

The Four Pillars of FoRRRwD



Source: FHWA



SAFETY ACTION PLANS

Roadway departures (aka lane departures) on the rural road network account for one-third of traffic fatalities. The FoRRRwD (Focus on Reducing Rural Roadway Departures) initiative encourages a systemic application of countermeasures that help keep vehicles in their travel lanes, reduce the potential for crashes, and decrease the severity of crashes that do occur.

FoRRRwD is supported by four pillars that work together to reduce rural roadway departures:

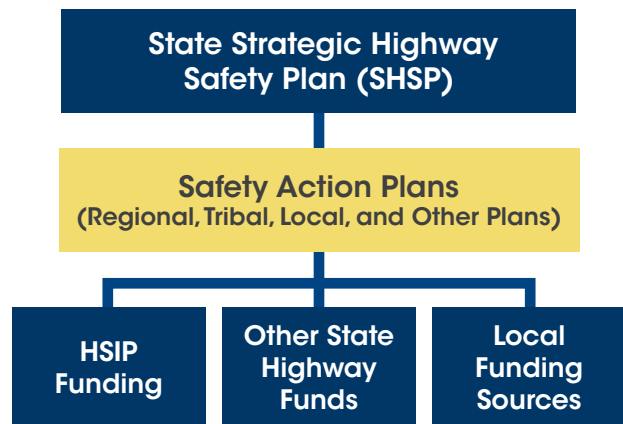
- ▶ Proven Countermeasures
- ▶ Systemic Approach
- ▶ **Safety Action Plans**
- ▶ All Public Roads

Reducing rural roadway departure crashes requires an integrated, disciplined approach. A Safety Action Plan is a strategic way to prioritize safety improvements. A written plan will also help with to:

- ▶ Communicate with stakeholders.
- ▶ Justify safety investment decisions.
- ▶ Access funding.

How a Safety Action Plan fits in:

Safety Action plans can be statewide, regional, local or tribal and can provide a critical link between a State's Strategic Highway Safety Plan and the funding that is available for improvements.



30 people will die today from rural roadway departure crashes. Let's save the people behind the numbers.

<https://safety.fhwa.dot.gov/FoRRRwD/>

Noteworthy Practices

The following are examples of State, local and Tribal agencies that have successful safety action plans. By planning ahead, these agencies were able to make thoughtful investment decisions based on prioritized safety improvement needs. The results have led to safer roads with fewer roadway departure fatalities and serious injuries.

Statewide Roadway Departure Action Plan *Kentucky*

In 2010, FHWA supported Kentucky in developing the Statewide Roadway Departure (RwD) Action Plan, as part of the Focused Approach to Safety initiative. As a result of this plan, the Kentucky Transportation Cabinet (KYTC) installed rumble strips and high friction surface treatment (HFST) on primarily State roads with functional class "Collector" or higher. The State evaluated these countermeasures and achieved a benefit-cost (B/C) ratio for center line and edge line rumble strips up to 65:1 and up to 44:1 for HFST. These findings led KYTC to adopt rumble strips into policy and the countermeasure is now systematically integrated into the State's resurfacing schedule.

KYTC then took the next step by developing a suite of safety performance functions (SPFs) used in network screenings for proven countermeasures, such as cable median barrier and HFST. This tailored network screening uses crash types and facility types that correlate with where these countermeasures are most effective (e.g., wet-weather curve crashes for HFST, median crossover crashes on interstate freeways for cable median barrier). This approach allows KYTC to eliminate non-RwD crash types to focus on locations with the most potential for safety improvement.

KYTC is building on the success of its Statewide RwD Action Plan with an ongoing RwD crash analysis at the District level. These studies will investigate each District's RwD safety challenges (e.g., risk factors and hot-spots) using a systemic approach and the State-specific SPFs to identify potential projects. KYTC has a goal to allocate HSIP funds 50/50 for systemic and site-specific projects across the State.



Figure 1. Center line and edge line rumble strips on a horizontal curve in Kentucky. Source: KYTC.

Toward Zero Deaths through Regional Safety Plans *Michigan*

In 2013, Michigan adopted the mission of Toward Zero Deaths (TZD) on its roadways. Since then, the Michigan Department of Transportation (MDOT) and other transportation agencies have fully embraced implementation of TZD as a safety program and developed several related action plans. Each of the seven MDOT Regions have developed TZD implementation plans focusing on the highest concentration of crash types including lane departure, intersections, and pedestrians/bicyclists. MDOT's Traffic and Safety Section created and is actively tracking a TZD Strategic Plan for the purpose of increasing awareness of MDOT's TZD efforts within the State of Michigan.

For local roads, MPOs, cities, and counties are engaged in TZD efforts through the development of Regional Traffic Safety Plans (RTSPs). The 14 RTSPs follow the framework of SHSPs, bringing together a multidisciplinary group of stakeholders to review crash data, identify emphasis areas, determine strategies to reduce fatalities and serious injuries, and develop a list of high-risk locations for potential projects. For the FY2019 HSIP Call for Projects, MDOT allocated \$3 million of safety funds for local agency projects identified in RTSPs. New for the FY2023 cycle, MDOT created a Streamlined Systemic Application to help local agencies address lane departure crashes on a larger systemic basis using proven countermeasures such as horizontal curve delineation, rumble strips, and edge line pavement markings. Projects that were identified in an RTSP receive additional points during the scoring process.

As a result of the RTSPs, Macomb County installed sinusoidal center line rumble strips on 50 miles of roadway and Kalamazoo County constructed 3-foot paved shoulders, removed trees, modified guardrail, improved ditching, and added edge line pavement markings to a 2-mile segment.



Figure 2. Example RTSPs in Michigan. Sources: SEMCOG, GVMC.

Strategic Tribal Transportation Safety Plan *Organized Village of Kasaan, Alaska*

The Organized Village of Kasaan (OVK) identified the need to formulate and implement a Strategic Tribal Transportation Safety Plan to identify opportunities to reduce fatalities and serious injuries on Kasaan's transportation network. The development and implementation of the Safety Plan was funded through the FHWA Tribal Transportation Program Safety Fund (TTPSF). This Safety Plan serves as a comprehensive source for OVK to identify and address transportation risk factors that have potential for serious injury or death. The Safety Plan reviews existing safety activities, identifies areas with opportunity for improvements, and recommends strategies to address the opportunity areas.

Kasaan Road is an essential facility and is the only road in and out of Kasaan, making safety improvements a priority for OVK. The road is a school bus route and used by residents for work both in and out of Kasaan. Due to limited law enforcement coverage on this remote island, the majority of crashes on the Kasaan transportation network are not reported. OVK collected crash data including locations identified by maintenance workers, tow truck operators, and citizens on a pin map. They then conducted two road safety audits (RSAs) on Kasaan Road, leading to the identification of locations with the most potential for safety improvements.

OVK established a local coordinating committee that consists of multiple directors within OVK that make important decisions involving the Safety Plan. The coordinating committee meets on a regular basis to analyze any new data, evaluate the success of the Safety Plan, determine if changes to the strategies are needed, and report back to OVK.

Through these strategic safety planning efforts, OVK identified the need for roadway departure improvements along Kasaan Road. Since this is a gravel road, many other RWD countermeasures could not be installed, but the plan found locations where guardrail would reduce the risk of severe injuries. In 2018, a TTPSF grant was awarded to install guardrail along a 1.5-mile section of the road that had been identified as a priority. The village also intends to implement additional countermeasures to address roadway departure in the future.

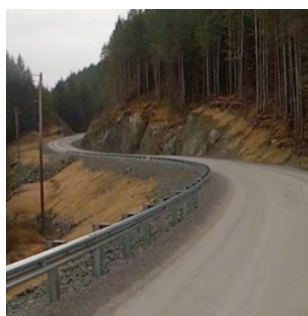


Figure 3. Guardrail installed in front of a steep slope on Kasaan Road. Source: FHWA.

Safety Plans Through a Regional Approach *Connecticut*

Connecticut has nine Councils of Governments (COGs) that cover the State and include 169 independent towns and cities with various transportation safety needs. While the Strategic Highway Safety Plan (SHSP) produced strategies and actions across the entire State, the COGs desired tailored plans specific to their regions and have begun developing Regional Transportation Safety Plans (RTSPs). As of 2021, four RTSPs are complete, and the remaining plans are in development.

RTSPs address safety concerns in two sections, (1) regional action plans and (2) municipal reports for each town in the region. The regional action plan provides countermeasures that should be prioritized across the region based on a data-driven analysis. For example, the Northwest Hills Region's action plan recommends edge line rumble strips with bicycle gaps, pedestrian improvements, speed mitigation, and enhanced delineation at horizontal curves. The municipal reports include Town-specific crash data, local stakeholder input, high-crash intersections and corridors, images from field visits, and countermeasure considerations (with relative costs). The RTSP includes a range of roadway departure strategies for improving safety, such as enhanced curve signage, center line and edge line rumble strips, high friction surface treatments, roadside management of vegetation and fixed-objects, cable median barrier and guardrail, as well as enforcement and education strategies. The RTSP also lists potential funding opportunities specific to municipalities to implement projects stemming from the plan.

As a resource to implementing RTSPs, the Connecticut Technology Transfer Center's Safety Circuit Rider Program provides technical assistance to local agencies at no cost to municipalities. Activities include countermeasure research, educational programs, technical assistance, and various training opportunities.



Figure 4. Cover of the Northwest Hills RTSP. Source: NHCOC.



Figure 5. Before and after views of the Elmore County road safety project. Source: Elmore County, AL.

Alabama's First Local Road Safety Plan

Elmore County, Alabama

Elmore County piloted the State's first local road safety plan (LRSP) with support from the Alabama Department of Transportation (ALDOT). This data-driven plan analyzed five years of crash data through a network screening process with specific performance metrics selected for Elmore County. The data showed that 83 percent of the fatal crashes on county-maintained roads are roadway departure. Analysts gave a composite score for each roadway, road segment, and intersection based on safety performance. This scoring identified Burt Mill Road, a 4.1-mile major collector route for a High-Risk Rural Road safety project.

This project retained the existing lane widths while adding 2-foot paved shoulders and thermoplastic striping. The county chose this countermeasure based on a previous study that found that adding 2- to 4-foot shoulders reduced crashes by 28 percent and had a benefit/cost ratio of 53:1.

Based on the success of Elmore County's plan, FHWA has been assisting 10 other counties in Alabama to develop LRSPs and the State plans to provide assistance to an additional 15 counties in the future using a combination of State Technology Investment Council (STIC) incentive and HSIP funding.



Figure 6. Chevrons are one countermeasure featured in many LRSPs. Source: Nevada County, CA.

Planning to Improve Local Roadway Safety California

In California, over 800 people die each year due to a roadway departure on rural roads. Over 60 percent of rural roadway departures occur on local roads. To address this issue, the California Department of Transportation (Caltrans) is dedicating \$18 million of its safety funding for local agency roadway safety improvements, with \$8 million dedicated to assisting local agencies develop their Local Road Safety Plan (LRSP). The next HSIP Cycle (beginning around April 2022) will require an LRSP or equivalent (e.g., Systemic Safety Analysis Report or Vision Zero Action Plan) for agencies to apply for HSIP funding. LRSPs identify a 4E approach (engineering, education, enforcement, and emergency medical services) to local agencies' safety priorities. The process of preparing an LRSP creates a framework to systemically identify and analyze safety problems and recommend safety improvements. Developing an LRSP facilitates local agency partnerships and collaboration, resulting in a prioritized list of projects and actions that contribute to the goals of California's Strategic Highway Safety Plan (SHSP).

FHWA supported Caltrans in developing LRSPs in six counties. These counties then assisted other counties in the State through peer exchanges, statewide webinars, and trainings, which allowed the six counties to share their successes and lessons learned regarding LRSP development. These outreach and technical assistance activities have resulted in over 313 local agencies in 23 counties that have completed or are in the process of developing an LRSP. The goal of the LRSPs is to reduce the number of fatal and serious injuries through implementation of low-cost countermeasures based on focus crash types and associated risk factors for those crashes. As an example of LRSP implementation, in HSIP Cycle 10 (released in March 2021), Caltrans awarded funds to Santa Barbara County to stripe new 6-inch edge lines on two-lane roads based on a systemic risk factor analysis included in the county's LRSP.

Resources

Roadway Departure Safety https://safety.fhwa.dot.gov/roadway_dept/

Safety Action Plans <https://safety.fhwa.dot.gov/FoRRRwD/safetyactionplans.cfm>

LTAP Center <https://nltapa.org/regions/>

LRSP DIY Site <https://safety.fhwa.dot.gov/LRSPDIY/>