

# BETTER FASTER LOWER COST



A Performance Report of  
the Wisconsin Department  
of Transportation





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### Transportation is important to all of us.

At the Wisconsin Department of Transportation, we're committed to providing the safest, most efficient and highest quality transportation services to best serve the needs of the state, its citizens and many visitors. To meet this goal, we are focused on being more efficient and innovative. We're working to make the best use of the funding we have available. And we're always assessing what we do in order to improve. This report provides a snapshot of some of the ways we're striving to be better and to deliver our programs and services faster and at a lower cost.

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## PROGRAM MANAGEMENT

Of the approximately 114,800 miles of road in Wisconsin, about 11,800 miles make up the state highway system. While state and Interstate highways account for only 10 percent of the system, they carry 60 percent of all the traffic.

Management of the state highway program requires that we invest wisely and use federal funds efficiently. Most of our efforts are focused on preserving the existing highway system. A much smaller portion of funding is dedicated to projects that expand the highway capacity to improve safety and mobility.

### ► Using federal funds efficiently

Federal funds pay for approximately 40 percent of the state and local highway program. We are striving to make sure that federal funds are used in ways that minimize that burden, partly by avoiding their use on smaller and less complex local projects. We also plan our programs to ensure eligibility for redistribution of federal funds that have gone unused by other states. In 2014, we received an additional \$33 million of redistributed funds.

### ► Adjusting programs to accommodate changing priorities

As circumstances dictate, we periodically review the justification for planned projects that have not yet begun construction. If the scope of a project is no longer appropriate to the purpose and need, or if local support is lacking, we may recommend that projects be downsized or cancelled, thus freeing up funds for other more important priorities. For example, we've recently recommended the cancellation of two expansion projects valued at \$133 million—the Beloit Bypass in Rock County and WIS 38 in Milwaukee and Racine counties.

## ► Investing wisely

Every highway deteriorates over time. The key to a sound preservation program is doing the most cost-effective repair at the right point in the life of the pavement. We inspect our highways on a two-year cycle. That inspection data is used to create unique deterioration models for each highway segment. We use these models to identify the treatments that will add the most additional life to our roadways per dollar invested.



## RIGHT-TIME TREATMENTS TO PRESERVE HIGHWAYS AND SAVE MONEY

Just as a homeowner needs to make ongoing improvements to preserve the condition of their roof or driveway, periodic treatments must be done to preserve and extend the service life of a highway. If the treatment is not done at the optimal time, the benefit will be lessened, or in some instances, there will be no benefit at all and the road will need to be reconstructed sooner.

Pavement maintenance costs rise as pavement conditions worsen. For instance, chip sealing is a common treatment used to seal and stabilize the upper layer of pavement. Chip sealing or other minor repairs might cost as little as \$10,000 per mile. If the needs are greater, the highway might require a thin overlay, which could cost as much as \$120,000 a mile. Appropriate use of these less-costly treatments can delay the need for complete reconstruction, which may cost over \$1 million per mile.



## ► Balancing preservation and expansion

Preservation is one of our core performance goals. Specific measures monitor the condition of state bridges and highways. Some people argue that Wisconsin is over investing in highway expansion at the expense of preserving our existing highway system. The data tells a different story. Over 85 percent of state construction costs are typically for preservation-related improvements; less than 15 percent of the costs involve capacity expansion.

Expansion projects are aimed at improving safety and reducing congestion, and are typically the most costly and complicated. They undergo an extensive environmental study process that provides opportunities for the public to be involved in selecting a design alternative. We must justify how the selected alternative addresses the purpose and need for the project.



## TOWER AVENUE IN SUPERIOR

Modern roadway improvement projects can often address traffic needs and community objectives without expanding capacity. A 1.2-mile project on Tower Avenue (WIS 35) in the city of Superior addressed transportation goals, accommodated community priorities and received top honors from the Mid America Association of State Transportation Officials. The award recognized the project for contributing to the general quality of life and economic development of the community. Through close coordination with local officials who wanted to revitalize the downtown area, the \$13.4 million project converted an aging four-lane roadway into a two-lane facility which preserves the historic appearance of downtown Superior, provides safer pedestrian crossings and improves biking and parking.

## J-TURNS IMPROVE SAFETY

We're using a variety of new designs to improve safety and reduce congestion while avoiding or delaying the need for more costly investments. The J-turn is a safer alternative to a traditional intersection that is less costly than a full interchange on a four-lane highway. Instead of motorists crossing fast-moving traffic to get to the opposing lanes, drivers at a J-turn intersection turn right in the same direction of traffic, then make a U-turn just down the road, without ever driving against oncoming traffic.

The first J-turn in Wisconsin was built in 2011 on US 53 and County Highway B in Douglas County. In the eight years preceding construction, this site had 24 crashes, many of which were severe. In the three years since the J-turn construction, no injury crashes have been reported. In 2013, J-turns were built on WIS 29 in Brown County and WIS 23 in Sheboygan County. J-turns are now being planned for other locations.



## SYSTEM OPERATIONS

We're working to get the best value in the design, construction and operation of the state highway system. This means making sure high quality products and services are delivered in a timely fashion by a professional and proactive workforce.

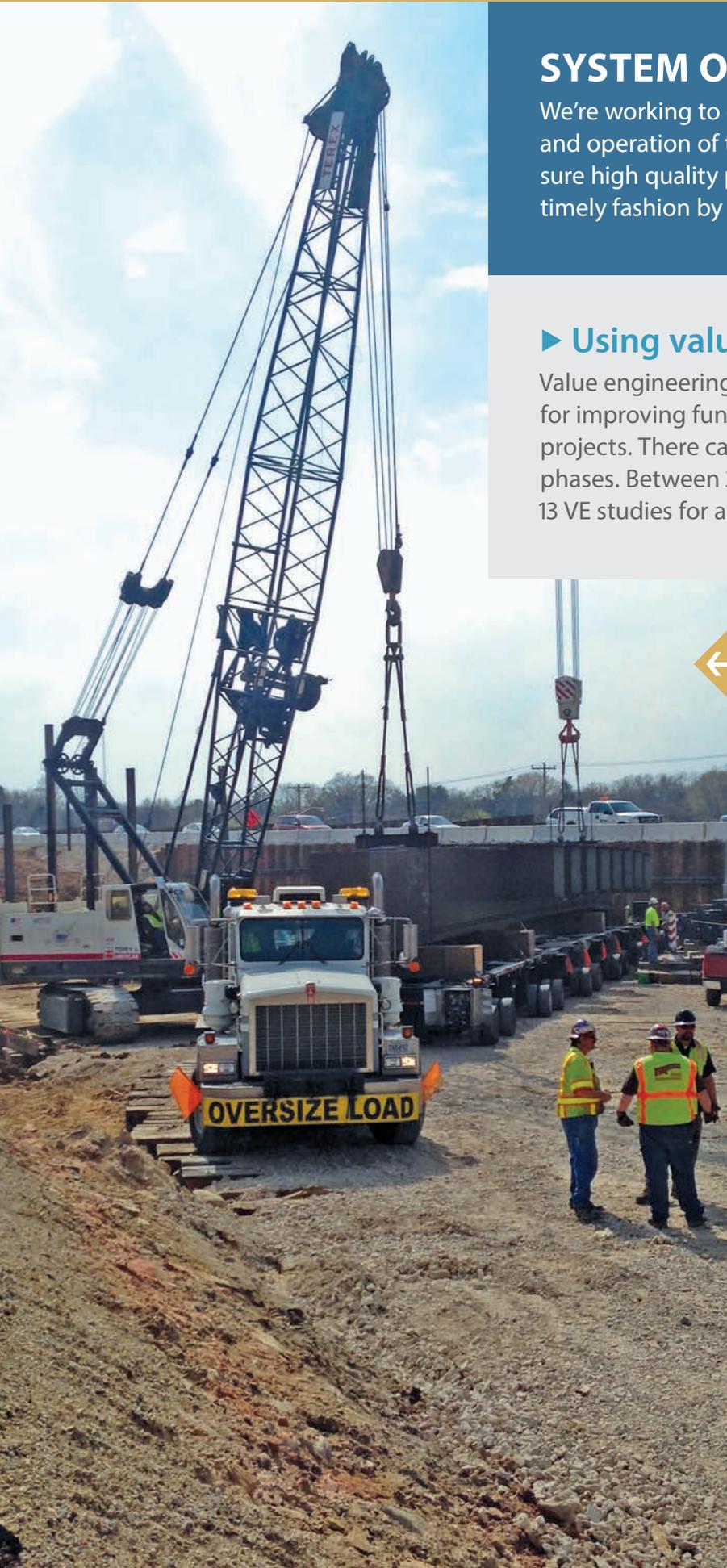
### ► Using value engineering

Value engineering (VE) is a nationally-recognized technique for improving function or reducing the cost of large highway projects. There can be savings in both the design and construction phases. Between 2011 and 2013, the department completed 13 VE studies for a cost savings of approximately \$53 million.



### US 18 VERONA ROAD IN MADISON

A VE study conducted in 2013 evaluated the second phase of this multi-year project between County Highway PD and Raymond Road. The study independently validated several key design decisions and suggested ways to manage construction. We expect the VE proposals to shorten the timeline for the project and reduce costs by over \$2 million.





## ► Providing cost reduction incentives

We're using a cost reduction incentive clause in contracts to partner with the design and construction industry to encourage innovative ideas for improved work methods, new products or equipment. Cost savings are shared between the state and private contractors. These incentives often provide secondary benefits by minimizing construction impacts on travelers or reducing materials used on the project. In recent years, over 30 cost reduction incentives have been awarded for an annual savings of \$2.5 million.



## I-94 NEAR BLACK RIVER FALLS

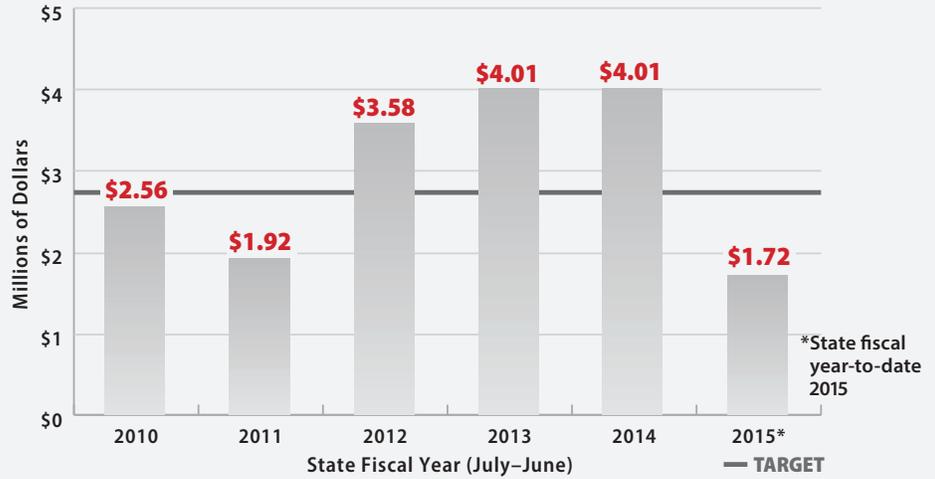
Hoffman Construction received a \$21.5 million contract to reconstruct the east and westbound lanes along 7.5 miles of I-94 near Black River Falls. The original project scope called for a two year project with reconstruction of eastbound lanes in 2014 and the westbound lanes in 2015. Hoffman submitted a cost reduction incentive proposal to complete the work in one year. The compressed schedule, combined with limited need for temporary roadways, resulted in cost savings of almost \$1.3 million.

## ► Selling surplus land

Parcels of land are acquired by the department as part of construction projects.

At times, there are surplus parcels leftover at the end of the project. We've placed a renewed emphasis on selling these parcels to recover costs and get them back on local tax rolls as soon as possible. Sale of the property also frees us from expenses such as lawn care and snow removal. We've established a goal to sell \$2.75 million in surplus land each year. In state fiscal 2014, we sold 113 parcels at a value of just over \$4 million.

**Figure:** Value of Surplus Land Sold



## SMALL LAND SALES PROVIDE BIG BENEFITS

The sale of small parcels of land can provide a big contribution to economic development. For example, as part of the US 41 Project in Brown County, the department acquired numerous parcels of land. In 2014, we sold a half-acre of surplus property to Fleet Farm for \$1.3 million. The company plans to use the property to expand its Green Bay store and create new job opportunities.

In another example, we had surplus property available near Marquette University in downtown Milwaukee. The university purchased the property for \$3.9 million and plans to use it for a campus expansion project.



## ► Implementing performance-based maintenance

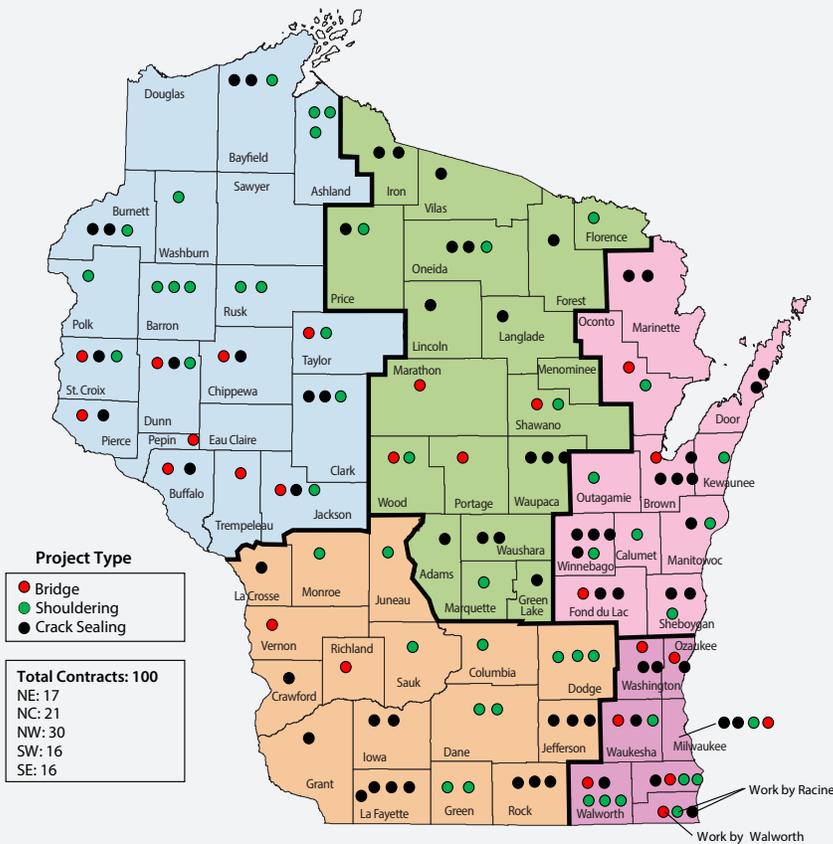
We partner with 72 county highway departments to perform winter and routine maintenance on state highways. In 2013, the department and the Wisconsin County Highway Association established a steering group to recommend changes aimed at lowering costs, improving efficiencies and providing more accountability. We are now piloting a collaborative process called performance-based maintenance (PbM). It is a proven way of effectively preserving roads and structures by identifying and standardizing best practices that can ultimately save money and improve quality.



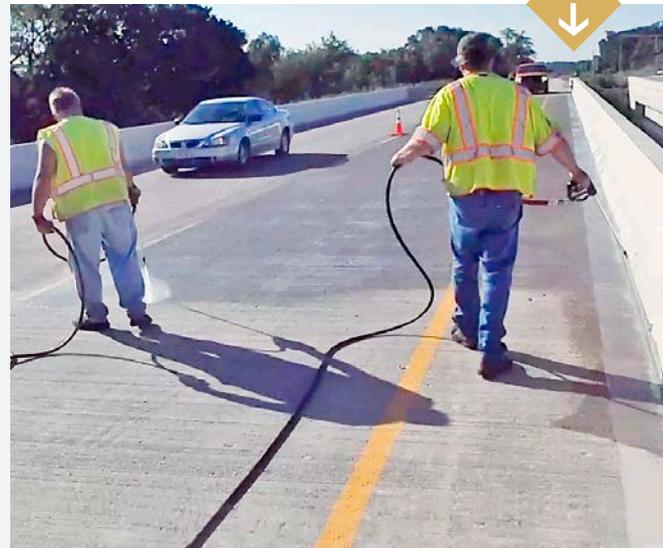
## BRIDGE MAINTENANCE TECHNIQUES SHORTEN TRAFFIC IMPACTS

Some counties have started using new techniques for sealing bridge decks with low-cost spray equipment. They have proven to efficiently and effectively apply deck sealant to bridges, resulting in shorter lane closures and less impact on traffic. The lessons learned from the early use of these techniques will be shared with all 72 counties to help reduce future maintenance costs.

## Performance-based Maintenance 2014 Pilot Projects



Number of Projects	NE	NC	NW	SW	SE	Totals
Bridge	3	4	9	2	7	25
Shouldering	7	6	17	11	8	49
Crack Sealing	17	16	12	15	9	69



## ► Creating a culture of continuous improvement

Our department's MAPSS Performance Improvement Program focuses on the five core goal areas of Mobility, Accountability, Preservation, Safety and Service. MAPSS is helping us be more transparent about the performance of the state transportation system and be a data-driven agency that makes cost-effective decisions.

In 2012, Governor Walker signed an Executive Order requiring every state agency to implement Lean strategies to support continuous improvement.

Lean Six Sigma is an internationally-recognized program that uses facts, data and statistical analysis to improve existing processes. Over 400 of our employees are trained to use Lean Six Sigma tools to analyze current practices with the goal to improve customer service, save time and taxpayer dollars.

To date, we've completed over 30 Lean projects with projected savings of \$1.5 million and 28,000 hours of staff time that can be redirected to other department priorities.

October 2014

# Wisconsin Department of Transportation MAPSS Performance Scorecard



Goal has been met



Performance is trending in a favorable direction



Trend is holding



Performance is trending in an unfavorable direction

Performance measure	How we measure it	Current report period	Goal	Goal met	Trend	Comments
<b>Accountability:</b> The continuous effort to use public dollars in the most efficient and cost-effective way.						
<b>Transportation Economic Assistance Grants</b> Calendar year-to-date 2014	Capital dollars leveraged per grant dollar provided	<b>\$60.09</b>	\$50.00	✓	↑	In the third quarter of 2014, the department leveraged over \$60 in capital investments for every \$1 in grant funds due to private capital investments that resulted in significant job creation and retention.
<b>Timely scheduling of contracts</b> State fiscal year 2014	Percent of highway program funding scheduled during the first six months of each fiscal year	<b>64.5</b>	60.0	✓	↑	DOT has made improvements to ensure our processes allow sufficient time for effective resource planning and competitive bidding. A new goal of 54 percent will be established in SFY 2015.
<b>On-time performance</b> Calendar year 2013	Percent of highway projects completed on-time	<b>96.1</b>	100.0		↑	Construction administration staff has stepped up efforts with project communication to head off problems and keep projects on-time.
<b>On-budget performance</b> State fiscal year 2013	Final highway project cost as percent of original contract amount	<b>102.7</b>	100.0		↓	Costs are impacted by quality and completeness of project designs, field conditions, weather and contract oversight (a lower number is better).
<b>Surplus property management</b> State fiscal year-to-date 2015	Dollar value of surplus land sold	<b>\$1.72 mil.</b>	\$2.75 mil.		↔	The surplus land sales measure is on track to meet the FY 2015 sales goal. Fifteen parcels were sold in the 1st quarter.



## CONSTRUCTION PROJECTS CLOSE-OUT FASTER

We oversee about 400 state highway and bridge construction projects a year. Both the department and contractors benefit by getting projects closed-out as quickly and efficiently as possible. A Lean project will ultimately increase the number of projects that are closed within six months of completion from 25 to more than 50 percent.



## HIGHWAY SIGN PROJECT POSTS BIG SAVINGS

It's a big job to keep up with the condition, replacement and installation of almost 300,000 signs along the state highway system. A Lean project focused on cutting costs by streamlining the sign delivery process. A comprehensive assessment found that signs could be shipped directly from the state sign shop to counties who install them, eliminating the need for a regional sign shop. By focusing on grouping sign replacements along highway corridors, the process became more efficient and cost effective.

These changes are expected to result in savings of approximately \$360,000 annually. More importantly, the process improvements enhance highway safety by allowing us to replace about 3,500 additional signs each year through a reinvestment of the cost savings.





## ► Enhancing Division of Motor Vehicle services

DMV serves over 50,000 customers every day by mail, phone, in person or online. We're working to make these interactions as quick and convenient as possible without increasing staff. Over 100 process improvements have been identified such as converting paper applications to electronic forms, introducing more automated services and developing on-line tutorials and wizards to assist customers and simplify the work flow.



## ONLINE OPTIONS PROVIDE 24/7 SERVICE

DMV continues to expand the number of services available to customers 24/7 at [www.wisconsin.dmv.gov](http://www.wisconsin.dmv.gov)

We invite customers to skip the trip to a service center for online services like these:

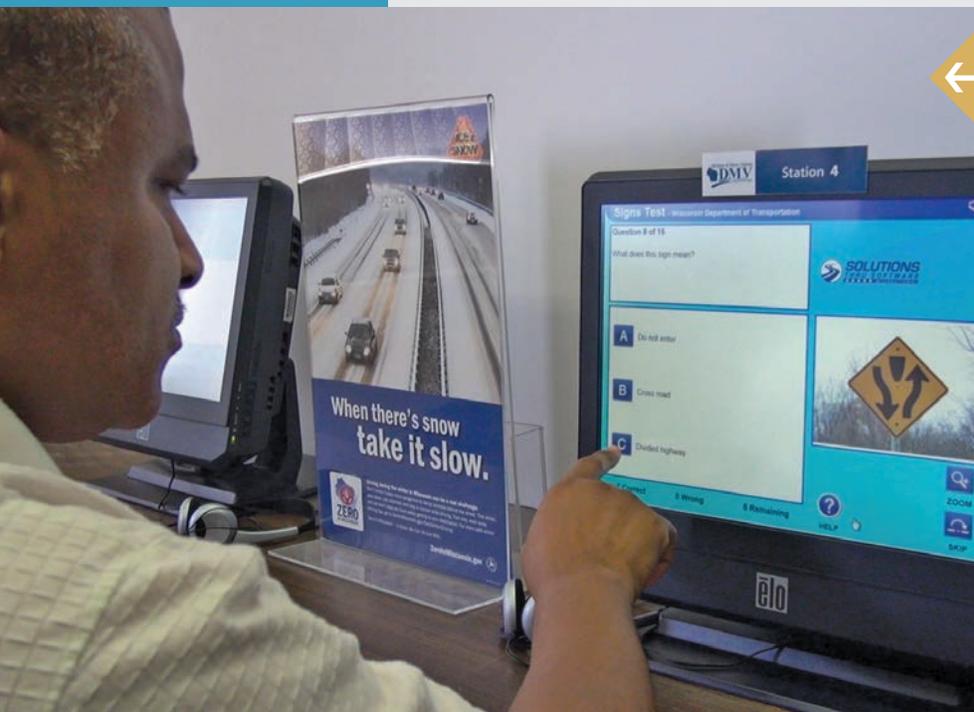
- Renew a license plate
- Title a vehicle
- Change an address
- Get a duplicate driver license
- Schedule, cancel or verify a road test
- Purchase a crash report



## DRIVER TESTS AVAILABLE WHEN NEEDED

There is great demand for driver license road tests. We have a goal to meet 90 percent of the estimated demand for test appointments four weeks before a customer's eligibility date. As the sole provider of these tests, it's critical to offer an ample amount of tests each week at DMV service centers.

In 2012, DMV had only 70 percent of appointments available four weeks in advance. In the third quarter of 2014, availability improved to 98 percent. This dramatic turnaround was done without the addition of staff. It was a direct result of a Lean project that analyzed data to predict the demand for driver skills tests at specific service center locations.



## INNOVATION, RESEARCH AND TECHNOLOGY

Our priority is to foster an organizational culture that supports innovative thinking and sharing ideas. We're focused on identifying opportunities for piloting, testing and adopting promising procedures, materials and technologies. This will lead to innovative approaches to complex issues, implementation of best practices and the deployment of modern tools. Combined, these efforts produce more efficient and timely delivery of transportation projects, safer public roads and higher-quality, longer-lasting infrastructure.

We advance research through the Wisconsin Highway Research Program and in other national and state pooled-fund efforts. The Federal Highway Administration (FHWA) has a number of programs to support innovation within state DOTs. These include Every Day Counts (EDC) and the Strategic Highway Research Program (SHRP and SHRP2).

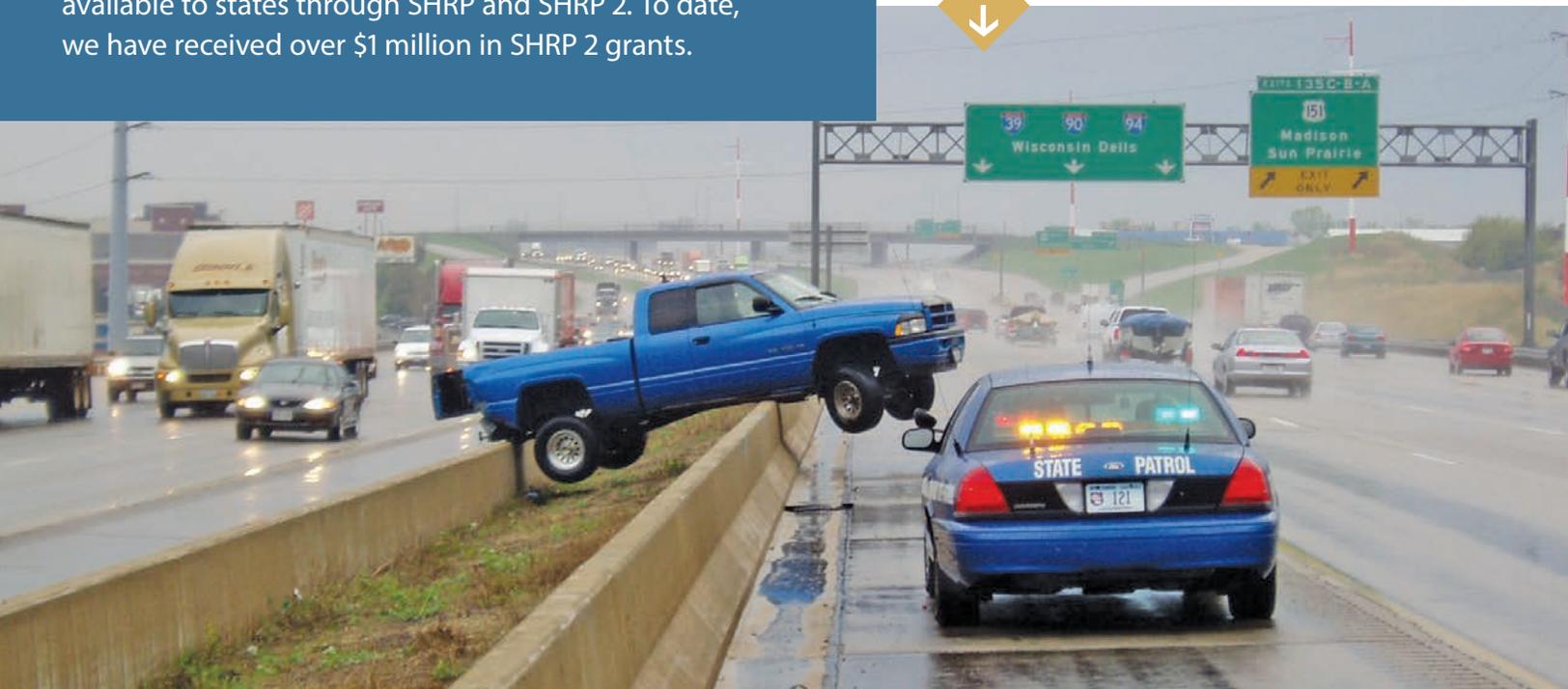
EDC supports innovations aimed at reducing the time it takes to deliver highway projects, enhancing safety and protecting the environment. WisDOT is one of the most active participants in the program, participating in 21 of the 25 EDC projects.

SHRP focuses on four key areas: safety, renewal, reliability and capacity. FHWA has made discretionary grants available to states through SHRP and SHRP 2. To date, we have received over \$1 million in SHRP 2 grants.

## FIRST RESPONDERS TRAINED TO MANAGE INCIDENTS

Traffic incidents like crashes and breakdowns create unsafe situations, putting motorists and responders' lives at risk. They also increase user delays, costs and harmful emissions. We are partnering with first responders statewide to expand outreach and training opportunities in the Traffic Incident Management (TIM) process, which is an EDC initiative.

Since 2012, over 3,000 first responders have been trained and equipped to instruct other agency personnel in responder safety, quick incident clearance and communication. We regularly host regional meetings with responders from law enforcement, fire and highway departments, towing companies and others to conduct incident debriefings and promote best practices. Through a partnership with the Department of Justice, TIM training will be mandatory for all new police recruits in 2016. We are also working with technical colleges to incorporate formal TIM training into fire service programs.





## ADAPTIVE SIGNALS EASE TRAFFIC FLOW

Conventional traffic signal systems use pre-programmed timing schedules which are not able to respond to the traffic demands of special events, construction or traffic crashes. Adaptive signal control technology, promoted as one of the first EDC initiatives, uses real-time traffic information to adjust the timing of signals to accommodate changing traffic patterns and ease congestion.

Adaptive controls are being used as part of the Zoo Interchange Project in Milwaukee. The project is adjacent to many businesses and tourism venues, along with the Milwaukee Regional Medical Center. Providing and maintaining adequate access to all areas is a key project goal and especially critical for the Medical Center. Adaptive signal controls were installed at 80 signalized intersections along WIS 100. During the afternoon peak period, northbound travel times decreased by 18 percent and southbound travel times by 14 percent. The value of time saved to travelers was over 30 times the cost of this project. WisDOT was recognized with an “Innovator of the Year” award for this outstanding effort to think outside the box. We are now using this technology on other projects.





## ABC'S OF BRIDGE CONSTRUCTION

Accelerated bridge construction (ABC) is dramatically changing the way we build bridges. Where conventional bridge construction takes months or years, a bridge utilizing ABC may be put into place in a matter of weeks, days or hours. ABC increases safety and quality, reduces traffic delays and road closures and can reduce project costs. Several ABC techniques are being used in Wisconsin.

A \$350,000 SHRP 2 grant provided the funding to use pre-fabricated bridge elements and systems for five bridges along the I-39/90 corridor. Because the pre-fabricated elements are built under controlled environmental conditions, the influence of weather is eliminated and product quality and long-term durability is improved. The practice also minimizes construction time and highway closures. The first structure at I-39 and Siggelkow Road is now complete. We're now considering using pre-fabricated bridge elements and systems on 60 other structures along the I-39/90 corridor, which could provide significant cost savings.



Another ABC technique is the self-propelled modular transporter (SPMT) used for the first time in Wisconsin on the replacement of the I-94 Rawson Avenue Bridge in Oak Creek. Over a four-week period in 2013, the aging bridge structures were demolished and two new bridges were constructed in a nearby staging area. During the overnight hours of June 14 and 15, a multi-wheeled SPMT was used to move the two new bridge spans (each weighing about three million pounds) into place.

The use of pre-cast bridge segments and SPMT technology reduced the overall bridge closure from about five months to only four weeks. The Interstate closure to install the bridge spans lasted just 12 hours. The compressed timeline saved an estimated \$8 million in user cost.



## 3D MODELS REDUCE COSTS

Our Southeast Freeway Team is leading the nation with the use of 3D models in both design and construction. The 3D models are used to review design concepts, develop visualizations of complex design elements, conduct clash detection (identify conflicts between the design and existing utilities, structures, etc.) and provide construction schedule, staging and cost information. The use of 3D models helps in the early identification of design and construction solutions which can significantly reduce costs and delays.

In July 2014, the department issued a design policy requiring all new projects with earthwork to include 3D surface models. Contractors use the 3D models in bid preparation, project planning and during construction with automated machine guidance equipment for grading and base course operations.

National reports show that use of 3D models can reduce construction costs an average of 20 to 30 percent when fully utilized.



## MOBILE APPS/DEVICES MAKE FIELD WORK MORE EFFICIENT

A pilot project now underway is investigating the potential benefits of using mobile technology (smart phones and tablets) in the field. Based on input and lessons learned from others states, the integration of mobile technology has the potential to provide numerous benefits, including increased productivity, quick communications and response to issues and time and cost savings. Pilot projects are also evaluating software applications on mobile devices to improve data collection and provide operational efficiencies.



## Wisconsin Department of Transportation

Providing leadership in the development and operation of a safe and efficient transportation system

