

Nighttime Visibility for Safety

Improving visibility along corridors, at intersections, and at pedestrian crossings can help reduce nighttime crashes and fatalities.



The nighttime fatality rate on the Nation's roadways is [three times higher](#) than the daytime rate, and [76 percent](#) of pedestrian fatalities occur at night. Enhancing nighttime visibility where non-motorists mix with traffic during darkness will save lives. The focus is to deploy countermeasures that improve nighttime visibility to safely connect people to the community and essential services.

A VISIBILITY PROBLEM WITH VISIBLE SOLUTIONS

FHWA has used a focused approach to safety for many years, based on findings that [almost 90 percent](#) of the traffic fatalities in the United States happen in three main areas: intersections, pedestrians and bicyclists, and roadway departures.

This initiative will place more emphasis on visibility improvements in close proximity to activity locations such as:

- Schools
- Parks
- Transit stops
- Sports complexes
- Entertainment (urban core)

Improving nighttime visibility in these areas can have a great impact on safety:

- Nighttime crashes at rural and urban intersections can be reduced using well-designed lighting.
- Adequate intersection lighting can reduce pedestrian fatalities.
- Crosswalk visibility enhancements can reduce pedestrian crashes.

Enhancing visibility in these activity areas with a targeted application of cost-effective and proven lighting and traffic control device countermeasures can save lives. Enhancing nighttime visibility can also increase pedestrians' perceived levels of safety and security associated with the use of pedestrian facilities, and for disadvantaged communities and underserved neighborhoods it can provide improved visibility for accessing essential services.

Available tools include proven safety countermeasures and products, as well as updated and new approaches for lighting design and application of traffic control devices to improve nighttime visibility for all road users at every level of government. A key focus of this effort will be lighting, including the design, maintenance, and technology advancements to improve pedestrian crossings near activity locations.

BENEFITS

Implementing measures to enhance nighttime visibility can save lives and, in some cases, reduce energy costs.

Intersections. Nighttime crashes at rural and urban intersections can be reduced by [33 to 38 percent](#) using well-designed lighting. Adequate intersection lighting can help reduce nighttime pedestrian-injury crashes by [42 percent](#). In addition, light-emitting diode (LED) luminaires use less energy than traditional ones, like high-pressure sodium luminaires, creating cost savings.

Pedestrians and Bicyclists. Crosswalk visibility enhancements for pedestrians such as rectangular rapid flashing beacons ([47-percent reduction](#)) or advance markings and signs ([25-percent reduction](#)) make it safer for people to cross a road. Many of these countermeasures are also cost-effective and relatively easy to install.



Roadway Departures. Horizontal curve delineation enhancements using chevrons ([16- to 25-percent reduction](#)), in-lane pavement markings ([35- to 38-percent reduction](#)), or fluorescent sheeting ([18-percent reduction](#)) can alert drivers to upcoming curves and can be used individually or in combination with each other or other countermeasures to reduce fatalities.

STATE OF PRACTICE

- Communities across the Nation are already benefiting from the use of many of these countermeasures.
- The Minnesota Department of Transportation (MnDOT) developed a process to streamline prioritization and funding of lighting installation at higher-risk rural intersections. MnDOT's process allows luminaires to be proactively installed through systemic analysis on both District and County Road Safety Plans. Since implementation, MnDOT has noticed a reduction in nighttime crashes at the rural intersections where lighting was installed.
- The Florida DOT researched lighting solutions and directed \$100 million to its districts to replace high-pressure sodium lighting with LEDs for improved pedestrian visibility, resulting in enhancements at approximately [80 percent](#) of the State's most dangerous intersections.
- Bonner County, ID, improved visibility at curves by using edge lines and delineators on 31 roadways to address roadway departure crashes. The edge lines are a durable pavement marking with a 10-year expected life. Delineators are installed at a 200-foot spacing (closer on sharp curves), are low cost, can be installed by maintenance crews, and are visible in snow conditions.
- The North Carolina DOT (NCDOT) evaluated durable pavement markings and wider lines (6 inches versus 4 inches) and found that while the 6-inch stripes had better crash reduction, using 4-inch stripes allows the agency to treat more miles of roads for the same amount of money, resulting in a larger overall crash reduction. NCDOT plans to use the wider lines on select roads with concentrations of lane departure crashes.

RESOURCES

[EDC Nighttime Visibility for Safety Website](#)

[FHWA Nighttime Visibility General Information](#)

[FHWA Proven Safety Countermeasures](#)

[FHWA Intersection Safety](#)

[FHWA Focus on Reducing Rural Roadway Departures \(FoRRRwD\) Website](#)

[FHWA Safe Transportation for Every Pedestrian \(STEP\) Website](#)

[Lighting—A Florida Case Study on a Proven Safety Countermeasure](#) (video)

[Pedestrian Lighting Primer](#)



The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. The U.S. Government does not endorse outside entities, products, or manufacturers. Links to content created by outside entities or other information is provided for informational purposes only and is not intended to reflect a preference, approval, or endorsement of any product or entity.



U.S. Department of Transportation
Federal Highway Administration

Joseph Cheung
FHWA Office of Safety
(202) 366-6994
joseph.cheung@dot.gov

Victoria (Tori) Brinkly
FHWA Resource Center
(360) 833-3795
victoria.brinkly@dot.gov

George Merritt
FHWA Resource Center
(404) 895-0250
george.merritt@dot.gov