Every Day Counts

Significant Impacts: August 2014

Changing the Way We Work:
Better, Faster, Smarter

U.S. Department of Transportation
Federal Highway Administration

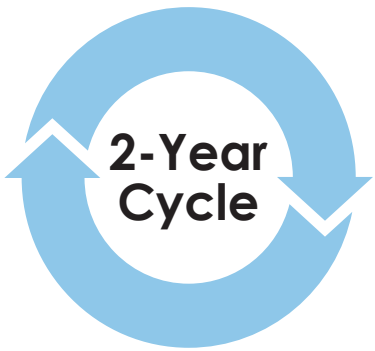
FHWA-14-CAI-027

Every Day Counts

In 2009, the Federal Highway Administration (FHWA) launched **Every Day Counts (EDC)** in cooperation with the American Association of State and Highway and Transportation Officials (AASHTO) to speed up the delivery of highway projects and to address the challenges presented by limited budgets. EDC is a state-based model to identify and rapidly deploy proven but underutilized innovations to shorten the project delivery process, enhance roadway safety, reduce congestion and improve environmental sustainability.

Proven innovations and enhanced business processes promoted through EDC facilitate greater efficiency at the state and local levels, saving time and resources that can be used to deliver more projects for the same money. By advancing 21st century solutions, the highway community is making every day count to ensure our roads and bridges are built better, faster and smarter.

How it Works



Through the EDC model, FHWA works with state and local transportation agencies and industry stakeholders to identify a new collection of innovations to champion every two years. Innovations are selected collaboratively by stakeholders, taking into consideration market readiness, impacts, benefits and ease of adoption of the innovation. After selecting the EDC technologies for deployment, transportation leaders from across the country gather at regional summits to discuss the innovations and share best practices. These summits begin the process for states, local public agencies and Federal Lands Highway Divisions to focus on the innovations that make the most sense for their unique program needs, establish performance goals and commit to finding opportunities to get those innovations into practice over the next two years.

Throughout the two-year deployment cycle, specifications, best practices, lessons learned and relevant data are shared among stakeholders through case studies, webinars and demonstration projects. The result is rapid technology transfer and accelerated deployment of innovation across the nation.

Significant Impacts of EDC

The EDC initiative has resulted in making broad impacts in:

1) accelerating the deployment of innovations to deliver better projects faster, and
2) creating a culture of innovation within the highway community.

Accelerating Innovation Deployment

EDC employs a focused, state-based approach for rapid innovation deployment. The EDC process brings national attention to innovation, elevates the conversation to decision-makers and provides technical support through various forms of interaction. The top-down and bottom-up engagement of highway stakeholders raises awareness of various innovations and increases the knowledge base to support implementation.

The following highlights provide a glimpse of innovation deployment by state and local transportation agencies along with the resulting benefits toward shortening project delivery, enhancing safety, reducing congestion and improving environmental sustainability.

Since EDC's inception, ***every*** *state DOT has used two or more of the innovations promoted under EDC.*

Shortening Project Delivery

Accelerated Bridge Construction (ABC) is a suite of technologies (innovative planning and construction methods, designs, and materials) that allow for accelerated construction of bridges, significantly reducing traffic delays and road closures and often reducing project costs. Using ABC, transportation agencies have been able to replace bridges within 48 to 72 hours and reduce the planning and construction of bridge projects by years.

Hawaii: The Hawaii DOT's first Geosynthetic Reinforced Soil-Integrated Bridge System (GRS-IBS) project, on the Lahaina Bypass, resulted in a 15 percent cost savings. The agency expects the savings to increase as it applies the technology on future projects.

Maine: The Maine DOT used GRS-IBS for the first time on a bridge in the island community of North Haven. The agency decided it was the best choice for the project because access to the construction site is limited for large equipment and the cost is nearly 11 percent below the engineer's estimate.

> *The Washington State DOT replaced the I-5 Skagit River Bridge in **three months** after it collapsed...*

I-5 Skagit River Bridge replacement, Mount Vernon, Washington
Photo: Parsons Brinckerhoff – C. Vanek

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

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

Ohio: Defiance County constructed the Bowman Bridge in just six weeks and at a cost savings of 25 percent over conventional methods, which would have taken months.

Oregon: The Oregon DOT used an alternate method of project delivery, rapid bridge removal and replacement techniques, and innovative staged construction to replace five bridges on an 11-mile stretch of Oregon Route 38 in less than 18 months. Under conventional construction, the residents and the traveling public using OR 38 would have had to deal with delays, lane closures and construction activities for well over three years. ODOT realized a total cost savings of about $2.4 million over conventional construction practices.

Pennsylvania: The Sandy Township in Clearfield County constructed a replacement bridge using its own equipment and workforce in only 35 days, saving months of detours and delays.

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

Washington: The Washington State DOT replaced the I-5 Skagit River Bridge in three months after it collapsed from being struck by a truck carrying an oversize load. Temporary bridges were used as the new bridge was built adjacent to the original alignment. Over one night, the temporary bridges were removed and the new bridge was slid into place.

*Since October 2010, transportation agencies have designed or constructed more than **2,500 replacement bridges** using ABC technologies.*

Programmatic Agreements (PAs) establish a streamlined process for handling routine environmental requirements for commonly encountered projects and can significantly reduce review times. During EDC-1 (2011-2012), over 150 new or updated PAs were initiated. Currently, 37 states have at least two PAs in place.

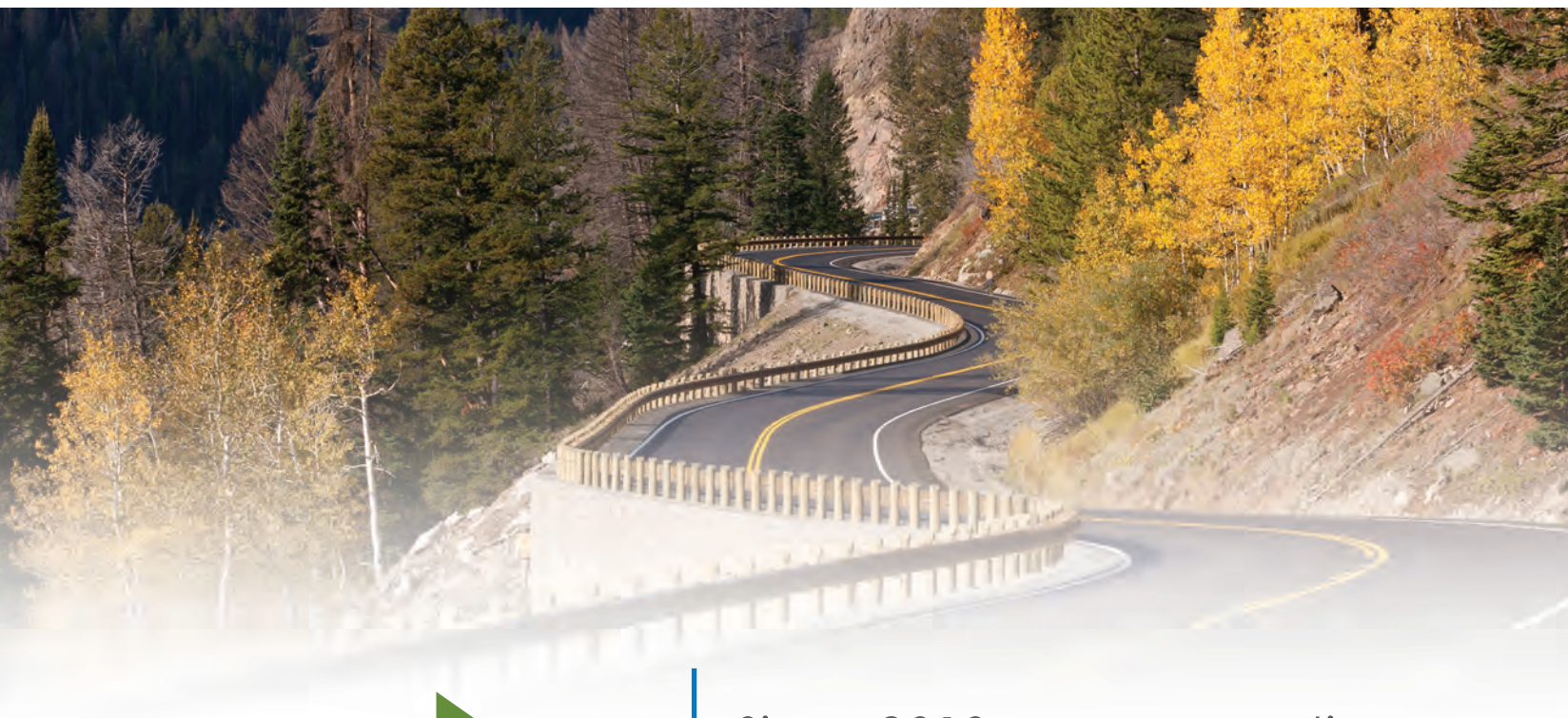
Connecticut: The Connecticut DOT signed a programmatic agreement covering minor projects with no historic impacts that cuts reviews from six months to days. Another agreement will streamline the National Environmental Policy Act process by allowing the Connecticut DOT to classify two categories of projects as categorical exclusions without further FHWA approval.

District of Columbia: The District DOT reports using programmatic agreements on about 50 projects a year, resulting in time and cost savings estimated at about 1,500 person-hours annually.

Nebraska: The Nebraska Department of Roads has nine programmatic agreements that address environmental compliance. Since 2010, the programmatic agreements have helped streamlined 712 projects.

Oklahoma: 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.

Oregon: The Oregon Endangered Species Act Programmatic Agreement with National Marine Fisheries Service reduces the review time by 85 percent, from 170 days to 30 days per biological assessment.



*Since 2010, programmatic agreements have helped Nebraska streamline **712** projects.*

Construction Manager/General Contractor (CM/GC) is a project delivery method in which the project owner hires a contractor to work with the designer during the design phase to propose innovations and provide constructability advice to allow for faster and cheaper construction. Once the design phase is complete, the contractor and project owner negotiate the price for the construction contract and construction begins. The CM/GC process allows the project owner to evaluate new innovations and consider approaches to reduce time, cost and overall risk.

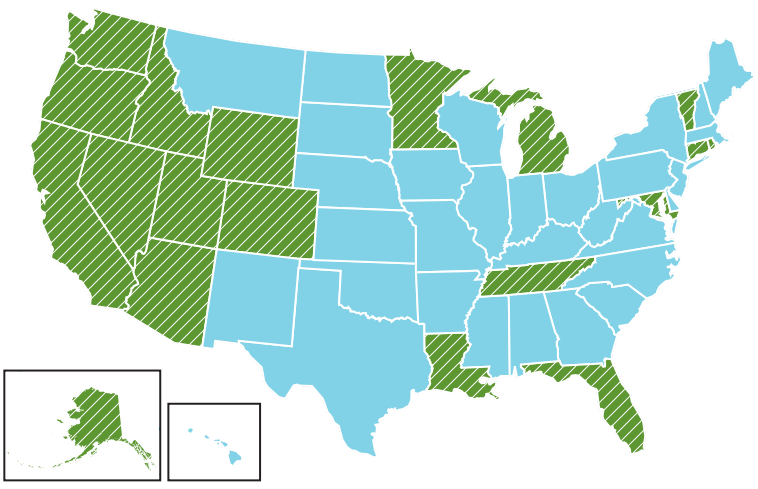
Colorado: The Colorado DOT is using the CM/GC method on five projects and recently approved its application on one more. The agency also created a project delivery method process matrix for determining which innovative contracting method is a good fit for a project.

Maine: To replace two washed-out bridges, the Maine DOT used CM/GC, which enabled it to construct a temporary bypass bridge in nine days and open permanent replacement bridges in 82 days.

Michigan: Using CM/GC, the Michigan DOT saved an estimated $4 million on the replacement of the bearings of the Zilwaukee Bridge using contractor innovations.

Oregon: Using CM/GC, Multnomah County saved $25 million and completed the Sellwood Bridge project one year earlier than if it were constructed using conventional methods.

Utah: The Utah DOT uses alternative delivery methods such as CM/GC to reduce risk and increase innovation on highway construction projects. CM/GC delivery on complex projects has resulted in cost and schedule reductions, increased public trust and greater political support for state funding on Utah highway construction projects.



States with enabling legislation for CM/GC

Environmental Sustainability

Warm-Mix Asphalt (WMA) is the generic term for a variety of technologies that allow producers of Hot Mix Asphalt (HMA) pavement material to lower temperatures at which the material is mixed and placed on the road. This reduces fuel consumption, greenhouse gas emissions and paving costs while extending the paving season and improving compaction.

- Forty-one State DOTs and all Federal Lands Highway Divisions have a specification and/or contractual language allowing WMA on Federal-Aid or Federal Lands projects.
- From 2009 to 2013, WMA use increased from 5 to 30 percent of the total asphalt produced. In the next three to five years, WMA is expected to increase to over 75 percent of total production.
- From 2009 to 2013, WMA is estimated to have saved over $600 million in fuel used during production – savings that contractors can pass on to state DOTs and local public agencies.
- In 2013, WMA is estimated to have reduced CO_2 emissions by 2 million tons (equivalent to taking over 200,000 vehicles off the road).

California: The California DOT adopted a standard WMA specification in March 2011 and is one of the largest volume WMA users in the nation.

Delaware: 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.

Kentucky: After Kentucky developed a specification in 2009, WMA is now a standard mix in the state. 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.

Louisiana: The Louisiana Department of Transportation and Development has adopted a standard specification for WMA. In 2012, over 2 million tons of WMA were placed in Louisiana. Also, 25 of the 41 asphalt plants in Louisiana now have WMA production equipment.

Minnesota: Minnesota has a specification in place for WMA and has used about 1 million tons of it to date.

New Hampshire: 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.

Virginia: 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.

Adaptive Signal Control Technology (ASCT) adjusts the timing of red, yellow and green lights to accommodate changing traffic patterns and ease traffic congestion – reducing fuel consumption and saving time for the driving public.

Prior to EDC, approximately 12 agencies were using ASCT. Under EDC, over 100 agencies are now implementing it.

Delaware: 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.

Kansas: The city of Topeka installed ASCT on its 21st Street corridor between Fairlawn Road and Wanamaker Road in 2011. The installation is estimated to save drivers 123,000 gallons of gasoline and eliminate 191,000 pounds of CO_2 per year. Crashes also dropped nearly 30 percent along the corridor during the system's first year of operation.

New Jersey: 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. This has resulted in 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.

South Dakota: The city of Sioux Falls installed a new ASCT system at 10 intersections on East 26th Street from Van Eps Avenue to Highline Avenue. The technology combines real-time traffic detection with real-time signal changes. As a result, drivers often experience shorter travel times and fewer stops. This system also has been proven to reduce fuel use and vehicle emissions and improve safety.

> *Adaptive signal control technology in the city of Topeka is estimated to save drivers **123,000** gallons of gasoline and eliminate **191,000** pounds of CO_2 per year.*

Enhancing Safety

High-Friction Surface Treatment (HFST) technology is applied to pavements to provide more surface friction in critical locations (e.g., sharp horizontal curves, steep hills, intersections) to help motorists maintain control, dramatically reducing the number of injury and fatal crashes.

California: Caltrans has completed 33 HFST projects and approximately 30 local agency HFSTs project will be completed in 2014. Caltrans estimates that 250-plus locations (state and local) will be treated with HFST by the end of 2015.

Kentucky: The Kentucky Transportation Cabinet applied HFST to an intersection approach on U.S. 25 in Knox County, reducing crashes from an average of 11 per year to five. KYTC applied HFST to a curve on Kentucky Route 22 in Oldham County reducing crashes from an average of 18 per year to just two. Kentucky installed and evaluated 25 additional HFST applications, resulting in crash reductions of 69 percent at these sites after at least one year.

Pennsylvania: The Pennsylvania DOT reports a before-and-after total crash reduction of 100 percent for its HFST trial projects over the three-to-five-year period after installation.

South Carolina: The South Carolina DOT reports a before-and-after total crash reduction of 57 percent for its HFST trial projects over the three-to-five-year period after installation.

Washington: The city of Bellevue installed the HFST "Tyre-grip" on a downgrade intersection approach often affected by icy weather conditions. After applying HFST, crashes at this intersection dropped 78 percent and costs associated with crashes declined by 83 percent.

> *After applying HFST, crashes at this intersection dropped by **78 percent**...*

The Diverging Diamond Interchange (DDI) design shifts crossroad traffic to the left side of the roadway between ramp intersections to eliminate the left-turn phase of the traffic signals, improving safety and traffic flow. Reconstruction of an existing interchange to a DDI configuration can often make use of existing infrastructure, resulting in substantial savings over other design alternatives.

Colorado: The Colorado DOT and the city of Grand Junction constructed a DDI at the I-70 and U.S. 6/50 interchange, doubling the capacity for left-turns and saving 70 percent of the costs of interchange alternatives.

Kansas: Kansas' first DDI, located at I-35 and Homestead Lane in Johnson County, will provide access to planned future development in the area, including an Intermodal facility, logistics park, and warehouse facilities. This new interchange will significantly improve safety because left turn movements do not conflict with opposing through movements.

Minnesota: To address the growing vehicular and transit demand, the Minnesota DOT, the Metropolitan Airport Commission and the city of Bloomington collaborated to build the first DDI in the world to have a light-rail transit line pass through the center of the interchange crossovers.

New York: The New York State DOT constructed the I-590 and Winton Road DDI project at a cost of $8 million, $4.9 million less than the partial cloverleaf configuration alternative. Construction of the DDI lasted only seven months, achieving a 50 percent reduction in total construction time.

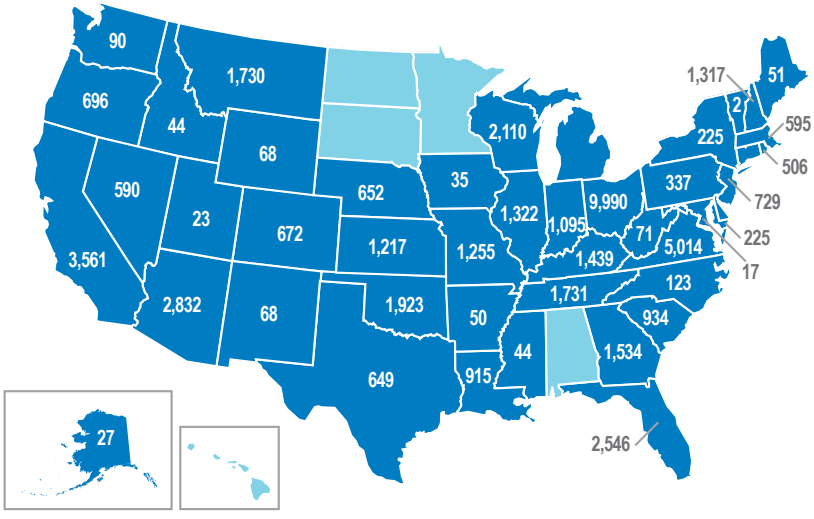
Wyoming: The new DDI located south of Cheyenne at I-25 and College Drive was built to improve safety and reduce traffic congestion. Traffic now moves onto and off of I-25 at nearly free-flow speeds, enhancing the operation of the interchange.

Ashford Dunwoody interchange at I-285, Georgia
Photo: Perimeter Community Improvement Districts (PCIDs)

The National Traffic Incident Management (TIM) Responder Training program educates first responders on best practices for handling incidents on our highways in a manner that minimizes impacts to traffic flow and enhances the safety of motorists and responders. Highway incidents, whether crashes, disabled vehicles or debris on the road, have numerous consequences. For each minute that a freeway travel lane is blocked during peak use, an estimated four minutes of delay results after the incident is cleared. Highway incidents account for 4.2 billion hours per year in delays and costs the U.S. economy $300 billion annually. Americans burn more than 2.8 billion gallons of gasoline every year while stuck in incident-related traffic.

TIM training provides first responders with the tools necessary to reduce these delays, enhance safety, and get traffic flowing as soon as possible following an incident on our highways.

> *Over **50,000** first responders have completed TIM training across the country.*

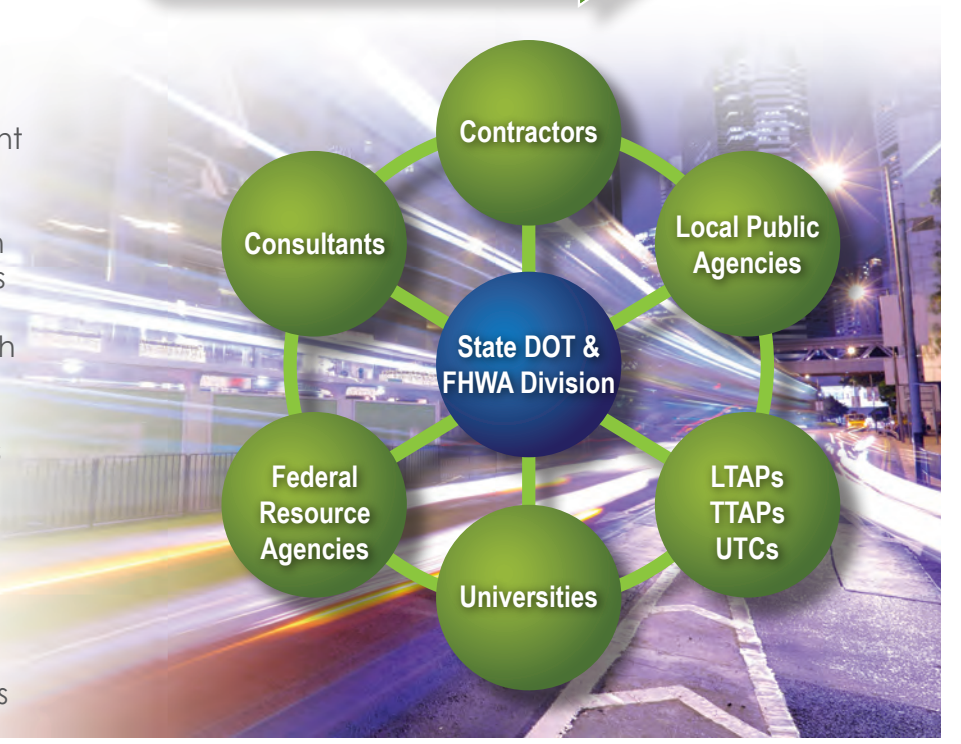


Number of first responders trained in each state

Creating an Innovation Culture

Through EDC, the highway community created a national innovation deployment network and established the foundation for a culture committed to innovation. Key components to this achievement are the state-based approach and the **State Transportation Innovation Council (STIC)** concept. A STIC is an established group of representatives from various levels of the highway community in each state tasked with comprehensively and strategically considering sources of innovation. The STIC puts the state in the driver's seat to select the innovations that best fit its unique program needs and quickly put those innovations into practice. With a STIC in each state, there is a national network to exchange best practices for widespread use of innovation across the nation.

STIC
State Transportation Innovation Councils



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