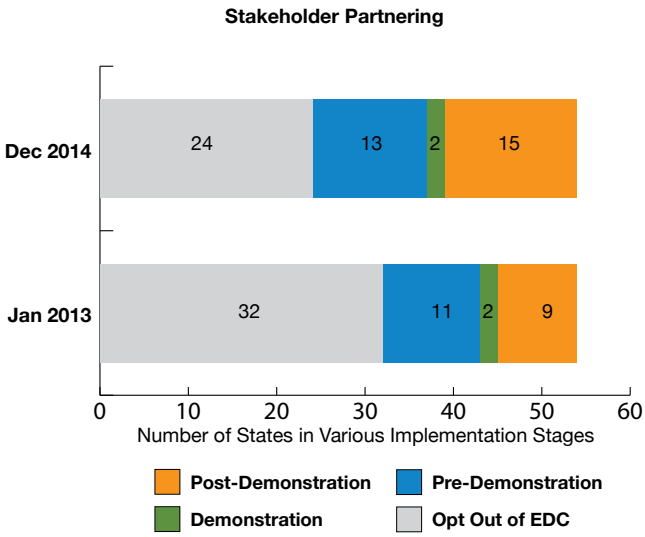
Pennsylvania

The **Pennsylvania** DOT is piloting a regionalized open-ended agreement that helps local agencies save time by eliminating the need to advertise for and select a consultant for services. It will ensure that services are procured in accordance with federal and state regulations and that a qualified consultant is chosen.

Stakeholder Partnering

Communication, coordination and cooperation are vital to implementing locally administered Federal-Aid projects successfully, as is clarity on federal requirements. Establishing stakeholder partnering groups with federal, state and local representatives can improve communication and enhance project development policies and processes.





Implementation of stakeholder partnering grew from 11 to 17 states during EDC-2. Twelve states have institutionalized their stakeholder partnering groups. FHWA is continuing the stakeholder partnering effort in EDC-3 to enhance success for local agencies, which administer 20 percent of the Federal-Aid projects funded each year.

Innovation Spotlight

Arizona

The **Arizona** DOT formed its Local Public Agency Stakeholder Council as a communication initiative. The initiative's purpose is to enhance communication, improve coordination and encourage collaboration among ADOT, FHWA and local agencies. The council consists of 26 members and meets quarterly to discuss topics related to the project development process and the Federal-aid Highway Program. The meetings enable all agencies to gain a better understanding of project delivery issues.

Project Highlights

Colorado

In 2014, the **Colorado** DOT launched a web-based application called Navigate to improve data exchange between CDOT and local agencies, including designs and invoice submittals. CDOT and local officials can use Navigate to chat, email, share files and shorten overall project time.

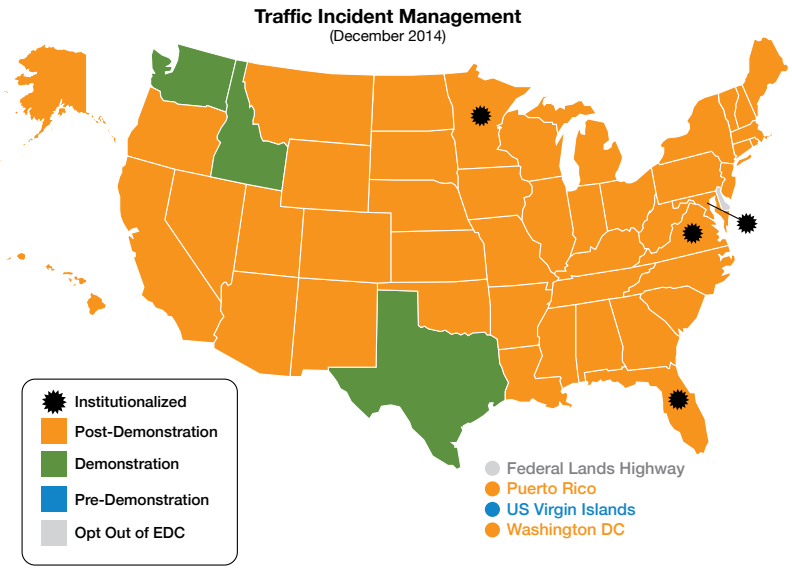
South Dakota

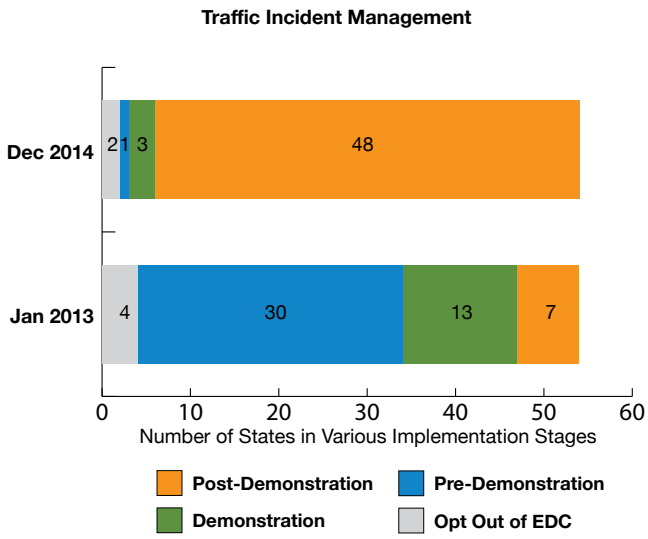
The **South Dakota** DOT executed a charter for a local stakeholder partnering group called the Transportation Advisory Council. Council members identified their top five topics for future action.

National Traffic Incident Management Training

FHWA, in cooperation with the second Strategic Highway Research Program, offered the first national traffic incident management process and training program. This unique training for first responders—including those from police, fire, emergency medical, public safety and transportation disciplines—focuses on safe, quick clearance at traffic incident scenes that protects motorists and responders while minimizing the impact on traffic flow.

Traffic incidents put motorists and responders' lives at risk and account for about 25 percent of all traffic delays. Congestion from incidents can result in secondary crashes, further increasing risk and delays and interrupting freight movement. Developing a cadre of well-trained responders can reduce the time it takes to clear incidents, saving lives, money and time. FHWA deployed a train-the-trainer course for experienced incident responders that facilitates widespread use of traffic incident management training. After completing the train-the-trainer course, participants are equipped to train other incident responders.





As a result of EDC-2, traffic incident management training has become a high priority across the country. During EDC-2, 139 train-the-trainer sessions were conducted to train 5,589 responders who, in turn, instructed more than 80,700 responders in best practices for clearing crashes. Forty-nine states, Washington D.C. and Puerto Rico had implemented traffic incident management training by the end of the two-year cycle, up from 20 at the beginning. Four states have made it a standard practice. At least 10 public safety academies for fire and law enforcement personnel adopted the TIM training program in 2014. The training has been a catalyst for new and emerging relationships among emergency response disciplines at the national and local levels, and responders and motorists are now safer because of this effort.

Innovation *Spotlight*

Ohio

The **Ohio** DOT and Ohio State Highway Patrol have trained more than 10,000 first responders in traffic incident management response. Numerous classroom training sessions have been held since the first train-the-trainer workshop was conducted in September 2012. This training initiative has touched the entire responder community, from law enforcement and fire to towing and public works. Training can be requested through ODOT's QuickClear website and Circuit Rider Program, which delivers onsite training to Ohio agencies.

Project Highlights

Arizona

The **Arizona** DOT has trained more than 3,200 of its targeted audience of 22,500 first responders in 129 training sessions conducted by the end of EDC-2. In Arizona, clearance times for noninjury crashes improved by 52 percent after incident responders applied lessons learned through the traffic incident management program.

California

The **California** DOT held 10 train-the-trainer workshops at which nearly 5,000 first responders received traffic incident management training. Caltrans is on track to train 10 percent of all California first responders by June 2015. The California Highway Patrol requires traffic incident management training for tow operators on the rotation list as part of the Tow Service Agreement and is incorporating training into its Freeway Service Patrol Program to assist stranded motorists.

District of Columbia

The **District** Fire and Emergency Medical Services Department conducts regular traffic incident management training classes. In 2014, more than 300 first responders were trained.

Florida

The **Florida** DOT has 278 traffic incident management trainers and 3,416 trained first responders. FDOT plans to pursue a computer-based training course to reach its goal of training 100,000 responders. The agency collaborated with FHWA to create a GIS map to pinpoint the geographic locations of all trainers in the state.

Georgia

The **Georgia** DOT held three workshops for 95 trainers who, in turn, have trained another 1,700 responders. The Georgia State Patrol has incorporated a four-hour block of traffic incident management responder training in its Trooper Training Academy.

Indiana

First responders trained in traffic incident management techniques were able to shorten road closure time by an estimated six hours after a multivehicle crash occurred on I-70 west of Indianapolis, **Indiana**, during a January 2013 snowstorm. Both directions were blocked with crashed vehicles. Responders cooperated on a decision to move the vehicles to a staging area off the interstate for further investigation. One towing business acted as an incident commander for all towing agencies. As a result, both directions of the interstate were reopened within seven hours.

Kentucky

The **Kentucky** Transportation Center at the University of Kentucky created a traffic incident management manual, revised an emergency traffic handbook and developed an informative article for distribution to local governments, Kentucky Transportation Cabinet and legislative staff. It also created a loan program for trainers for the table-top displays and education tools used in the traffic incident management training program. A total of 2,160 responders have been trained to date through the 93 training sessions conducted across the state.

Missouri

Through training and a focused approach to quick, safe clearance, the **Missouri** DOT has reduced lane closure and incident clearance times from previous averages of 27 to 30 minutes each month to less than 22 minutes. The agency has also prevented many events from lasting more than two hours by applying techniques discussed in training classes and building partnerships with other agencies involved in incident response. MoDOT has incorporated videos of actual crash events into the training program to provide real-world examples of what to expect. Training sessions also cover the state's steer-it-and-clear-it law requiring motorists involved in minor crashes to move out of the driving lane and move-over law requiring drivers to yield to emergency vehicles.

New Jersey

The **New Jersey** DOT hosted three train-the-trainer events and trained more than 200 people. NJDOT included personnel from the towing and utility sectors so they, in turn, can train people in private companies who play an integral part in clearing incidents and reopening roadways safely.

Oregon

Interagency coordination and communication enabled emergency responders in **Oregon** to restore traffic less than 90 minutes after a dump truck spilled a load of gravel across both northbound lanes of I-5. Three crashes occurred almost immediately. Oregon State Police relayed information to the Oregon DOT on the equipment needed to remove the debris. An ODOT incident response vehicle quickly established a lane closure and set up advance warning for motorists. A maintenance crew arrived with a grader, broom trucks and blowers to remove the debris to the shoulder. Without collaboration, the incident could have taken two to three hours to clear.

Puerto Rico

The **Puerto Rico** Highways and Transportation Authority partnered with stakeholders to form a traffic incident management committee. About 30 people meet twice a month to share ideas, such as buying 2,500 safety vests and 600 traffic cones to improve responders' safety. PRHTA is developing an *Open Roads Policy* report that evaluates whether current laws comply with traffic incident management practices. PRHTA also created a traffic incident management website.

Rhode Island

The **Rhode Island** DOT's 40 trainers trained more than 660 people from 100 agencies, including 43 cities in Rhode Island and Massachusetts. To reach new recruits, traffic incident management classes are now part of the municipal police and fire academies.

Tennessee

The **Tennessee** DOT, in cooperation with the Tennessee Department of Safety and Homeland Security, built the nation's first traffic incident management training facility. The Nashville facility, which includes road sections and intersections on which incidents can be simulated, is used to teach responders best practices for safe, quick clearance of incidents. Tennessee has trained 3,021 responders in 117 sessions throughout the state.

Vermont

Vermont is in the process of having every police recruit go through a four-hour traffic incident management training block while in the police academy. The long-term goal is to train every state trooper in incident-clearing techniques.

Programmatic Agreements

Also part of EDC-1, programmatic agreements establish streamlined approaches for handling routine environmental requirements on common project types. EDC-2 continued to expand use of programmatic agreements, including applying newly developed agreements in additional states and regions. The emphasis was on increasing the efficiency and effectiveness of the highway development process while maintaining appropriate consideration of the environment.

Programmatic agreements enhance efficiency a number of ways: They standardize coordination and compliance procedures and decrease permit processing time while making permitting outcomes more predictable. They enable agencies to focus limited staff and resources more effectively. They specify clear roles and responsibilities for those involved. And they facilitate development of greater trust among transportation and regulatory agency staffs.

All 50 states now have a programmatic agreement in place and 37 have two or more. With more than 500 programmatic agreements in place across the country, transportation departments and partner agencies report a wide range of benefits, including cost savings, accelerated project delivery, increased certainty about the project development process and project schedule, and decreased review times for state DOT and partner agency staffs.

Innovation Spotlight

New Hampshire

The **New Hampshire** DOT executed a new National Historic Preservation Act Section 106 programmatic agreement with FHWA, the New Hampshire State Historic Preservation Office and the Advisory Council on Historic Preservation in 2014. The agreement will streamline Section 106 reviews on about 70 percent of the transportation projects that typically do not affect historical resources. It allows NHDOT to conduct individual historical resource reviews and eliminates the need for FHWA and the State Historic Preservation Office to conduct project-by-project evaluations. To support the agreement, NHDOT is creating a state historic architectural and archeological resource database.

Oregon

The **Oregon** DOT, National Marine Fisheries Service and FHWA developed a programmatic agreement to provide Endangered Species Act coverage for ODOT projects beginning in January 2013. So far, it has reduced review time by 85 percent and saved $1.23 million. Before the agreement, Endangered Species Act projects required costly and complex biological assessments that took three to five months to prepare and another 200 days to reach a signed biological opinion. Cost savings come from decreasing National Marine Fisheries Service liaison staff from three to one, using a standard form to cut biological assessment costs by 50 percent and reducing project delays.

Photo: John Phelan

Regional

In 2013, the U.S. Fish and Wildlife Service and FHWA formed an interagency team to develop a range-wide programmatic Section 7 consultation for the Indiana bat and Northern long-eared bat under the Endangered Species Act. The programmatic consultation will cover routine highway projects funded by FHWA in as many as 38 states. The team completed a draft effects analysis in December 2014 and incorporated it into a preliminary draft biological assessment in early 2015. The programmatic consultation is expected to be completed in spring 2015.

Regional

In 2014, FHWA and the National Marine Fisheries Service formed an interagency team to improve the consultation process for design-build and similarly funded projects, as well as to develop a programmatic approach to consultation on species and habitats along the Atlantic Coast protected under the Endangered Species Act and Magnuson-Stevens Fishery Conservation and Management Act. A draft of the guidelines was completed in December 2014 and is expected to be finalized in spring 2015. The programmatic consultation approach was initiated at the end of 2014 and is expected to be completed in 2015.

Project Highlights

California

In 2014, the **California** DOT, FHWA, the Advisory Council on Historic Preservation and the California State Historic Preservation Office renewed a programmatic agreement first developed in 2004. The agreement streamlines reviews of projects that impact historic properties so the State Historic Preservation Office does not have to review every project. From 2011 to 2013, only 195 of 2,300 projects required review, saving $1.6 million.

Delaware

The **Delaware** DOT, the Delaware State Historic Preservation Office, the Advisory Council on Historic Preservation and FHWA signed a programmatic agreement in September 2013. The agreement—which replaces an outdated one—helps streamline processes while fulfilling requirements for construction projects under Section 106 of the National Historic Preservation Act.

Idaho

The **Idaho** Transportation Department completed three agreements, including a programmatic finding of no effect to threatened or endangered gastropods, a programmatic finding on environmental justice on minor transportation projects and a Section 106 programmatic agreement with the Idaho State Historic Preservation Office and the Advisory Council on Historic Preservation. In addition, ITD developed a Section 106 programmatic agreement for minor transportation projects with the Nez Perce Tribe.

Kentucky

The **Kentucky** Transportation Cabinet's programmatic agreement on the Indiana bat was developed in 2006 and modified in 2011. As of November 2014, 78 projects required formal consultation. Stakeholders whose projects impacted the habitat were required to pay into the Indiana Bat Conservation Fund. The KYTC estimates the agreement saved $150,000 in 2014 alone.

Maine

The **Maine** DOT, FHWA, U.S. Fish and Wildlife Service, National Marine Fisheries Service and U.S. Army Corps of Engineers signed an updated programmatic agreement on Section 7 of the Endangered Species Act. The January 2014 agreement streamlines the review of projects that have no effect on listed or proposed threatened and endangered species or designated critical habitats. The agreement is Maine's first to include the U.S. Army Corps of Engineers as a signatory. The Maine DOT and FHWA also signed a programmatic agreement that improves the process of documenting categorical exclusions and updates processes, policies and terms to streamline project reviews. The agreement includes the two new categorical exclusions in the Moving Ahead for Progress in the 21st Century Act involving projects in existing operational rights-of-way and those receiving less than $5 million in federal funds.

Nebraska

The **Nebraska** Department of Roads has nine programmatic agreements in place to address environmental compliance. These agreements have helped streamline 712 projects since 2010.

New Jersey

The **New Jersey** DOT and FHWA developed a programmatic biological agreement for the bog turtle, which is on the U.S. Fish and Wildlife Service threatened list. The agreement is designed to provide a streamlined Endangered Species Act Section 7 process for highway construction and maintenance projects. There is no programmatic coverage for the bog turtle in other states that contain this species, so states can benefit by using the New Jersey agreement as a template.

South Dakota

A programmatic agreement for categorical exclusions between the **South Dakota** DOT and FHWA was formalized in October 2013. Designed to accelerate decision making under the NEPA process, the agreement identifies actions on highway projects that SDDOT and FHWA agree do not typically involve significant environmental impacts. When SDDOT's environmental review determines that these actions do not involve unusual circumstances, they may be certified as categorical exclusions with limited documentation.

Washington

The **Washington** State DOT, National Marine Fisheries Service and FHWA successfully implemented a new programmatic agreement for Endangered Species Act Section 7 consultations. The agreement is expected to cover 70 percent of WSDOT projects requiring Endangered Species Act consultations and save an estimated $103,000 a year. Time spent on projects by Washington DOT biologists has been reduced by 98 percent under the new agreement.

Resources for Innovation Implementation

FHWA's Center for Accelerating Innovation administers three programs that provide resources to encourage rapid innovation deployment and foster a culture of innovation in the transportation community, including the State Transportation Innovation Council Incentive program, the Accelerated Innovation Deployment Demonstration program and the MAP-21 Section 1304 - Innovative Project Delivery Program.

"With dwindling revenues, it can be difficult to get new things implemented. Providing an incentive to offset the costs is sometimes the only way to get that initial deployment."

— Jennifer Harper, Missouri Department of Transportation Research Engineer

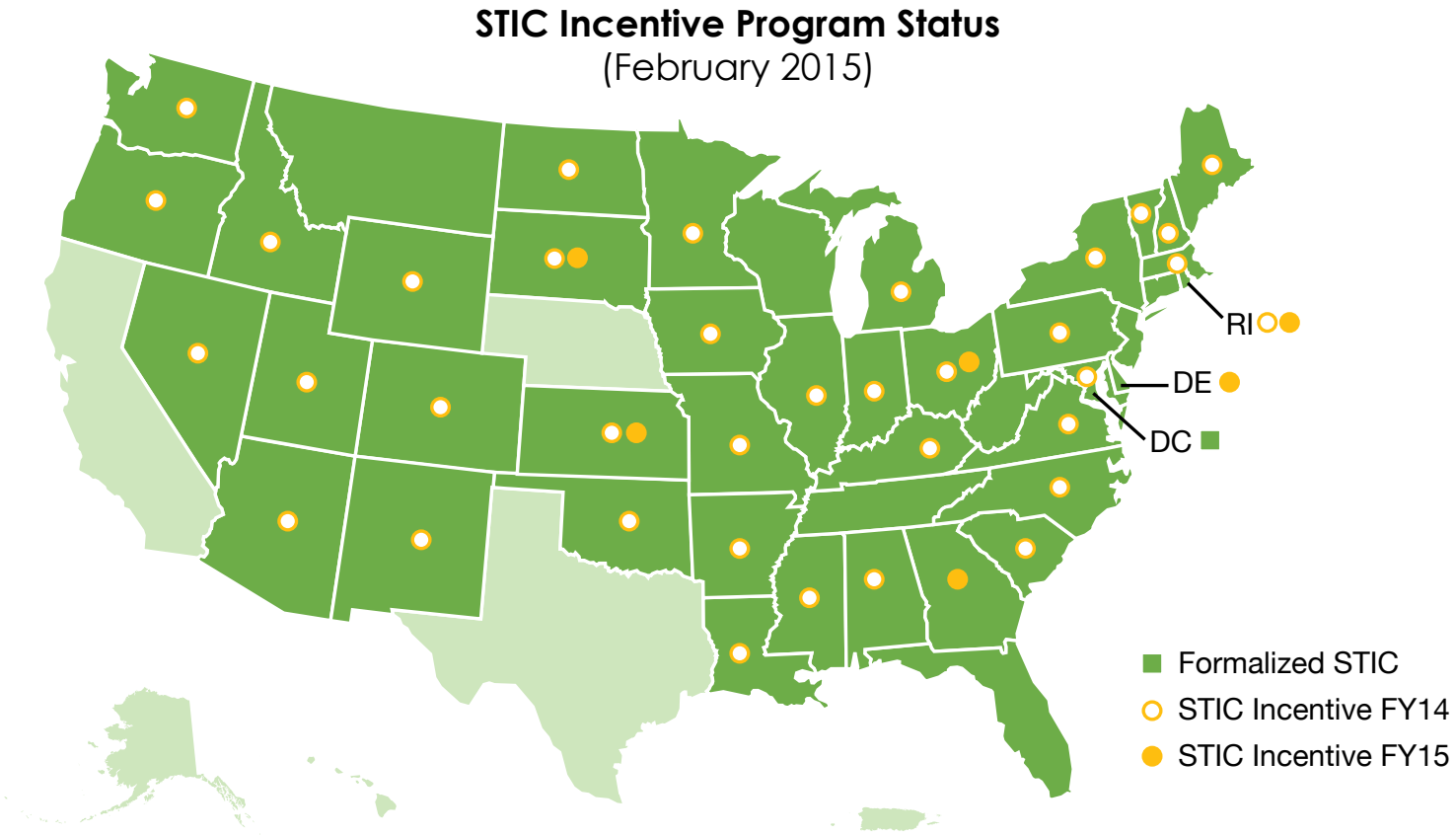
State Transportation Innovation Council Incentive Program

A vital component of EDC's state-based approach to innovation deployment is innovation groups, called State Transportation Innovation Councils in many states, which bring together public and private transportation stakeholders from throughout each state to evaluate innovations that may benefit the transportation system. FHWA's STIC Incentive program provides resources—both technical assistance and funds—to help STICs make innovations standard practice in their states.

Under the program, each STIC can apply for up to $100,000 a year to carry out projects that standardize innovative practices in a state transportation agency or other public sector STIC stakeholder. Activities can include implementing system process changes, organizing peer exchanges, delivering training, preparing innovation decision matrices, developing technical guidance and specifications, and creating evaluation plans.

The map below shows the current status of the STIC Incentive program. As of February 2015, 45 states and the District of Columbia have established formal STICs to evaluate and monitor innovation implementation. In fiscal year 2014, 36 states received a total of $3.5 million in STIC Incentive funds to mainstream the use of innovations such as 3D modeling, high-friction surface treatments, design-build contracting and diverging diamond interchange design. So far in fiscal year 2015, six states have obtained STIC Incentive funds to advance innovation.

Additional information about the STIC network, STIC charters and incentive program funded projects is available at *www.fhwa.dot.gov/stic*.



Accelerated Innovation Deployment Demonstration

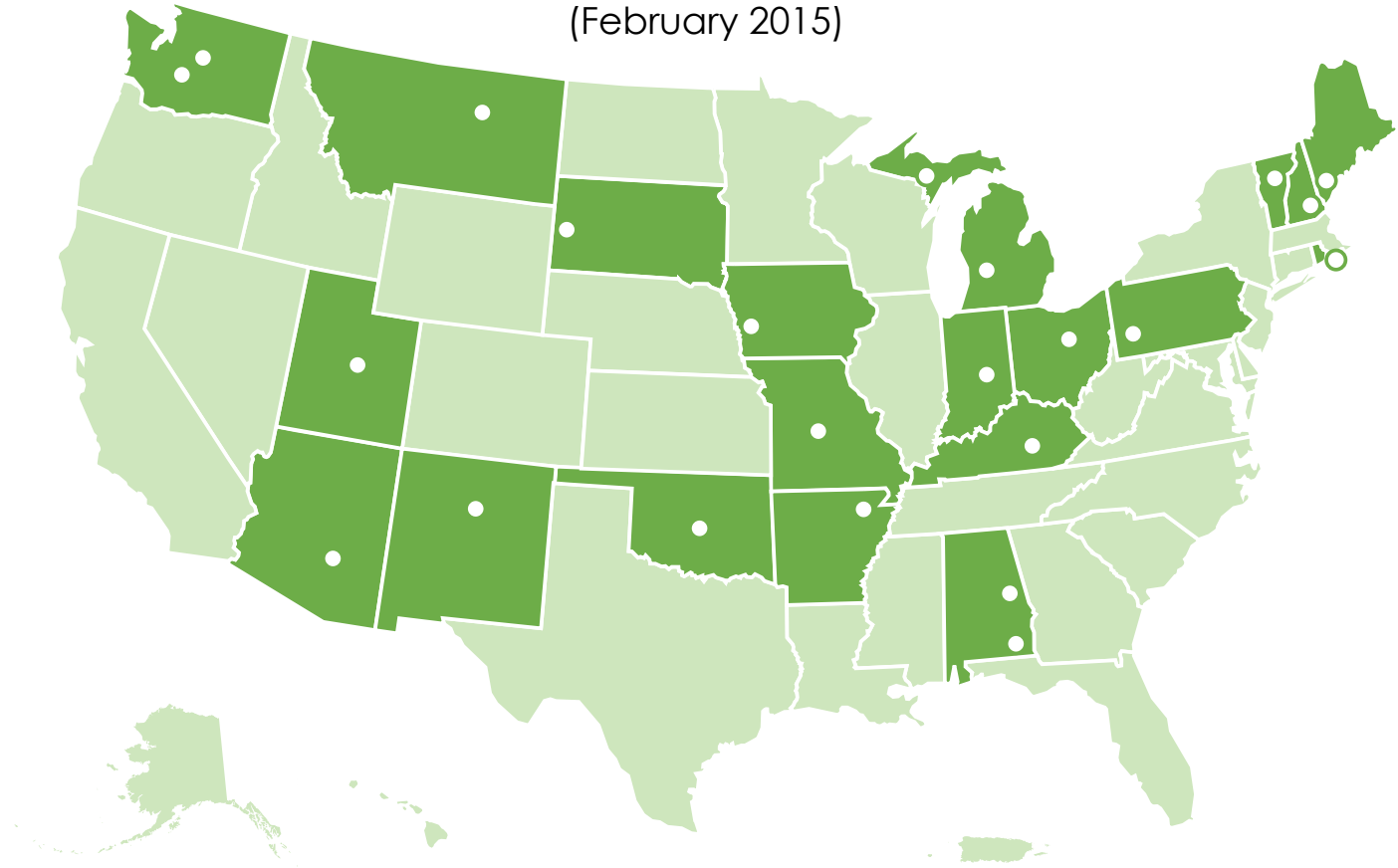
Transportation agencies can take advantage of opportunities to adopt innovations to improve their practices through the FHWA AID Demonstration program launched in February 2014. Under the program, incentive funding of up to $1 million may be awarded for federal aid eligible projects that use proven innovations for any aspect of highway transportation, including planning, financing, environment, design, construction, materials, pavements, structures and operations.

Applications are accepted on a rolling basis through Grants.gov from state transportation departments, federal land management agencies and tribal governments. Metropolitan planning organizations and local governments may also apply through their state transportation department.

Within the first year of the program, 23 AID Demonstration awards totaling nearly $16 million were provided to projects across the country. Sixteen of the awards include deployment of innovations promoted through EDC, such as innovative bridge-building methods, safety-enhancing pavement treatments and warm-mix asphalt.

Additional information about the AID Demonstration program and project awards is available at *www.fhwa.dot.gov/accelerating/grants*.

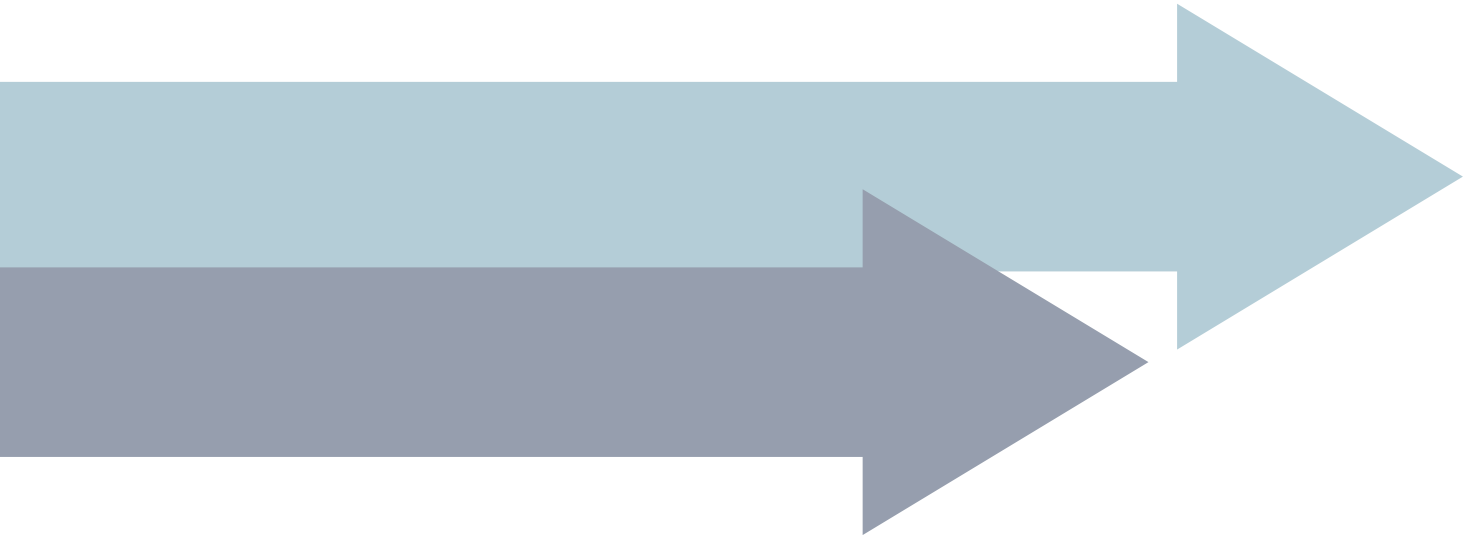
AID Demonstration Award Locations
(February 2015)



MAP-21 Section 1304 – Innovative Project Delivery

Section 1304 of MAP-21 (as codified in 23 U.S.C. 120(c)(3)) provides agencies the ability to increase the Federal share payable on a project by 5% to incentivize the use of an innovation to deliver the project faster, better, and smarter. The 5% increase in Federal share payable on a project does not represent additional Federal funding, but the authority provides additional flexibility to States in terms of financial and program management since a State or subrecipient may utilize more of its current Federal allocation on an eligible project to reduce the non-Federal match required. The increase in Federal share is limited to the following apportionment categories: National Highway Performance Program (NHPP), Surface Transportation Program (STP), or Metropolitan Planning Program (PL).

More information on MAP-21 Section 1304 is available at *www.fhwa.dot.gov/map21/qandas/qaipd.cfm*.



Acronyms and Abbreviations

3D	three-dimensional
AASHTO	American Association of State Highway and Transportation Officials
ABC	accelerated bridge construction
ADOT&PF	Alaska Department of Transportation & Public Facilities
AHTD	Arkansas Highway and Transportation Department
AID Demonstration	Accelerated Innovation Deployment Demonstration
AII	AASHTO Innovation Initiative
ATC	alternative technical concept
Caltrans	California Department of Transportation
CM/GC	construction manager/general contractor
D-B	design-build
DDI	diverging diamond interchange
DOT	department of transportation
EDC	Every Day Counts
FHWA	Federal Highway Administration
GIS	geographic information system
GPS	Global Positioning System
GRS-IBS	geosynthetic reinforced soil-integrated bridge system
HFST	high-friction surface treatment
IC	intelligent compaction
IQED	implementing quality environmental documentation
ITD	Idaho Transportation Department
KYTC	Kentucky Transportation Cabinet
Louisiana DOTD	Louisiana Department of Transportation & Development
LTAP	Local Technical Assistance Program
Maryland SHA	Maryland State Highway Administration
NDOR	Nebraska Department of Roads
NEPA	National Environmental Policy Act
PBES	prefabricated bridge elements and systems
PRHTA	Puerto Rico Highways and Transportation Authority
RFQ	request for qualifications
SHRP 2	second Strategic Highway Research Program
STIC	State Transportation Innovation Council
VTrans	Vermont Agency of Transportation

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