

Every Day Counts:

Building a Culture of Innovation for the 21st Century



Report on the EDC2 Summits

Spring 2013



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of Transportation

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Administration



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Foreword

Every Day Counts is the Federal Highway Administration's initiative to advance a culture of innovation in the highway community in partnership with States. 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, and improve environmental sustainability. This report documents a series of summits held in fall 2012 and spring 2013 to launch the second round of Every Day Counts innovations. It highlights the key role summits play in the Every Day Counts innovation deployment process and outlines the impact they have on the initiative's progress. The report is intended as a resource for the highway community as it develops a new business model to encourage ongoing innovation in managing highway project delivery to better serve the Nation.



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Report on the EDC 2 Summits





Every Day Counts: A Collaborative Approach to Innovation Deployment



Every Day Counts (EDC) is the Federal Highway Administration's (FHWA) initiative to work in partnership with States to shorten project delivery and accelerate deployment of market-ready innovations. The initiative is designed to create a new sense of urgency in pursuing better, faster, and smarter ways to build highway infrastructure. It uses an innovation deployment approach that tailors strategies to the needs, preferences, and regulations of each participating State and develops a nationwide network of innovation proponents.

Regional summits are an integral component of the EDC initiative, bringing together the front-line professionals responsible for delivering the highway projects that keep America moving. The eight EDC summits held in fall 2012 gave transportation professionals the opportunity to learn about the second 2-year round of EDC innovations, exchange ideas with their agency and industry counterparts in neighboring States, and provide feedback to FHWA on the support they need to adopt innovations in their own States.

Since the first round of EDC innovations was launched in October 2010, EDC has focused on moving proven but underused technologies and practices into widespread use to benefit road users and taxpayers. "We have an ambitious goal, which is to change the culture of the transportation community to one that embraces innovation as the standard way of doing business," FHWA Administrator Victor Mendez told participants at the

EDC regional summit in Baltimore, MD, in October 2012. "We've committed ourselves to a course that will benefit the American taxpayer. Every Day Counts is about fulfilling our mission in a better, smarter, faster way."

In developing the EDC initiative, FHWA created a State-based model in which FHWA teams work with departments of transportation (DOT) and other highway community stakeholders, co-led by the State DOT chief executive officer and FHWA division administrator, to make innovations standard practice. Each State formed a State Transportation Innovation Council to lead its EDC effort. States consider the menu of EDC innovations, adopt those they wish to pursue in their individual highway programs, and advise FHWA on the types of tools and assistance that would aid them in their deployment efforts. This approach enables highway agencies to tailor the EDC program to their State's needs. It also recognizes that DOTs serve as the innovation leaders for their States and, by partnering with local and county agencies and industry stakeholders, they play a pivotal role in innovation deployment.

FHWA's role in the EDC process is to provide national leadership in incorporating key innovations into highway programs to improve the country's transportation system. The agency assembles deployment teams for each EDC innovation to assist States in their implementation efforts. Based on what they learn from stakeholders through communi-

innovation → ingenuity → invention → imagination →

cation mechanisms such as EDC regional summits, the teams offer technical assistance, training, and outreach to help them adopt innovations and use them regularly. “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,” FHWA Deputy Administrator Gregory Nadeau told summit participants. “By advancing 21st century solutions, we can improve safety, reduce congestion, and keep America moving and competitive.”

Through EDC, FHWA fosters partnerships among public and private stakeholders throughout the highway community, bringing them together to develop and implement

solutions. FHWA seeks input from stakeholders on which innovations to promote during each round of the initiative, basing the options on transportation system needs, magnitude of benefits, and solutions already being used successfully that could be applied nationally. EDC also enables FHWA to support and build on other efforts to enhance the transportation system, such as the second Strategic Highway Research Program (SHRP 2) and the American Association of State Highway and Transportation Officials (AASHTO) Technology Implementation Group. “EDC is not simply an FHWA initiative. It is a joint initiative. We only move innovation forward in partnership, through relationships,” said Mendez.

“The State-based approach has led to the development of a national network of transportation professionals skilled in the rapid deployment of innovation.”

**—Victor Mendez, Administrator,
Federal Highway Administration**



EDC2 Summits:



"I believe the EDC format truly works. The regional summits rally support and focus on key processes, initiatives, and the products that we are delivering."

*-Matthew Garrett, Director,
Oregon Department of Transportation*

Starting a New Round of Progress

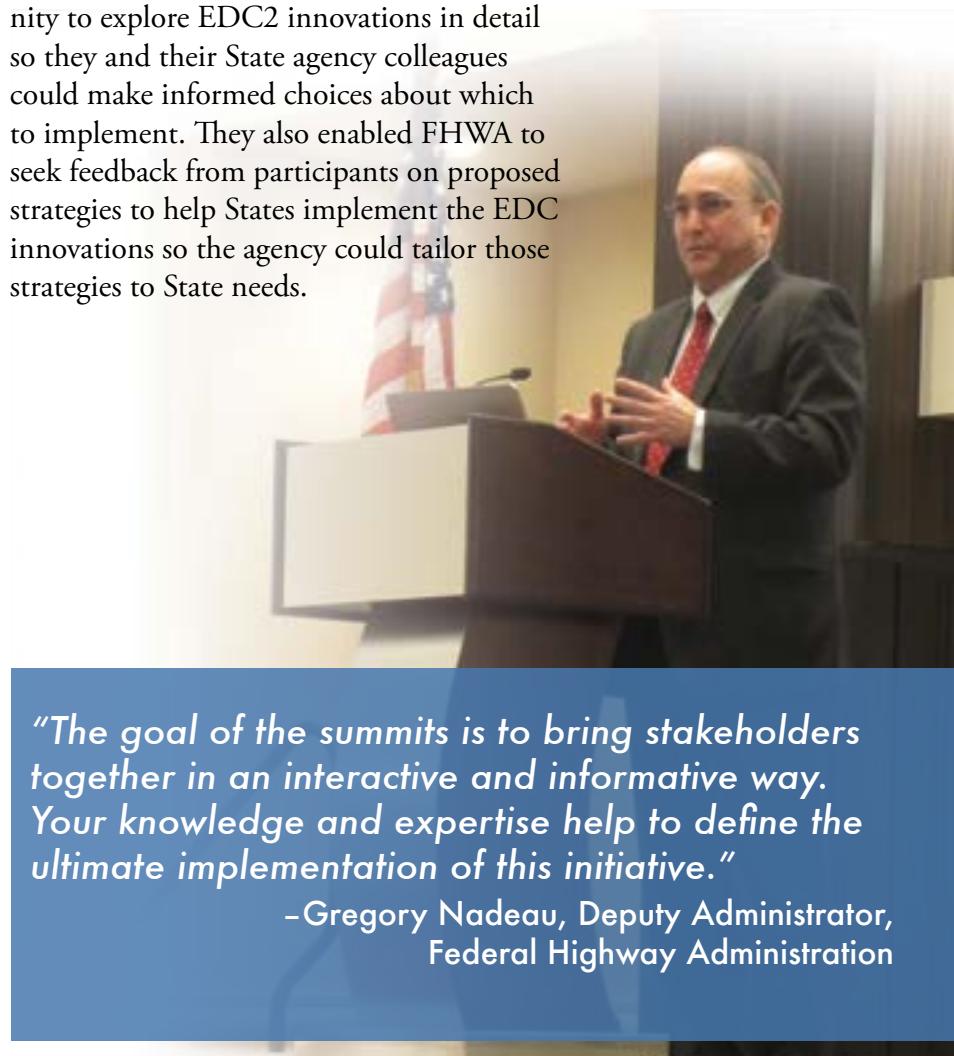
Transportation professionals gathered at eight regional summits in fall 2012 to learn about the second round of EDC innovations. The purpose of the summits was to disseminate information on the new approaches so States could identify those that could help them achieve fiscal and environmental sustainability while reducing project delivery time and increasing safety and mobility. The summits featured interactive working sessions for participants where they could begin the process of determining which innovations to deploy over the next 2 years.

The summits were targeted to professionals responsible for project delivery. More than 1,300 representatives from State and local highway agencies and private industry attended the events. “We’re holding these summits for the people who are on the front lines of project delivery, the people who make the day-to-day decisions that all add up to completed projects,” Mendez said. “This is our opportunity to bring everybody to the table—all the key stakeholders in the public and private sectors—and make sure that we all understand the strategies and technologies we’re about to implement.”

The meetings were held between October and December at eight locations: Sacramento, CA; Atlanta, GA; Baltimore, MD; Detroit, MI; Kansas City, MO; Portland, OR; Warwick, RI; and Dallas, TX. Each day-and-a-half event (see Appendix C for a summit agenda) was designed to create synergies among transportation professionals 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.

At the summits, representatives of State transportation agencies provided feedback on their work on the EDC1 innovations. Some State DOTs had efforts already underway on the innovations before EDC was launched to provide support, but were able to accelerate their programs through the EDC process. Others found that EDC provided the tools and training that enabled them to successfully apply innovations they had never or rarely used. Many reported that their legislatures were willing to authorize pilot programs to enable them to try innovations that were new to their States.

The summits gave participants the opportunity to explore EDC2 innovations in detail so they and their State agency colleagues could make informed choices about which to implement. 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.



“The goal of the summits is to bring stakeholders together in an interactive and informative way. Your knowledge and expertise help to define the ultimate implementation of this initiative.”

*—Gregory Nadeau, Deputy Administrator,
Federal Highway Administration*

"Innovation is the implementation of research. The research does not have to be yours or new to the world; it only has to be new to you. That is why we need to seek opportunities to learn from each other and share with each other, and that is one of the objectives of EDC."

– Edward Pollack, Director of Innovation and Enhancement,
Indiana Department of Transportation

After attending in-depth sessions on EDC2 innovations, participants met in State caucuses to discuss what they had learned about the innovations presented and how they could be applied in their highway programs. Each caucus included decisionmakers from the State's highway agency and FHWA Division office and other stakeholders from that State. Based on their State needs and priorities, the caucus participants developed preliminary recommendations on which innovations to adopt during the next 2 years. These sessions laid the groundwork for further deliberations in each State on which EDC innovations had the most potential to enhance the highway system.

EDC2 Innovations

The innovations in EDC2 are aimed at 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. Each regional summit featured sessions on the eight innovative project delivery strategies FHWA announced in summer 2012 (see Appendix A).

"Our agency's strategic goals address taking care of our facilities and assets and building projects on time and on budget. We are confident that EDC will assist us in meeting these goals."

– Keith Golden, Commissioner,
Georgia Department of Transportation

Four are new:

- Strategies for **locally administered Federal-Aid projects** are designed to help local public agencies navigate the complexities of the Federal-Aid Highway Program.
- **Three-dimensional (3-D) engineered models for construction** allow for faster, more accurate, and more efficient planning and construction.
- **Intelligent compaction** uses special vibratory rollers and GPS technology to improve the quality, uniformity, and performance of pavements.
- The use of **alternative technical concepts** enables contractors to propose innovative options that are equal to or better than the State's criteria during the project procurement process.

Four other strategies covered during the summits were continued from EDC1:

- **Programmatic agreements** improve environmental outcomes and save time and resources by establishing streamlined approaches for handling routine environmental requirements.
- **Accelerated bridge construction** techniques—including prefabricated bridge elements and systems, slide-in bridge construction, and geosynthetic reinforced soil integrated bridge systems—allow highway agencies to replace bridges faster, more safely, and sometimes at lower cost.

MAP-21



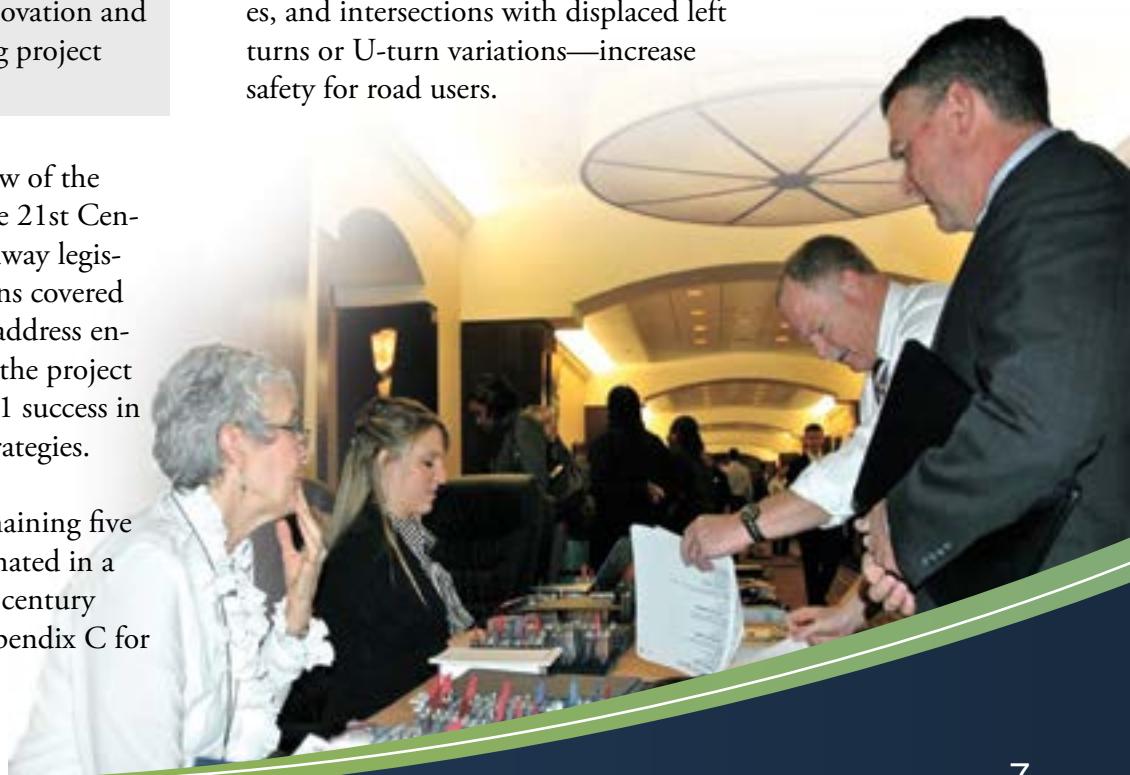
- The **design-build** contracting method combines the design and construction phases of a project in one contract, accelerating project completion.
- The **construction manager/general contractor** project delivery method, in which the project owner hires a general contractor to provide feedback during the design phase, fosters innovation and mitigates risk while speeding project delivery.

MAP-21

Sessions also provided an overview of the Moving Ahead for Progress in the 21st Century Act (MAP-21), Federal highway legislation passed in 2012. The sessions covered MAP-21 provisions designed to address environmental issues and speed up the project delivery process, a result of EDC1 success in deploying project acceleration strategies.

In-depth information on the remaining five EDC2 innovations were disseminated in a series of virtual summits on 21st century solutions in spring 2013 (see Appendix C for a summit agenda):

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



"We had a group of contractors that actually had a lot of input into developing some of the construction manager/general contractor initiative. We have contractors that are going to participate in all eight of the summits. Everyone benefits when every day counts."

—Brian Deery, Senior Director, Highway and Transportation Division,
Associated General Contractors of America

- **Geospatial data collaboration** uses cloud-based geographic information system services to improve date sharing among project delivery stakeholders.
- **Implementing quality environmental documentation** promotes recommendations to improve the quality of and streamline National Environmental Policy Act (NEPA) documents developed for construction projects.
- **National traffic incident management responder training**, also a SHRP 2 priority, offers the first national, multi-disciplinary traffic incident management process and training program.

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 transportation professionals participated in the virtual summits, which were held at central locations in each State so that participants did not need to travel a great distance to attend, but still had opportunities to network with peers about their EDC2 implementation plans. Surveys showed that participants responded positively to the summits, with more than 90 percent giving good to excellent ratings to the overall summits and the virtual summit format.

MAP-21

"Every Day Counts has and will continue to promote a unified focus by all stakeholders for the implementation of innovation in Vermont."

—Richard Tetreault,
Director of Program Development,
Vermont Agency of Transportation

EDC1 Success

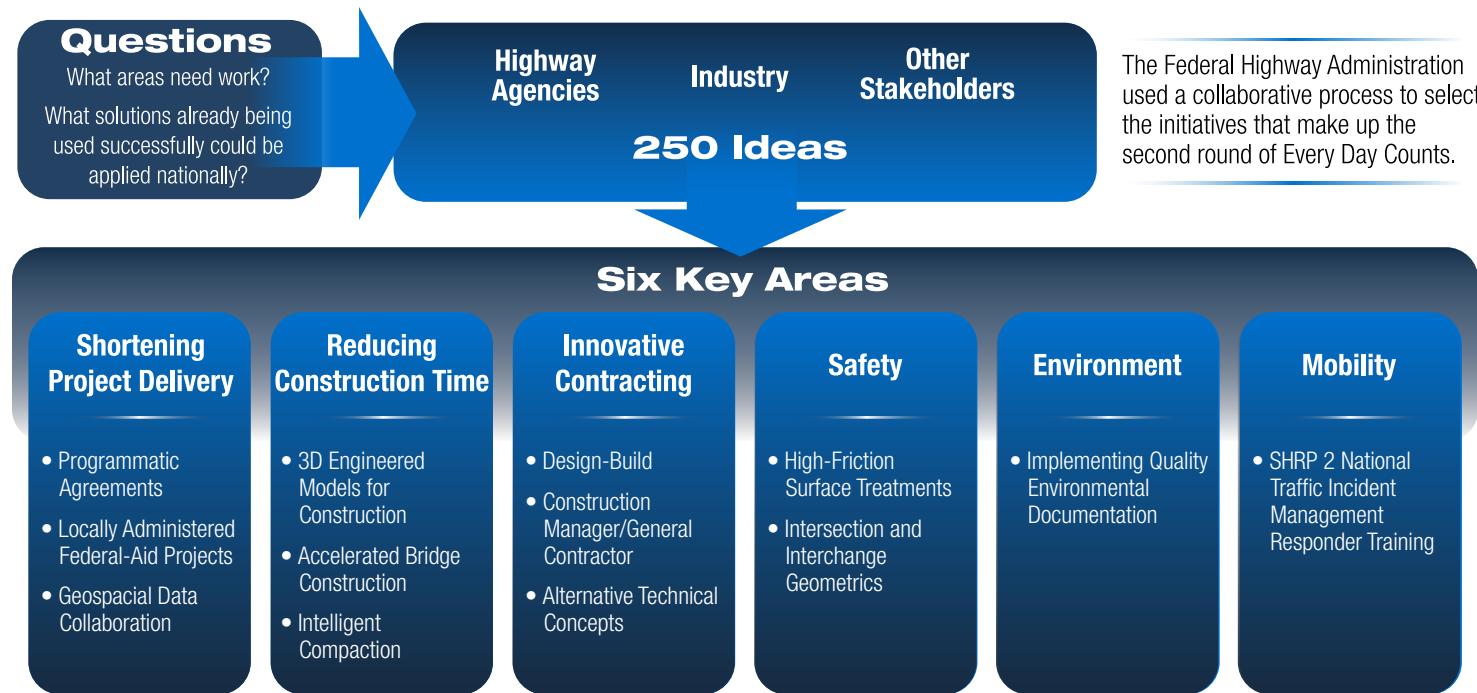
The regional summits provided an opportunity to report on progress on EDC1 technology initiatives, both at the national level and in individual States (see Appendix B). The 16 first-round technology initiatives were aimed at shortening project delivery and accelerating innovation deployment. Since they were introduced at regional summits in fall 2010, every State has applied one or more of them and many are now widely used. "We will build on the successes of EDC1 to continue creating a culture of innovation," said Nadeau.

Planning and environmental linkages (PEL) incorporate information developed during planning into the NEPA review process. This reduces duplicative work and costs and leads to more informed and faster project-level decisions, more transparent planning practices, and better coordination among stakeholders. By December 2012, 17 DOTs and Federal Lands Highway Divisions had implemented the PEL Questionnaire or an equivalent process and 10 more were working on it. The Louisiana Department of Transportation and Development, for example, created a National Best Practice Planning & Environmental Linkages Checklist and is using it on all new projects to save time and money.

Thirty-seven States have at least two active **programmatic agreements** that promote a standardized approach to handling environmental requirements on projects. A total of 104 agreements have been updated and 58 have been initiated under EDC. The District DOT saves about 1,500 person-hours a year by using programmatic agreements on about 50 projects, while the Ohio DOT has nine programmatic agreements in place that impact as many as 900 projects a year.

MAP-21

How the EDC2 Innovations Were Chosen



Stream and wetland **mitigation banking** programs provide an efficient way to minimize resource requirements and expedite project delivery. Nineteen States have active agreements defining terms and assessment methodology for mitigation banking, and seven of these agreements extend to local agencies. The Mississippi DOT, which has 20 mitigation banks in place, has streamlined the compensatory mitigation permitting process for wetland and stream impacts on all applicable transportation projects.

Preliminary design identifies the amount of design work allowable under current law before completion of the NEPA review process. It promotes better decisionmaking, time and cost effectiveness, and environmental responsibility. Thirty State DOTs have adopted a definition of preliminary design in project development policies, procedures, or recommended practices for Federal-Aid projects. Fifteen have used it on at least 50 percent of Federal-Aid projects. Since executing a 2011 agreement with FHWA clarifying the preliminary design activities that can be completed before the end of the NEPA review process, the Tennessee DOT has used it on more than 300 projects.

Enhanced technical assistance targets States addressing major challenges with environmental impact statements on highway projects and helps resolve those challenges. FHWA is providing additional technical assistance on five projects in North Carolina, South Dakota, Texas, Utah, and West Virginia. One EDC success story was a Nebraska project on which FHWA provided enhanced technical assistance which had stalled because of legislative language. The solution was to repackage the \$22 million project on a 70-mile corridor into three smaller projects to free up the funds.

MAP-21

The **design-build** (D-B) accelerated project delivery method combines the design and construction phases into one contract, allowing certain aspects of design and construction to take place at the same time and speeding up project delivery. Twenty-four States expanded their D-B statutory authority in 2011–2012, according to the Design-Build Institute of America. About 175 projects used

the D-B method from 2010 through 2012, including a North Carolina DOT project to replace seven bridges on Ocracoke Island in just 74 days. The California DOT has finished or is nearing completion on 15 D-B projects.

MAP-21

Another accelerated project delivery method, **construction manager/general contractor** (CM/GC), allows a highway agency to engage a construction manager during the design process to provide constructability input. This leads to more accurate price and schedule information. This contracting method has been used on 26 projects in the past 3 years and another nine are planned for 2013. MAP-21 has mainstreamed the technique, and 14 States now have laws or policies allowing its use. A leader in CM/GC contracting, the Utah DOT has used it on more than 20 highway projects, including an Interstate 80 widening project that included 14 bridges.

The **Safety EdgeSM** is a paving technique that produces a sloped edge, which allows vehicles that drift off the road to return to the driving lane more easily and increases pavement edge durability. Fifty-two DOTs and Federal Lands Highway Divisions have used the Safety Edge on at least one project, initiating nearly 1,200 projects since October 2010.

The Iowa DOT has made the Safety Edge a standard practice, requiring it on all projects with a paved shoulder less than 4 feet wide. In addition to using it on asphalt paving projects, the Iowa DOT was the

first in the country to try it on a portland cement concrete paving project. The Minnesota DOT, which made reducing roadway departure crashes part of its "Toward Zero Deaths" approach, adopted a Safety Edge policy in 2011.

Warm-mix asphalt technologies allow production and placement of asphalt at lower temperatures than traditional hot-mix asphalt, decreasing energy use and fuel emissions and extending the paving season in many States. Forty-seven DOTs and all Federal Lands Highway Divisions have adopted a standard specification for statewide use of warm-mix asphalt. Twenty-two DOTs and Federal Lands Highway Divisions have set usage goals ranging from 46,000 to 600,000 tons of warm-mix asphalt a year, or 20 to 50 percent of applicable projects.

Adoption of warm-mix asphalt is one of the Virginia DOT's biggest EDC success stories, according to State officials. By 2011, 75 percent of the asphalt by tonnage being used on State roads was warm-mix asphalt, which the agency first tried in 2009. The Kansas DOT also uses warm-mix asphalt on 75 percent of its paving projects.

An accelerated bridge construction technology known as a **geosynthetic reinforced soil integrated bridge system** (GRS-IBS) reduces costs and construction time and improves durability and safety. The technology uses alternating layers of compacted granular fill and geosynthetic reinforcement to provide support for a bridge. Since October 2010, 15 GRS-IBS bridges have been designed or constructed on the National Highway System and another 75 on other types of roads.

"Every Day Counts has really been the seed to grow innovations within the Pennsylvania Department of Transportation."

*-Scott Christie, Deputy Secretary for Highway Administration,
Pennsylvania Department of Transportation*

In Ohio, GRS-IBS was used to build a bridge in Defiance County in weeks, compared to the months re-

"This is just the beginning of EDC2. You have the opportunity to be open to positive change, to establish new relationships and nurture those relationships to collaborate on these efforts, and to take advantage of all the knowledge and technical assistance that is being brought to this effort. This is a unique opportunity, and it will provide the vehicle for establishing a real culture of innovation in your agencies."

—Janet Oakley, Director of Policy and Governmental Relations,
American Association of State Highway and Transportation Officials.

quired for traditional construction methods. The county saved nearly 25 percent on the project because of lower labor and material costs. In Pennsylvania, GRS-IBS technology helped Clearfield County build a bridge on a school bus route in just 35 days, saving months of time and 50 percent on costs.

Adaptive signal control technology (ASCT) uses real-time data to automatically adjust the timing of traffic lights to accommodate changing traffic patterns, reducing traffic congestion, fuel use, and motorist delays. Sixty-one agencies are in various stages of implementing ASCT at 63 locations.

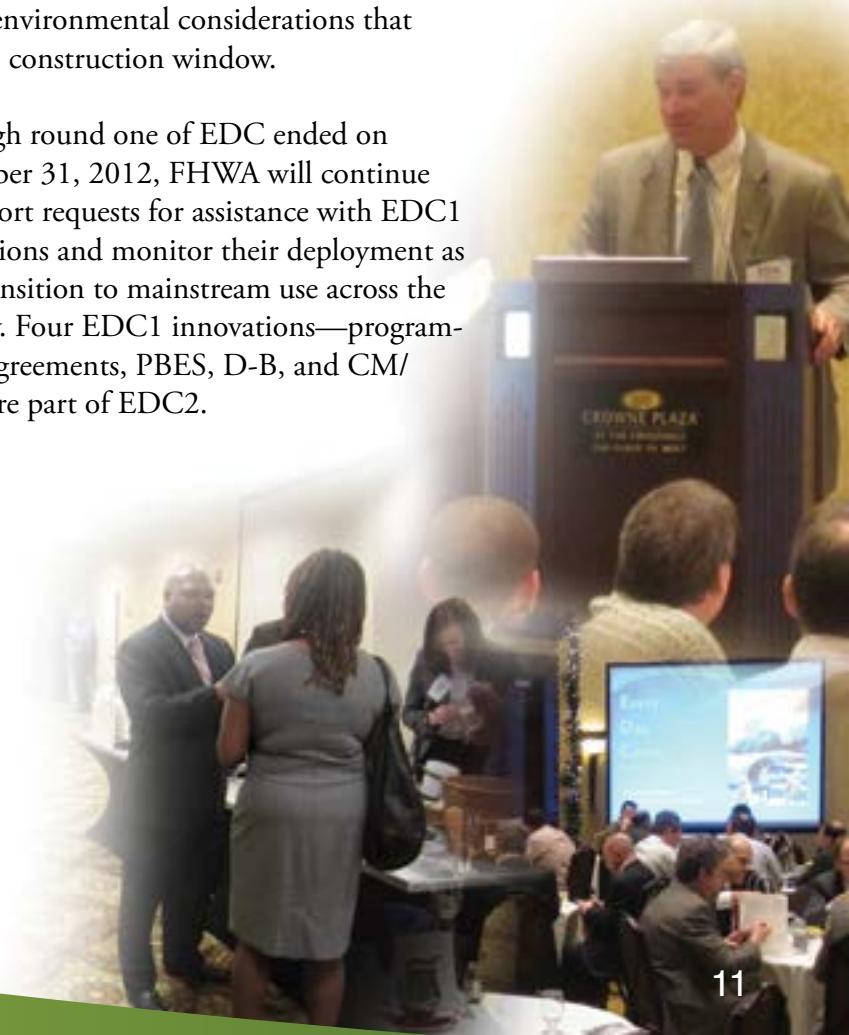
One Kansas city using ASCT is Topeka, which installed it on the 21st Street corridor. The system saves drivers on the corridor an estimated 123,000 gallons of gasoline and 191,000 pounds of CO₂ a year. Crashes dropped by 30 percent during the system's first year of operation. The New Jersey DOT used ASCT on a 128-signal project in the congested Meadowlands region. The agency expects reductions of 20 percent in delay and travel time on the corridor, 40 percent in stops, 12 percent in fuel use, and 14 percent in airborne emissions.

Prefabricated bridge elements and systems (PBES), manufactured offsite under controlled conditions and transported to work zones for installation, greatly reduce onsite construction time, minimize traffic disruption, and enhance work zone safety. Since October 2010, more than 2,500 replacement bridges have been designed or constructed using PBES, and in at least 21 States more than 25

percent of the replacement bridge projects have incorporated at least one major prefabricated element.

In Massachusetts, where PBES use is a mainstream practice, the DOT used it on a project to replace 14 bridge superstructures on Interstate 93 in Medford, shrinking a 4-year bridge replacement project to just one summer. The agency built the bridge superstructures in sections offsite and installed them on weekends during 55-hour windows to minimize impact on travelers. It is also a bridge construction standard for the Alaska Department of Transportation and Public Facilities, which uses PBES to address weather and environmental considerations that limit its construction window.

Although round one of EDC ended on December 31, 2012, FHWA will continue to support requests for assistance with EDC1 innovations and monitor their deployment as they transition to mainstream use across the country. Four EDC1 innovations—programmatic agreements, PBES, D-B, and CM/GC—are part of EDC2.



Moving Forward on Innovation Deployment

The EDC regional summits are a crucial component in launching an effective, far-reaching innovation deployment effort, but they are only the beginning of the process. The work continues in each State, day by day and project by project. After learning about project delivery strategies and reviewing them in State caucuses at the fall 2012 summits, participants presented their preliminary recommendations to State Transportation Innovation Councils in each State. These councils set State implementation goals, which drive national implementation goals for the EDC technology initiatives.

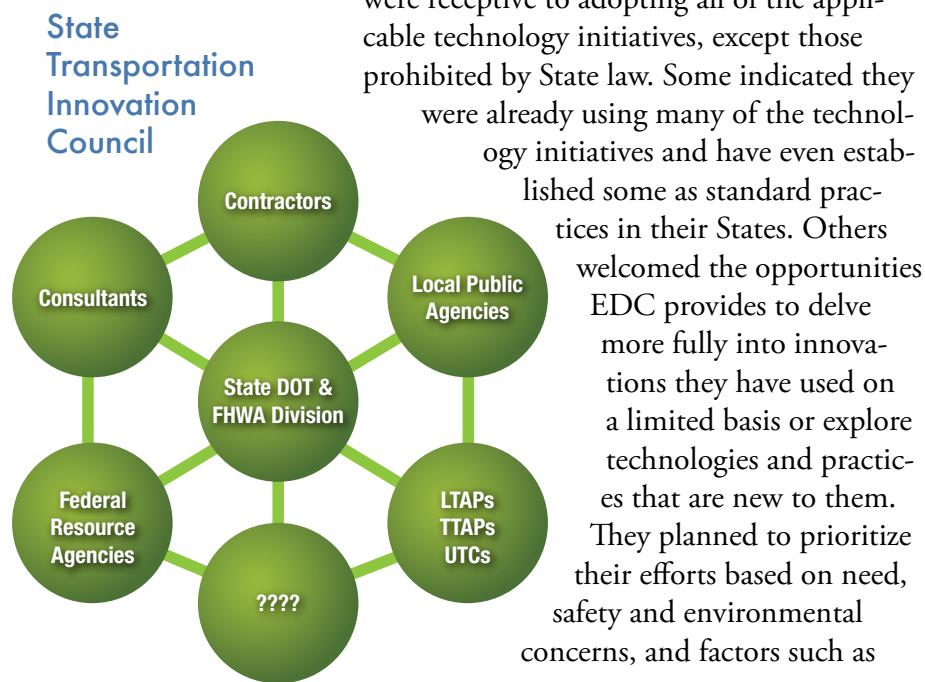
In early 2013, State agencies began developing strategies and drafting plans to deploy the EDC2 technology initiatives over the next 2 years. Most agencies indicated they were receptive to adopting all of the applicable technology initiatives, except those prohibited by State law. Some indicated they were already using many of the technology initiatives and have even established some as standard practices in their States. Others welcomed the opportunities EDC provides to delve more fully into innovations they have used on a limited basis or explore technologies and practices that are new to them. They planned to prioritize their efforts based on need, safety and environmental concerns, and factors such as

construction seasons, contracting environments, and potential for private industry involvement.

By spring 2013, about two-thirds of DOTs had reported their plans for participating in EDC2 technology initiatives over the next 2 years:

- At least 34 States plan to participate in the programmatic agreements technology initiative.
- Another 34 will take part in the locally administered Federal-Aid projects effort.
- Thirty-two plan to deploy 3-D modeling.
- Thirty-five will try intelligent compaction.
- Thirty-five will implement accelerated bridge construction technologies, including PBES, slide-in bridge construction, and GRS-IBS.
- Sixteen will work to incorporate the D-B project delivery method.
- Eighteen will pursue the CM/GC technique.
- Eighteen will include alternative technical concepts in projects.

To support the EDC2 implementation efforts, FHWA teams will work closely with State DOTs and other stakeholders to provide assistance in deploying their selected innovations. Using feedback they obtained during the EDC2 summit sessions, the teams completed implementation plans for each innovation that address the needs, chal-



"The biggest benefit of Every Day Counts events is to network with other DOTs—the decisionmakers, the implementers—who have been involved in similar strategies and projects and see how they were able to overcome the challenges."

—Ronaldo Nicholson, Deputy Director and Chief Engineer,
District Department of Transportation

"Every Day Counts has provided tremendous focus and clarity on the things that are important nationally for us to be working on."

—Dave Nichols, Chief Engineer,
Missouri Department of Transportation

lenges, and concerns of highway agencies and other stakeholders. Input from summit participants helped FHWA strengthen the plans and target strategies and tactics to State needs.

The FHWA implementation plans focus on providing expertise and technical assistance on each innovation. The assistance includes training sessions, briefings, Web conferences, workshops, and peer exchanges to provide stakeholders with the information they need to become knowledgeable about and apply the innovations. Also planned are demonstrations at which stakeholders can observe the use of innovations on construction projects and learn from the successes and challenges of 'other States' implementation efforts. In addition, FHWA will develop guidance and sample specifications, provide contract reviews, and share best practices for using innovations. Echoing the EDC2 summits, FHWA will facilitate regional collaboration on technology initiatives such as programmatic agreements.

FHWA also established the Center for Accelerating Innovation to support the EDC initiative. The center's role is to coordinate outreach and communication efforts, develop training and educational tools, provide technical support, and work with the agency's partners throughout the highway community to deploy innovation. "We've made Every Day Counts a part of our business model. It has become the way we do business at FHWA," Nadeau said.

Measuring performance on EDC innovation deployment provides data on progress toward meeting the highway community's goal to provide safe, reliable, effective, and

sustainable mobility for all road users. As FHWA works with State highway agencies to implement the second round of technology initiatives, it will continue to monitor the deployment of first-round innovations. FHWA will measure the long-term effectiveness of all of the innovations in enhancing safety, decreasing traffic congestion, shortening project delivery time, and saving money for taxpayers and highway agencies. FHWA will also track the EDC2 deployment process to measure progress on implementing the innovations and determine areas where additional assistance may be needed. That will enable FHWA to fine-tune its implementation support and resource allocation throughout EDC's second round.

"When we started with EDC, we talked about real outcomes. We had 1,168 structurally deficient bridges, and now we are down to 634. Through the EDC initiative, we expect to have zero structurally deficient bridges by 2019."

—Gary Evans, Chief Engineer,
Oklahoma Department of Transportation

Ultimately, the focus of the EDC initiative is greater than specific technologies or strategies. The long-term goal is to create a culture of innovation, one in which innovations are regularly incorporated into the standards, specifications, and manuals that highway professionals use every day to plan and build the Nation's highway system. The aim is to connect people across the highway community, building an ongoing conversation on innovation and creating a national network to foster innovation use. It is a new way of doing business to meet the transportation demands of the 21st century and provide the American people with a safe, accessible, and reliable highway system.



Appendix A: Every Day Counts Second-Round Plans



The second round of the Federal Highway Administration's (FHWA) Every Day Counts (EDC) initiative includes 13 processes and technologies designed to shorten the time needed to complete highway projects. The EDC regional summits held in fall 2012 provided detailed sessions for participants on eight of the EDC2 technology initiatives. The remaining five were covered in virtual summits in spring 2013. This section provides an overview of the technology initiatives discussed during the summits and State department of transportation (DOT) plans for implementing many of them over the next 2 years.

"Every Day Counts is something that will make a difference for the American people. AASHTO and the State DOTs welcome the opportunity to collaborate on this initiative."

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



Programmatic Agreements

Programmatic agreements, also part of the first round of Every Day Counts, establish streamlined approaches for handling routine environmental requirements in common project types. The EDC2 initiative will continue to expand programmatic agreements, focusing on agreements with the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service. Some of the agreements developed in EDC1 will be applied in additional States or expanded to include regions or new actions. The emphasis will be on using programmatic agreements to enhance 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.

The time-saving component of using programmatic agreements is significant, according to Steve Long, environmental administrator for the Virginia DOT, which uses more than 20 programmatic agreements. “Just the people resources to do the work nowadays is big,” Long said. “If you save 10 to 30 minutes on a project and you are doing hundreds or thousands a year, it’s an improvement.” The agreements also can focus on specific areas. “Keep in mind they don’t have to be statewide and can exclude sensitive areas,” said Mike Ruth of FHWA, so they are more broadly applicable and easier to negotiate.

Fall summit discussions covered the challenges of developing and using programmatic agreements. Although successful programmatic agreements can streamline permitting processes and project delivery, they require a significant staff time commitment for initial development. Leadership is necessary to make developing programmatic agreements a priority, make the necessary staff resources available, set performance standards, and solicit support from other agencies involved in agreements. In addition, agreements need to comply with all applicable laws and regulations.

"Just the people resources to do the work nowadays is big. If you save 10 to 30 minutes on a project and you are doing hundreds or thousands a year, it's an improvement."

*-Steve Long, Environmental Administrator,
Virginia Department of Transportation*

About two-thirds of the Nation's State DOTs had shared their plans for implementing EDC2 innovations by early 2013, and 34 of those included programmatic agreements on their list of technology initiatives to pursue over the next 2 years. The following are among the strategies agencies plan to implement by the end of 2014:

- The Illinois DOT will pursue new or updated programmatic agreements in several areas and participate in a regional programmatic agreement workshop. One agreement with FHWA and the U.S. Fish and Wildlife Service will streamline compliance with Endangered Species Act requirements on the Indiana bat.
- The Idaho Transportation Department plans to assess its bridge program for potential opportunities for time-saving programmatic agreements.
- The Missouri DOT will work with the U.S. Army Corps of Engineers on a programmatic agreement to address requirements under Section 106 of the National Historic Preservation Act.
- The Arkansas State Highway and Transportation Department has identified streamlining the Section 7 Endangered Species Act consultation process as among its strategies.
- The District DOT plans to develop a memorandum of agreement to address Section 4(f) of the Department of Transportation Act.
- The Washington State DOT will evaluate the benefits of pursuing programmatic agreements for local agency-administered projects.
- The Colorado DOT will develop an inventory of its programmatic agreements and determine which need to be updated. The agency also plans to work on several new ones.
- The Massachusetts DOT plans to develop three new programmatic agreements, including one with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service.
- The Mississippi DOT will execute a programmatic agreement for Section 106 consultation and identify other programmatic agreement opportunities.
- The Delaware DOT put exploration and development of programmatic agreements on bridges, Section 106, and Section 4(f) on its action list.
- The Alaska Department of Transportation and Public Facilities will develop programmatic agreements covering Section 106 historic properties and Bald Eagles.



Photo: jboyle3/Flickr Pennsylvania Game Commission



Locally Administered Federal-Aid Projects

Under EDC2, FHWA is promoting a three-pronged approach 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 contracts, and stakeholder committees. 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.

Mainstreaming the strategies through EDC2 can provide significant benefits:

- State transportation agencies can use certification and qualification programs to improve the ability of local public agencies to administer Federal-Aid projects and assure that projects follow Federal regulations and guidelines. These programs help confirm that local public agencies that administer Federal-Aid projects have the qualifications and experience to handle them, enable State agencies to reduce oversight needs, and allow certified local public agencies to manage their own projects.
- State and local agencies also have the flexibility to use consultant services to manage, develop, and deliver locally administered Federal-Aid projects. Understanding available options may allow agencies to lower project costs, shorten project development and delivery times, improve the quality and performance of contracted services, and ensure that projects meet the necessary Federal and State requirements.
- Communication, coordination, and cooperation are vital to success in implementing locally administered Federal-Aid projects. Clarity of FHWA and State requirements is also paramount. FHWA encourages establishing stakeholder committees that include Federal, State, and local representatives to aid in this partnering effort. The committees are designed to foster dialog, ensure appropriate training is provided, and refine the project development and delivery process.

“We’re talking about forming a stakeholder committee to bring decisionmakers together to talk about issues and problems on Federal, State, and local levels,” said Nick Finch of FHWA. “We’re talking about promoting the idea of a collaborative process to achieve better understanding for all parties.”

Among the barriers to certification programs discussed at the summits were State laws and regulations, organizational culture, administration and oversight concerns, lack of training and resources for local agencies, and local agency concerns about U.S. Government Accountability Office audits. Obstacles to using consultants are similar, including constrained resources, oversight concerns, and State laws and regulations. Issues in developing stakeholder committees include achieving leadership commitment and fostering trust among stakeholders.

With two-thirds of the States reporting, 34 indicated they will pursue this EDC2 innovation. The following is an overview of some of their plans:

- The North Carolina DOT plans to create a prequalification and certification program to ensure that local government agencies meet compliance requirements for transportation projects.
- To minimize the risk of not meeting State and Federal requirements on projects, the Colorado DOT plans to implement risk-based approaches for the preconstruction and construction processes. It also will work on improving communication with local agencies and developing web-based resources for them.
- The Tennessee DOT has set a goal of developing and implementing a process that enables local governments to accelerate the project development process and reduce project delivery times.
- Establishing a Local Public Agency Council is among the strategies the Louisiana Department of Transportation and Development is planning.
- The Missouri DOT will coordinate with the Local Public Agency Advisory Committee to develop a statewide on-call consultant contract for local agencies within regions.
- The Mississippi DOT will formalize a certification and qualification process in a manual for local public agencies and establish a Local Public Agency Stakeholder Committee with FHWA and local representatives.
- The Idaho Transportation Department plans to set criteria for certifying local governments and develop a certification process.
- The Wyoming DOT will establish a Local Public Agency Steering Committee to foster dialogue among FHWA, State, and local entities.
- The Arizona DOT will set up a Certification Acceptance Stakeholder Committee that also includes representatives from FHWA and local agencies.
- The California DOT will complete a feasibility study and assess the needs of local public agencies in this area.
- The Maryland State Highway Administration will conduct a survey of local agencies to gauge interest in a certification program.



Three-Dimensional Engineered Models for Construction

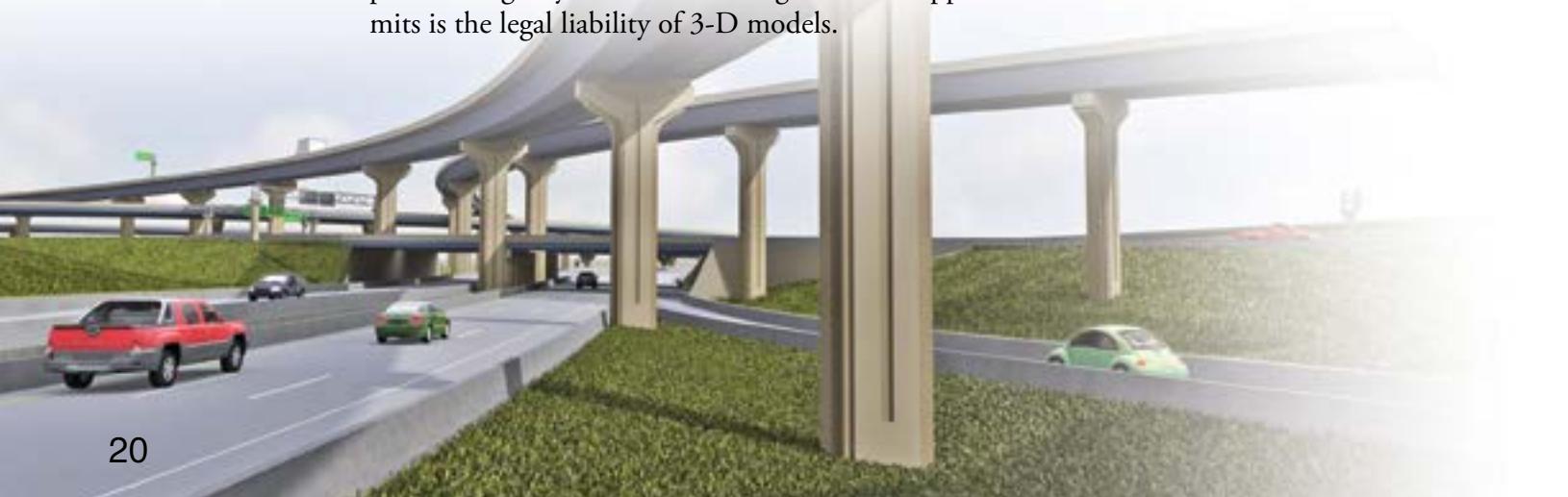
Although three-dimensional (3-D) modeling technology has been widely used in other industries, its potential to increase productivity, quality, and efficiency in highway construction is just now being realized. The technology allows for faster, more accurate, and more efficient planning and construction. Through EDC2, FHWA is encouraging a transition from traditional two-dimensional (2-D) design to 3-D modeling as a strategy for shortening project delivery and improving quality and safety on the construction site.

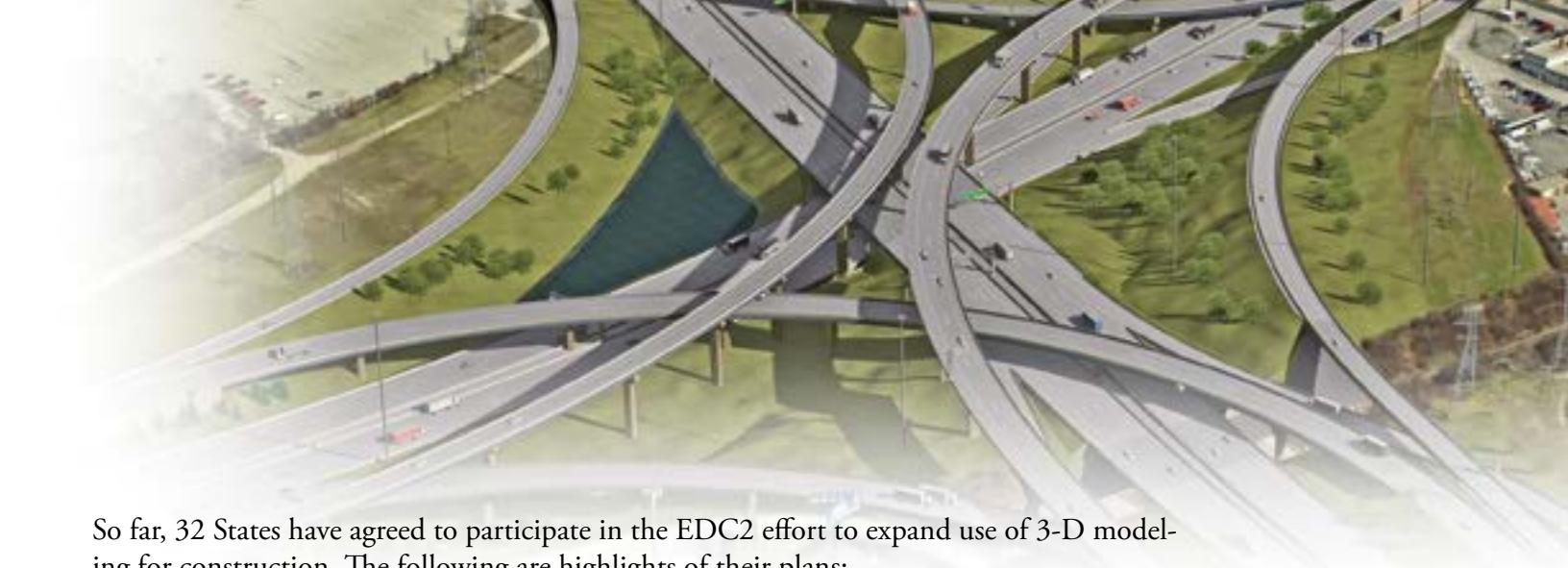
With 3-D modeling software, design and construction teams can connect virtually to develop, test, and change project designs throughout the design and construction phases. Intricate design features can be viewed geospatially from multiple perspectives, and simulations can be run to detect design clashes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

The combination of 3-D modeling and GPS machine control helps highway agencies complete projects faster, more efficiently, and with improved quality and safety. GPS-enabled construction equipment, for example, can run all day and night with guidance from 3-D model data and achieve accurate grades on the first pass, reducing waste and improving resource use. With GPS machine control, many manual tasks can be done automatically and with great precision. The combined technologies of 3-D modeling and GPS machine control can increase productivity by up to 50 percent on some operations and cut survey costs by as much as 75 percent.

Summit participants described benefits they have observed with 3-D modeling. Dan Russell of Sundt Construction, a firm experienced in using 3-D modeling on transportation projects, reported on the return on investment of 3-D models. For roadways, a contractor can get a return of \$2 to \$5 for every \$1 invested, he said. For bridges, the return is about \$5.50 for every \$1 invested. Michael Kennerly of the Iowa DOT commented that 3-D models serve as excellent tools for communicating with the public and other stakeholders about complex or controversial projects.

Barriers to implementing 3-D modeling include the upfront investment and the time and learning curve required to make the transition from the 2-D process. Other challenges include determining the types of projects to use the technology on, quantifying the benefits of using it on a project, and coordinating its use among key stakeholders, including the transportation agency, contractors, designers, and suppliers. Another issue discussed at the summits is the legal liability of 3-D models.





So far, 32 States have agreed to participate in the EDC2 effort to expand use of 3-D modeling for construction. The following are highlights of their plans:

- The Pennsylvania DOT will pursue two pilot projects, one aimed at improving efficiency and quality of construction with the use of automated machine guidance and another to improve project delivery time and project quality through the use of 3-D modeling in design.
- The Mississippi DOT will allow use of this technology on large grading projects. It will also review its specification and update it as necessary.
- Among the 3-D modeling efforts the California DOT plans to pursue are developing a policy on project development staff sharing 3-D models with contractors.
- The Arkansas State Highway and Transportation Department has set a goal of piloting the use of 3-D modeling for bidding and GPS machine control for project construction.
- The Delaware DOT is updating its specifications to accommodate the use of 3-D modeling.
- The Idaho Transportation Department will work with industry groups to develop policies and procedures for using 3-D modeling.
- The Florida DOT has set a 2014 goal of starting at least five projects that use 3-D modeling with automated machine guidance.
- The North Dakota DOT will test 3-D modeling, including automated machine guidance equipment for earthwork and aggregate base construction on asphalt, on two projects.
- The Nevada DOT plans to increase the number of contracts that use 3-D modeling to realize potential cost savings for contractors that may lower bids.
- The Montana DOT will develop a process to use 3-D models beyond the design phase and implement the process on at least one pilot project.
- The South Dakota DOT will evaluate the applicability and implementation of 3-D modeling on urban and large grading jobs.

"Three-dimensional models serve as excellent tools for communicating with the public and other stakeholders about complex or controversial projects."

*- Michael Kennerly, Director, Office of Design,
Iowa Department of Transportation*

Accelerated Bridge Construction

Accelerated bridge construction (ABC) technologies are changing the way highway agencies do business, enabling them 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.

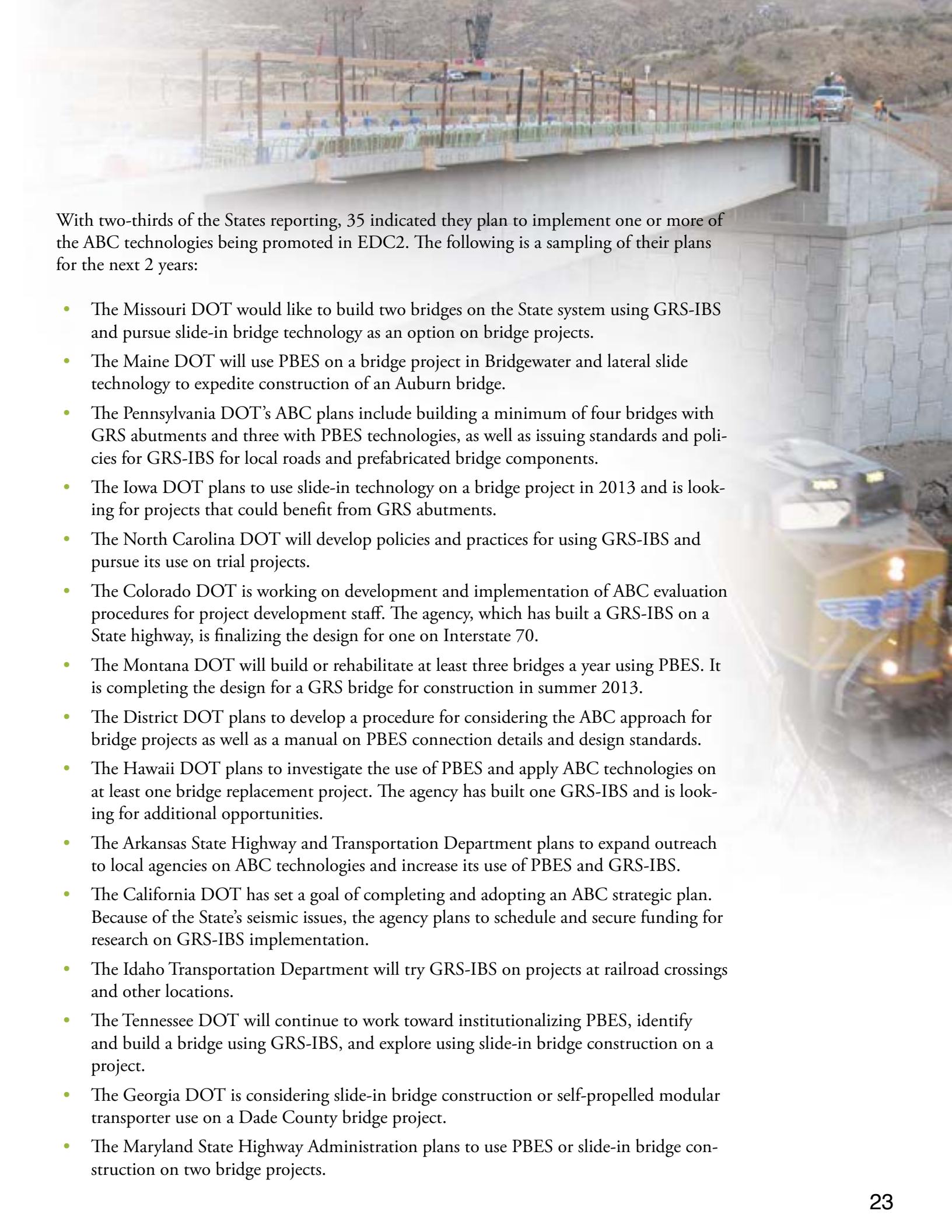
Three ABC technologies are being promoted under EDC2:

- Prefabricated bridge elements and systems (PBES), also part of EDC1, 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.
- 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 in a short time, usually within 48 to 72 hours, reducing traffic disruption and improving safety.
- Geosynthetic reinforced soil integrated bridge system (GRS-IBS) technology, also promoted in EDC1, uses geosynthetic reinforcement and granular soils as a composite material to build enhanced abutments and approach embankments. The GRS-IBS is easy to build and maintain and is 25 to 60 percent more cost-effective than conventional construction.

Summit participants discussed benefits and challenges of using ABC technologies and opportunities to expand their use. State DOTs and local agencies are interested in developing tools to help them determine which projects to apply ABC strategies on and good cost-benefit analyses. They want information on construction costs and the long-term performance of bridges built with these methods, as well as training on design and construction methods for owners, engineers, and contractors.

They also expressed a need for demonstrations at which transportation professionals can observe use of ABC on actual projects, as well as more FHWA facilitation of collaboration among States in a region. “States spend too much time trying to solve problems on their own. What we need is something to facilitate collaboration,” one participant said. “Regional demonstration projects will go a long way in gaining support,” another participant said.





With two-thirds of the States reporting, 35 indicated they plan to implement one or more of the ABC technologies being promoted in EDC2. The following is a sampling of their plans for the next 2 years:

- The Missouri DOT would like to build two bridges on the State system using GRS-IBS and pursue slide-in bridge technology as an option on bridge projects.
- The Maine DOT will use PBES on a bridge project in Bridgewater and lateral slide technology to expedite construction of an Auburn bridge.
- The Pennsylvania DOT's ABC plans include building a minimum of four bridges with GRS abutments and three with PBES technologies, as well as issuing standards and policies for GRS-IBS for local roads and prefabricated bridge components.
- The Iowa DOT plans to use slide-in technology on a bridge project in 2013 and is looking for projects that could benefit from GRS abutments.
- The North Carolina DOT will develop policies and practices for using GRS-IBS and pursue its use on trial projects.
- The Colorado DOT is working on development and implementation of ABC evaluation procedures for project development staff. The agency, which has built a GRS-IBS on a State highway, is finalizing the design for one on Interstate 70.
- The Montana DOT will build or rehabilitate at least three bridges a year using PBES. It is completing the design for a GRS bridge for construction in summer 2013.
- The District DOT plans to develop a procedure for considering the ABC approach for bridge projects as well as a manual on PBES connection details and design standards.
- The Hawaii DOT plans to investigate the use of PBES and apply ABC technologies on at least one bridge replacement project. The agency has built one GRS-IBS and is looking for additional opportunities.
- The Arkansas State Highway and Transportation Department plans to expand outreach to local agencies on ABC technologies and increase its use of PBES and GRS-IBS.
- The California DOT has set a goal of completing and adopting an ABC strategic plan. Because of the State's seismic issues, the agency plans to schedule and secure funding for research on GRS-IBS implementation.
- The Idaho Transportation Department will try GRS-IBS on projects at railroad crossings and other locations.
- The Tennessee DOT will continue to work toward institutionalizing PBES, identify and build a bridge using GRS-IBS, and explore using slide-in bridge construction on a project.
- The Georgia DOT is considering slide-in bridge construction or self-propelled modular transporter use on a Dade County bridge project.
- The Maryland State Highway Administration plans to use PBES or slide-in bridge construction on two bridge projects.



Intelligent Compaction

Intelligent compaction (IC) is a modern approach to compaction of materials, an important construction process that enhances quality and performance. IC uses special vibratory rollers equipped with accelerometers, a continuous measurement system, GPS-based mapping, and an onboard computer reporting system. The EDC2 technology initiative will focus on expanding IC use nationwide 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 produce time, cost, and fuel savings. With more efficient paving processes, production can increase and highway agencies can pave larger roadway sections daily. Cost-benefit analyses show that investment in IC can break even in 1 to 2 years.

The Texas DOT has completed three projects with IC and has five more in process. “IC greatly improves the quality and uniformity critical for long-lasting performance of pavements,” said Jimmy Si of the agency’s Construction Division. “Traditional compaction methods do not provide real-time feedback, so sometimes paving work must be redone. IC comes to the rescue of all this.”

FHWA is developing training on the use of Veda, software that allows project personnel to view and analyze geospatial data from various IC machines. FHWA and the Minnesota DOT cosponsored the development of Veda, which displays compaction information in easy-to-read formats, including maps and graphs. FHWA has created a guide specification for IC that State DOTs can use as a template for developing specifications tailored to their own needs.

Challenges to expanding IC technology use discussed at the summits include a lack of awareness among transportation decisionmakers of the benefits of using it and the need for State IC construction specifications. Other issues are the cost of the system on new or leased equipment, the learning curve involved, and the need for training for contractors, quality

"IC greatly improves the quality and uniformity critical for long-lasting performance of pavements. Traditional compaction methods do not provide real-time feedback, so sometimes paving work must be redone. IC comes to the rescue of all this."

*-Jimmy Si, Construction Division,
Texas Department of Transportation*

control technicians and managers, and agency field inspectors. Another barrier is the numerous file formats available from vendors, which make it difficult for agencies to evaluate and analyze data produced by different IC rollers.

With two-thirds of the States reporting their EDC2 plans, IC is on the implementation list for 35 of them. The following are some of their planned activities over the next 2 years:

- The North Carolina DOT will pursue development of IC specifications and complete a pilot project using the technology.
- The Missouri DOT will use IC for quality control on one grading project and one asphalt paving job.
- The Tennessee DOT will develop guidelines on IC project selection and use IC on four projects, including asphalt pavement, base stone, and embankments.
- In Montana, the State highway agency will use IC on a pilot basis on one project.
- The California DOT plans to develop IC specifications, develop a users' guide, and pursue pilot projects that use the technique.
- The Georgia DOT will use results from past and 2013 pilot projects to develop guidance and policies for using IC on future projects.
- The Illinois DOT will develop specifications for IC use, implement the technology on pilot projects, and review that implementation to assess successes and challenges.
- The Louisiana Department of Transportation and Development is planning a showcase at which transportation professionals can observe IC use on a Lafayette project.
- The Nevada DOT will develop IC specifications and identify projects on which to require its use.
- The New Mexico DOT wants to draft an IC specification and use the procedure on a project to demonstrate its effectiveness and compare it to conventional compaction methods.
- The Colorado DOT plans to pursue educational opportunities on the benefits of IC technologies, such as a workshop, and consider using IC on pilot projects.





Design-Build

The design-build (D-B) project delivery method allows the design and construction phases of a project to be combined in one contract, which can dramatically accelerate project completion over the traditional design-bid-build (D-B-B) 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 balanced risk and responsibility for both the design and construction phases. D-B was part of EDC1, and FHWA included it in the second EDC round to continue nationwide mainstreaming of the 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 the traditional D-B-B project delivery method. D-B allows transportation agencies to assign various 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. It also enhances environmental stewardship opportunities.

Obstacles to D-B include laws and regulations that limit its use in some States. Other challenges are determining the most appropriate projects on which to use D-B and developing a clear scope of work. Another issue is overcoming concerns in the contractor community that the technique is not accessible to smaller contractors.

Although many States already use D-B contracting, at least 16 plan to pursue it under EDC2. The following are some of their strategies for the next 2 years:

- The Idaho Transportation Department plans to develop and implement policies and procedures on D-B and try the delivery method on select projects.
- The California DOT has authorization to use D-B on up to 10 projects by January 2014 and has awarded eight of them already.
- At the District DOT, the focus will be on developing consistent criteria and a manual for administering D-B and other alternative delivery methods in the District of Columbia.
- The Mississippi DOT plans to pursue two federally funded D-B projects per year.
- The Pennsylvania DOT plans to draft legislation that would allow D-B-best value contracting in the State.
- The Massachusetts DOT will conduct a forum to discuss lessons learned from past D-B experiences and develop criteria for selecting future D-B projects.

"When you get into CM/GC, it's a collaborative mindset. You have to get into the mindset that you are part of a team and that your goal is to deliver the best project you can."

-Contractor

Construction Manager/General Contractor

The construction manager/general contractor (CM/GC) method enables the project owner to hire a contractor to provide feedback during the design phase. Once the design phase is complete, the contractor and owner negotiate a price for the construction contract. This process allows the contractor to offer feedback on innovations, cost and schedule savings, and constructability issues. It helps the owner make more informed design decisions and manage projects with fewer change orders, improved designs, and shortened construction schedules. This project delivery method also allows the owner to deploy innovations and make more design decisions that bring 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. It also gives the project owner, as a member of the design team, control over design details. The process 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 partnering environment that results in more successful projects with reduced risk, improved design quality, better cost certainty, and optimized construction schedules. Overall, agency and industry partners find that the CM/GC contracting method can increase the efficiency of construction projects.

Although CM/GC is authorized under the Moving Ahead for Progress in the 21st Century Act, obstacles include State laws and regulations. It also requires a cultural shift in the transportation community to try an unfamiliar contracting process. “When you get into CM/GC, it’s a collaborative mindset,” a contractor said at an EDC2 summit. “You have to get into the mindset that you are part of a team and that your goal is to deliver the best project you can.”

“Good projects on which to use CM/GC are those that have unknown risks so they can be mitigated during the design phase,” another contractor said. “It’s also good for projects that require a lot of public involvement. There has to be an enormous amount of transparency.”

So far, implementing CM/GC is on the list of 18 of the States that have reported their EDC2 plans. Highlights include the following:

- The Delaware DOT plans to seek legislative approval to use CM/GC and develop a decisionmaking process, policies, and procedures for using it.
- The Alaska Department of Transportation and Public Facilities will pursue training on evaluating when to use CM/GC. It also plans to start construction on a CM/GC project and select two more candidates.
- The California DOT has been authorized to use CM/GC on up to six projects and plans to procure at least one during the 2012–13 fiscal year.
- The District DOT is evaluating the city’s procurement laws and identifying possible projects on which to use the CM/GC process.
- The Idaho Transportation Department plans to develop policies and procedures for using CM/GC.
- The Montana DOT wants to pilot the use of CM/GC on one project.
- The North Carolina DOT plans to seek enabling legislation for CM/GC use in the State and implement the process on pilot projects.
- The Pennsylvania DOT will draft legislative and contract language to allow CM/GC contracting.
- The Tennessee DOT will pursue enactment of CM/GC enabling legislation.





Alternative Technical Concepts

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

The ATC process is most commonly used with D-B project delivery, in which a State highway agency issues a request for proposals that covers basic project configurations and design and construction criteria. D-B teams submit ATC suggestions that, if the State accepts them, can be incorporated into proposals. These can include concepts that accelerate project delivery, reduce the impact of construction on the traveling public, or add features that the State agency and public desire. The process allows contractors to offer innovative ideas and solutions in a confidential manner.

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.

Natalie Roark of the Missouri DOT, which has used ATCs on D-B-B projects, said at an EDC2 summit that the method helps achieve the most economical design for projects, maximizes competitive bidding, and engages industry to provide innovative solutions at great prices. A contractor commented, "We pursued ATCs because we believed we would save the State money and increase our chances to be the successful bidder."

Among the challenges to using ATCs are creating a climate of trust between agencies and contractors and protecting proprietary information during the procurement process with a good confidentiality agreement. "If we start to get the impression that an owner is sharing our ideas, we are going to clam up and not share them," one summit participant said. "We view them as proprietary. We understand that once the job is awarded, they will come out." Another issue is the cost to contractors of preparing project proposals that include ATCs, which can limit the involvement of smaller firms.

At least 18 States plan to pursue the use of ATCs as part of their EDC2 efforts. Strategies include the following:

- The Montana DOT plans to incorporate ATCs as a standard contract administration procedure and use ATCs on five projects by the end of 2014.
- The California DOT plans to use ATCs on 80 percent of its D-B projects.
- The District DOT is evaluating the city's procurement laws and identifying possible projects for ATC use.
- The Maryland State Highway Administration has set a goal of using ATCs on 10 projects by the end 2014.
- The Washington State DOT, which already uses ATCs on D-B projects, will pursue using them on projects that use D-B-B and other delivery methods.
- The Mississippi DOT plans to use ATCs on its D-B projects.
- The Nevada DOT wants to clarify ATC procedures for use on D-B contracts and explore incorporating ATCs in D-B-B projects.

"We pursued ATCs because we believed we would save the State money and increase our chances to be the successful bidder."

-Contractor



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, approaches to intersections, and downgrades. FHWA is highlighting the technology through EDC2 to encourage States to mainstream it as a safety countermeasure at spot locations.

A key benefit of high-friction surface treatments is reduced crashes, injuries, and fatalities. On trial projects, the Pennsylvania DOT reported a 100 percent reduction in crashes, the Kentucky DOT saw a 90 percent decline, and the South Carolina DOT experienced a 57 percent drop during the 3 to 5 years after the treatments were applied. One location where the treatments have been particularly effective is horizontal curves, where more than 25 percent of fatal crashes occur even though they represent only 5 percent of the Nation's highway miles. After a high-friction surface treatment was installed on a curve in Oldham County, KY, five crashes were reported over a 3-year period, compared to a pretreatment 3-year crash rate of 59.

High-friction surface treatments are relatively low in cost compared to geometric improvements, speakers told spring summit participants. 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. They typically last 5 to 10 years, especially if calcined bauxite is used as the aggregate. Test cases have shown that they are not affected by snow-plowing operations and that pavement markings used with them hold up well.

The treatments are customizable, enabling State and local agencies to use them where they are most needed, such as two-lane rural roads at horizontal curves, areas near steep grades, on and off ramps at interchange areas, and rural and urban intersections. At least 39 States have applied a high-friction surface treatment on one or more project sites. The American Traffic Safety Services Association and the American Association of State Highway and Transportation Officials (AASHTO) are working on a high-friction surface treatment specification.

Products and application methods continue to evolve, making the technology better and more versatile, said Frank Julian of FHWA's Safety and Design Technical Service Team. "The potential for crash reduction with high-friction surface treatments is significant. Every day counts because every life counts," Julian said.



Intersection and Interchange Geometrics

Through EDC2, FHWA is promoting intersection and interchange geometrics that 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 strategically eliminating or relocating the intersection conflicts that can cause significant problems. FHWA recommends that highway agencies include these innovative designs in their evaluation processes for intersection construction and reconstruction projects and use them where appropriate.

EDC is focusing on the following designs:

- The diverging diamond interchange design eliminates the signalized left-turn phase at the two ramp intersections by shifting the crossroad traffic to the left side of the roadway between the ramp terminals. This change in the crossroad configuration improves safety by reducing the number of traffic conflict points and improves traffic flow by decreasing the number of signal phases.
- The displaced left-turn intersection enhances safety and operations by strategically relocating intersection conflicts between turning vehicles and oncoming traffic. Left-turning traffic makes a coordinated signalized crossover before the main intersection into left-turn bays on the opposite side of oncoming traffic.
- U-turn intersections—including restricted crossing U-turns, median U-turns, and ThrU-turns—relocate traffic movements at the main intersection to a U-turn movement. Variations of this strategy are appropriate for a range of conditions, including unsignalized rural intersections and high-volume signalized intersections.
- The modern roundabout is a circular intersection in which traffic travels counterclockwise around a central island and entering traffic yields to circulating traffic. It improves safety by replacing perpendicular crossings and opposing direction turns with low-speed merging and diverging maneuvers. Mini-roundabouts, which have a fully traversable central island, are being used at locations with constrained right-of-way.

"We've deployed many unconventional intersections. We've used them in locations where conventional intersections won't work or where the impacts of using them are so great that we would have to buy locations or businesses out."

*-James Young, Deputy Director,
Division of Engineering,
Ohio Department of Transportation.*

These designs have proven safety records, summit speakers reported. Roundabouts, for example, can reduce severe crashes—those that cause severe injury or death—by about 80 percent. Diverging diamond interchanges can cut total crashes by 46 percent and left-turn right-angle crashes by 72 percent, while displaced left-turn intersections have produced crash reductions of 60 percent. An FHWA evaluation of restricted crossing U-turn intersections in Maryland found a reduction of 46 percent for total crashes and 70 percent for fatal crashes. The designs also improve mobility by lessening congestion and delays at intersections and boost value by reducing construction time, costs, and right-of-way acquisition needs.

The Ohio DOT has used unconventional intersection geometrics in areas where conventional designs did not adequately address project goals or where an unconventional solution would have less impact on right-of-way acquisition or the environment than a traditional design, Engineering Division Deputy Director James Young told summit participants. To address public concerns, the agency developed outreach programs to educate stakeholders on the value of the innovations and how to navigate them safely.

Carmel, IN, Mayor James Brainard noted that the city has constructed more than 80 roundabouts. In one case, using a roundabout enabled the city to limit its right-of-way acquisition to three buildings, compared to the 43-building acquisition that would have been required for a traditional diamond interchange. “The other big cost savings we have found is that we don’t have to widen our highways by installing roundabouts,” he said.

Through EDC, FHWA is offering technical assistance and training on how to tailor the designs to fit State needs, as well as peer exchanges, evaluations processes, and analysis tools to help States use the innovations effectively. “Deploying these intersection and interchange designs offers significant potential for crash reductions,” said Mark Doctor of the FHWA Resource Center. “States that are doing it are doing it effectively and it’s paying off.”



Geospatial Data Collaboration

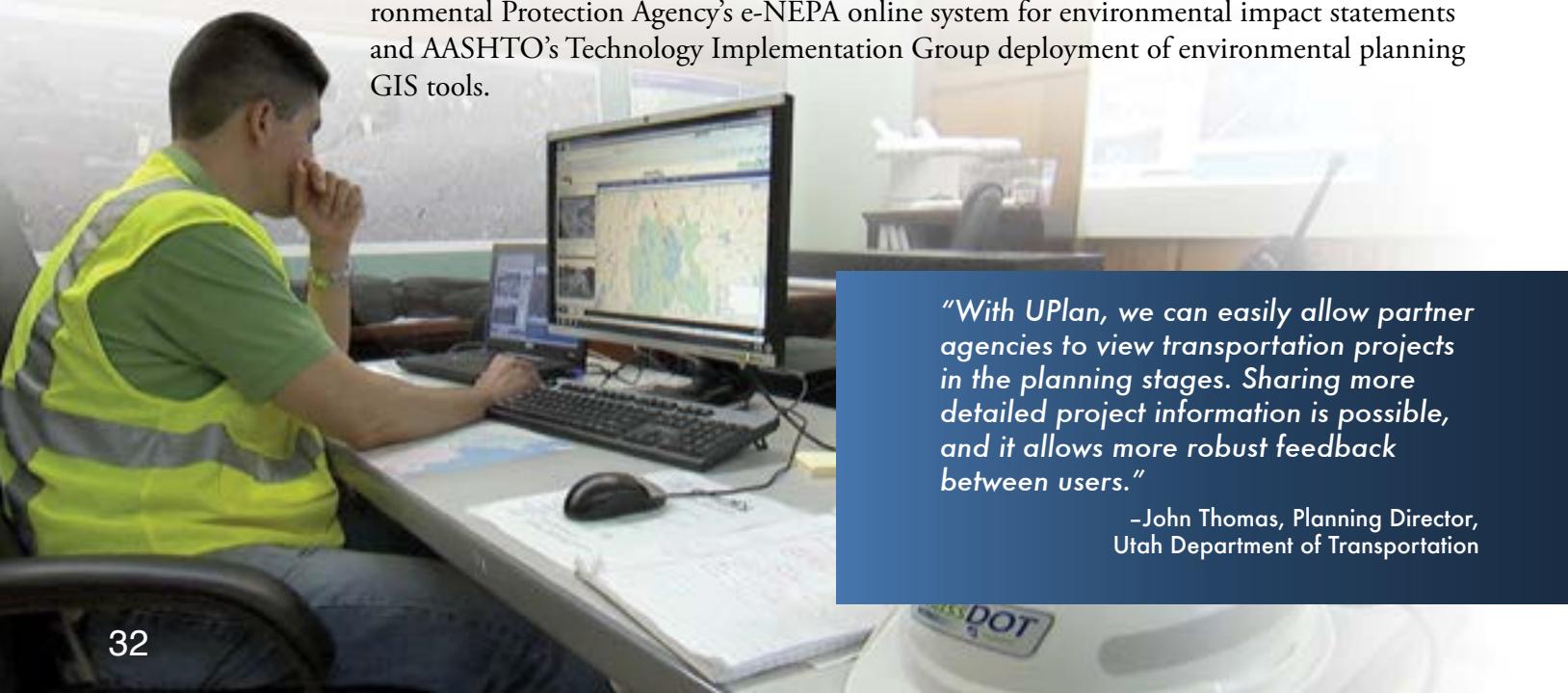
FHWA is promoting geospatial data collaboration to facilitate information sharing among project delivery stakeholders and improve the quality and speed of project decisions. Geographic information system (GIS) tools at many Federal, State, and local agencies are housed separately, which makes partnering on projects challenging. Through EDC2, FHWA is recommending the use of web-based technology that facilitates project collaboration by making tools, data, and maps accessible on the Web.

Geospatial data collaboration can improve working relationships between organizations, facilitate 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 access to data and share only the information they wish to provide to partners.

Several States have developed GIS-based tools and are using geospatial data to support project development and environmental streamlining efforts. The South Carolina DOT created a web-based Project Screening Tool that incorporates GIS data to help users identify impacts from potential projects. The Florida DOT has an Efficient Transportation Decisionmaking Process that uses a web-based screening tool for making project decisions.

Another example is the Utah DOT's UPlan, an interactive web-based GIS tool hosted as a third-party service, that enables better coordination between agencies. UPlan provides a common geospatial format, making it easier to bring data together collaboratively. With it, the Utah DOT can allow partner agencies to view transportation projects in the planning stages and provide feedback. The result, according to Utah DOT Planning Director John Thomas, has been improved data quality and information sharing, strengthened collaboration and partnerships, and streamlined project development and delivery.

The EDC2 geospatial data collaboration effort builds on the planning and environmental linkages initiative in EDC1. It is related to several other national efforts, such as SHRP 2's C40A "Integration of National-Level Geospatial, Ecological Tools and Data," the U.S. Environmental Protection Agency's e-NEPA online system for environmental impact statements and AASHTO's Technology Implementation Group deployment of environmental planning GIS tools.



"With UPlan, we can easily allow partner agencies to view transportation projects in the planning stages. Sharing more detailed project information is possible, and it allows more robust feedback between users."

*-John Thomas, Planning Director,
Utah Department of Transportation*

Implementing Quality Environmental Documentation

The goal of the initiative is to improve and expedite transportation project delivery through focused improvement in National Environmental Policy Act (NEPA) documentation, especially the presentation of project purpose and need and alternatives analysis prepared for decisionmakers, resource agencies, and the public. Existing recommendations and recent experience will be used to address the minimally necessary and sufficient material that comprises the NEPA document, what is considered documentation that supports (but need not be included in) the document, and what materials are important to retain for an administrative record to demonstrate project decisions were not arbitrary and capricious.

By improving NEPA documents, project proponents can 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 the documents. It also makes them more accessible to the stakeholders who read them. Through EDC2, FHWA is encouraging State DOTs to adopt the three core principles of quality environmental documentation: telling the story of the project, keeping the document brief, and ensuring that it meets all legal requirements. FHWA is building on earlier efforts, such recommendations published in 2006 in *Improving the Quality of Environmental Documents—A Report of the Joint AASHTO/ACEC Committee in Cooperation With the Federal Highway Administration*.

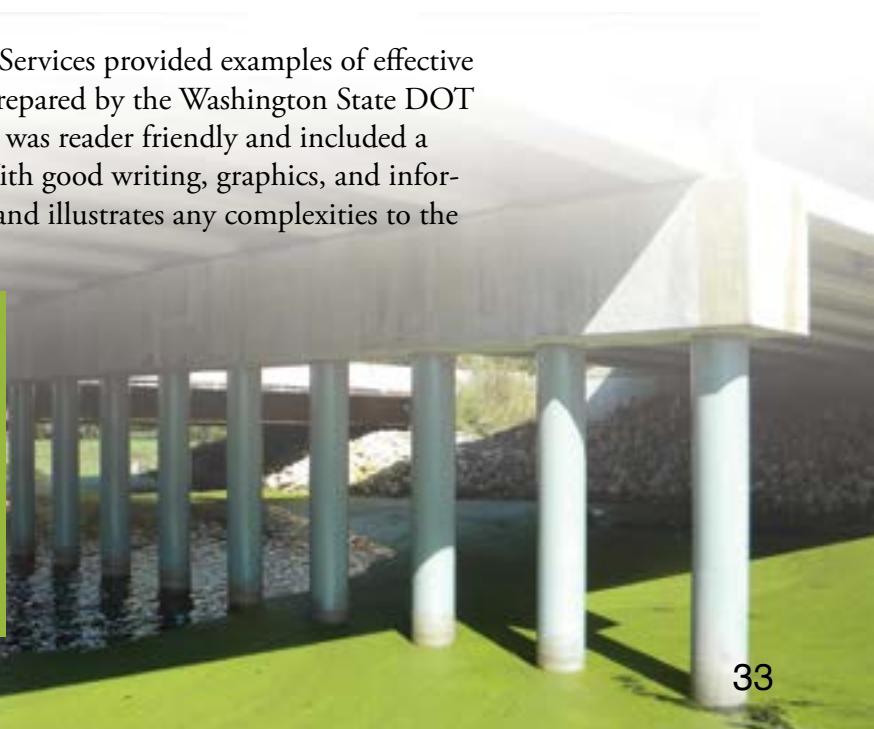
During the summit, Hal Kassoff of Parsons Brinckerhoff, representing the American Council of Engineering Companies, outlined recommendations in the AASHTO/ACEC Committee report. They include using the scoping process to focus on key issues and tailoring the level of detail in the document to those issues. The report also recommended explaining project benefits and impacts clearly, communicating well-grounded findings, and using professional editorial services to produce a readable document.

Owen Lindauer of the FHWA NEPA Program Office noted that the EDC2 effort on quality environmental documentation emphasizes development of quality purpose and need statements and alternatives analysis. “Purpose and need statements should present the problem and relevant facts in an engaging way that allows the reader to immediately understand the project purpose,” he said.

Tim Hill of the Ohio DOT Office of Environmental Services provided examples of effective purpose and need statements. He cited a document prepared by the Washington State DOT on the Alaskan Way Viaduct replacement project that was reader friendly and included a question-and-answer format for subject headings. “With good writing, graphics, and informative captions, this format provides simple answers and illustrates any complexities to the public,” he said.

“Environmental documents should provide information to decisionmakers and the public to assess project effects and benefits. They should focus on clear issues and avoid ambiguous or opaque discussion of analysis.”

—Hal Kassoff, Vice President,
Parsons Brinckerhoff





SHRP 2 National Traffic Incident Management Responder Training

As part of EDC2, FHWA is offering the first national, multidisciplinary 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—promotes a shared understanding of the requirements for safe, quick clearance at traffic incident scenes. The training focuses on a response effort that protects motorists and responders while minimizing the impact on traffic flow.

Traffic incidents—including crashes, disabled vehicles, and debris on the road—put motorists and responders' lives at risk and account for about 25 percent of all traffic delays. Congestion from these incidents can result in secondary crashes, further increasing risk and traffic 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.

Through EDC2, FHWA is deploying a train-the-trainer course for experienced incident responders that facilitates widespread use of the multidisciplinary training. After completing the train-the-trainer course, participants are equipped to train other incident responders. Flexible delivery approaches allow trainers to customize the training for one or multiple disciplines and large or small groups. Over the next 2 years, the plan is to conduct train-the-trainer sessions in every State, the District of Columbia, and Puerto Rico. The goal is to train 2,500 instructors who, in turn, will train 50,000 first responders.

One State advancing the train-the-trainer program is Ohio, where 12 regional coordinating teams are expected to train nearly 6,000 incident responders by the end of 2013. A partnership with the Ohio State Highway Patrol has been important to the success of the training program, said Michael Flynn, Ohio DOT deputy director for operations, as has a sense of urgency to make incident management part of the culture. “Another key to success is learning to speak the right language,” he said. “The Ohio Department of Transportation now speaks law enforcement and fire.”

“Since we started the training, we have found that the interaction between the responders may be the most valuable part of the class, versus teaching to only one discipline.”

***–Barry Ross, Major,
Oklahoma Highway Patrol***

National traffic incident management responder training is also a second Strategic Highway Research Program priority and is included in FHWA’s Strategic Implementation Plan. It has been endorsed by a broad range of organizations, including the International Association of Chiefs of Police, International Association of Fire Chiefs, and AASHTO.

Appendix B: **Every Day Counts First-Round Accomplishments**

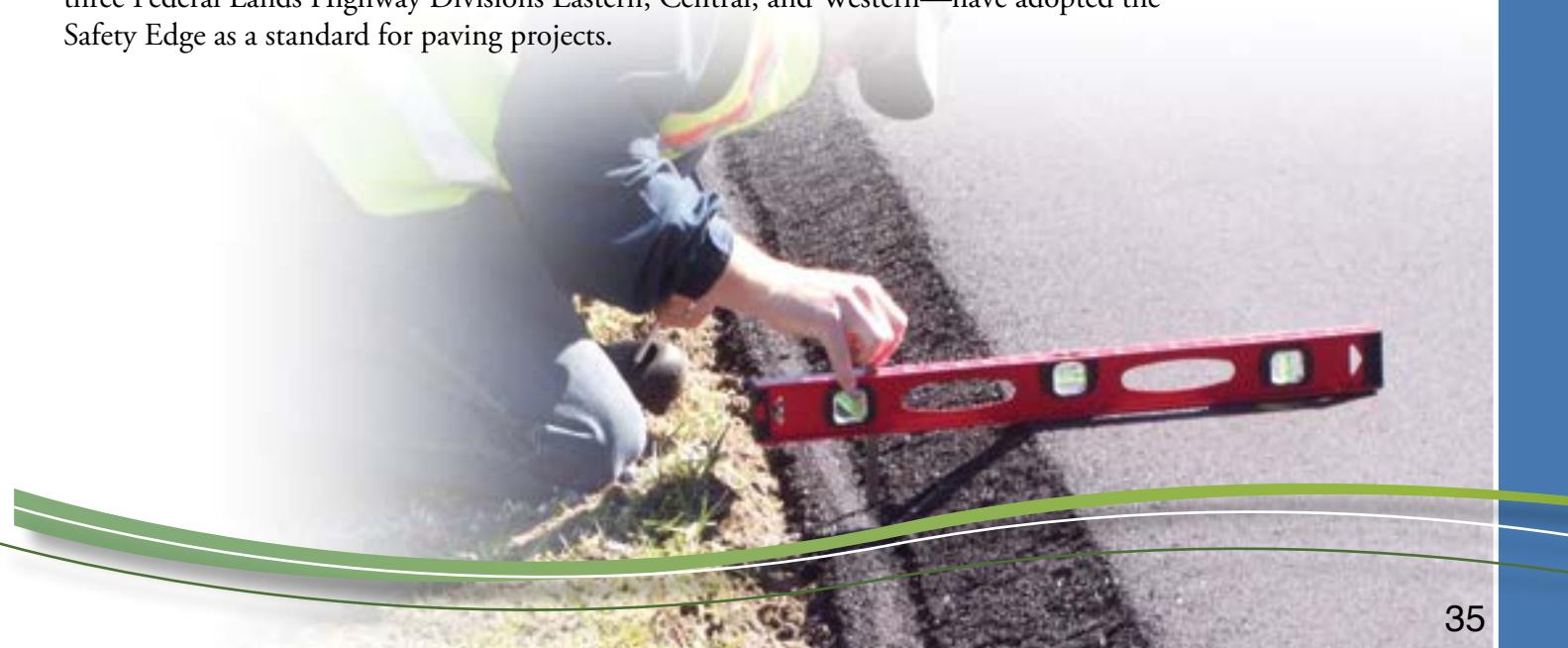
The Federal Highway Administration (FHWA) launched Every Day Counts (EDC) in 2010 to deploy innovations that shorten project delivery, enhance roadway safety, and improve environmental sustainability. Every State has adopted one or more of the 16 first-round innovations, and many are now widely used. This section provides an overview of what was achieved by many of the EDC1 technology initiatives by the end of 2012.

Safety Edge

Pavement edge dropoff on highways has been linked to many serious crashes and fatalities. A simple but effective treatment for pavement edges, the Safety EdgeSM helps save lives by enabling drivers who stray off the travel lane to return safely. Rather than leave a vertical dropoff at the pavement shoulder, the Safety Edge shapes the pavement edge to a 30-degree angle, making it easier for errant drivers to steer back onto the roadway.

The Safety Edge involves minimal time and cost to implement. It is installed during paving, using a commercially available shoe that attaches to existing paving equipment in just a few minutes. On a typical job, less than 1 percent more asphalt is needed. Because the Safety Edge provides an additional level of consolidation on the edge, it decreases pavement edge raveling and contributes to longer pavement life.

Fifty-two DOTs and Federal Lands Highway Divisions have used the Safety Edge, incorporating the technique into nearly 1,200 projects since October 2010. Thirty-six DOTs and all three Federal Lands Highway Divisions Eastern, Central, and Western—have adopted the Safety Edge as a standard for paving projects.



At the EDC2 regional summits, many State department of transportation (DOT) representatives reported on their successes in implementing the Safety Edge:

- The Iowa DOT has made the Safety Edge a standard practice and requires it on all projects with a paved shoulder less than 4 feet wide. In addition to using it on asphalt paving projects, the Iowa DOT was the first in the country to try it on a portland cement concrete paving project.
- The North Carolina DOT had used the Safety Edge on five projects by 2011 for a total of 19.5 miles and placed it on 150 miles in 2012. The agency expects to mainstream its use statewide in 2013.
- The Safety Edge has been used on 55 miles of roadway in Kentucky, and 30 more projects are lined up for 2013 and 2014.
- The Ohio DOT has completed 12 Safety Edge pilot projects. The technique is a standard for future two-lane road paving projects.
- The Minnesota DOT adopted a Safety Edge policy in 2011. Part of its “Toward Zero Deaths” approach is reducing fatalities from vehicles drifting off the roadway edge and overcorrecting.
- The Safety Edge is now required on all Colorado DOT paving projects.
- The Puerto Rico Highway and Transportation Authority has adopted a Safety Edge specification and developed standard drawings for using the paving technique. The agency has used the Safety Edge on 12 projects and is planning two more.
- Based on the success of a Safety Edge pilot project, the Guam Department of Public Works is changing its contract requirements to include the Safety Edge on all FHWA-funded projects and eventually all locally funded roads.
- Although the Idaho Transportation Department has used the Safety Edge for years, it recently developed a standard specification for using it at the local level.
- The Virginia DOT has completed two Safety Edge pilot projects and developed a draft specification.
- After trying the Safety Edge on a project and finding that it worked well, the Wyoming DOT revised its previous view that it did not need to add the technique to its paving practices.

Warm-Mix Asphalt

Warm-mix asphalt (WMA) is the generic term for a variety of technologies that enable construction crews to produce and place asphalt on the road at lower temperatures than possible using conventional hot-mix methods. In most cases, the lower temperatures result



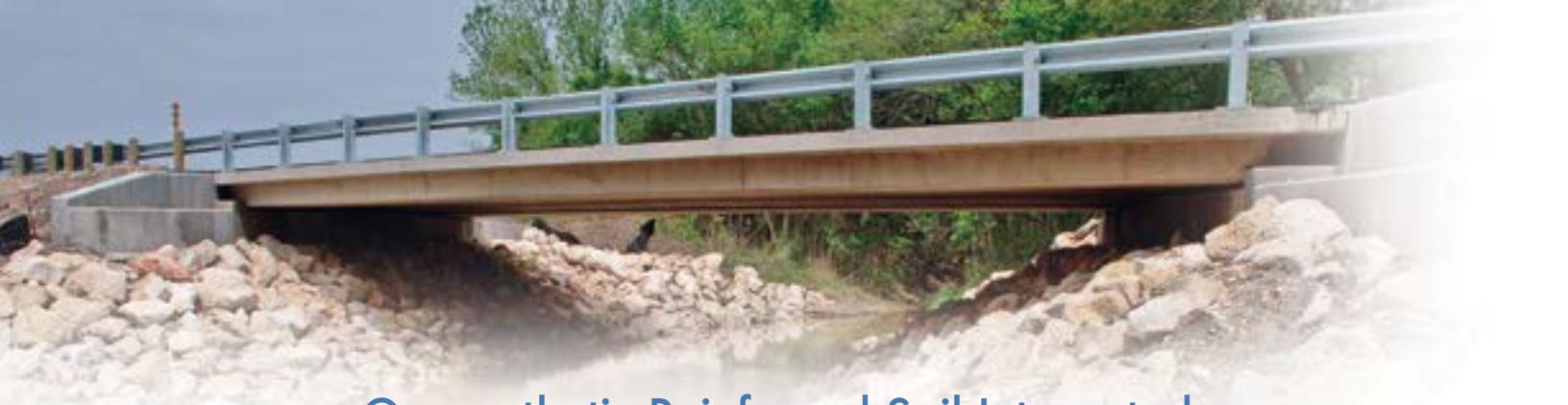
in cost savings and reduced greenhouse gas emissions because less fuel is required to achieve and maintain the temperatures for WMA paving. WMA also has the potential to extend the construction season, enabling agencies to deliver projects faster.

Forty-seven DOTs and all Federal Lands Highway Divisions have adopted a standard specification for statewide use of WMA. Twenty-two DOTs and Federal Lands Highway Divisions have set usage goals ranging from 46,000 to 600,000 tons of WMA per year, or 20 to 50 percent of all applicable projects. In 2010, about 46 million tons of WMA were produced nationwide. That saved more than 30 million gallons of fuel worth more than \$80 million and removed 800,000 tons of CO₂ from the air, which equates to taking more than 150,000 cars off the road. According to the National Asphalt Paving Association, WMA will be the industry standard for asphalt mixtures in 3 to 5 years, in part because of the focus it has received through the EDC initiative.

At the EDC2 summits, several States reported progress on incorporating WMA into their paving programs:

- The Virginia DOT considers WMA its fastest EDC adoption story. The State started with WMA foaming technology in 2009. By 2011, 75 percent of asphalt by tonnage being used on State roads was WMA.
- WMA is now a standard mix in Kentucky, which first developed a WMA specification in 2009. Tons of WMA placed have increased from 160,000 in 2008 to 1.9 million in 2011, 41 percent of the total asphalt mix placed in the State.
- The Rhode Island DOT incorporated WMA into its specifications and used an estimated 40,000 tons on 12 projects in 2012, including a Block Island project to repair damage from Superstorm Sandy.
- The Delaware DOT used WMA on about 40 percent of its asphalt paving projects in 2011 and plans to use it on all projects by 2015.
- The Kansas DOT has been using WMA for a couple of years and now uses it on 75 percent of its projects.
- Minnesota has a specification in place for WMA and has used about 1 million tons of it to date.
- WMA allows the North Dakota DOT to extend its fall paving season into mid-November because it can be produced and placed at cooler temperatures than hot-mix asphalt. The State has done four WMA projects under EDC and is taking on a fifth.
- The Colorado DOT has placed more than 100,000 tons of WMA on eight projects and has preapproved eight WMA technologies for use in the State.
- The Louisiana Department of Transportation and Development has placed 400,000 tons of WMA and plans to double that amount in 2013.
- The Utah DOT, which first used WMA on a project in 2009, placed 430,000 tons of WMA in 2012.
- The California DOT has used more than 1 million tons of WMA on more than 35 projects since 2006, which has allowed the agency to pave under adverse conditions and extend its paving season.
- The New Hampshire DOT placed about 243,000 tons of WMA in 2011, 41 percent of all asphalt pavement the State placed during the year.





Geosynthetic Reinforced Soil Integrated Bridge System

Unlike conventional bridge support technology, the geosynthetic reinforced soil integrated bridge system (GRS-IBS) uses alternating layers of compacted granular fill material and geosynthetic reinforcement to provide support. The technology offers advantages in the construction of small bridges in particular, including reduced construction time and cost savings from 25 to 60 percent compared to conventional construction methods. A GRS-IBS can be built using traditional equipment and materials, and it is easier to maintain because it has fewer parts than a conventional bridge. It facilitates design flexibility conducive to construction under variable site conditions, including soil type, weather, utilities and other obstructions, and proximity to existing structures.

Since Every Day Counts began promoting the technology in October 2010, 15 GRS-IBS bridges have been designed or constructed on the National Highway System and 75 more off the system. GRS-IBS implementation is continuing in EDC2. As EDC2 summit participants reported, GRS-IBS technology is being used on projects throughout the country:

- In Ohio, GRS-IBS was used to build a bridge in Defiance County in weeks rather than months for traditional construction methods. Since then, the county has built more than 30 GRS-IBS bridges, saving 25 to 50 percent on the projects.
- The Wisconsin DOT piloted GRS-IBS on a bridge on U.S. 40 and is monitoring its performance. The agency has determined that the technology has potential for use on other small bridges.
- The Louisiana Department of Transportation and Development is pursuing two GRS-IBS bridges. The agency plans to host a showcase at one bridge so professionals from other States can observe GRS-IBS construction and learn about the technology.
- The Hawaii Department of Transportation's first GRS-IBS project, on the Lahaina Bypass, saved about 15 percent in costs. The agency expects the savings to increase as it applies the technology on future projects.
- The Maine DOT will use 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 is nearly 11 percent below the engineer's estimate.
- The Rhode Island DOT has three GRS-IBS bridges in procurement and is considering using the technology in other locations, including two bridges on the National Highway System.
- GRS-IBS technology helped Clearfield County, PA, build a bridge on a school bus route in just 35 days, saving months of time and 50 percent on costs.

Adaptive Signal Control Technology

Conventional traffic signal systems use preprogrammed signal timing schedules, but poor signal timing accounts for more than 10 percent of traffic delays. Adaptive signal control technology (ASCT) systems coordinate the control of traffic signals across a network in real time by adjusting signal phase lengths based on prevailing traffic conditions. This improves travel time reliability, reduces congestion and fuel consumption, and creates smoother traffic flow.

Although ASCT has been used in the United States for about 20 years, it had been deployed on less than 1 percent of existing traffic signals before its adoption as an EDC technology. Now, 61 agencies representing 63 project locations are implementing the technology. The following are among the results States reported on using ASCT technology:

- The New Jersey DOT used ASCT on a 128-signal project in the Meadowlands region, which experiences some of the heaviest traffic congestion in the country. The agency expects reductions of 20 percent in delay and travel time on the corridor, 40 percent in stops, 12 percent in fuel use, and 14 percent in airborne emissions.
- In Kansas, ASCT is being applied at the local level. One city using the technology is Topeka, which installed new traffic signals equipped with cameras and processors on the 21st Street corridor. The system saves drivers an estimated 123,000 gallons of gasoline and 191,000 pounds of CO₂ a year. Crashes dropped by 30 percent during the system's first year of operation.
- About 1,200 ASCT signals have been installed in Delaware, 900 of which are owned by the Delaware DOT and the rest by the city of Wilmington. Delaware expects to have a statewide system by 2015.
- The District DOT plans to go to a total ASCT system in the city within the next few years.
- The Alabama DOT has fast-tracked implementation of ASCT and has three projects under construction. The agency set up a monitoring process to track improvements on corridors with ASCT.
- In West Virginia, an ASCT system was installed in Morgantown to ease congestion in the West Virginia University area.
- The Virginia DOT has been testing an ASCT system on nine urban corridors where congestion has been a problem.
- The South Dakota DOT is working on two ASCT projects, one on a State highway and the other on a Sioux Falls road.
- The New York State DOT is implementing ASCT on two pilot projects in Albany and one on Long Island.

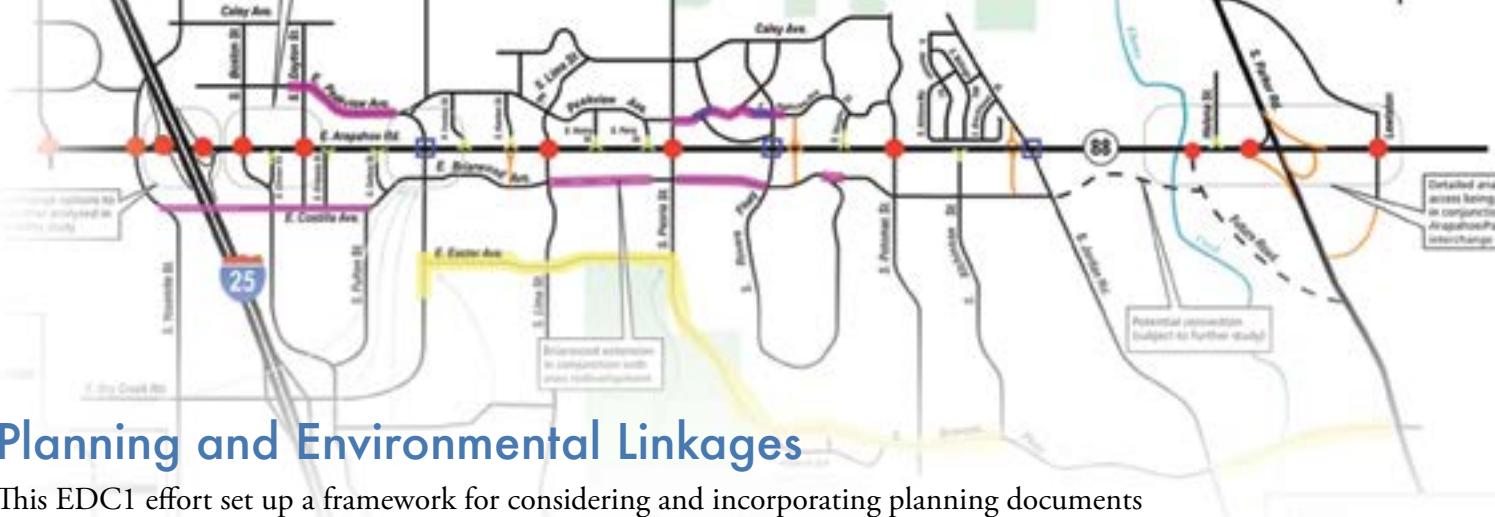


Prefabricated Bridge Elements and Systems

With prefabricated bridge elements and systems (PBES), many time-consuming construction tasks no longer need to be done sequentially. Prefabricated components are constructed offsite and moved to the work zone for rapid installation, which means that in some cases an old bridge can be removed overnight and the new bridge put in place the next day. Because PBES components are usually fabricated under controlled conditions, weather has less impact on the quality and duration of the project. The result is more durable bridges that can be built faster, more safely, and with much less traffic disruption.

Since October 2010, more than 2,500 replacement bridges have been designed or constructed using PBES, and in at least 21 States more than 25 percent of the replacement bridge projects have incorporated at least one major prefabricated element. Summit participants reported that use of PBES, which is also part of EDC2, has spread across the country:

- The Massachusetts DOT has made PBES use a mainstream practice. The agency used prefabricated bridge elements and D-B contracting on a project to replace 14 bridge superstructures on Interstate 93 in Medford, shrinking a 4-year bridge replacement project to just one summer.
- PBES is the standard for bridge construction in Alaska. The Alaska Department of Transportation and Public Facilities uses it to address weather and environmental considerations that limit the construction window, as well as transportation costs and modes and concrete plant limitations at remote construction sites.
- Since 2010, New Jersey has built at least 150 bridge projects that have incorporated at least one PBES technology.
- The Virginia DOT has used a number of PBES structural systems, including lightweight precast to full-depth precast panels and integral and semi-integral abutments. Major PBES efforts planned for Interstate 95 include superstructure replacements and a job involving building a bridge offsite and lifting it into place.
- In Illinois, PBES was used on the Torrance Bridge project in Chicago. A 400-foot-long, 4.3 million-pound prefabricated bridge truss system was built offsite and moved into place with a self-propelled modular transporter.
- Under EDC, the Kentucky Transportation Cabinet has four bridges designed and three constructed using prefabricated bridge elements. A project in Harlan County involved replacing a superstructure overnight.
- The Iowa DOT used prefabricated components and accelerated bridge construction to replace a bridge on U.S. 6 over Keg Creek with minimal effect on traffic, cutting construction impact on travelers from 6 months for conventional methods to 2 weeks.
- Twenty-five percent of the bridge projects in Colorado use PBES.
- When flooding washed out several bridges, the Montana DOT tried PBES technology to replace them and determined that it is a good strategy for future bridge replacements.
- The Oregon DOT, which has used PBES on a number of projects, has developed design guidelines and a decisionmaking tool to help planners determine when to apply PBES.
- PBES use supports the Vermont Agency of Transportation's Accelerated Bridge Program. The agency incorporated PBES in 12 bridge projects in the past 2 years and set a goal of using it on 30 percent of future projects.



Planning and Environmental Linkages

This EDC1 effort set up a framework for considering and incorporating planning documents and decisions from the earliest stages of project planning into the National Environmental Policy Act (NEPA) review process. Linking planning and environmental considerations can lead to a seamless decisionmaking process that reduces duplication of work and costs and produces more informed and faster project-level decisions. It also promotes transparent planning practices and better coordination among stakeholders.

FHWA recommends use of the Planning and Environmental Linkages (PEL) Questionnaire, adapted from a questionnaire developed jointly by the Colorado Department of Transportation and the FHWA Colorado Division, or an equivalent process to ensure that planning information and decisions are properly documented for use in the NEPA review process. PEL was codified in the Moving Ahead for Progress in the 21st Century Act (MAP-21).

Seventeen DOTs and Federal Lands Highway Divisions have implemented the PEL Questionnaire or an equivalent process and 10 more are working on it. The following are examples of how States are applying PEL:

- The Louisiana Department of Transportation and Development created a National Best Practice Planning & Environmental Linkages Checklist and is using it on all new projects to save time and money.
 - The Montana DOT has standardized its corridor planning process through its Corridor Planning Study Checklist.
 - The North Carolina DOT is already realizing the benefits of linking long-range planning with NEPA and is developing problem statements earlier, such as in long-range transportation planning processes.
 - PEL use has allowed Arkansas State Highway and Transportation Department planning studies to be more productive and open. The agency can make more value decisions on the front end of projects, allowing it to present projects to the public and provide information on construction alternatives.
 - The Nevada DOT has developed a prioritization process (low, medium, high) to help determine which projects to move forward on and a PEL questionnaire that will be used as a pilot on the agency's Interstate 11 study.
 - The Minnesota DOT is working with FHWA and other stakeholders to use PEL on a group of projects to determine how to get environmental issues addressed at the front end.
 - EDC helped the New Mexico DOT formalize and implement the PEL process, enabling the agency to plan ahead for contingencies and environmental processes that can slow down projects.



Programmatic Agreements

Programmatic agreements, which establish streamlined processes for handling routine environmental requirements on common project types, are effective in helping multiple organizations and agencies work together. A programmatic agreement spells out the terms of a formal agreement between a State DOT and other State or Federal agencies and sets up a process for consultation, review, and compliance with applicable Federal laws. Such agreements save time in the project delivery process by specifying clear roles and responsibilities, standardizing coordination and compliance procedures, and improving relationships among DOT and regulatory agency staff.

Through EDC, FHWA is identifying situations in which new programmatic agreements can be beneficial and helping States expand their use of the time-saving approach. Thirty-seven States have at least two active programmatic agreements, and 104 agreements have been updated and 58 agreements have been initiated under EDC. Programmatic agreements were incorporated in MAP-21 and included in EDC2. Many States are using programmatic agreements, EDC2 summit participants reported:

- The District DOT uses programmatic agreements on about 50 projects a year, resulting in time and cost savings estimated at about 1,500 person-hours annually.
- The Illinois DOT has 13 executed programmatic agreements, including three new ones, and is working on more.
- The Ohio DOT has nine programmatic agreements in place that impact as many as 900 projects a year, saving money and resources.
- The Nebraska Department of Roads has six areas where it has programmatic agreements plus a National Historic Preservation Act Section 106 memorandum for 14 activities that do not impact historic properties. Together, they have helped streamlined 338 projects since 2010.
- The Connecticut DOT signed a programmatic agreement covering minor projects with no historic impacts that cuts reviews from 6 months to days. Another agreement will streamline the NEPA process by allowing the Connecticut DOT to classify two categories of projects as categorical exclusions without further FHWA approval.
- The Oklahoma DOT's American Burying Beetle Programmatic Biological Opinion has expedited projects by as much as a year, and it minimizes schedule uncertainty on projects where this endangered species might be present.
- The Maryland State Highway Administration is on its fourth iteration of its first programmatic agreement, signed in 1989, and the agency uses it on 98 percent of projects.

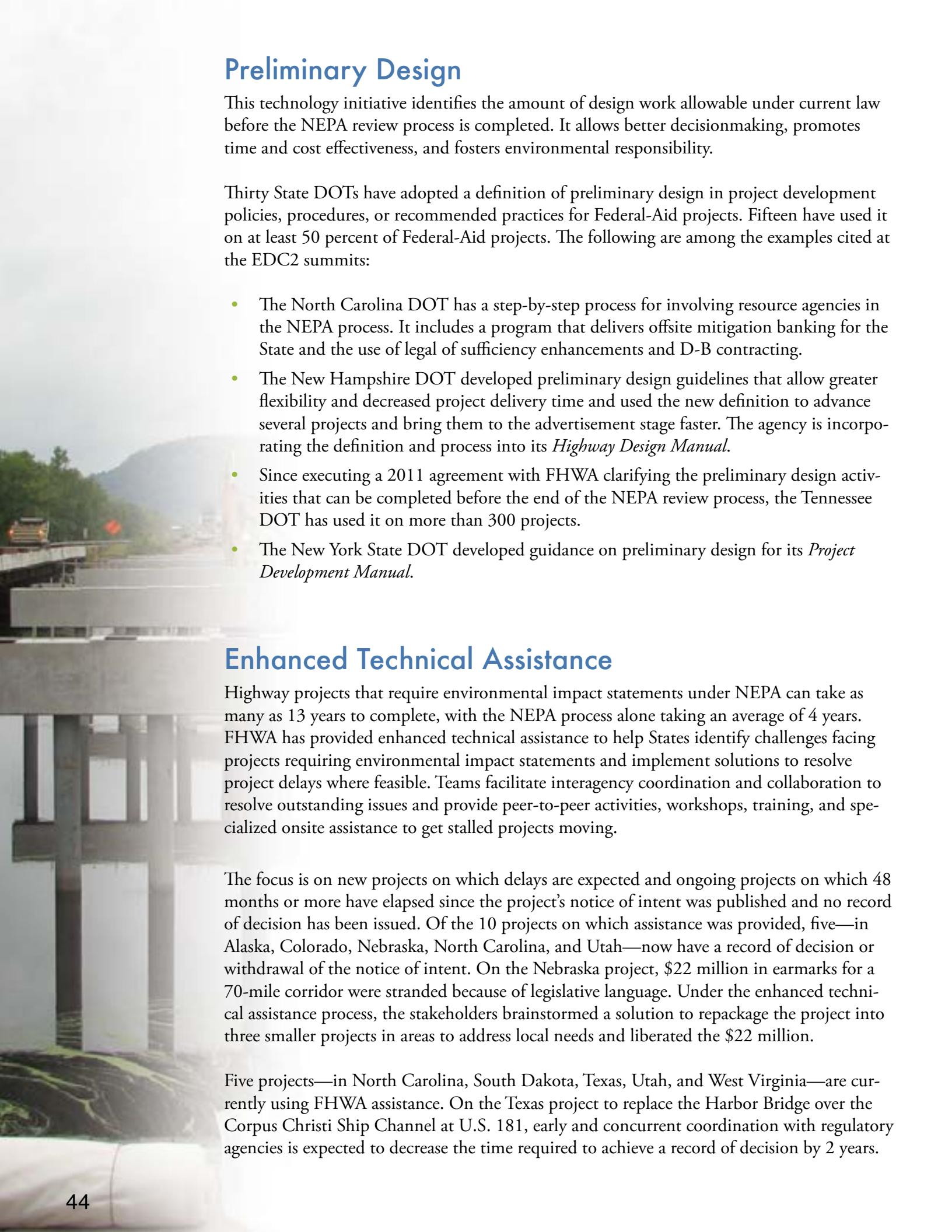
Mitigation Banking

EDC promotes expanded use of mitigation banking and in-lieu fees to expedite project delivery. Mitigation banking refers to restoring or enhancing wetlands, streams, or other resources to offset unavoidable adverse impacts related to a highway project in another area. In-lieu fees are those charged to perform environmental enhancement activities throughout an entire watershed rather than at a particular site. FHWA encourages highway agencies to use both approaches where allowed under FHWA regulations, State laws, and court decisions.

Thirty-one States have established or purchased from mitigation banks. Nineteen States have active agreements defining terms and assessment methodology, and seven of these agreements extend to local agencies. Eighteen States have established or purchased in-lieu fees. States offered several examples at the EDC2 summits:

- The Mississippi DOT has streamlined the compensatory mitigation permitting process for wetland and stream impacts on all applicable transportation projects. The agency has 20 mitigation banks in place and is adding another.
- The Illinois DOT has established three wetland mitigation bank sites where wetlands will be restored in advance of unavoidable losses from highway projects and is working on a fourth.
- The Arkansas State Highway and Transportation Department has established one mitigation bank and has four others in the review process. It plans to purchase 141,000 stream credits from private and State agency banks to help minimize environmental impacts and reduce costs.
- The New York State DOT implemented a pilot for an umbrella wetland mitigation bank in Adirondack Park.
- The Vermont Agency of Transportation executed its first in-lieu fee payment in 2012 for its Bristol project with more than an acre of wetlands and ordinary high-water impacts. Ducks Unlimited is the organization shouldering the responsibility for using these Federal funds to provide compensatory mitigation for the impacts. The agency expects to use this fee instrument whenever impacts rise to the level of warranting mitigation.





Preliminary Design

This technology initiative identifies the amount of design work allowable under current law before the NEPA review process is completed. It allows better decisionmaking, promotes time and cost effectiveness, and fosters environmental responsibility.

Thirty State DOTs have adopted a definition of preliminary design in project development policies, procedures, or recommended practices for Federal-Aid projects. Fifteen have used it on at least 50 percent of Federal-Aid projects. The following are among the examples cited at the EDC2 summits:

- The North Carolina DOT has a step-by-step process for involving resource agencies in the NEPA process. It includes a program that delivers offsite mitigation banking for the State and the use of legal of sufficiency enhancements and D-B contracting.
- The New Hampshire DOT developed preliminary design guidelines that allow greater flexibility and decreased project delivery time and used the new definition to advance several projects and bring them to the advertisement stage faster. The agency is incorporating the definition and process into its *Highway Design Manual*.
- Since executing a 2011 agreement with FHWA clarifying the preliminary design activities that can be completed before the end of the NEPA review process, the Tennessee DOT has used it on more than 300 projects.
- The New York State DOT developed guidance on preliminary design for its *Project Development Manual*.

Enhanced Technical Assistance

Highway projects that require environmental impact statements under NEPA can take as many as 13 years to complete, with the NEPA process alone taking an average of 4 years. FHWA has provided enhanced technical assistance to help States identify challenges facing projects requiring environmental impact statements and implement solutions to resolve project delays where feasible. Teams facilitate interagency coordination and collaboration to resolve outstanding issues and provide peer-to-peer activities, workshops, training, and specialized onsite assistance to get stalled projects moving.

The focus is on new projects on which delays are expected and ongoing projects on which 48 months or more have elapsed since the project's notice of intent was published and no record of decision has been issued. Of the 10 projects on which assistance was provided, five—in Alaska, Colorado, Nebraska, North Carolina, and Utah—now have a record of decision or withdrawal of the notice of intent. On the Nebraska project, \$22 million in earmarks for a 70-mile corridor were stranded because of legislative language. Under the enhanced technical assistance process, the stakeholders brainstormed a solution to repackage the project into three smaller projects in areas to address local needs and liberated the \$22 million.

Five projects—in North Carolina, South Dakota, Texas, Utah, and West Virginia—are currently using FHWA assistance. On the Texas project to replace the Harbor Bridge over the Corpus Christi Ship Channel at U.S. 181, early and concurrent coordination with regulatory agencies is expected to decrease the time required to achieve a record of decision by 2 years.

Design-Build

Design-build (D-B) is an accelerated project delivery method in which the design and construction phases are combined in one contract, allowing certain aspects of design and construction to take place at the same time. This approach can provide significant time savings compared to the traditional design-bid-build (D-B-B) approach, in which the design and construction phases take place sequentially. The designer-builder assumes responsibility for most of the design work and all construction activities. Along with greater responsibility and risk, D-B allows the designer-builder more flexibility to innovate.

Twenty-four States expanded their D-B statutory authority in 2011–2012, according to the Design-Build Institute of America. About 175 projects used the D-B method from 2010 through 2012. D-B is also part of the EDC2 effort. Results on D-B implementation during EDC1 include the following:

- The North Carolina DOT used D-B to replace seven bridges on Ocracoke Island in just 74 days.
- The District DOT's largest D-B project to date was its \$260 million 11th Street Bridge project. Using D-B allowed construction to begin sooner after the project was awarded, kept the project on schedule, and resulted in public accolades on the new bridge.
- The West Virginia DOT has used D-B on several pilot programs, including a number of bridges, and has requested permission from the State legislature to complete 10 to 15 more projects.
- The Missouri DOT has averaged eight to 10 D-B projects a year. The agency has one project underway, one in procurement, and one ready to go to procurement.
- The Minnesota DOT has awarded more than \$1.3 billion in D-B contracts, the most notable project being the replacement of the Interstate 35 West Bridge.
- The Colorado DOT has three large D-B projects underway on U.S. 6, U.S. 36, and Interstate 25.
- The Louisiana Department of Transportation and Development is finishing up four D-B projects and will complete another in 2013.
- The California DOT has finished or is nearing completion on 15 D-B projects. The agency cited faster delivery, cost certainty, constructability, and appropriate risk transfer as benefits of using the technique.
- After the Connecticut legislature passed a bill allowing the use of D-B and construction-manager-at-risk contracting, the Connecticut DOT sought bids on its first D-B project, the replacement of four bridge superstructures in Bridgeport. The project also involves the use of PBES.
- Since 2010, the Maine DOT has advanced nine D-B projects and the D-B method has become an established accelerated project delivery practice for the agency.
- After legislation was passed allowing D-B, the New Hampshire DOT awarded three projects using the technique. It is finalizing guidelines on using D-B and identifying future projects.
- The Rhode Island DOT has completed two D-B projects, has one in procurement, and has five more in the early stages. The agency is also completing a manual on D-B practices.
- The Maryland DOT has used D-B since 1996 to keep costs down and avoid change orders, an effort that has been successful.

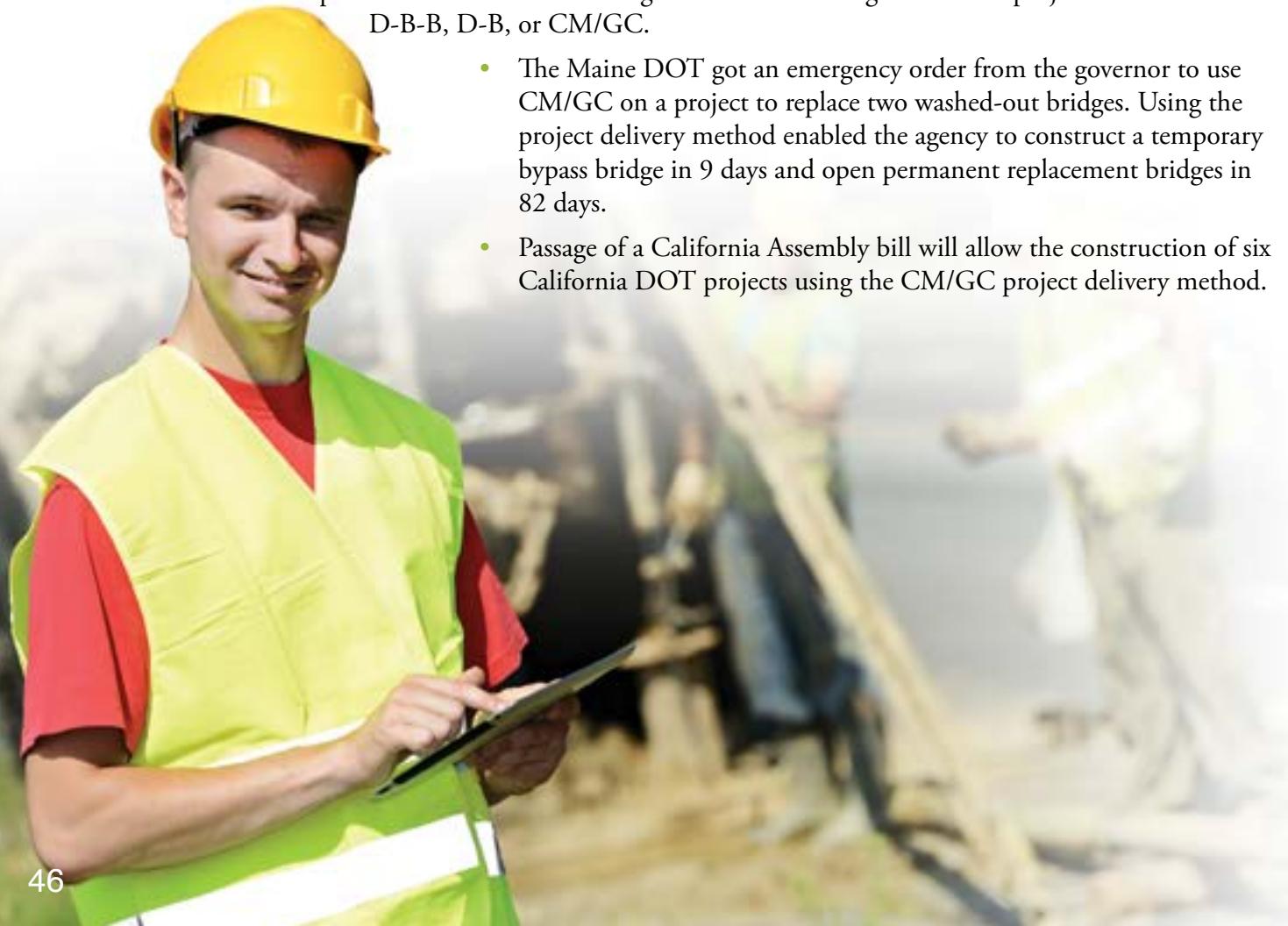


Construction Manager/General Contractor

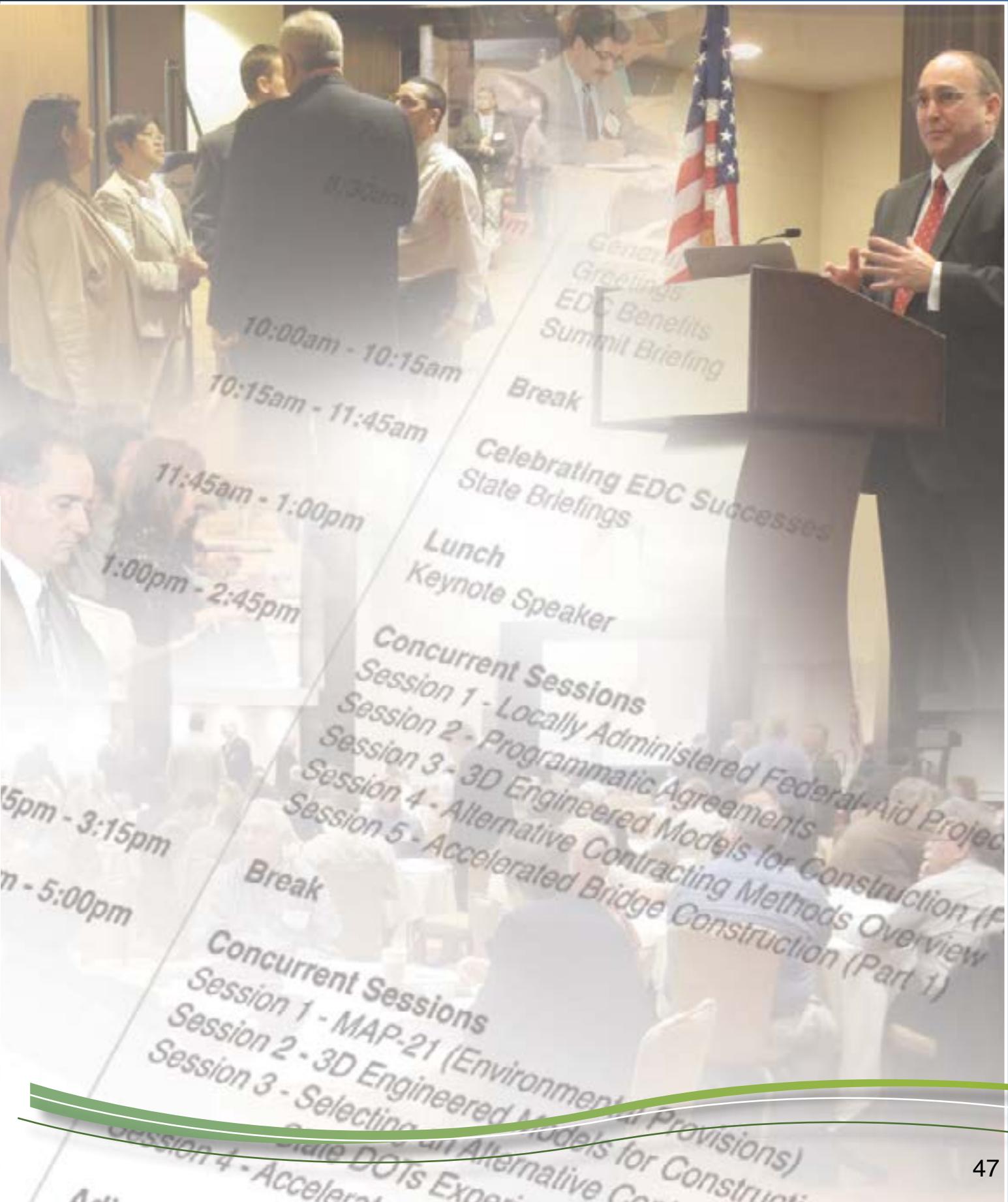
Construction manager/general contractor is an alternative project delivery method in which the owner hires a contractor as a construction manager to provide feedback during the design phase before construction work begins. The CM/GC process consists of two separate contracts. During the design phase, the contractor, designer, and owner work together to identify and minimize risk, provide cost certainty, improve constructability, and optimize the construction schedule. Once the design is complete, the owner and contractor negotiate a fair price for a separate construction contract. If they can reach an agreement, the contractor begins construction as the general contractor for the second phase of the CM/GC process.

Fourteen States now have laws or policies allowing CM/GC contracting, and six more are in the process of changing laws or policies to allow it. Twenty-six projects were constructed in the past 3 years using CM/GC, and nine are planned for 2013. CM/GC was authorized under MAP-21 and included in EDC2. Progress on adopting CM/GC includes the following:

- Utah, a leader in CM/GC contracting, has used it on more than 20 highway projects. On an Interstate 80 widening job that included 14 bridges, CM/GC resulted in user cost savings of \$25 million on a \$140 million project.
- The Michigan DOT reported several examples of CM/GC use. On one, a roadway project along a river that was eroding the highway, CM/GC saved time and lowered costs from \$15 million to \$10 million.
- The Colorado DOT is using the CM/GC method on five projects and recently approved its application on one more. The agency created a project delivery method process matrix for determining which method is a good fit for a project—traditional D-B-B, D-B, or CM/GC.
 - The Maine DOT got an emergency order from the governor to use CM/GC on a project to replace two washed-out bridges. Using the project delivery method enabled the agency to construct a temporary bypass bridge in 9 days and open permanent replacement bridges in 82 days.
 - Passage of a California Assembly bill will allow the construction of six California DOT projects using the CM/GC project delivery method.



Appendix C: Summit Agendas



Federal Highway Administration

Every Day Counts

Innovation Initiative

EDC Summit

Location / Date



Day 1

7:30am - 8:30am	Continental Breakfast & Sign-In
8:30am - 10:00am	General Session Greetings EDC Benefits Summit Briefing
10:00am - 10:15am	Break
10:15am - 11:45am	Celebrating EDC Successes State Briefings
11:45am - 1:00pm	Lunch Keynote Speaker
1:00pm - 2:45pm	Concurrent Sessions <i>Session 1 - Locally Administered Federal-Aid Projects</i> <i>Session 2 - Programmatic Agreements</i> <i>Session 3 - 3D Engineered Models for Construction (Part 1)</i> <i>Session 4 - Alternative Contracting Methods Overview</i> <i>Session 5 - Accelerated Bridge Construction (Part 1)</i>
2:45pm - 3:15pm	Break
3:15pm - 5:00pm	Concurrent Sessions <i>Session 1 - MAP-21 (Environmental Provisions)</i> <i>Session 2 - 3D Engineered Models for Construction (Part 2)</i> <i>Session 3 - Selecting an Alternative Contracting Method / State DOT's Experience with ATCs</i> <i>Session 4 - Accelerated Bridge Construction (Part 2)</i>
5:00pm	Adjourn (dinner on your own)

Day 2

7:00am - 8:00am	Continental Breakfast
8:00am - 9:45am	Concurrent Sessions <i>Session 1 - MAP-21 (Environmental Provisions) REPEAT</i> <i>Session 2 - Intelligent Compaction</i> <i>Session 3 - Case Studies for CMGC and an Alternative Contracting Methods Panel</i> <i>Session 4 - Locally Administered Federal-Aid Projects REPEAT</i>
9:45am - 10:00am	Break
10:00am - 10:15am	Setting the stage
10:15am - 11:45am	State-Based Caucus <i>Develop State Draft Implementation Plans</i>
11:45am - 12:00pm	Closing Remarks
12:00pm	Adjourn

Federal Highway Administration

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Innovation Initiative



EDC 2 Spring Virtual Summits

EDC 2 Executive Level/STIC EDC 2 Spring Virtual Summit

Date: April 2, 2013

Target Audience: STIC members

Duration: 1.5 hours (Eastern Time)

2:00 PM - 2:20 PM Opening Remarks

Victor Mendez, Administrator - FHWA

Bud Wright, Executive Director – AASHTO

2:20 PM - 2:30 PM SHRP 2 National Traffic Incident Management Responder Training

Jeff Lindley, Associate Administrator, Office of Operations - FHWA

2:30 PM - 2:55 PM High Friction Surfaces Treatments and Intersection and Interchange Geometrics

Tony Furst, Associate Administrator, Office of Safety - FHWA

2:55 PM - 3:20 PM Geospatial Data Collaboration and Implementing Quality Environmental Documentation

Gloria Shepherd, Associate Administrator, Office of Planning, Environment and Realty - FHWA

3:20 PM - 3:30 PM Closing Remarks

Greg Nadeau, Deputy Administrator - FHWA

3:30 PM Adjourn

Federal Highway Administration

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Innovation Initiative



EDC 2 Environment Virtual Summit

Date: April 3, 2013 and April 10, 2013

Target Audience: State and local transportation agencies, SHPO, NOAA, USACE, USFW, EPA, MPOs, State Associations of MPOs, and ACEC

Moderator: Gloria Shepherd, Associate Administrator, Office of Planning, Environment and Realty - FHWA

Duration: 3 hours and 30 minutes (Eastern Time)

12:30 PM - 12:45 PM **Opening Remarks**

12:45 PM - 1:30 PM **Geospatial Data Collaboration**

1:30 PM - 1:45 PM **Geospatial Data Collaboration Q&A's**

1:45 PM - 2:00 PM **BREAK**

2:00 PM - 2:45 PM **Implementing Quality Environmental Documentation**

2:45 PM - 3:00 PM **Implementing Quality Environmental Documentation Q&A's**

3:00 PM - 3:45 PM **State Discussion and Q&A's**

3:45 PM - 4:00 PM **Wrap-up and Closing**

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EDC 2 Safety Virtual Summit

Dates: April 4, 2013 and April 11, 2013

Target Audience: Maintenance, Pavement, Materials and Design Engineers and Safety Specialists, Planning, LTAP, TTAP, Consultants, Contractors, Suppliers, Producers, and Trade/Professional Associations, NACE, ATSSA, ARTBA, APWA, AGC, ASCE, ITE and Highway Safety Partnership Venture(HSPV)

Moderator: Tony Furst, Associate Administrator, Office of Safety - FHWA

Duration: 3 hours 30 minutes (Eastern Time)

12:30 PM - 12:45 PM **Opening Remarks**

12:45 PM - 1:30 PM **High Friction Surfaces Treatments**

1:30 PM - 1:45 PM **High Friction Surfaces Treatments Q&A's**

1:45 PM - 2:00 PM **BREAK**

2:00 PM - 2:45 PM **Intersection and Interchange Geometrics**

2:45 PM - 3:00 PM **Intersection and Interchange Geometrics Q&A's**

3:00 PM - 3:45 PM **State Discussion and Q&A's (Use Map pod)**

3:45 PM - 4:00 PM **Wrap-up and Closing**

Federal Highway Administration

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EDC 2 Operations Virtual Summit

Dates: April 4, 2013 and April 9, 2013

Target Audience: Transportation, public safety (fire, rescue, emergency medical service [EMS]), law enforcement), emergency management communities, ITE and other professional associations

Moderator: Jeff Lindley, Associate Administrator, Office of Operations - FHWA

Duration: 1.5 hours (Eastern Time)

April 4, 2013

9:30 AM - 9:45 AM **Opening Remarks**

9:45 AM - 10:30 AM **SHRP 2 National Traffic Incident Management Responder Training**

10:30 AM - 10:50 AM **State Discussion**

10:50 AM - 11:00 AM **Q&A's and Wrap-up**

April 9, 2013

2:00 PM - 2:15 PM **Opening Remarks**

2:15 PM - 3:00 PM **SHRP 2 National Traffic Incident Management Responder Training**

3:00 PM - 3:20 PM **State Discussion**

3:20 PM - 3:30 PM **Q&A's and Wrap-up**



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U.S. Department
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