

Federal Highway Administration Every Day Counts

Innovation Initiative



The Safety Edge: Frequently Asked Questions

What is the Safety Edge?

The Safety Edge is a simple but highly effective solution to reduce crashes on rural two-lane highways. Shaping the edge of the pavement to 30 degrees minimizes the problem of vertical drop-off. This angle provides a safer roadway edge that allows drivers to re-enter the paved road safely. The Safety Edge also improves pavement density, which makes the edge durable.

How does the Safety Edge compare with conventional asphalt paving processes?

Compared with the conventional hot-mix asphalt paving process, the Safety Edge improves pavement density as well as driver safety. The shoe that makes the Safety Edge can be installed on new or existing asphalt resurfacing equipment. The attachment acts as a screed extension and extrudes the asphalt, forming a compacted pavement edge in the desired 30-degree shape. Using the Safety Edge adds little to construction costs.

Can a generic device be used to form the 30-degree angle?

Generic devices that extrude the correct shape should be tested to ensure they achieve similar results. Shoes that only cut the pavement into the shape do not consolidate the asphalt, so they will be less durable.

Why should I change my current process to include the Safety Edge?

The Safety Edge improves the short- and long-term safety of the roadway. Studies show that severe crashes often occur when a driver attempts to steer the tires back onto the pavement at an edge that is nearly vertical. The research shows that virtually all drivers can recover, even at high speeds, when the pavement edge is a 30-degree wedge. Using the Safety Edge also improves the durability and stability of the pavement.

Is the Safety Edge really needed on well-maintained highways?

In a perfect world, constant maintenance would prevent the drop-offs from becoming steep enough to be a problem. In the real world, drop-offs occur due to settlement, erosion, and tire wear.

How much will the Safety Edge cost per mile?

The cost is almost negligible for hot-mix asphalt. It is calculated to be less than 1 percent additional asphaltic material. The cost does depend somewhat on the specific design and construction parameters, but typically the Safety Edge process compacts loose asphalt that otherwise might break off.

Is the toe of the Safety Edge durable? Does the toe break, or the wedge come apart, over a period of time?

Safety Edge toes and wedges are very durable when they are created with the recommended technology. The Safety Edge demonstration projects from 2003 are still performing effectively. Because the Safety Edge provides an additional level of consolidation on the edge, edge raveling is decreased. This contributes to longer pavement life.

Will the Safety Edge hold the shoulder material level with the roadway surface?

In-service evaluations demonstrate that the Safety Edge performs as well as traditional procedures in holding the shoulder material flush with the pavement. Where the shoulder material does settle or move, the Safety Edge shape provides a safer situation until maintenance operations are scheduled and mobilized.



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Pavement/Construction FAQs

How does the Safety Edge affect pavement quality and structure?

Results from a 6-year test section demonstrate that the pavement edges constructed with the Safety Edge deteriorate less than sections built without the Safety Edge. Keep in mind that pavement quality is mostly dependent on factors other than the edge, such as density, mixture components, and overall construction quality.

Do I need to change my mix design or layer thickness to use the Safety Edge?

The Safety Edge has been constructed with most typical Superpave and Marshall Mix designs used for resurfacing. To date, the nominal aggregate sizes of 12.5mm (1/2 inch) and 9.5 mm (3/8 inch) are the most common mixtures used to construct the Safety Edge. Open Graded Friction Courses (OGFC) or similar mixes have not been attempted. Test sections should be constructed if these types of mixes will be used with the Safety Edge.

Do I need to modify my paving process to install the Safety Edge on asphalt?

Very few changes are needed. The key item is to add a shoe, per manufacturer's instructions, to the screed extension of the paver to create the Safety Edge. While paving, the shoe must be monitored and adjusted to keep the bottom edge of the device in contact with the road shoulder surface. Using the Safety Edge should not affect the rate of production.

When we constructed sections with a tapered edge, the wedge often broke off or cracked. How is the Safety Edge different?

The Safety Edge is smaller than the typical tapered pavement edge. Because it is formed by a spring-loaded shoe that constrains the asphalt head, the density of the extruded profile increases. Using a single plate strike-off to form a tapered edge will not produce a durable edge. Both the spring and the rounded shape of the shoe are critical to obtaining the Safety Edge.

Can the Safety Edge be installed with Portland cement concrete (PCC)?

Yes, the Safety Edge shape can be created using the same techniques used to construct various curb shapes.

Does the Safety Edge affect finished ride quality?

There is no indication that the Safety Edge will affect finished pavement smoothness. In the initial research project, which compared sections constructed with and without the Safety

Edge, no statistical difference in smoothness was seen. The same is true with sections that were constructed later in multiple States.

Does the Safety Edge have to be placed on gravel?

No, it can be placed on other materials. The Safety Edge has been constructed over shoulders of crushed stone, Reclaimed Asphalt Pavement (RAP), and in-situ soil. But like any pavement, it will perform better and last longer if it has an adequate base to provide support.

Safety FAQs

If the road has a paved shoulder, is there still a benefit to installing the Safety Edge?

Yes, the Safety Edge offers important benefits for paved as well as unpaved shoulders. Even with six-foot shoulders, some vehicles will leave the pavement. If they encounter a drop-off, their chance of safely returning to the roadway is reduced unless a Safety Edge is used. Though paved shoulders allow many vehicles to recover, driver inexperience, vehicle size, steering angle, and roadside obstacles can affect a driver's ability to return safely to the roadway.

What if a roadway only has limited clear zone available?

Even roads with a limited clear zone can benefit from the Safety Edge. A larger clear zone increases the likelihood that drivers can recover and return to the pavement, but not all drivers will be able to do so if the angle is not optimal.

If I use the Safety Edge, do I still need to pull the shoulders back up to the new pavement height?

Yes, it is the best practice to pull the adjacent material flush with the height of the pavement surface. Shoulders typically settle or erode after two months. The Safety Edge provides short-term mitigation to edge drop-offs. It also offers a longer window for practical maintenance scheduling. For jurisdictions that do not typically bring shoulders back up following an overlay, the Safety Edge would significantly reduce the safety risk.

If my crash data does not indicate we have a pavement edge drop-off problem, do I still need to install the Safety Edge?

Electronic crash data may not provide enough detail to indicate a problem with pavement edge drop-offs. A 2006 AAA report shows that many very severe crashes occur as a result of pavement edge drop-off, yet few crash report forms include pavement edge drop-offs as a contributing factor.

Sometimes the crash location was too far from the drop-off location for the connection to be clear. Since the Safety Edge is virtually cost-free and improves pavement durability as well as safety, it is wise to install it even if you are not aware of a problem.

What type of crash reductions can I expect from the Safety Edge?

The Safety Edge is a proven safety countermeasure, as documented by numerous field tests with a wide variety of vehicles, drivers, and speeds. Virtually all drivers can recover from roadway departures, even at high speeds, if the edge shape is a 30-degree wedge. According to Transportation Research Board (TRB) State-of-the-Art Report 10, the Safety Edge is so smooth that vehicles can transition easily from the on-roadway surface to the shoulder and back again. Since crash reduction is also influenced by traffic volume, vehicle speed, highway curvature, presence and width of a paved shoulder, and available clear zone, research is currently being conducted on other crash reduction factors; but the Safety Edge clearly offers major safety and durability advantages over other methods.



Contact Information:

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