**The Safety Edge**

**WHAT IS IT?**

Roadway departures account for over half of all fatal crashes. Not all of these crashes involve speeders and drunk drivers. Some could have been easily prevented if a vertical pavement edge drop-off had not been present.

Many of these tragedies might have been prevented by a cutting-edge technology known as the Safety Edge. This simple, inexpensive solution is a focus of the FHWA's Every Day Counts program.

**Pavement Edge Drop-offs**

Drop-offs occur when there are height differences between a paved road and the adjacent graded material. Conventional paving techniques result in vertical or nearly vertical pavement edges, which can cause safety concerns when they are exposed.

National crash data is lacking on edge drop-off issues, but the existing data is compelling. In Iowa, pavement edges may have contributed to as many as 18% of rural run-off road crashes on paved roads with unpaved shoulders during 2002-2004. In Missouri, that percentage was nearly 25%. These statistics were strong motivation for the FHWA's ground-breaking Safety Edge initiative.

**Why Vehicles Leave the Road**

Drivers leave the paved road for many reasons. Some may need to avoid a drunk driver or a roadway obstruction. Others are drowsy or distracted by a phone call, a text message, a GPS device, or a passenger. It is particularly easy to leave the paved road when visibility is low.

Returning to the paved road can be challenging when vertical edge drop-offs are present. A driver who doesn't slow down before attempting to steer back onto the pavement can easily lose control of the car. One State found that drop-off crashes are four times as likely to include a fatality than other types of crashes on similar roads.

**The Safety Edge Solution**

The Safety Edge is an uncomplicated and effective solution to mitigate pavement edge-related crashes. When done correctly, simply shaping the edge of the pavement to 30 degrees can eliminate the problem of vertical drop-off. Research has shown this "shape is considered conservative in that the transition from on-roadway surface to shoulder and back is so smooth it defies assignment of any degree of severity, except when the elevation change from pavement to shoulder causes a noticeable tilt in the vehicle."

**Crash Correction Diagram**

The Safety Edge provides a strong, durable transition for all vehicles that are particularly vulnerable, such as smaller, lighter cars or
motorcycles. Even at relatively high speeds, vehicles can return to the paved road smoothly and easily.

As with conventional paving, the graded material adjacent to the Safety Edge should be brought flush with the top of the pavement following paving. The Safety Edge concept is that when drop-offs recur, they will not be vertical, but a shape that will not induce tire scrubbing.

**Avoiding Tire Scrubbing**

Without the Safety Edge, a vertical or near-vertical pavement edge can become exposed. Attempts to return to the road can create "tire scrubbing" as the tire rubs intensely against the vertical edge, causing friction between the wheel and the pavement.

If the driver overcompensates by steering too hard, the vehicle can fishtail, swerve into another lane, or go off the road entirely. The vehicle may roll over or be thrown into oncoming traffic.

Inexperienced drivers are not the only victims of tire scrubbing. Smaller, lighter vehicles have a harder time climbing a steep pavement edge. At high speeds, the climb is particularly dangerous.

Whereas a vertical drop-off of 2.5 inches or greater has been shown to be problematic at speeds of 55-60 mph, drop-offs of up to 5 inches with the Safety Edge are traversable at these speeds.

**Added Benefits to the Safety Edge**

The Safety Edge also improves density at the pavement edge, which makes the pavement more durable. Less frequent road maintenance may be needed as edge raveling is reduced.

The Safety Edge is also easy to install. A commercially available shoe can be mounted on asphalt resurfacing equipment. An attachment acts as a screed extension. As the asphalt is extruded, it confines the asphalt into the desired 30-degree shape.

Although generic devices that provide a 30-degree angled shape can also be used, they typically only cut the pavement into the correct angle, but do not consolidate the asphalt. This leaves the edge more open to breaking off.

The Safety Edge is inexpensive to install. Typically, less than 1% additional asphalt is required, since the Safety Edge technology compacts the loose asphalt that would otherwise crumble.

The Safety Edge is also recommended for concrete pavements where the edge is adjacent to an unpaved surface. This may call for other considerations, including an increase in materials.

**The Safety Edge Challenge**

The Safety Edge is a proven solution that requires minimal cost and time. By including the Safety Edge detail while paving, this countermeasure can be implemented system-wide at a very low cost. FHWA's goal is to accelerate the implementation of the Safety Edge technology, so that more lives can be saved.

The FHWA has joined with state and local agencies in 20 states to sponsor or initiate project demonstrations installing this
technology. Working together with State partners, contractors, equipment manufacturers, and the industry on this 21st century initiative, we can prevent the tragedy of pavement edge drop-offs.

---

**THE SAFETY EDGE IN OHIO**

The Ohio Department of Transportation’s Office of Pavements Engineering has already incorporated the Safety Edge technique into projects across the state.

The project specifications are in the new Section 105 Pavement Edge Treatments of the ODOT Pavement Design manual. ([Click Here to access the manual.](http://www.dot.state.oh.us/Divisions/Engineering/Pavement/Standard%20Drawings%20%20Pavement%20Design%20Manual%20-%202014)) If you are interested in incorporating the Safety Edge technique into your paving bid specification requirements, you can utilize Section 105 and standard drawings BP-3.2 and BP-8.2.


For additional information regarding the Safety Edge technique, please contact Ohio LTAP [614-387-7358, 877-800-0031, or email: ltap@dot.state.oh.us] or ODOT’s Office of Pavement Engineering [614-995-5997].

---