



## National Roadway Safety Awards

## Noteworthy Practices Guide









### Letter from the Administrator

U.S. Department of Transportation Federal Highway Administration

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Office of the Administrator

1200 New Jersey Ave., SE Washington, D.C. 20590

Letter from the Administrator

It is a privilege and an honor to formally recognize the tremendous achievements of the States, localities and agencies that were selected for 2011 National Roadway Safety Awards; each one of this year's entries demonstrated a commitment to save lives by improving our Nation's roadways.

This outstanding national awards program is the result of a long-standing partnership between the Federal Highway Administration and the Roadway Safety Foundation. It provides a national opportunity to showcase and share noteworthy practices in roadway safety among a broad range of partners and stakeholders. These achievements demonstrate that State and local officials are taking full advantage of the opportunities to help save lives provided by programs such as the Highway Safety Improvement Program. Bringing together local, State and Federal partners, we have achieved the lowest number of roadway fatalities nationwide in more than 50 years. There is more to be done. Safety is our number one priority and we will continue to develop and advance innovative and lifesaving measures to continue to bring those numbers even lower.

This noteworthy practices guide book features the 2011 National Roadway Safety Award winners. Each of the entries was carefully evaluated for innovation, effectiveness, and efficient use of available resources by a prestigious panel of roadway safety professionals.

Congratulations to all of the 2011 National Roadway Safety Awards winners!

Sincerely,

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Victor M. Mendez Administrator

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#### Infrastructure Improvements Using Micro Surfacing to Reduce Wet Weather Crash Rates





If the elevated bridge decks allowed the concrete deck to cool off faster than the surrounding pavement. In 1999, the Minnesota Department of Transportation (MnDOT) applied micro surfacing treatment to the bridges and approaches.

MnDOT analyzed crash data for the 10 years both before and after the application to determine the effectiveness of micro surfacing on reducing wet weather crash rates. Over a 20-year period, the combined average daily traffic (ADT) for both directions rose 65 percent, from an estimated ADT of 33,000 in 1988 to an ADT of 54,000 in 2009. However, wet weather crashes and total crashes decreased by 76 percent and 19 percent respectively after the placement of micro surfacing.

In looking at cost-effectiveness, MnDOT calculates an average cost of \$70,000 for all crashes and an average construction cost of \$2.30 per square yard for single course micro surfacing. Using these figures, the wet weather crash reduction has a payback ratio of 14:1 for every dollar spent. Local maintenance forces re-applied the micro surfacing after five years to insure high friction characteristics. If the time between re-application is lengthened to seven years, the payback ratio becomes 19.7:1. These analyses show that the use of micro surfacing was a cost-effective method for reducing wet weather crashes.

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Infrastructure Improvements Mississippi Cable Median Barrier Safety Initiative



he Mississippi Department of Transportation (MDOT) launched a cable median barrier safety initiative to reduce fatalities and the severity of crashes in a highly cost-effective manner. Initial results show lives saved and an outstanding return on investment.

The project was piloted in the early 2000s on segments of I-55 in northern Mississippi with especially high median-crossover crash rates. An immediate reduction in crash severity on I-55 led to the installation of cable median barriers on a 12-mile stretch of I-220 in metropolitan Jackson that had a long history of high crash rates. In fact, during construction, the cable was hit more than 20 times. Since the installation, there have been zero cross-median fatalities and the severity of crashes has been dramatically reduced. These results generated positive media coverage and won the widespread support of elected officials, MDOT management, and the public.

Next, MDOT installed a cable median barrier in Vicksburg on 6 miles of I-20, a major east-west Interstate Highway in the Southern United States. Again, the cable median barrier produced excellent results. MDOT's evaluation studies are quantifying a significant reduction of fatalities and severity after installation of a cable median barrier in each location.

In 2010, MDOT awarded more than \$20 million in cable median barrier contracts throughout the State. This resulted in 209 more miles of cable median barriers installed on stretches of Mississippi roadway with high crash rates. Another 150 miles of highway have been targeted for future phases of installation. As funding allows, MDOT plans to install cable median barrier on all interstates and access-controlled highways in the State.

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#### **Infrastructure Improvements**

Jones/Linn County Portland Cement Concrete Pavement Overlay With Safety Edge<sup>SM</sup>



R oadway departure crashes account for 53 percent of U.S. highway fatalities and 1 million injuries annually. Many of these crashes occur as a result of pavement edge drop-offs. Edge drop-offs often reduce vehicle stability, affecting a driver's ability to control a vehicle when it inadvertently leaves the paved driving area. In Iowa, the Jones/Linn County E34 project incorporated a solution proven to be effective – the Safety Edge<sup>SM</sup> – to address the potentially severe danger of roadway departure crashes that exists in Iowa and other states.

A study by Iowa State University found that a pavement edge drop-off may have been a contributing factor in approximately 18 percent of rural run-off-the-road crashes on paved roadways with unpaved shoulders, and that pavement edge drop-off-related crashes were twice as likely to result in fatalities as other crash types on similar roadways.

This project was located along a 2.7 mile stretch of a county highway that carries an average traffic volume of approximately 1,350 AADT. The county engineers of Jones and Linn Counties chose to incorporate the Safety Edge<sup>SM</sup> on this project in order to provide additional safety protection for a road segment that was on the list of Iowa's "High Risk Rural Roads" and to evaluate the constructability, quality, and performance of the Safety Edge<sup>SM</sup>. The project design included a 6-inch unbonded Portland cement concrete (PCC) overlay placed over an existing 6-inch PCC pavement. The overlay also included two 11-foot lanes with tied 2-foot shoulders plus a 9-inch wide, 30-degree sloped Safety Edge<sup>SM</sup> in both eastbound and westbound directions.

More widespread use of the Safety Edge<sup>SM</sup> has the potential to reduce lane departure crash occurrence and severity. Crash reduction factors indicate that the use of the Safety Edge<sup>SM</sup> has the potential to reduce crashes by 5.7 percent, making it a cost-effective countermeasure. It can also provide additional pavement edge stability, which may improve pavement life.

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Making Roadways Safer for Motorcycles

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n 2008, the Florida Department of Transportation (FDOT) Safety Office requested its motorcycle programs be reviewed by the National Highway Traffic Safety Administration. The result was the formation of a motorcycle safety coalition, the development of a Motorcycle Strategic Safety Plan with 11 emphasis areas, and a plan to track implementation and status of the initiatives.

Members of Florida's motorcycle safety coalition, which includes state and local engineers, made a recommendation to produce a 10-minute training DVD that calls attention to common road conditions that challenge motorcycle riders. The video shows how motorcycle riders react to different roadway conditions including grates, potholes, ridges, steel plates, pavement markings, grooved surfaces, loose gravel, lane changes, and drop-offs in work zones. The video also enables viewers to understand more clearly how a motorcycle rider reacts when encountering these various roadway conditions.

Motorcycle safety continues to be a concern in Florida. In 2008, 532 motorcycle riders and their passengers were killed on Florida roadways. In Florida, motorcyclists account for 6 percent of the motoring public, but make up 17.8 percent of all fatalities. In 2009, those numbers dropped by 13 percent to 402 fatalities and just 15.7 percent of all roadway fatalities. Developing a Motorcycle Strategic Plan and identifying safety countermeasures continues to be an emphasis area for FDOT, whose goal is to continue to reduce motorcycle fatalities. Infrastructure changes often take years to program and build, with the use of the DVD, the problems identified can be used in numerous training sessions throughout Florida and can be provided to engineers and engineering groups in a relatively short time.

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### **Operational Improvements**

Evaluation of Moveable Barriers in Construction Work Zones



he 3500 South Reconstruction Project in Utah consisted of reconstructing and widening a 1.7-mile arterial from six lanes to an eight lane facility to provide two lanes in the center median dedicated for the first Utah Transit Authority Bus-Rapid Transit Line. The average annual daily traffic ranges from 39,000 near Bangerter Highway to 48,800 at the Interstate 215 interchange. Reconstruction included new curbs, gutters, and sidewalks to further facilitate the safe flow of pedestrian traffic.

The project began in November 2008 and ended in June 2010, seven months ahead of schedule. One side of the highway was completely closed for construction while traffic was diverted to the other side. Phase I of the traffic control plan called for two lanes of traffic to be open in each direction, utilizing plastic barrels to separate directional traffic and delineate the work zone. The work zone was confined, inefficient, and lacked positive protection for workers, creating dangerous conditions. Furthermore, confused motorists would occasionally turn into the work zone, and crashes occurred when drivers made left turns through the barrels into businesses, contributing to the congestion.

During the second phase of construction, the Utah Department of Transportation (UDOT) implemented a "reversible lane with a moveable barrier." The moveable barrier system consisted of one-meter sections of highly reinforced concrete pinned together at each end to form a continuous barrier wall. The barriers had a modified "T" top, which acts as a lifting surface for the transfer machine. A barrier transfer machine lifted the barrier and passed it through an inverted conveyor system, laterally transferring the barrier from 4 to 18 feet in a single pass.

The moveable barrier was deployed on a 1.7-mile stretch of the work zone as a positive barrier separation between east and westbound traffic. It was moved multiple times daily to create 1-2 and 2-1 traffic patterns based on peak traffic needs. The barrier was laterally transferred 12 feet in a single pass at 5 miles per hour. The transfer took approximately 20 minutes to complete (including repositioning signage and traffic control devices). As one of the first applications in the country on a highly congested urban arterial, the moveable barrier positively separated workers and motorists; enabled a larger, more efficient work zone in the off peak periods to help accelerate construction; and resulted in zero work zone encroachments by motorists into the work area.

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**Operational Improvements** Safety Patrol Sponsor-Partnership



While the Safety Patrol Sponsor-Partnership, Travelers Marketing identified a highly effective transportation program with untapped sponsorship value and forged partnerships with companies whose business interests and corporate missions aligned with the program's safety objectives. The partnership exists among State departments of transportation and toll road authorities; the private-sector, sponsor companies, and Travelers Marketing. Travelers Marketing identifies the sponsorship elements, assembles the private partners, leads them through the procurement process, and implements and manages the sponsorship program throughout the term.

Ongoing State fiscal crises have reduced or eliminated funding for these programs. The partnership program, however, uses private sector resources to offset the cost of operating the patrols.

The first Safety Patrol Sponsor-Partnership was developed in Massachusetts in 2002. Since then, six other states, including Florida, Pennsylvania, Georgia, New York, Maryland and Kansas, have joined the program. Sponsorship revenues enable States to sustain the program when they otherwise would not be able to do so, or to expand geographic coverage and hours of operation. Through this sponsorship program, what was previously a significant DOT expense now generates in excess of \$30 million for participating States over the term of the current partnerships. These funds are typically reinvested into new safety patrol vehicles, equipment, and drivers.

In addition, the Safety Patrol Sponsor-Partnership program increases public awareness of roadway safety by leveraging the public relations and marketing capabilities of private industry to spread the roadway safety message. Public awareness activities include a launch event announcing the sponsorship that was attended by the State's governor or other high ranking officials, promotion from the sponsor company through events and photo opportunities, newsletters, and die cast models of the patrol vehicles. Safety Patrol drivers also have brochures to distribute.

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#### **Program Planning, Development and Evaluation**

California's HSIP Application and Evaluation Tool for Local Roadways



### Project Application Tool



Results from HSIP - Cycle 4 Top Funded Countermeasures (by %)



alifornia has roughly 10 percent of all roadway fatalities in the United States, with 57 percent of those occurring on local roadways. The California Department of Transportation (Caltrans) has a wellestablished process for identifying and constructing safetyimprovement projects on their State's highway system. In contrast, local roadway safety improvement projects are identified and scoped by the more than 600 individual local agencies eligible for Federal Highway Safety Improvement Program (HSIP) funding. Eligible agencies range from larger agencies with established safety evaluation processes and dedicated roadway safety staff to smaller rural agencies with little or no in-house highway safety experience, no evaluation processes, and no funding set aside for roadway safety projects.

One of Caltrans' long-term objectives has been to improve the safety of California's local roadway network by assisting local agencies in selecting projects with the maximum safety benefit. With the goal of making the local roadway HSIP entirely data driven, Caltrans' Division of Local Assistance (DLA) staff developed the HSIP Tool through a partnership with the University of California Berkeley's Safe Transportation Research and Education Center and with members of California's Strategic Highway Safety Planning team.

The result is a user-friendly HSIP Tool that makes fair and reliable statewide project selections following Federal guidelines for proven safety countermeasures. The tool also encourages local agencies to put a greater emphasis on roadway safety through network analysis and low-cost safety projects, and works within the context of the State's inconsistent, and not always reliable, local roadway safety data.

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**Program Planning, Development and Evaluation** Smart Roadside Inspection Program



he challenge for Commercial Vehicle Enforcement (CVE) has been keeping up with the growth in commercial vehicles. There are more than 12 million registered commercial vehicles in North America today, and the number is growing.

The number of inspection personnel has not grown proportionally however, and increasing the number of random inspections is not sustainable. Additionally, the traditional preliminary screening methodology of forcing vehicles to stop interferes with the flow of commerce, putting additional pressure on inspection personnel.

New Mexico's Smart Roadside Inspection System Program is based on objective free-flow inspection systems and management tools. Traditional inspection is limited by a fixed number of CVE inspectors screening "unsafe looking" or randomly-selected trucks. Electronic screening is based on objective testing criteria which helps level the playing field. Multiple roadside sensors allow automated data collection from passing vehicles without creating transportation slow-downs or stoppages. The sensors can be deployed in conjunction with existing technology.

When the sensors identify a high-risk vehicle, it is checked against safety and security databases for alert flags for enforcement operations. Because this is done automatically, the Smart Roadside Inspection Program allows CVE personnel to focus their resources more efficiently and effectively on trucks that pose the most risk to transportation safety and security without interfering with the flow of commerce. It rewards responsible carriers with free-flow travel and also motivates those who do not maintain or insure their fleets to comply with the law.

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**Program Planning, Development and Evaluation** Minnesota County Road Safety Plans (Joint award with Wright County Highway Department)





innesota's 2007 Strategic Highway Safety Plan noted more than half of the State's traffic fatalities occurred on local roads, which are operated by local communities and counties. Meeting the statewide Toward Zero Deaths goal would not be possible without reducing crashes on those systems.

County highway departments in Minnesota generally do not have experience with carrying out system-wide crash analyses or linking crash causes with mitigation strategies at specific locations. The County Road Safety Plans (CRSP) Program was initiated by the Minnesota Department of Transportation (MnDOT) to more effectively involve local highway agencies in the safety planning process and to provide these agencies with the technical assistance needed to apply for State and Federal funding successfully.



Typically, locations on county roads do not experience the number of crashes that are high enough to identify them as candidates for improvement under traditional safety planning processes. The CRSP process includes a crash analysis and system-wide risk assessment of road and traffic characteristics for each county. The results of this process are used to identify low-cost, infrastructure-based safety projects for specific at-risk locations on county roads. MnDOT then works with county engineers to prioritize projects and familiarize them with the safety project development and the Highway Safety Improvement Program solicitation processes.

The first set of 20 county road safety plans completed identified \$70 million worth of projects equating to \$3.5 million per county. About 90 percent of these projects focused on roadway departure crashes. Minnesota receives approximately \$20 million per year in HSIP funds and targets 65% toward local roads based on the distribution of fatal and serious injury crashes.

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#### **Program Planning, Development and Evaluation**

Wright County Highway Roadway Safety Program (Joint award with Minnesota Department of Transportation)





ver the past few years Wright County Minnesota has become one of the fastest growing counties in the Nation. The county is responsible for 520 miles of highways, and safety is a top priority for the Wright County Highway Department, which has initiated a number of safety programs and strategies in order to minimize injuries and fatalities.

Two critical safety emphasis areas have been roadway departure crashes and intersection crashes. A variety of projects have been employed including improved pavement markings and signage and ITS technologies such as intersection warning systems, a curve warning system, and driver feedback speed limit signs. These engineering safety improvement projects have contributed to a 34 percent reduction of fatal and serious injury crashes since 1997.



Public awareness also has improved the effectiveness of Wright County's safety programs. Wright County has proactively engaged the local media and has been an active participant in the statewide Toward Zero Deaths Program Team and other safety organizations. As a result, a positive change in the safety culture has been created in Wright County.

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he Houston District of the Texas Department of Transportation (TxDOT) recently completed the FM 1960 Median Improvements Project to improve mobility and safety along approximately 8 miles of FM 1960. The project included construction of raised-curb medians, channelized left-turn bays, signal improvements, and striping.

FM 1960, which serves as the primary east-west thoroughfare in Harris County, has a daily traffic count of approximately 65,000 vehicles, 50 cross streets, 36 signals, and a driveway density as high as 49 driveways per mile in a mixed-use area that includes commercial, retail, and residential developments and a high population density. Prior to the improvements, FM 1960 was primarily a multi-lane concrete roadway with a curb and gutter and a continuous center left-turn lane. Many sections operated at a level of severe congestion, which was compounded by the large number of driveways and other obstructions. Only 2 sections along the entire 8-mile corridor had raised medians.

Before construction began, a 3-year study documented 2,171 crashes on the corridor, some 217 percent higher than the statewide average. Between 1998 and 2000 there were a total of 2,316 total crashes, with 42 percent occurring at intersections and 58 percent at driveways. On the 2 existing sections of roadway containing raised medians, however, there were only 123 crashes per mile - 17 percent fewer crashes than on those sections with a continuous center left-turn lane.

TxDOT completed the safety improvements project in the fall of 2010. Early results show a reduction in conflict points and more efficient traffic operations. However, sufficient crash data is not yet available to fully assess this project. Law enforcement officials in the area believe the project will reduce crashes and help emergency vehicles reach their destinations along the corridor more quickly. Modeling data in the FM 1960 Access Management Study indicates the improvements will reduce travel time by an average of 16 percent, delays by an average of 40 percent, and the number of stops by 45 percent.

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eveloped, maintained, and led by the New Jersey Local Technical Assistance Program (NJ LTAP) at Rutgers Center for Advanced Infrastructure and Transportation, the Work Zone Safety Education Program has a 20 year history of providing a multi-level, interactive, and state-certified collection of educational training courses. For the past 12 years, the program also has included a major statewide annual conference for State transportation agency officials, law enforcement, highway construction managers, work zone personnel, engineers, and highway contractors to help reduce work zone related injuries and fatalities.

As the only work zone curriculum recognized by the New Jersey DOT (NJDOT), the program offers specified instruction on an annual basis to more than 1,000 work zone safety professionals at convenient locations statewide with little or no cost to the attendee. To a degree, New Jersey credits the increased availability of training through the program to a 50 percent decrease in work zone worker fatalities since 2007, despite a concurrent increase in highway construction projects.

Each year, the work zone safety training sessions and annual conference are updated based upon partnership and attendee feedback to provide access and up-to-date educational materials to incoming students. Because of this, the Work Zone Education Program does not simply develop and offer training, it serves as a "watchdog" for work zone-related issues and continually advances the program in an effort to increase safety in and around work zone areas.

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#### The 2011 Blue Ribbon Panel

We are especially grateful to the esteemed panel of Blue Ribbon Judges who have supported this program. Their contributions of expertise, time, talent and vision have been extremely important in ensuring the continued success of this program.

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U.S. Department of Transportation Federal Highway

Administration

#### The Federal Highway Administration

The FHWA Office of Safety's mission is to significantly reduce highway fatalities and serious injuries by making our roads safer through a data-driven, systematic approach to putting safety first when applying engineering, education, enforcement, and emergency medical services. Focus areas include: Comprehensive Strategic Planning, Roadway Departure, Intersections, Pedestrians and Speed Management. Visit: http://safety.fhwa.dot.gov

US Department of Transportation Federal Highway Administration 1200 New Jersey Avenue SE Washington DC 20590 Tel. 202.366.2288

http://safety.fhwa.dot.gov



#### **The Roadway Safety Foundation**

The Roadway Safety Foundation is a 501(c)(3) nonprofit charitable and educational organization solely dedicated to reducing the frequency and severity of motor vehicle crashes by improving the safety of America's roadways. To this end, the RSF focuses on improving the physical characteristics of roadways, such as design and engineering, operating conditions, removal of roadside hazards, and effective use of safety features.

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