Every Day Counts:
Creating Efficiency Through Technology and Collaboration

EDC-3 Summit Summary and Baseline Report

March 2015

U.S. Department of Transportation
Federal Highway Administration

Foreword

Every Day Counts is the Federal Highway Administration's initiative to advance a culture of innovation in the transportation community in partnership with stakeholders in the public and private sectors. Through this collaborative, state-based effort, FHWA coordinates rapid deployment of proven, market-ready strategies and technologies to shorten the project delivery process, enhance roadway safety, reduce congestion and improve environmental outcomes.

This report describes the innovations FHWA is promoting in the initiative's third round, which focuses on creating efficiency through technology and collaboration. The report summarizes the feedback from the EDC-3 fall 2014 summits, the status of innovation deployment at the beginning of 2015, and the goals transportation stakeholders set to broaden innovation adoption by the end of 2016. The report is intended to be a resource for transportation stakeholders developing innovation deployment plans and to encourage ongoing innovation in managing highway project delivery to better serve the nation.

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ACRONYMS AND ABBREVIATIONS

3D	three-dimensional
4D	four-dimensional
5D	five-dimensional
AASHTO	American Association of State Highway and Transportation Officials
ABC	accelerated bridge construction
AID Demonstration	Accelerated Innovation Deployment Demonstration
ATC	alternative technical concept
CM/GC	construction manager/general contractor
DOT	department of transportation
EDC	Every Day Counts
FHWA	Federal Highway Administration
GRS-IBS	geosynthetic reinforced soil-integrated bridge system
IQED	implementing quality environmental documentation
ITS	intelligent transportation system
MAP-21	Moving Ahead for Progress in the 21st Century Act
NEPA	National Environmental Policy Act
PBES	prefabricated bridge elements and systems
SHRP 2	second Strategic Highway Research Program
STIC	State Transportation Innovation Council
UHPC	ultra-high performance concrete

"The bottom line is state DOTs have benefited from EDC and the results have been terrific."

– Mike Hancock, Kentucky Transportation Cabinet Secretary

Every Day Counts: Creating an Innovative Culture

Every Day Counts is the Federal Highway Administration's initiative to work in partnership with the American Association of State Highway and Transportation Officials and other transportation stakeholders to foster a culture of innovation. It focuses on shortening project delivery and getting proven innovations quickly and broadly deployed to benefit road users. Designed to complement other initiatives centering on innovative technologies, practices and investment, EDC plays an important role in helping transportation agencies fulfill their obligation to the American people to deliver the greatest value for the tax dollars spent.

Every two years, FHWA works with state transportation departments, local governments, tribes, private industry and other stakeholders to identify a new set of innovative technologies and practices that merit widespread deployment through EDC. The selected innovations share common goals of shortening project delivery, enhancing the safety and durability of roads and bridges, cutting traffic congestion and improving environmental sustainability. The third round of EDC, which promotes the adoption of 11 innovations in 2015 and 2016, builds on the success of the deployment efforts during EDC-1 (2011/2012 cycle) and EDC-2 (2013/2014 cycle).

After the process of selecting EDC innovations for each two-year deployment cycle 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, which bring together public and private transportation stakeholders to evaluate innovations and spearhead their deployment in each state.

EDC's collaborative, state-based approach to deploying innovation enables states to be in the driver's seat and decide which innovations will work best for them and their customers. Working through STICs or similar groups, states can consider innovations FHWA recommends, along with technologies and practices from sources such the AASHTO Innovation Initiative and the second Strategic Highway Research Program, and adopt those that add value to their highway programs. "EDC and other technology initiatives have really been critical in helping states save money and save time," said Bud Wright, AASHTO executive director.

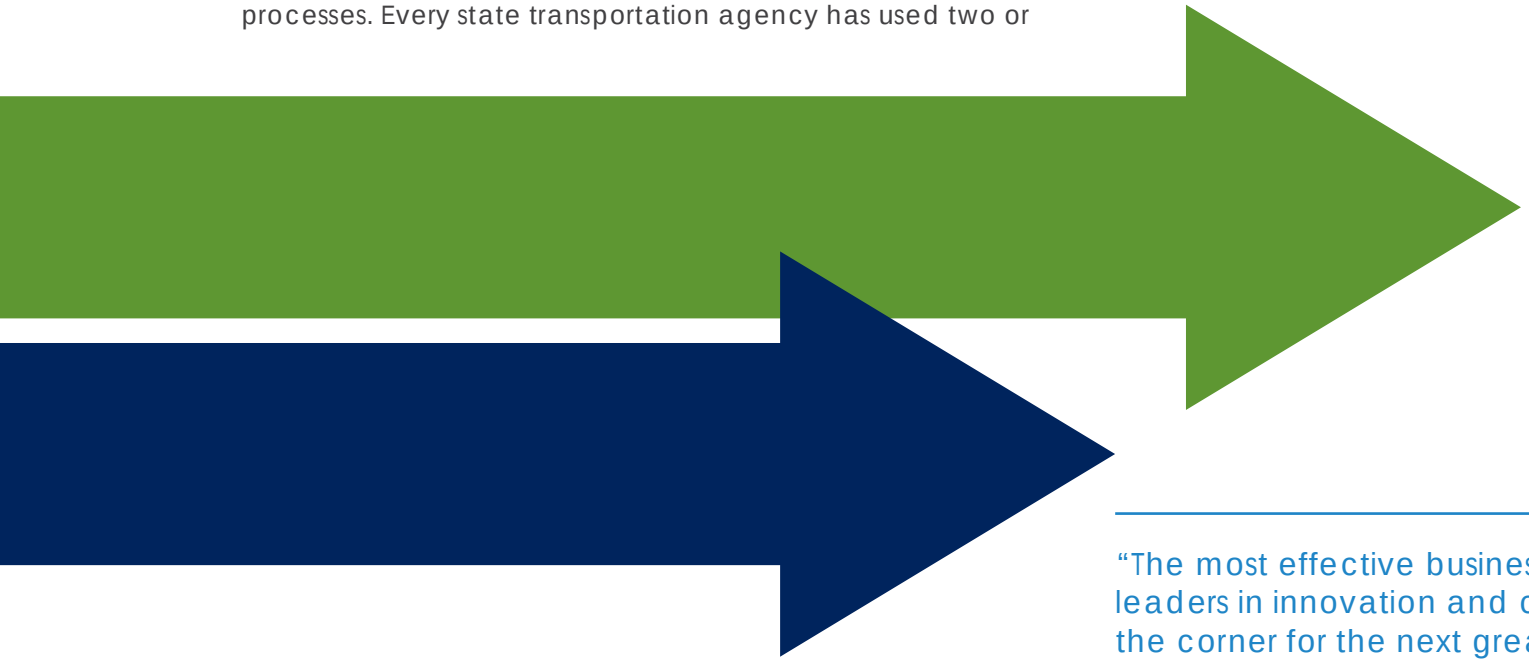
FHWA's role in the EDC process is to provide national leadership in encouraging adoption of innovations that can

"One of the things that's been very beneficial in our partnership with the Federal Highway Administration is the idea of Every Day Counts. The initiative is not limited to the 11 ideas in EDC-3. It's a mindset. It's a culture of innovation."

– Malcolm Dougherty, California Department of Transportation Director

improve the nation's transportation system. The agency forms deployment teams for each EDC innovation to assist states in their implementation efforts. Using feedback from stakeholders obtained through communication opportunities such as the EDC summits, the teams offer technical assistance, training and outreach to help the transportation community adopt innovations and make them standard practice. FWHA also offers assistance through its State Transportation Innovation Council Incentive and Accelerated Innovation Deployment Demonstration programs to encourage and provide incentives for innovation deployment.

The EDC initiative has had a significant positive impact on the highway community's adoption of new technologies and processes. Every state transportation agency 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. The initiative has also fostered a transportation workforce that is adept at putting innovation to work to address transportation challenges. "We're saving money, saving time and saving lives, exactly the results we said were possible if we made innovation a standard industry practice," said FHWA Deputy Administrator Gregory Nadeau. "And we're making a strong case to Congress and policy makers in the states for future investments in transportation."



"The most effective businesses are those that are leaders in innovation and continually looking around the corner for the next great idea to implement to stay ahead of their competitors. We have to be just as innovative."

– Janet Oakley, South Carolina Department of Transportation Secretary

EDC-3 Summits: Launching the Next Round of Innovation

A series of seven summits in fall 2014 gave nearly 1,200 people on the front lines of highway project delivery a forum to learn about the latest EDC innovations and network with colleagues who have used them. The summits were held at locations around the country to foster the creation of synergies among regional transportation professionals and encourage long-term networking and collaboration on innovative practices. The summits—held in Arizona, California, Kentucky, Maine, Missouri, North Carolina and Virginia—featured details on the 11 innovations FHWA is promoting in 2015 and 2016 as part of EDC-3. They gave participants the opportunity to explore EDC strategies in detail so they and their colleagues could make informed choices about which to implement.

"You are the champions of change," Nadeau told summit participants. "By being here today, you've confirmed your commitment to the ongoing process of finding, choosing and deploying innovation."

"These summits allow someone to come in, listen to their brothers and sisters here, and take that back home and apply some things that maybe they hadn't thought about. I think these summits are extremely beneficial."

– Matthew Garrett, Oregon Department of Transportation Director

The purpose of the summits was to disseminate information on the EDC-3 innovations so states could identify those that could assist in achieving fiscal and environmental goals while reducing project delivery times and enhancing safety and mobility. The summits featured interactive working sessions that enabled participants to discuss the technologies and practices, share lessons learned and best practices with colleagues, and begin the process of determining which innovations to deploy over the next two years.

The summits also enabled participants to provide feedback on proposed strategies to implement EDC-3 innovations so the teams of experts FHWA assembled to spearhead deployment could tailor their strategies to state needs. "We value hearing your insights and perspectives," said Amy Lucero, FHWA director of technical services. "That is why the summits are such an important part of EDC. Your feedback will help the teams in their implementation planning to ensure that the resources and support you'll need will be available."

A new feature extended the opportunity to participate in the EDC-3 summits to a wider audience. For the first time, the summits included live broadcasts of the presentations and discussions through Web conference sessions, which generated more than 2,500 online views. Recordings of the sessions are available to view through the EDC website.

At each summit, speakers discussed the goals and benefits of EDC, reported overall progress on earlier rounds of the initiative and introduced the third-round innovations. "Over the first two rounds of EDC, we've deployed about two dozen innovations that we distilled from literally hundreds of ideas we got from people like you. We're putting to work innovative technologies that are making our roads safer, our air cleaner, and are helping state and local governments stretch every transportation dollar as far as possible," said Nadeau.

Wright's message to summit participants emphasized the importance of innovation-focused programs such as Every Day Counts: "As competition for resources at the state and federal levels grows, innovation is essential to delivering high-quality transportation services. It's important for us to bring our A-game. And our A-game is not yesterday's program. It reminds us of that culture of innovation we're building, the ability to stretch resources, deliver projects more efficiently and provide a return on investment."

Every Day Counts "creates the desire to be better, faster and smarter," said Mike Hancock, Kentucky Transportation Cabinet secretary. "Leadership, serving the customer and partnering with others to bring about change faster and take advantage of the experience of others are all important."

"It is a good thing to be an innovator. I think in this industry many practitioners tend to be relatively conservative and we are an industry that is dominated by engineers. You don't want to make a mistake in engineering, but the fact is innovation is important."

– Bud Wright, American Association of State Highway and Transportation Officials Executive Director

Efficiency Focus

Like those in the first two rounds, the EDC-3 innovations are designed to shorten the project delivery process, enhance safety, reduce congestion and improve environmental sustainability, but "efficiency through technology and collaboration" is the theme this time. "The EDC-3 innovations are aimed at taking advantage of technology and electronic tools as well as improving the collaborative processes necessary to develop and deliver projects," said Jeff Lindley, Associate Administrator of the FHWA Office of Operations.

Seven EDC-3 innovations focus on shortening project development and delivery:

- **Regional models of cooperation** help state agencies and regional groups coordinate transportation planning across jurisdictional boundaries to cut project delivery times and traffic congestion.
- **Improving collaboration and quality environmental documentation** uses tools, including FHWA's eNEPA, to enable collaborative, concurrent and timely agency reviews of environmental documents, saving time and money and improving the quality of National Environmental Policy Act documents.
- Agencies can expand their use of **3D engineered models** by adding schedule and cost information to 3D models and using data to optimize roadway inventory and asset management processes.
- An electronic project document management system—or **e-Construction**—replaces paper with technology tools to improve workflow and save time and money. It is also an AASHTO Innovation Initiative focus technology.
- **Geosynthetic reinforced soil-integrated bridge systems**, which use layers of compacted granular fill and sheets of geotextile reinforcement to provide support for a bridge, are cost-effective and easy to build.
- **Stakeholder partnering** committees bring local, state and federal agency representatives together to improve and streamline processes for administering local projects under the Federal-Aid Highway Program.
- **Improving transportation department and railroad coordination**, also a SHRP 2 product, offers tools to help agencies and railroads streamline development of highway projects involving railroad rights-of-way.

Four innovations enhance mobility, safety and quality:

- The **smarter work zone** effort focuses on road project coordination and technology applications, such as queue and speed management, to minimize travel delays, ensure safety and save time.
- **Data-driven safety analysis** focuses on two approaches to making safety investment decisions: predictive to estimate an existing or proposed road's safety performance and systemic to find and fix crash-related features throughout a roadway system.
- Roadway reconfiguration, or a **road diet**, is a low-cost strategy that reallocates the roadway cross-section to safely accommodate all users, increase mobility and access, reduce crashes and improve a community's quality of life.
- **Ultra-high-performance concrete connections** use a steel fiber-reinforced material that improves durability and simplifies connection details, fabrication and construction aspects associated with using prefabricated bridge elements to accelerate construction.

EDC-3 Innovation Implementation

The EDC summits are a crucial part of carrying out an effective, far-reaching innovation deployment effort. After learning about the EDC-3 innovations and reviewing them in state caucuses at the fall 2014 summits, participants took their recommendations back to their states for further discussion and development of plans for implementation over the next two years. In 45 states and Washington, D.C., STICs evaluate and choose innovations that fit the state's needs and oversee deployment efforts in the state.

To start the process of tracking progress on EDC-3 innovation deployment, FHWA's EDC coordinators in each state gathered information on the current stage of implementation for each innovation at the beginning of 2015 and the implementation stage goal the state plans to achieve by the time the two-year cycle ends in 2016. Every six months, FHWA will update the status of the state of practice on the innovations.

State implementation plans for the EDC-3 innovations show that interest in all 11 technologies and practices is strong. Every state plans to try at least two innovations, and many states are deploying multiple technologies and processes. Some innovations, including 3D engineered models, data-driven safety analysis, GRS-IBS, road diets, and smarter work zones, are being implemented in 40 or more states during this EDC cycle.

To support state implementation efforts, EDC-3 innovation deployment teams are working closely with state transportation agencies and other stakeholders. Using feedback they obtained during the EDC-3 summit sessions, the teams developed implementation plans for each innovation that focus on providing technical assistance, outreach and training, including workshops, peer exchanges and demonstration projects. FHWA is also developing guidance and sample specifications as well as sharing best practices for using the innovations and making them standard practice.

FHWA also offers assistance through its STIC Incentive and AID Demonstration programs. The STIC Incentive program provides resources—technical assistance and funds—to assist STICs make innovations standard practice. States can get up to $100,000 a year for activities such as implementing system process changes, organizing peer exchanges, and developing guidance and specifications. The AID Demonstration program offers incentive funding of up to $1 million for projects using innovation on any aspect of highway transportation, including planning, financing, environment, design, construction, materials, pavements, structures and operations. In addition, Section 1304–Innovative Project Delivery of the Moving Ahead for Progress in the 21st Century Act enables agencies to increase the federal share of funding payable on a project by five percent if they use an innovation to deliver the project faster, better and smarter.

"Jump on board because the train's left the station and it is an expectation of the public. We can't operate the way we have in the past. We need to move toward the future."

–Butch Waidelich, FHWA Associate Administrator of Office of Infrastructure

Innovation Implementation Plans

At the EDC-3 summits, transportation professionals attended in-depth sessions to explore the 11 EDC-3 innovations, discuss the benefits of and barriers to implementation, and learn how their colleagues are using the innovations in their highway programs. This section provides those details for each innovation and shows on maps and charts the progress expected in advancing the technologies and practices in 2015 and 2016.

The maps illustrate the implementation stage for the EDC-3 innovations in each state. The baseline maps show the state of practice as of January 2015, and the goal maps indicate the implementation stage states plan to achieve by December 2016. The charts provide the same baseline and goal comparison in numerical form. Every six months throughout the remainder of the EDC-3 cycle, FHWA will compile a report on the status of the state of practice to track the progress of innovation deployment.

"State" is used as a general term that includes the state transportation department, metropolitan planning organizations, local governments, tribes, private industry and other stakeholders in a state or territory. Information is provided for the 50 states, Washington, D.C., Puerto Rico, the U.S. Virgin Islands and Federal Lands Highway, a total of 54 entities.

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

Innovation Implementation Stages

Not Implementing	The state is not pursuing the innovation.
Development Stage	The state is collecting guidance and best practices, building support with partners and stakeholders, and developing an implementation process.
Demonstration Stage	The state is testing and piloting the innovation.
Assessment Stage	The state is assessing the performance of and process for carrying out the innovation and making adjustments to prepare for full deployment.
Institutionalized	The state has adopted the innovation as a standard process or practice and uses it regularly on projects.

3D Engineered Models: Schedule, Cost and Post-Construction

Three-dimensional engineered models are widely used by the highway community to more effectively connect a project's design and construction phases. These models and the digital geospatial data that support them can also be applied to other phases of the project delivery cycle to positively affect safety, project costs, contracting, maintenance and asset management.

After encouraging adoption of 3D engineered models in EDC-2, FHWA is continuing to promote the technology in EDC-3 to help the transportation community glean even more from the technology. The focus this time is on three practices:

- Using the as-found survey data from which 3D models are created for roadway inventory and asset management purposes
- Incorporating schedule (4D) and cost (5D) information into models to enhance stakeholder communication, enable contractors to streamline construction schedules and improve cost estimating of work
- Using post-construction survey data to correct design models and create accurate as-built record drawings that include useful details such as subsurface utilities

The EDC-3 innovation team provided transportation professionals with information on the benefits of extending 3D applications. For example, 4D modeling can improve project management by helping stakeholders visualize construction over the life of a project and identify potential conflicts, and 5D models enable stakeholders to evaluate costs and model cash flow for each phase of construction. Once a 3D model is built, it can be used for continuing maintenance, management and planning, creating a living record throughout the project life cycle.

At the summits, participants learned that new survey tools and technology allow vast data sets to be captured safely and in less time. "When different parts of an organization pool their resources on a consolidated approach to acquiring data, they're able to leverage economies of scale and capture a richer data set, which lets them have more information to inventory and manage their assets," said Francesca Maier, Parsons Brinckerhoff lead engineer.

Among the barriers to implementation summit participants discussed were the cost of investing in the technology, the need for training in using the technology, data compatibility and interoperability, maintenance and storage of data, and liability issues. Assistance they indicated would be helpful include workshops, best practices on what data to capture, case studies on how states are using the technology, and specifications and guidelines on how and when to use the technology appropriately. They also requested cost-benefit information, which FHWA is developing through a research project.

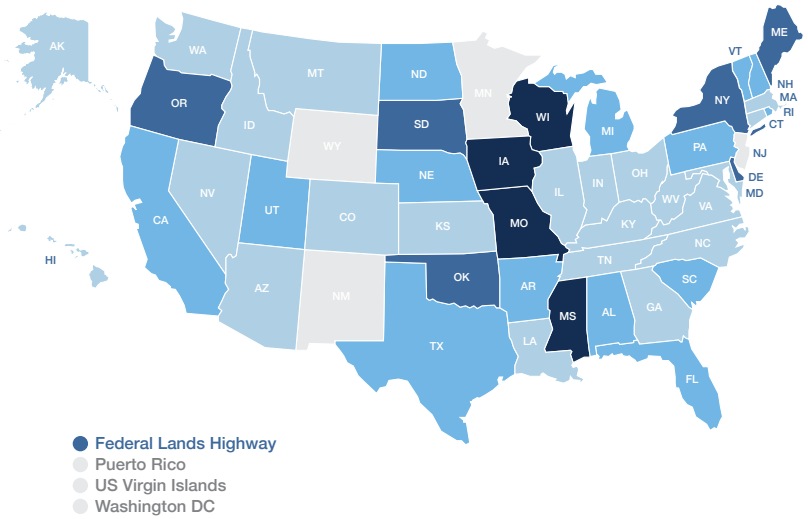
"The benefits of 3D modeling are really broad because it touches everything we do. It describes the physical shape of this thing that we're building or maintaining."

– Francesca Maier, Parsons Brinckerhoff lead engineer

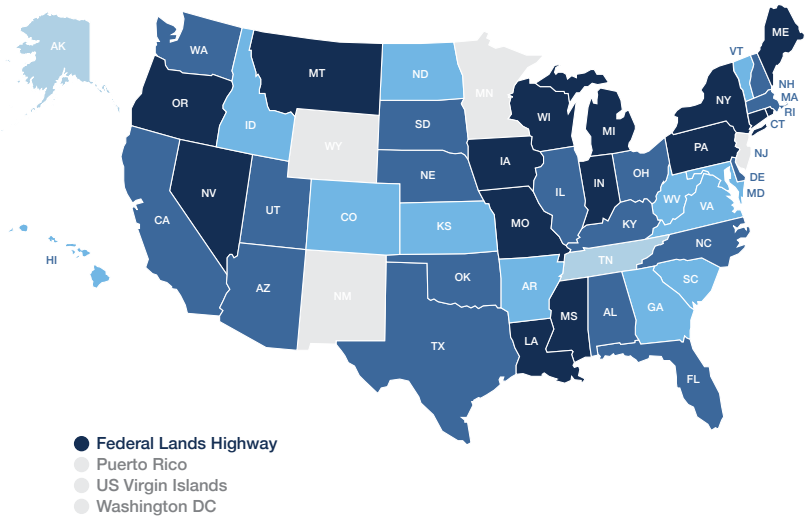
3D Engineered Models: Project Planning, Design and Construction

Using 3D engineered models in project planning, design and construction is becoming a widespread practice in the United States, with 29 states planning to implement it in 2015 and 2016. An additional 15 states and Federal Lands Highway plan to integrate 3D modeling in planning, design and construction into highway agency culture by the end of the two-year EDC-3 cycle.

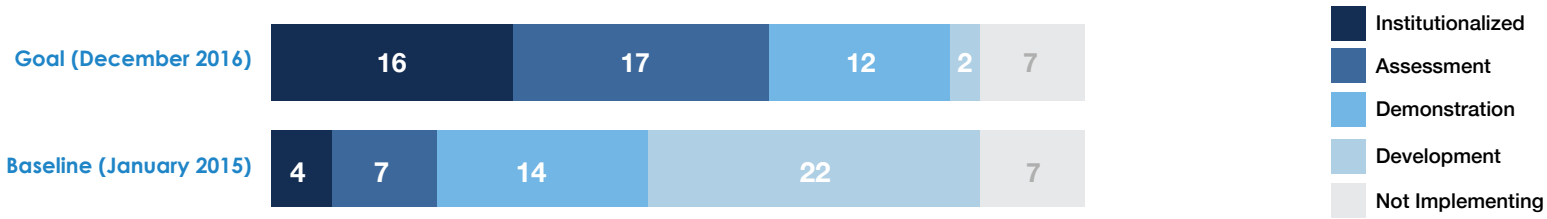
Baseline (January 2015)



Goal (December 2016)



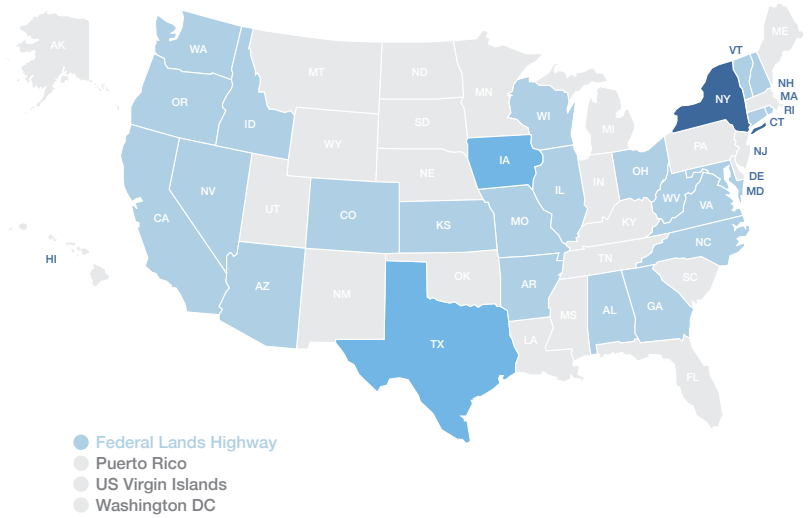
Number of States in Various Implementation Stages



3D Engineered Models: Schedule and Cost

During EDC-3, 16 states plan to explore the use of 4D and 5D modeling, incorporating schedule and cost data into 3D design models to improve project management and provide more accurate cost estimates. Two more states plan to take steps to make it a standard practice.

Baseline (January 2015)



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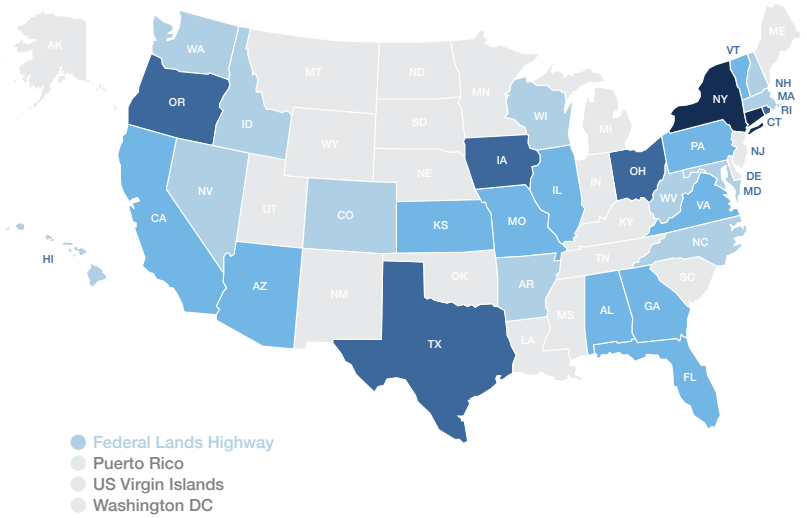

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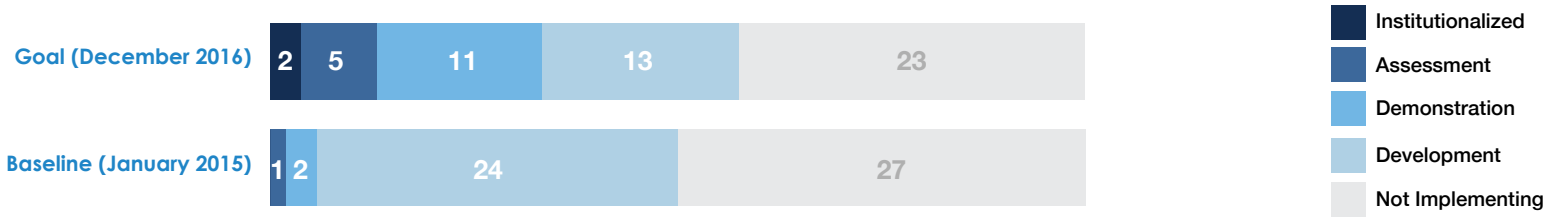
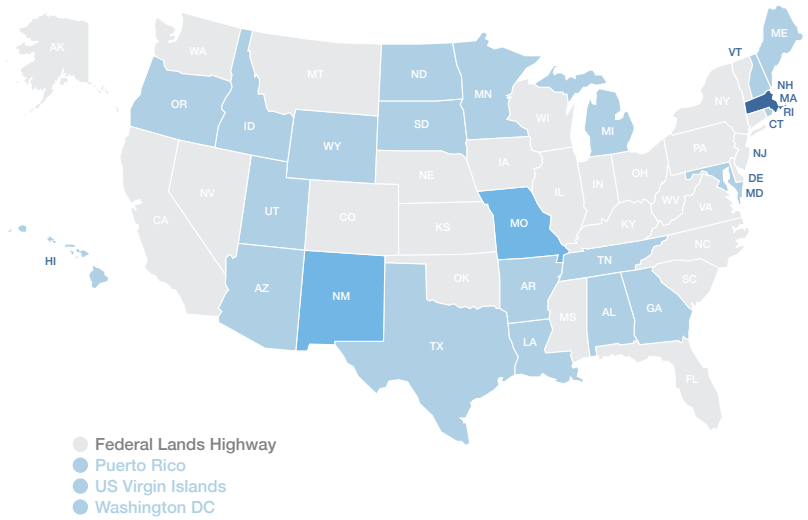


3D Engineered Models: Post-Construction

Over the next two years, two states plan to institutionalize the use of 3D engineered models in post-construction applications, such as using 3D data for roadway inventory and asset management purposes and creating accurate as-built records of 3D design models. An additional 16 states, Federal Lands Highway and Puerto Rico are planning to implement 3D models in post-construction in 2015 and 2016.

Baseline (January 2015)



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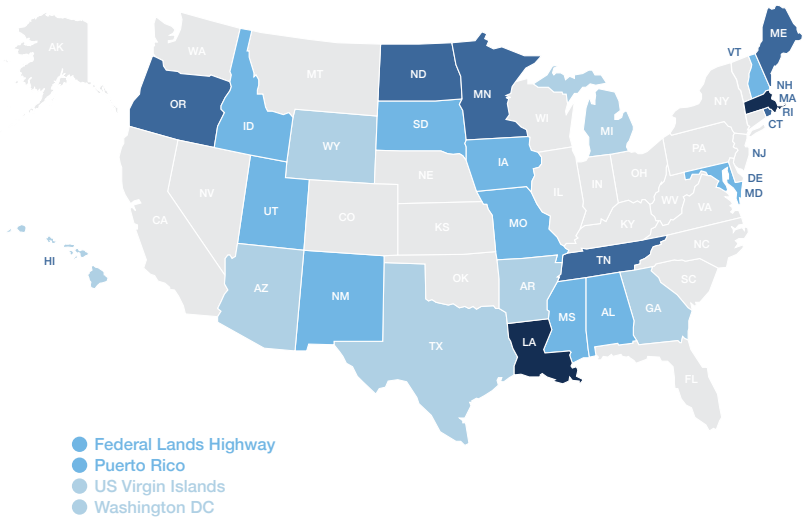

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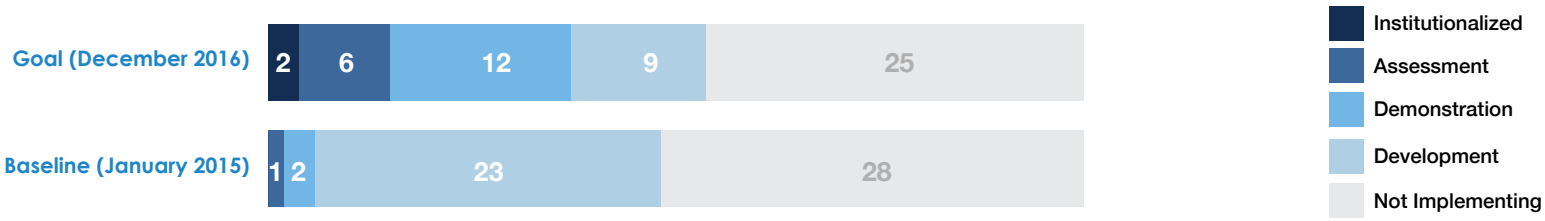


Data-Driven Safety Analysis

Data-driven safety analysis promotes the integration of safety performance into highway investment decisions with the ultimate goal of saving lives. Recent advances in highway safety analysis can provide transportation agencies with the reliable, scientifically sound data they need to make effective investments in maintaining the nation's roads. The EDC-3 effort focuses on broadening implementation of two approaches—predictive and systemic—to improve safety management processes and project development decision making.

Predictive approaches combine crash, roadway inventory and traffic volume data to provide more reliable estimates of an existing or proposed roadway's expected safety performance, such as crash frequency and severity. "Predictive analysis can help quantify safety impacts similar to the ways agencies do with construction costs, traffic operations and environmental impacts," Jerry Roche of the FHWA Office of Safety told summit participants. The results inform roadway safety management and project development decisions as well as safety countermeasure selection and evaluation.

Systemic approaches identify high-risk features associated with severe crash types—an intersection near a horizontal curve, for example—and fix the problems wherever they exist in a roadway system. These techniques are particularly applicable when a significant number of severe crashes occur over a wide area, such as on rural and local roadways, and for specific crash types, such as those involving vulnerable road users. "Instead of coming up with high-cost improvements at high-crash locations, we come up with more low-cost improvements that we can deploy system-wide, which will help reduce fatalities," Roche said.

Many agencies already use these safety analysis approaches in their safety management processes, and FHWA is promoting the tools to state and local agencies for use throughout project development. "Resources are scarce these days for all agencies, so we have to use the money we have wisely to help us make the best decision for safety, for mobility and for our communities," said Hillary Isebrands, FHWA safety engineer.

Summit participants said they wanted to learn more about how states use systemic and predictive approaches in safety decision making and how to add data analysis to their processes a step at a time. Obstacles they discussed include limited data and constrained resources. Will Stein, FHWA safety engineer, told summit participants about Minnesota's experiences using the systemic approach to reduce rural crashes cost-effectively. "We look at various roadway and other characteristics that indicate high-risk locations," he said. "We proactively treat those locations, usually with low-cost countermeasures such as shoulder rumble strips."

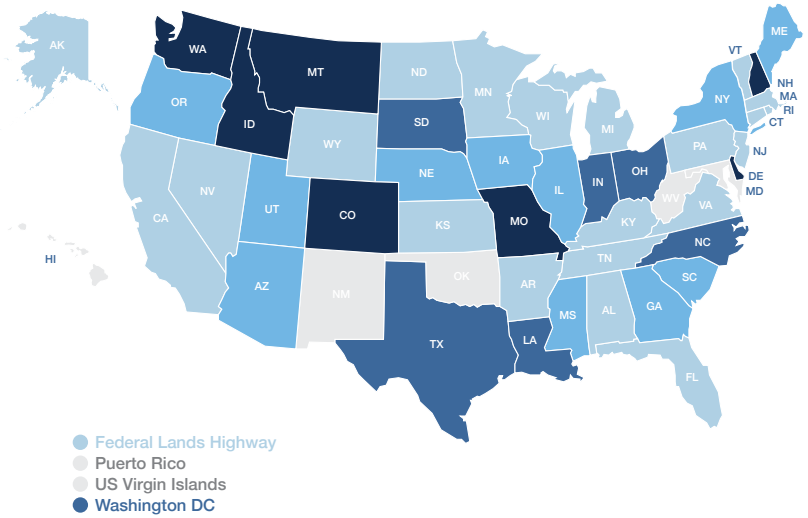
"The benefit of using data is that you can be more confident in your solutions and that the projects you're working on will have good results. You can improve the safety of your roadways."

– Hillary Isebrands, FHWA Safety Engineer

Data-Driven Safety Analysis: Project Development

The benefits of data-driven safety analysis in project development have attracted interest in 42 states and Washington, D.C. The number of states that incorporate predictive safety analysis as a standard practice in their project development processes and policies is expected to expand to 17 during the next two years. An additional 25 states and Washington, D.C., plan to apply data-driven safety analysis in project development.

Baseline (January 2015)



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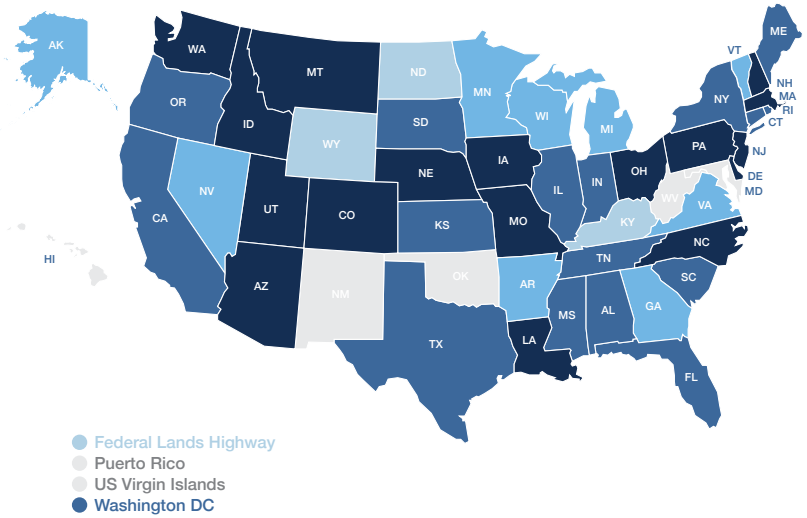

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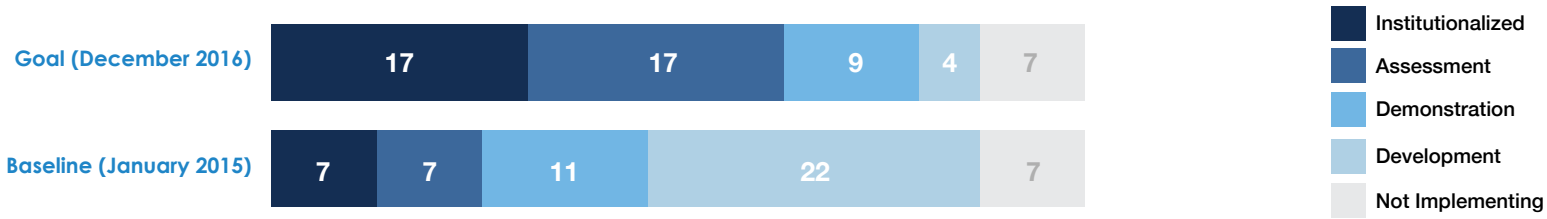
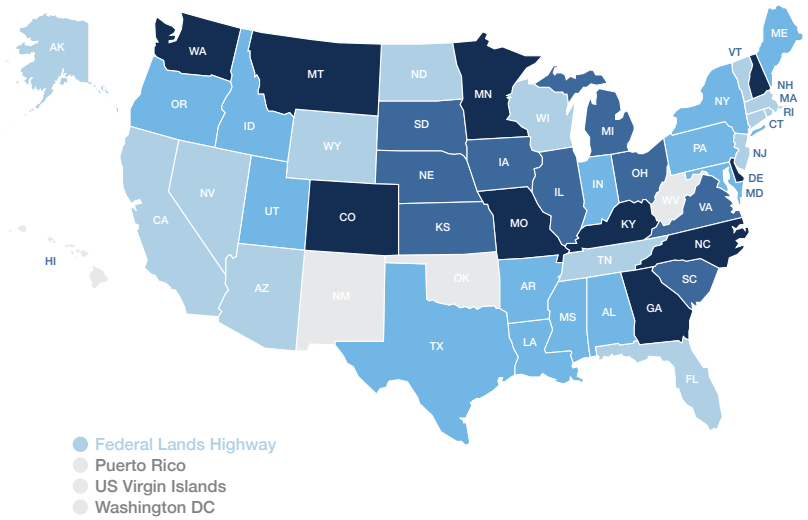


Data-Driven Safety Analysis: Safety Management

Forty-four states and Federal Lands Highway are pursuing the use of data-driven safety analysis to improve safety management. The number of states adopting predictive and systemic safety analysis into their safety management process is expected to grow to 24 during EDC-3. Another 20 states and Federal Lands Highway plan to use data-driven safety analysis in safety management.

Baseline (January 2015)



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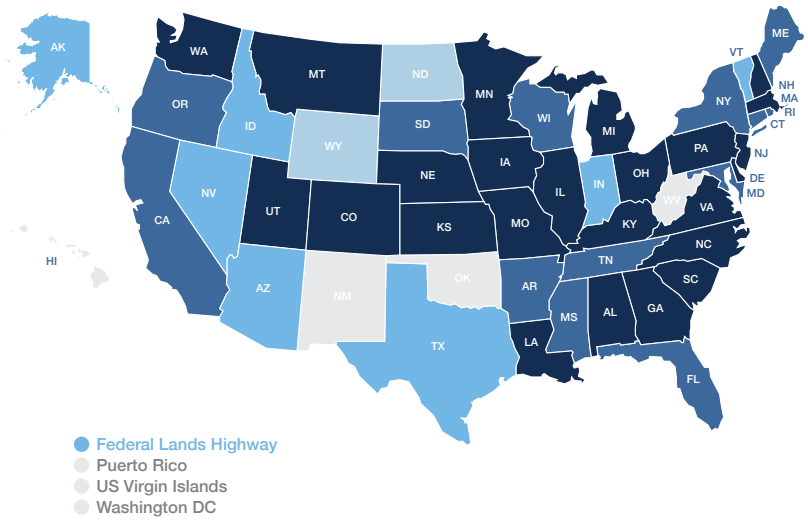

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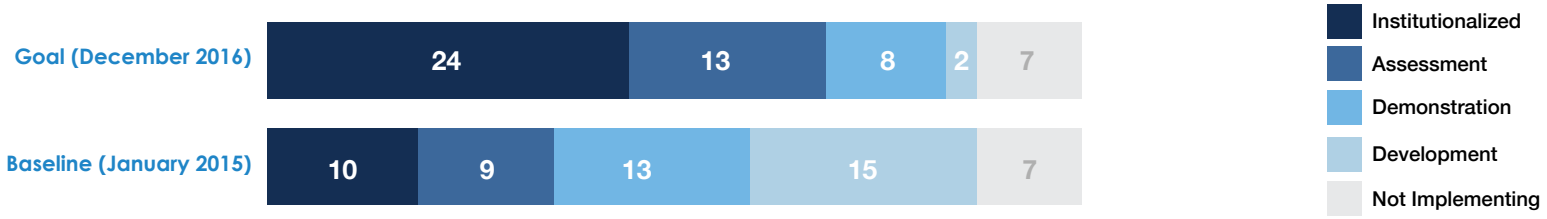


e-Construction

Administering highway projects requires a large amount of documentation. In EDC-3, FHWA is encouraging state agencies to exchange the cumbersome paper-based approach to construction document management with e-Construction—the collection, review, approval and distribution of construction contract documents in a paperless environment. e-Construction is also an AASHTO Innovation Initiative focus technology.

The e-Construction effort involves using readily available technologies—including digital electronic signatures, electronic communication, secure file sharing, mobile devices and web-hosted data archival and retrieval systems—to improve construction documentation management. Not only does it save money by decreasing paper use, printing and document storage costs, it also saves time by decreasing communication delays and transmittal time. It improves communication by allowing faster approvals, increased accuracy and better document tracking, all while enhancing transparency.

At the summits, state transportation agency staff shared their experiences using e-Construction. The Michigan Department of Transportation, a leader in using e-Construction, estimates that each year the agency saves about $12 million through increased efficiency and six million pieces of paper by using electronic document storage for its $1 billion construction program, while reducing its average contract modification processing time from 30 to three days.

The Florida Department of Transportation, one of several state highway agencies using e-Construction on design-build projects, has invested in a collaborative sharing site, mobile devices, digital signatures and form automation to improve its processes. "This is a new way to be more efficient, save money, save time and embrace technology," said Amy Tootle, state construction final estimates engineer for the Florida DOT.

Questions summit participants asked about e-Construction involved how to get started, what elements to implement first, interoperability between systems, information technology security issues and potential cost savings. Among the tools they requested to help them implement e-Construction were training, peer exchanges, an application tool roadmap and a compilation of lessons learned by states that have implemented aspects of e-Construction already. "I went to the e-Construction session twice because I was so excited about it," said former FHWA Federal Lands Highway Associate Administrator Joyce Curtis. "We are in the process of moving Federal Lands into e-Construction. It brings extraordinary benefits to our agency."

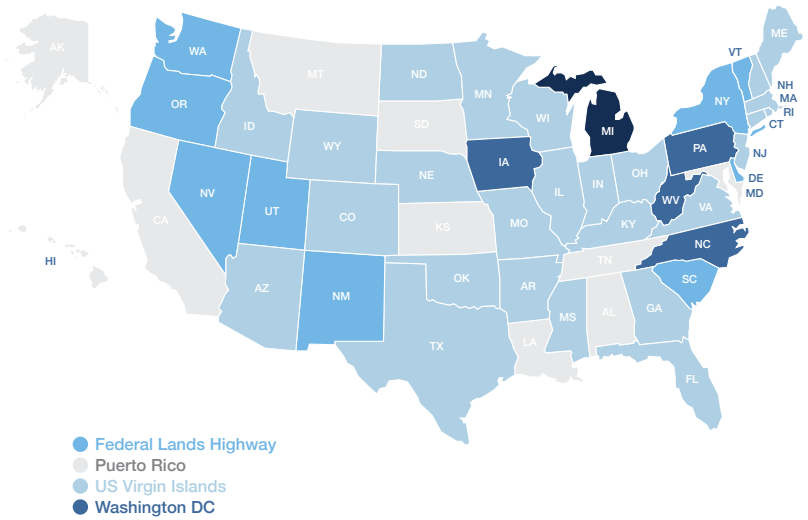
"Quite a few states are starting on e-Construction. It's just another way of doing business that is bringing us into the 21st century."

– Amy Tootle, Florida Department of Transportation
State Construction Final Estimates Engineer

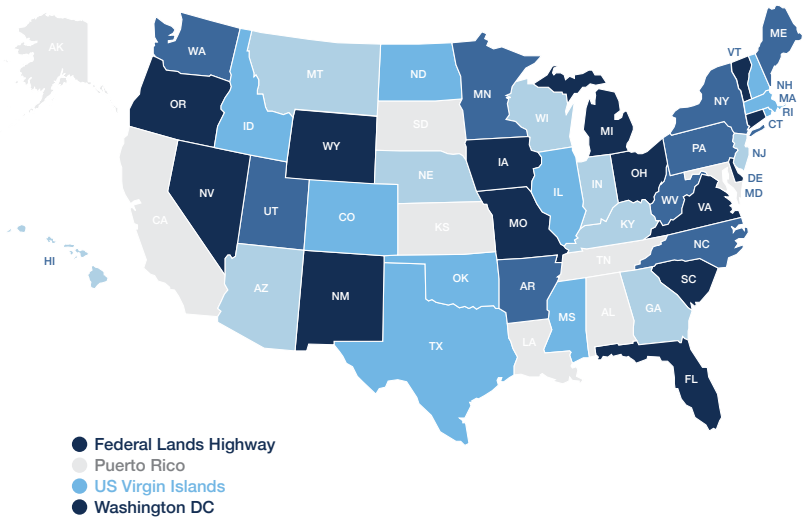
e-Construction

Using a paperless approach to project document management has generated interest across the country. During EDC-3, 13 states, Washington, D.C., and Federal Lands Highway want to take advantage of the benefits of e-Construction and join Michigan in making it a mainstream practice. An additional 19 states and the U.S. Virgin Islands plan to use e-Construction tools during the next two years.

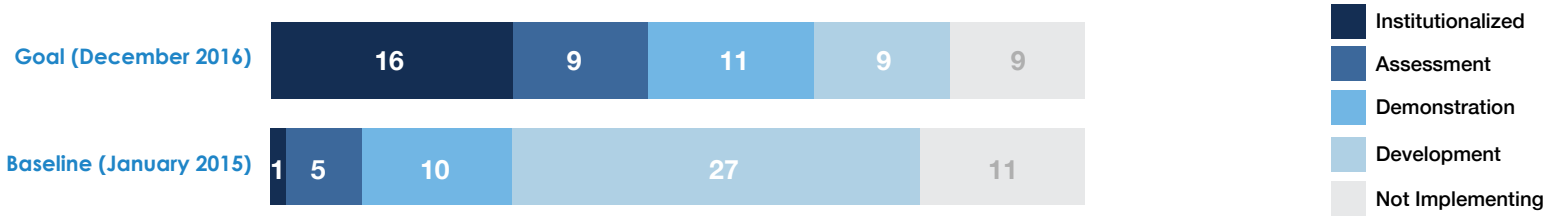
Baseline (January 2015)



Goal (December 2016)



Number of States in Various Implementation Stages



Geosynthetic Reinforced Soil-Integrated Bridge System

The geosynthetic reinforced soil-integrated bridge system can help meet the country's demand for small, single-span bridges by delivering low-cost, durable structures that can be constructed with readily available equipment and materials. A GRS-IBS project can be built in weeks instead of months, saving time and cutting work zone congestion.

GRS-IBS bridges can cost 25 to 60 percent less than bridges built with conventional methods. They use a simple design that can be adapted to suit environmental or other needs, and the design can be modified in the field to adjust to unexpected site conditions. Another benefit of GRS-IBS is that it integrates the roadway approach to the bridge, eliminating the bump drivers commonly feel between the road and the bridge.

Promoted through EDC-1 and EDC-2, GRS-IBS technology spread from primarily two counties in New York and Ohio to about 200 structures in 44 states. During EDC-3, the focus is on helping state and local agencies develop standard plans, details and specifications for using GRS-IBS, an accelerated construction technique that uses alternating layers of geosynthetic reinforcement and compacted fill to provide support for the bridge.

Summit participants discussed challenges of using GRS-IBS, including the need for more familiarity with design and concerns about settlement and scour, or the washing away of soil around a bridge. "Knowledge of GRS-IBS and experience with the technology has changed quite a bit since our first round of EDC, and FHWA has guidance to address these concerns," said Daniel Alzamora, FHWA senior geotechnical engineer. FHWA has developed a generic GRS system that is expected to drive down costs and make it more feasible for local owners to build their own bridges.

Among the summit speakers who talked about their experience with GRS-IBS was James Luebke, structural development engineer with the Wisconsin Department of Transportation. The agency became interested in the technology because of the potential for cost savings, minimizing the "bump at the end of the bridge" and other benefits. After using GRS-IBS on a successful project, the Wisconsin DOT spread the word about the technology's benefits to local public agencies and other transportation stakeholders. "GRS-IBS is a tool," Luebke said. "It is not right for every location, but when there is a right location, we should definitely look at using it."

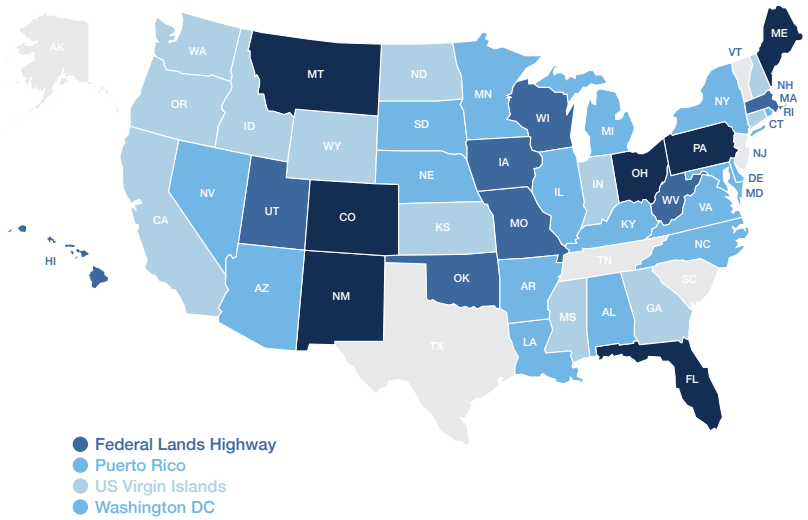
"The money and time saved as well as the smoothness created between the superstructure and the approach are reasons why GRS-IBS is part of EDC-3."

– Daniel Alzamora, FHWA Senior Geotechnical Engineer

Geosynthetic Reinforced Soil-Integrated Bridge System

Interest in GRS-IBS continues to grow. Thirteen states, Puerto Rico and Federal Lands Highway plan to adopt GRS-IBS technology as a standard practice and use it regularly where appropriate during EDC-3. An additional 28 states, Washington, D.C., and the U.S. Virgin Islands expect to use GRS-IBS on projects or prepare for full deployment of the technology.

Baseline (January 2015)



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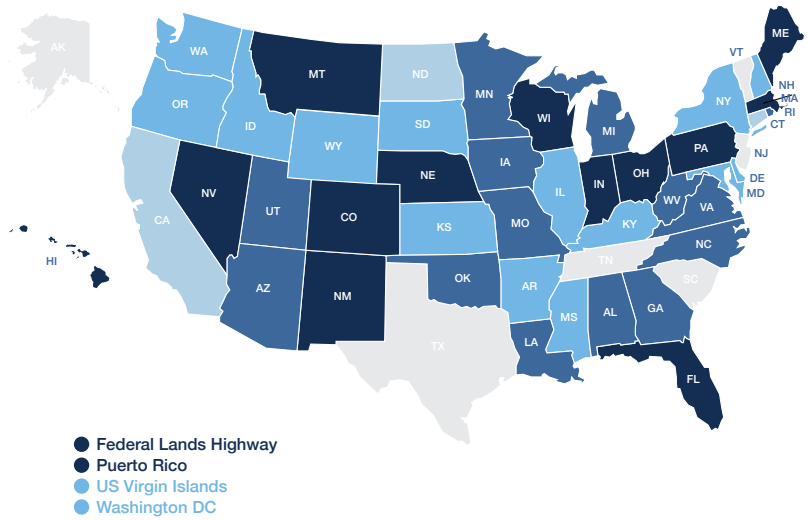
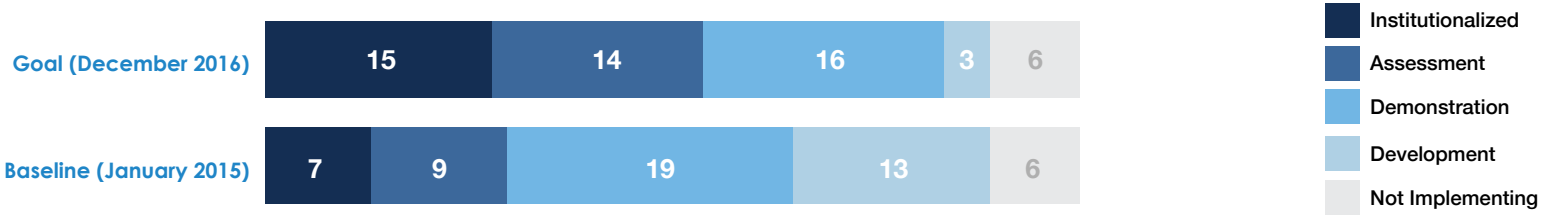


Number of States in Various Implementation Stages



Improving Collaboration and Quality Environmental Documentation

Shortening the time needed for National Environmental Policy Act project approval is a core need of the transportation community. EDC-3 supports tools to foster collaborative, concurrent, timely and transparent interagency reviews that can cut the amount of work and resources required, save significant time and money, and improve the quality of NEPA documents.

The implementing quality environmental documentation, or IQED, effort that started in EDC-2 promotes best practices for simplifying and expediting the development of environmental documents needed for construction projects. It focuses on three core principles for developing effective NEPA documents: tell the project story, keep the document succinct and ensure that it meets legal requirements.

The EDC-3 effort builds on EDC-2 by incorporating eNEPA, an online workspace and collaboration forum FHWA created for major transportation projects that require an environmental impact statement or an environmental assessment. When combined with IQED, the eNEPA tool helps agencies transition to an electronic review process that can be done concurrently with more effective interagency dialogue. "eNEPA is a workflow tool," said Lamar Smith of the FHWA Resource Center. "It provides an opportunity for the agencies and experts involved to review documents and comment on them."

Summit participants had the opportunity to see demonstrations of eNEPA and learn how it can help them share documents, track comments, schedule tasks and simplify concurrent reviews of their NEPA documents. They learned that several state highway agencies and other transportation agencies, such as the Federal Transit Administration and Federal Railroad Administration, have piloted eNEPA on projects.

FHWA's EDC-3 team can provide a number of training resources to help agencies learn to use the eNEPA tool, as well as help them set up a test project or use the tool with online processes they may have in place already. "We've tried to make it a tool that any transportation agency can use," said Kreig Larson of the FHWA Office of Project Development and Environmental Review. "They can follow the major steps and use them to fit their own processes."

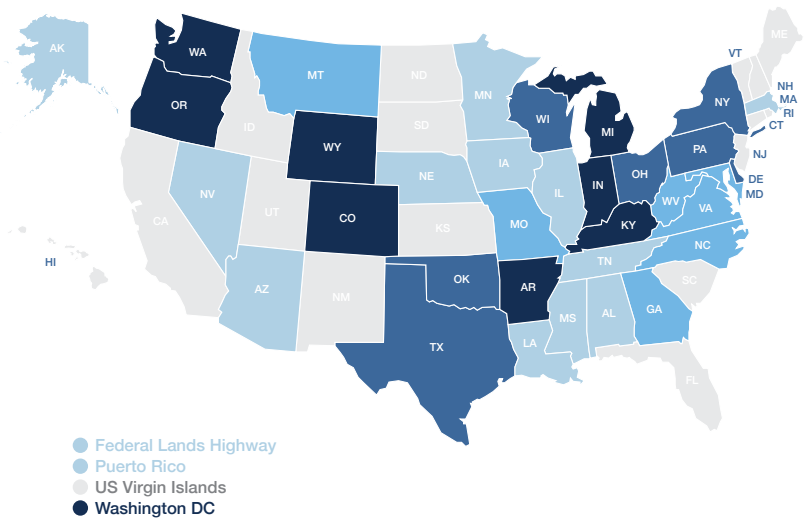
"The idea behind eNEPA is to promote a more efficient information flow between team participants."

– Kreig Larson, FHWA Office of Project Development and Environmental Review

Improving Collaboration and Quality Environmental Documentation: IQED

The mainstream use of strategies to implement quality environmental documentation is expected to double from nine to 17 states plus Washington, D.C., during EDC-3. Thirteen states, Puerto Rico and Federal Lands Highway plan to pilot the use of IQED principles on NEPA documents or prepare for full deployment of IQED.

Baseline (January 2015)



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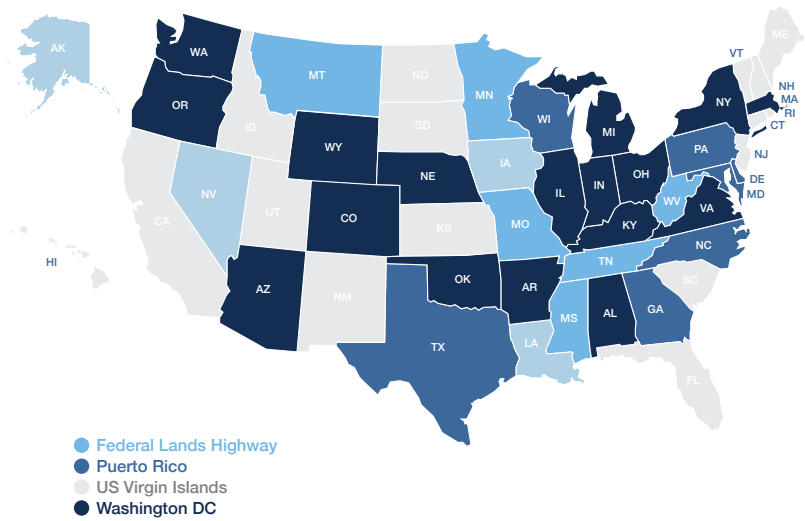
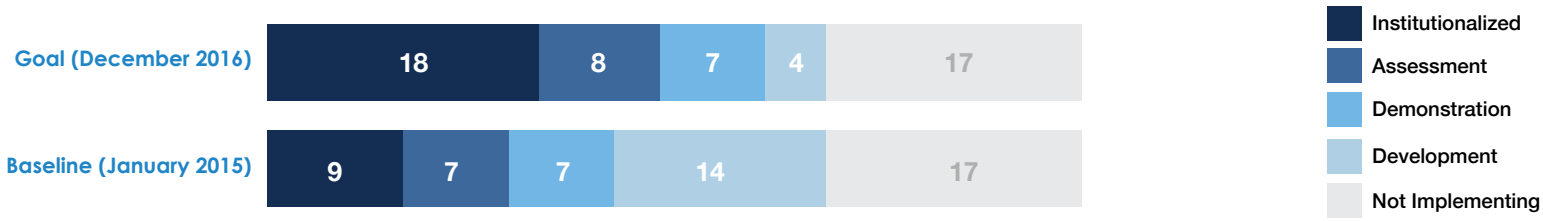


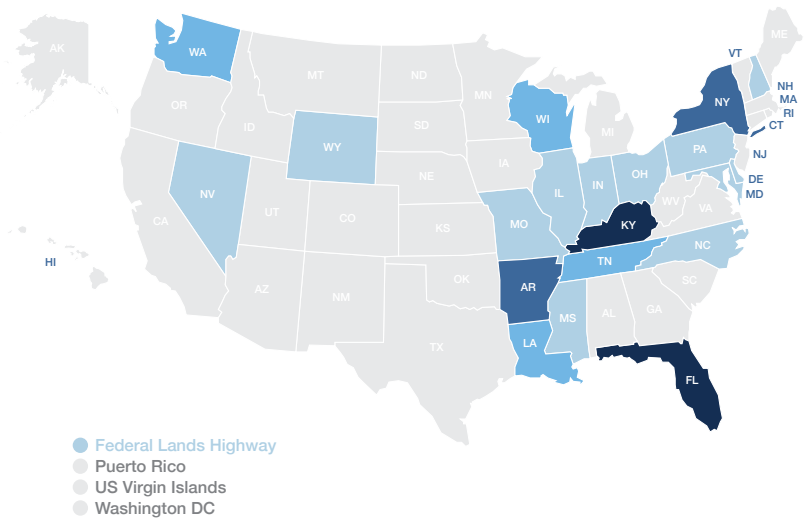
Number of States in Various Implementation Stages



Improving Collaboration and Quality Environmental Documentation: eNEPA

Using the eNEPA tool to conduct NEPA review processes electronically is expected to become a standard practice in six states during EDC-3, up from the two—Florida and Kentucky—that have institutionalized it so far. Another nine states and Federal Lands Highway plan to demonstrate and assess eNEPA during EDC-3.

Baseline (January 2015)



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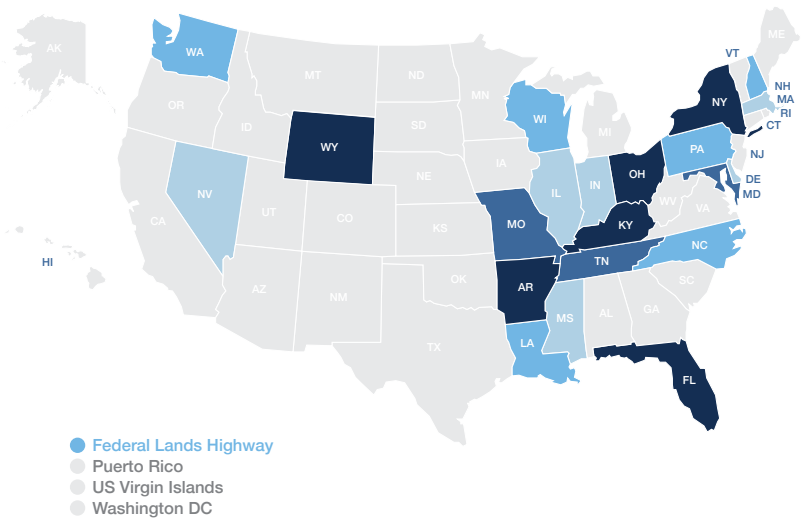
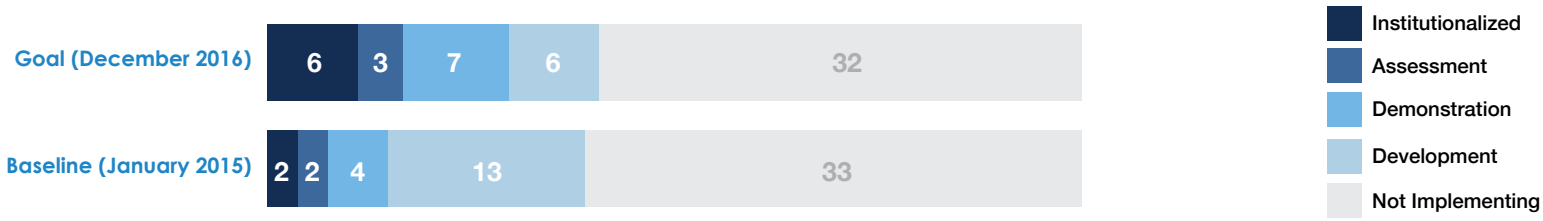


Number of States in Various Implementation Stages



Improving DOT and Railroad Coordination

Each year, transportation agencies build hundreds of highway projects near railroad rights-of-way that require extensive coordination between the organizations involved. With railroad volumes projected to grow, the need for project coordination will also increase. Cementing mutual understanding and streamlining processes will save money and time for highway agencies and railroads. Road users will see the positive results of faster, smarter highway renewal in facilities and budgets.

The EDC-3 effort on improving transportation department and railroad coordination encourages agencies and railroads to identify issues and negotiate agreements to expedite development of highway projects involving railroad rights-of-way. It uses a model agreement library, tools and training developed under the SHRP 2 R16 project, which enables agencies and railroads to identify and avoid sources of conflict and develop memoranda of understanding for project and program needs.

Among the challenges to improving collaboration participants discussed at the summits are inadequate communication, constrained resources and the different perspectives of public and private organizations on their need to serve taxpayers and customers. "The DOT has a public point of view. The railroad has a private point of view. Their business models are different," said Shobna Varma, president of Starlsis Corp.

The best practices, streamlined processes and master agreements recommended in the EDC-3 effort are designed to help DOTs and railroads address the challenges. The summits gave participants an opportunity to ask representatives of public agencies and private organizations about their experiences using them to expedite project delivery. A major theme of the presentations was that long-standing problems between DOTs and railroads can be solved with collaboration, tools, trust and credibility.

"A record number of trains are on the rails," said Daniel Parker, Norfolk Southern Corp. public improvements engineer. "This is great for the economy, but a challenge for construction activities. Deciding how to create maximum efficiency is crucial and requires finding the times when there is the best chance for the tracks to be clear to maximize availability for the contractor."

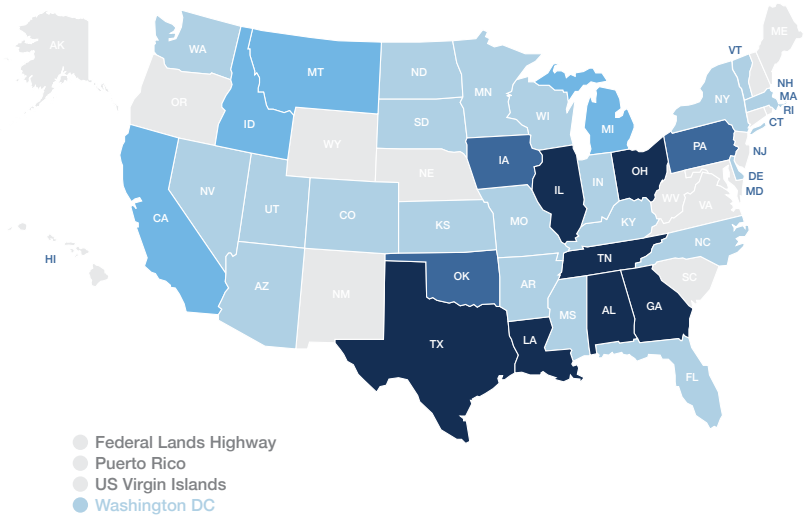
"Compromise needs to be implemented in all phases of the project. Public safety needs to be at the forefront of these projects."

– Michael Stead, Illinois Commerce Commission
Rail Safety Program Administrator

Improving DOT and Railroad Coordination

Improving transportation department and railroad coordination is expected to be an institutionalized practice in 15 states by the end of the EDC-3 two-year cycle. That's more than double the seven states that now regularly use tools and practices to improve coordination, including committees of stakeholders who collaborate on highway projects involving railroad rights-of-way. Another 17 states and Washington, D.C., plan to pilot the innovation or prepare for full deployment.

Baseline (January 2015)



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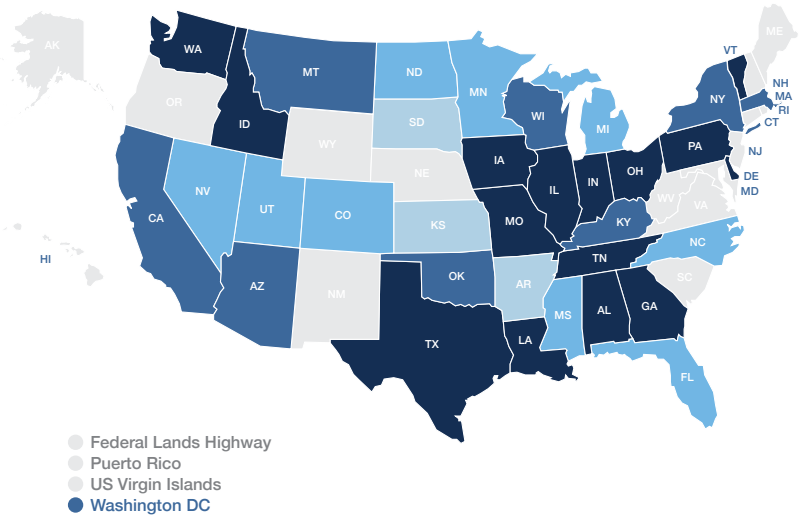
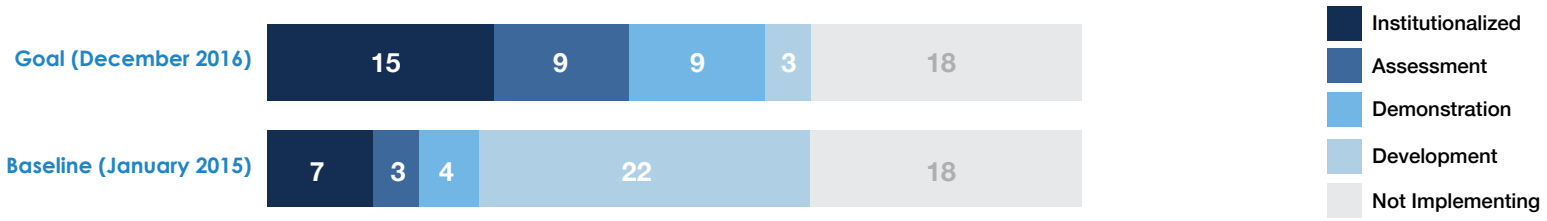


Number of States in Various Implementation Stages



Locally Administered Federal-Aid Projects: Stakeholder Partnering

Stakeholder partnering provides local public agencies, state transportation departments and FHWA with an effective way to work together to increase program compliance and integrity and streamline the project delivery process under the Federal-Aid Highway Program. After promoting the formation of stakeholder partnering groups in EDC-2, FHWA is continuing the effort in EDC-3 to enhance success for local agencies, whose projects receive 20 percent of Federal-Aid funding.

Now active in many states, stakeholder partnerships are committees or working groups that meet regularly to identify program-level issues and review project development processes. They work on solutions through a defined decision-making process and action plans. "The idea is to get all the players at the table discussing whatever the issues might be," said Brian Roberts, executive director of the National Association of County Engineers. "In our case, we're really interested in streamlining, which is the foundation of Every Day Counts."

Stakeholder partnering improves communication and trust among those involved, which can clarify local program issues and generate better understanding of project development requirements. It also increases consistency by establishing a cooperative environment for reviewing and refining project development compliance requirements and policies for use across the state. It provides a launching platform to initiate process enhancements, training and other ways to improve program integrity.

Summit participants were interested in the experiences of colleagues in other states with stakeholder partnering groups. They asked about how they set up their groups, what issues had been brought to the table and what improvement processes had been implemented as a result. They also were interested in the role of stakeholder partnering groups in overcoming communication obstacles and building relationships.

An example cited was the Virginia Department of Transportation's stakeholder partnering effort, which spans more than a decade and includes several groups associated with local programs. One is the Urban Construction Initiative Group, which formed when a 2003 state code change allowed some municipalities to manage their construction programs. It now includes 14 localities. Besides giving members a voice in the state's local assistance program, the UCI Group has come up with several streamlining solutions, including a certification program, a project development review timeline and changes in the Virginia DOT's sole source and proprietary projects process.

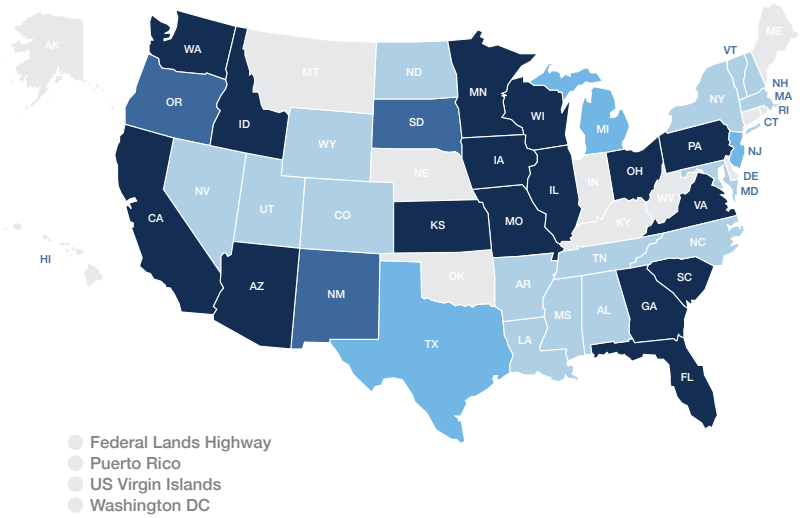
"The exciting thing about stakeholder partnering is that in every state that has done it, it has become a success story. There's never a failure when you bring people together to talk to each other."

– Brian Roberts, National Association of County Engineers Executive Director

Locally Administered Federal-Aid Projects: Stakeholder Partnering

Stakeholder partnering on local projects is already an institutionalized practice in 16 states, but that number is expected to expand to 23 states during EDC-3 as more states form committees or working groups of local, state and federal representatives to address program-level issues and improve project processes. Another nine states are working to establish stakeholder partnering groups.

Baseline (January 2015)



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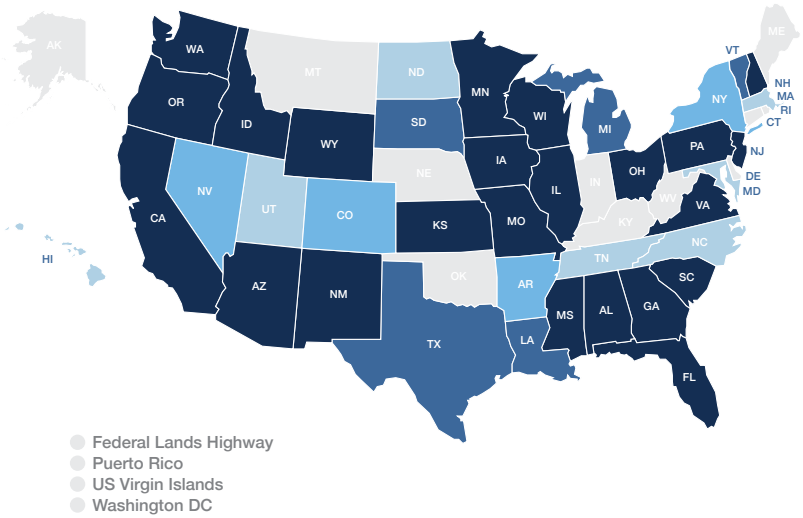
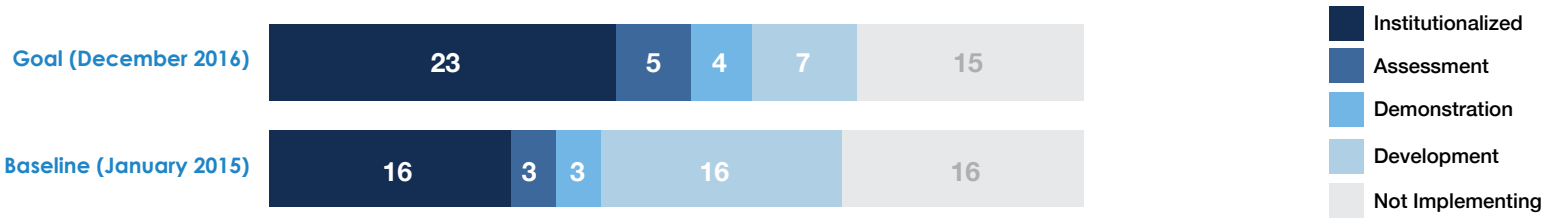


Number of States in Various Implementation Stages



Regional Models of Cooperation

Traffic congestion doesn't stop at geographic borders, but transportation planning often does. Using regional models of cooperation can help state agencies and regional planning groups develop agreements and coordinate planning across jurisdictional boundaries, yielding benefits such as faster project delivery, less traffic congestion and better freight movement.

Planning in jurisdictional silos can interfere with essential coordination of regional transportation planning solutions, which can lead to project delays, process inconsistencies and reduced freight reliability. In EDC-3, FHWA is promoting a framework and process for highway agencies and metropolitan planning organizations to develop agreements across agency boundaries, improving communication, collaboration, policy implementation and performance management.

Using regional models of cooperation requires thinking beyond traditional borders, summit participants learned. It brings together many entities to support common goals on transportation planning topics such as congestion management, safety, freight, commerce and livability. Using regional models of cooperation for transportation planning can improve decision-making, save time and money through resource sharing and help agencies work together to achieve more than they can on their own.

"Often there are multiple MPOs for one urbanized area. The traveling public doesn't necessarily know what these agencies do. All they see are transportation needs, so for the sake of transparency, efficiency and better decision making, we're encouraging them to work together," said Jody McCullough, FHWA community planner.

Obstacles to jurisdictional planning summit participants discussed include differing priorities, funding issues and competing political interests. Coordination techniques they covered that address those challenges include expanding partnerships, sharing data and tools, and planning across sectors and agencies. "This is a joint initiative with the Federal Transit Authority, so we're looking beyond just highway planning and also considering transit planning," said David Harris, FHWA transportation specialist.

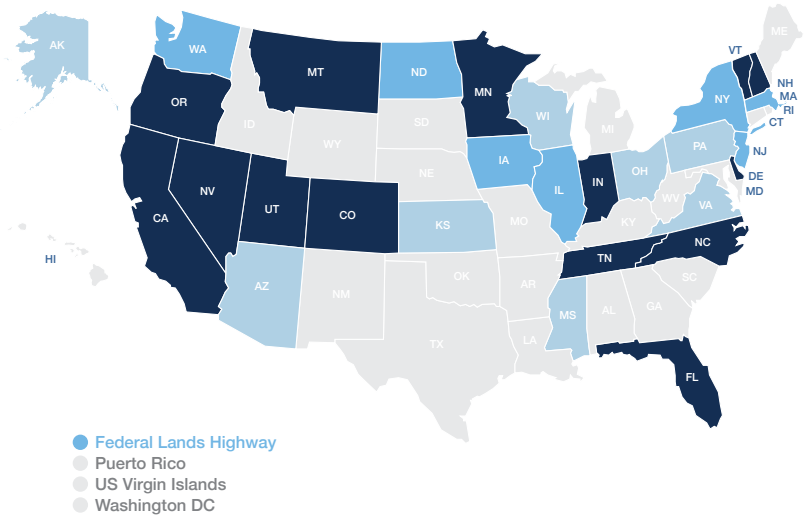
"Regional models of cooperation is about getting jurisdictions to work together to be more effective."

– Jody McCullough, FHWA Community Planner

Regional Models of Cooperation: Planning Products and Studies Across Agencies

Use of multijurisdictional planning on highway, transit, freight, air quality, congestion mitigation and other transportation issues is expected to spread to about half the country during EDC-3. MPOs in 20 states and Federal Lands Highway plan to institutionalize products and studies across agencies and adopt the outcomes into their long-range plans, while MPOs in another six states undertake multijurisdictional studies.

Baseline (January 2015)



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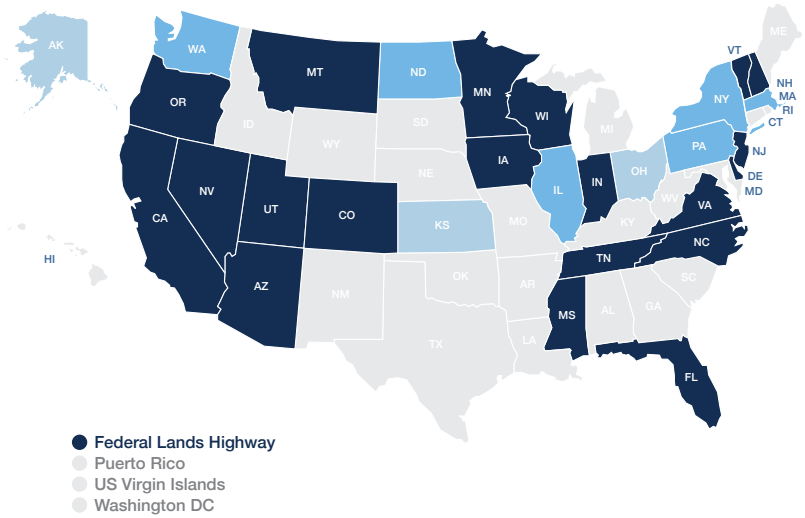
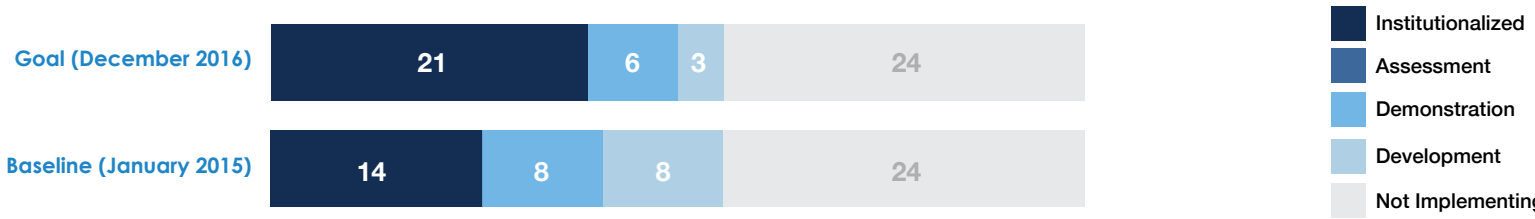


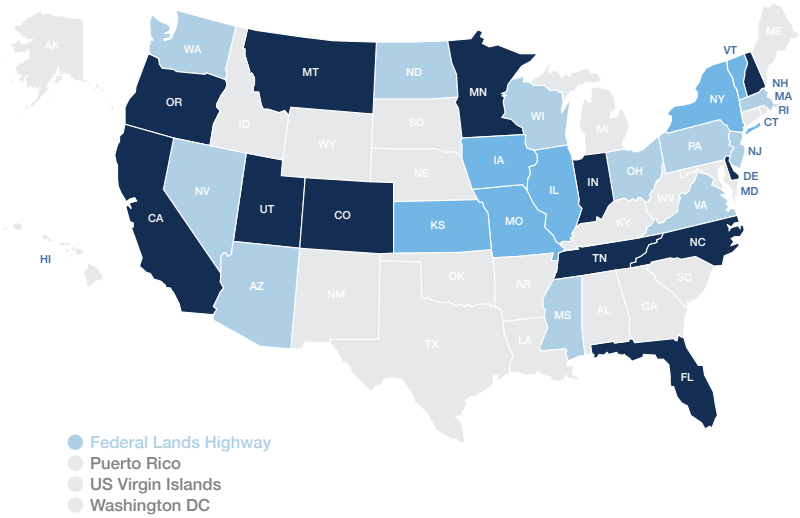
Number of States in Various Implementation Stages



Regional Models of Cooperation: Data Models and Tools

MPOs, state transportation departments and other transportation stakeholders in about half the country plan to coordinate the sharing of data, models and tools such as geographic information systems, transportation models, safety data and asset management information. MPOs in 17 states and Federal Lands Highway plan to institutionalize the practice of sharing data, models and tools. Another eight are initiating the sharing of data, models and tools.

Baseline (January 2015)



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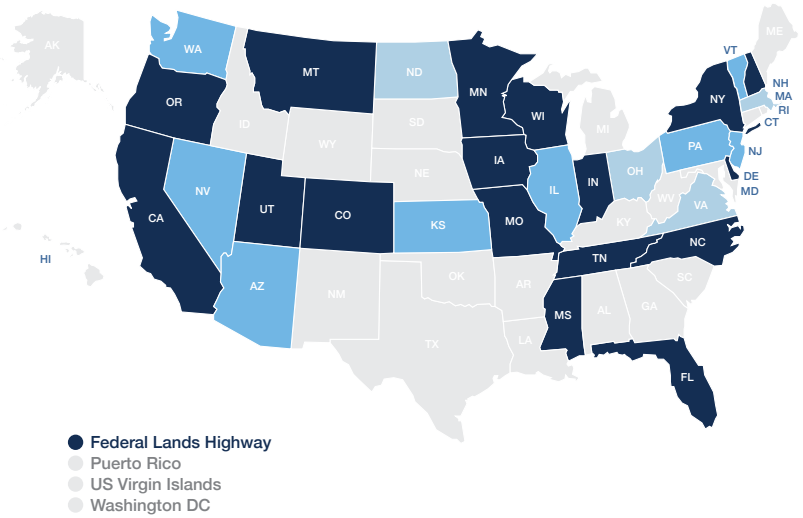

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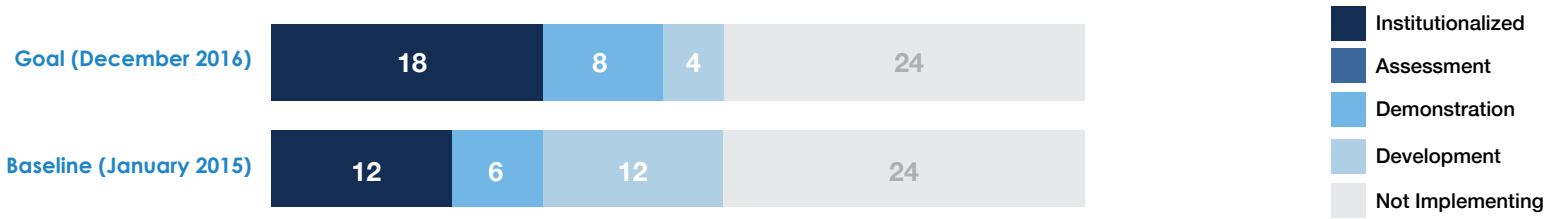


Road Diets (Roadway Reconfiguration)

Improved safety and congestion relief on public roads are high-priority national goals. Innovative roadway reconfigurations such as road diets can help achieve these goals for motorists and nonmotorists on mixed-use streets by reducing vehicle speeds and freeing space for alternative modes. Road diets can reduce crashes, increase mobility and access, and improve a community's quality of life.

A road diet is a safety-focused alternative to a four-lane, undivided roadway. One common type involves converting a four-lane, undivided road segment that serves both through and turning traffic into a three-lane segment with two through lanes and a two-way left-turn lane in the middle. The reclaimed space can be allocated for other uses, such as bike lanes, pedestrian refuge islands, bus lanes and parking.

Most summit participants were familiar with road diets, but they wanted to learn more about their benefits and the challenges to anticipate when implementing them. They were interested in the real-world experiences of those who had used them, particularly their effects on capacity and safety. They wanted information on determining when a road diet is an appropriate solution, as well as marketing and outreach materials that summarize the benefits of road diets to share with community members and elected officials.

Participants asked how to overcome public opposition to a reduction in vehicle through lanes. They learned that outreach is essential to explain the benefits of road diets to businesses and residents along a corridor and that road diets often gain wider acceptance after they are implemented and people experience their benefits directly. Iowa and Michigan, for example, implemented temporary road diets with a promise to remove them if the public disliked the reconfiguration after the trial period. When a student group in Arkansas set up a "weekend road diet" by using hay bales to delineate the reconfiguration, public response was positive and road diets are now being considered as a permanent solution.

"We do extensive public engagement with people to make sure they understand what the project is going to do," said Norm Steinman, manager of planning and design for the Charlotte, North Carolina, Department of Transportation, which has completed 19 road diet projects. "Now that we have more projects around Charlotte, it's even easier for people to understand what happens with these kinds of projects."

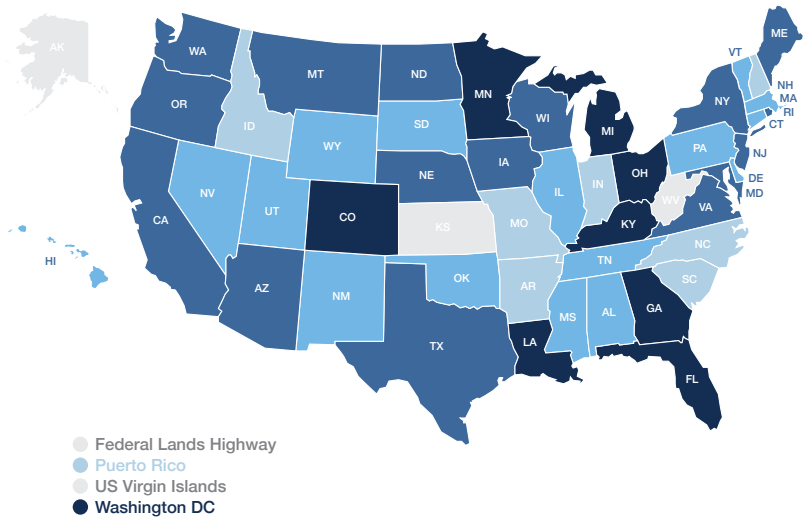
"All of our reconfiguration projects have been success stories. We actually handle more traffic volumes through a roadway in a much safer environment."

– Dongho Chang, Seattle, Washington, City Traffic Engineer

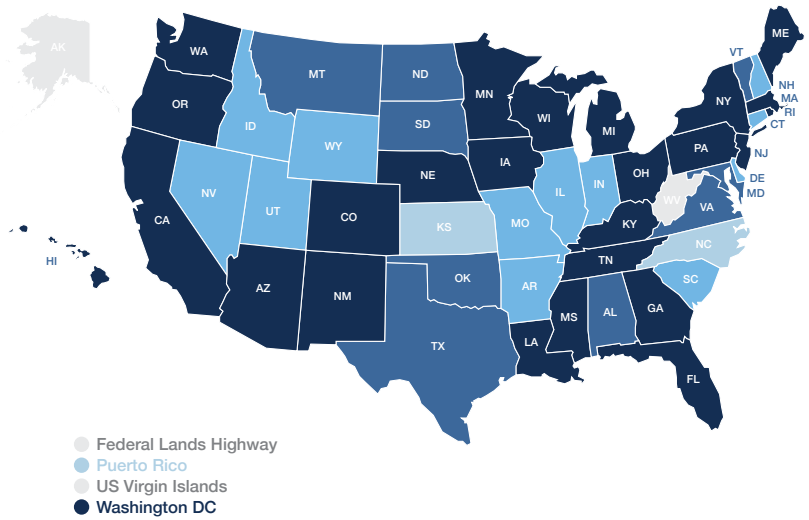
Road Diets (Roadway Reconfiguration)

The use of road diets to enhance safety and mobility has attracted widespread interest across the country. They are expected to be a standard practice in 25 states and Washington, D.C., by the end of EDC-3, triple the current number of nine. Another 21 states plan to implement road diets and develop processes for identifying potential sites for roadway reconfiguration during the two-year cycle.

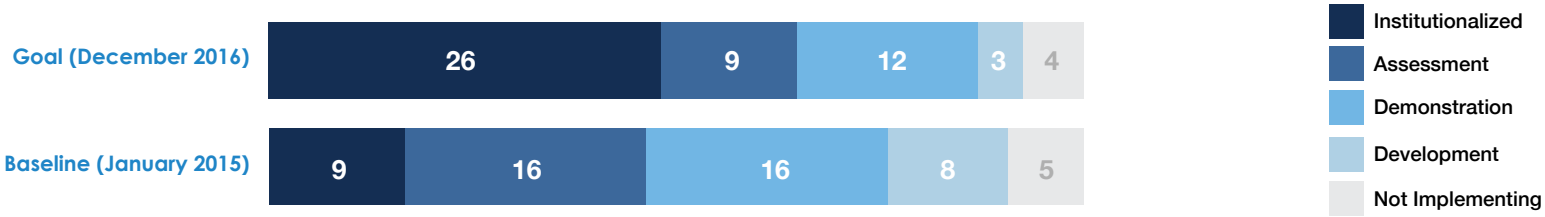
Baseline (January 2015)



Goal (December 2016)



Number of States in Various Implementation Stages



Smarter Work Zones

Effective traffic management during construction reduces traffic delays, ensures motorist and worker safety, maintains access to local businesses and residences, and helps get road work done on time. The EDC-3 effort on smarter work zones encourages the adoption of traffic management strategies that create efficient work zones through road project coordination and technology applications such as queue and speed management.

Road project coordination involves smarter construction planning that minimizes work zone impacts and generates time and cost savings. Cities and regions are synchronizing projects at various levels, combining multiple projects in a corridor or network, correlating right-of-way acquisition and utility work, and coordinating work among transportation agencies. "Project coordination involves working within an agency, but also reaching outside to other agencies, utility contractors and developers," said W.D. Baldwin, associate vice president of HDR Inc.

Technology applications such as queue management and speed management involve using intelligent transportation system technology to manage work zone traffic. Queue management systems alert drivers to work zone backups so they can slow down safely. Speed management solutions, such as variable speed limit signs, dynamically manage work zone traffic in real time. "It's always easier for drivers to understand the impacts of a work zone if they know what to expect," said Todd Peterson, FHWA transportation specialist. "Conveying information gives them a better perception of how work zones are being managed."

At the summits, participants wanted to learn about using the smarter work zone approach to balance safety and efficiency, how other states are applying the innovation and new tools available. They raised questions about system costs versus budget constraints, standard procedures and specifications for state-level implementation, how to demonstrate the value of smarter work zone applications to the public and other stakeholders, and past experiences with technology that did not perform as expected.

"Over the years, the equipment has gotten more reliable and dependable, and we've developed a better feel for what equipment you should get and when you should use it," said Ken Wood, FHWA traffic operations engineer. "So now is a good time to start incorporating work zone ITS as a strategy to minimize the impacts of work zones."

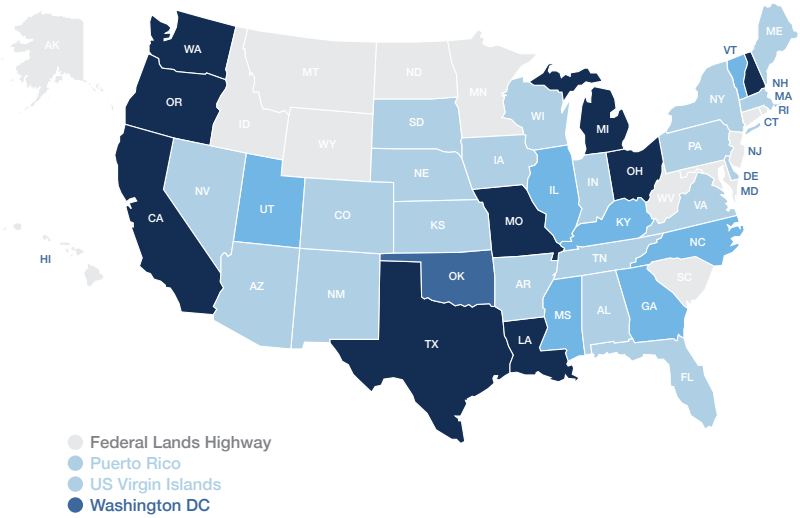
"In Oregon, we're just getting going with introducing work zone ITS technology into our highway construction contracts. EDC-3 has been an incentive to push harder to get that system in place."

– Scott McCanna, Oregon Department of Transportation
State Traffic Plans Engineer

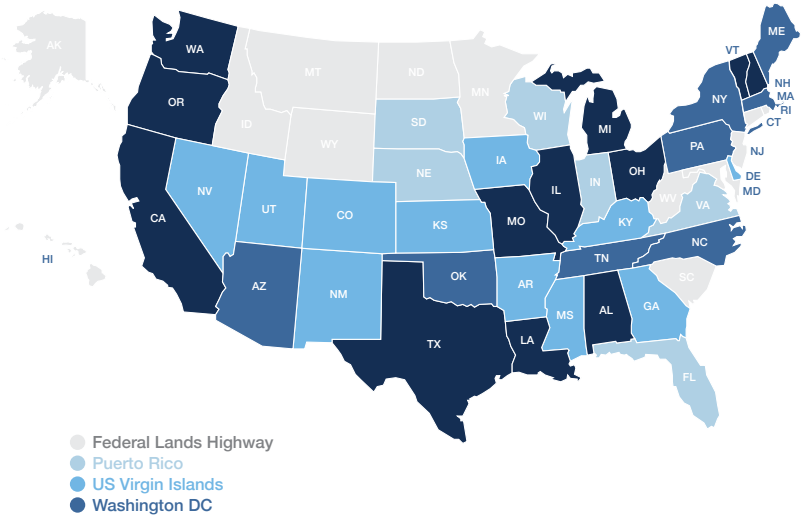
Smarter Work Zones: Project Coordination

Nineteen states, Washington, D.C., and the U.S. Virgin Islands plan to incorporate project coordination strategies or work zone software tools into planning, design, operating and maintenance processes during the next two years. An additional 12 states plan to institutionalize project coordination to reduce work zone impacts.

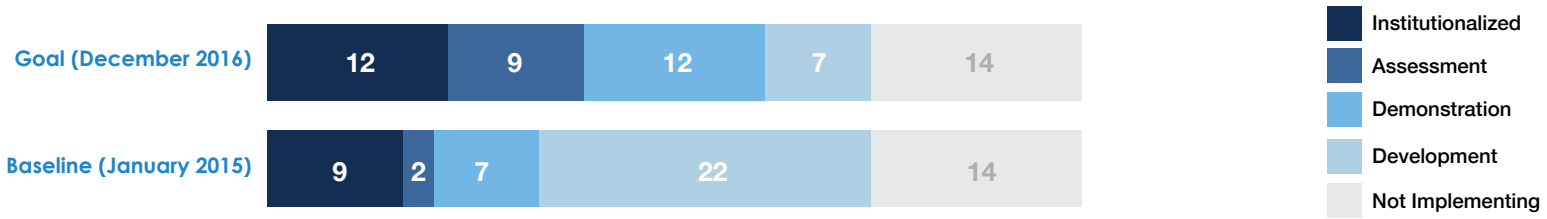
Baseline (January 2015)



Goal (December 2016)



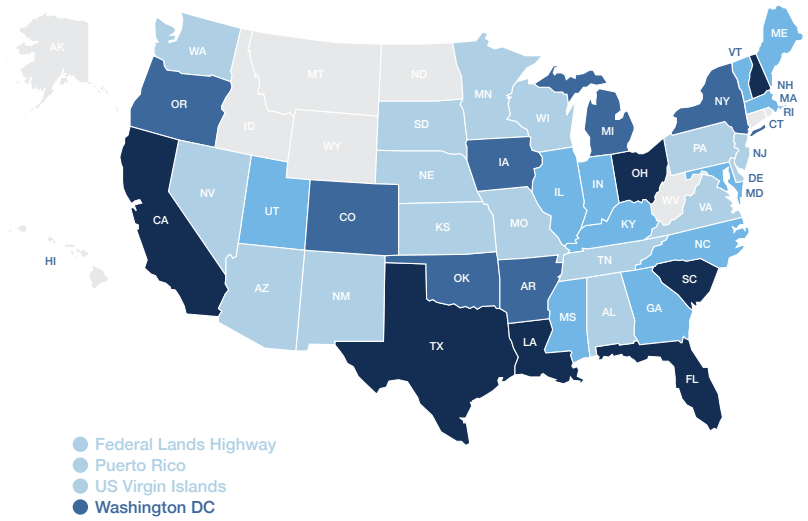
Number of States in Various Implementation Stages



Smarter Work Zones: Technology Applications

During EDC-3, technology applications will be incorporated into work zone planning, design, operating and maintenance practices in nearly half the country—20 states, Washington, D.C, the U.S. Virgin Islands and Federal Lands Highway. Eighteen more states plan to make use of technology tools and strategies to manage work zone impacts a mainstream practice, more than doubling the current number of seven.

Baseline (January 2015)



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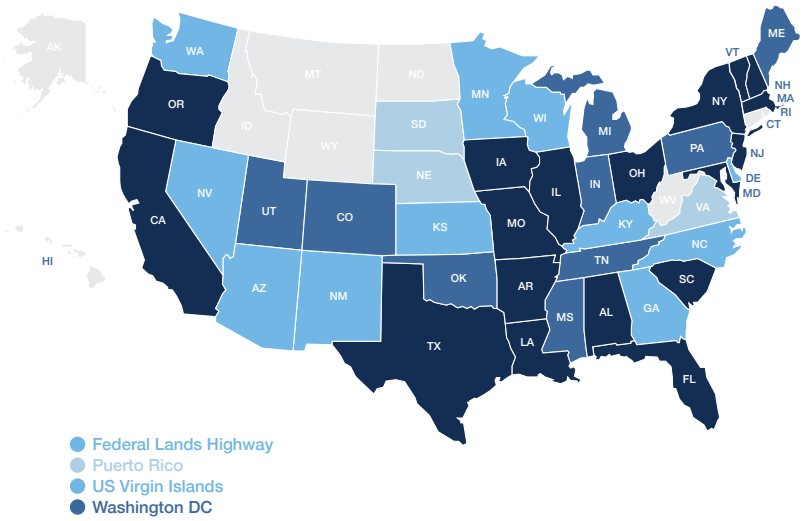

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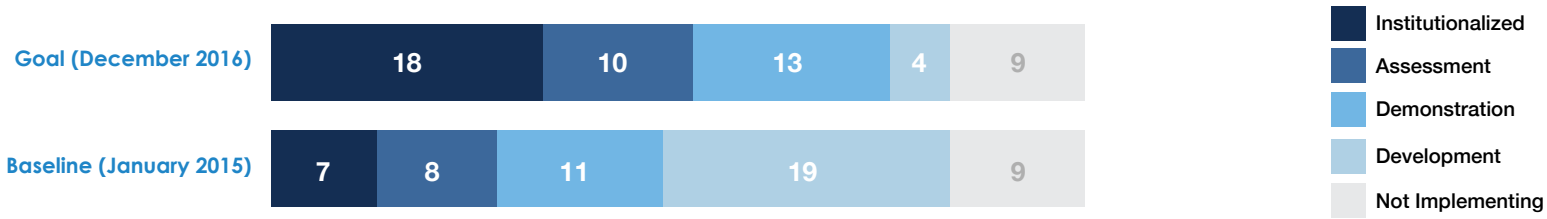


Ultra-High Performance Concrete Connections for Prefabricated Bridge Components

Growth in the use of prefabricated bridge elements and systems has led to a recognition that robust connection systems are a key part of a successful bridge project. Ultra-high performance concrete is a steel fiber-reinforced material that improves durability and simplifies connection details, fabrication and construction when using prefabricated bridge components.

The EDC-3 effort focuses on demonstrating the advantages offered by UHPC as an option for connecting prefabricated bridge elements. Field casting of UHPC connections between prefabricated components results in a strong connection that provides better long-term performance. The mechanical properties of UHPC allow for the redesign of common connection details in ways that promote both ease and speed of construction. Use of UHPC is expected to increase the routine use of prefabricated bridge elements to accelerate bridge construction.

Summit participants learned that many of the challenges related to UHPC use are receding. "There is more familiarity with UHPC as a material, and more states are using UHPC connections with prefabricated bridge elements," said Benjamin Beerman, senior structural engineer for FHWA. New York leads the way with more than two dozen bridges using UHPC connections with prefabricated elements. Other states that have used UHPC for bridge-related applications include Iowa, Montana, New Jersey and Oregon.

Domestic production of the steel fiber reinforcement commonly used in UHPC began in 2014. That's expected to open the door to more highway agencies interested in using prefabricated bridge elements and systems with UHPC, but were hindered in the past by Buy America provisions.

FHWA is providing technical assistance and information to support state agencies and other highway stakeholders as they make UHPC use part of their practices. UHPC is not a difficult material to work with, said Beerman, who observed workers constructing a Pennsylvania bridge project learning how to use it for the first time. "It took them about an hour and then they got it," he said.

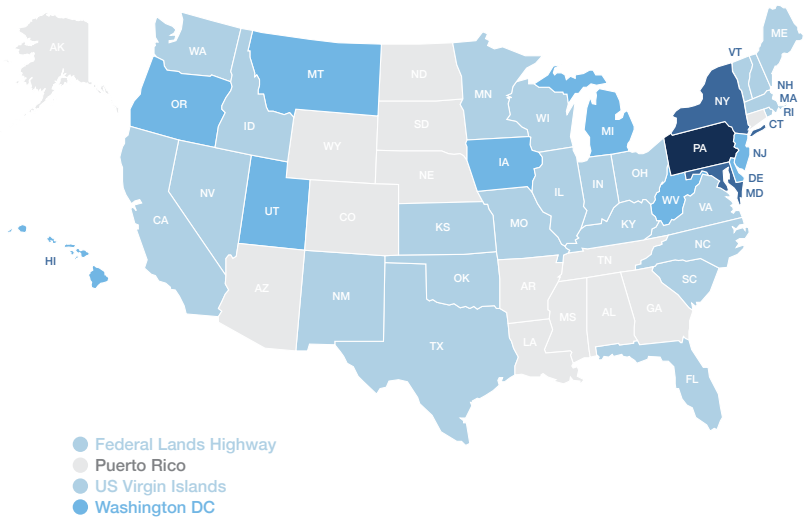
"As the bridge community brings UHPC into our industry, it is going to challenge our existing practices. It is a game changer."

– Benjamin Beerman, FHWA Senior Structural Engineer

Ultra-High Performance Concrete Connections for Prefabricated Bridge Components

Twenty-six states, Washington, D.C., and the U.S. Virgin Islands expect to add UHPC connections to their bridge-building toolbox during EDC-3. By the end of the two-year cycle, three states and Federal Lands Highway plan to join Pennsylvania in making UHPC connections a standard practice on bridge projects that use prefabricated elements.

Baseline (January 2015)



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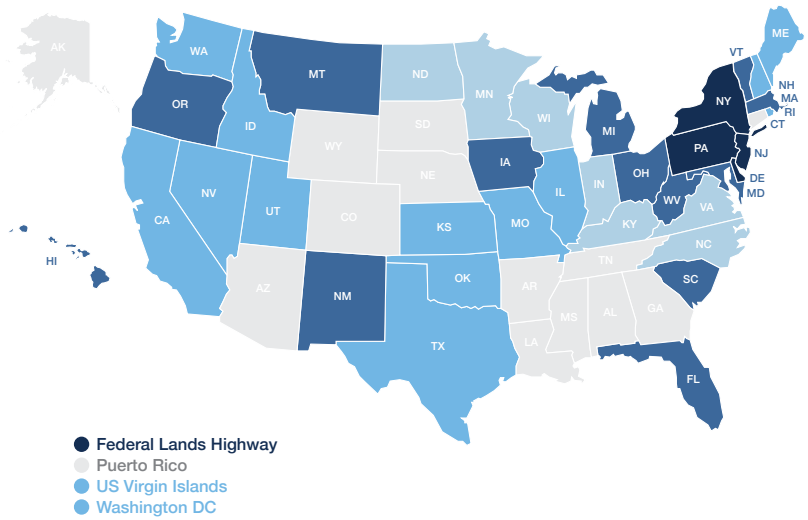

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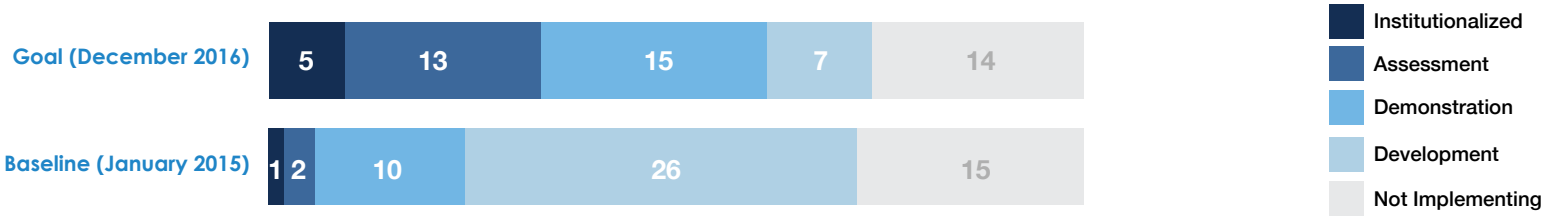

U.S. Department of Transportation
Federal Highway Administration

http://www.fhwa.dot.gov/everydaycounts

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