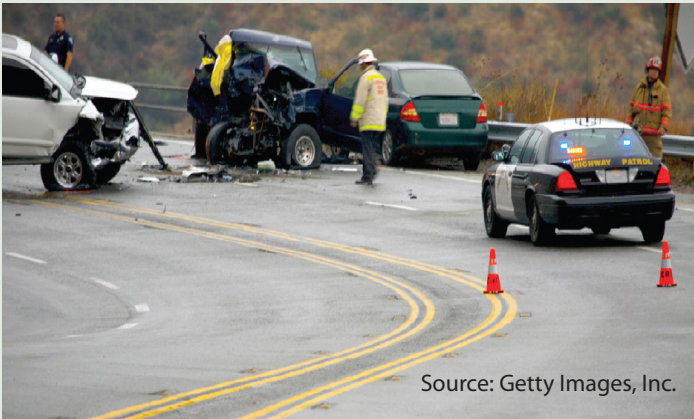




U.S. Department of Transportation
Federal Highway Administration

Lessons for New Drivers: Tips for Safely Navigating Curves

WHAT ARE ROADWAY DEPARTURE CRASHES?



Source: Getty Images, Inc.

A roadway departure (RwD) crash is one in which a vehicle leaves its lane by crossing an edge line or a center line, or otherwise leaves the road.

WHY IS IT IMPORTANT TO REDUCE RWD CRASHES?

RwD crashes account for 87 percent of curve-related fatal crashes. While the majority of these involve vehicles leaving the roadway and striking roadside objects such as trees and guardrail, about 10 percent of them are head-on crashes where vehicles wander across the center line of a curve and into the opposing lanes.¹

Each year, approximately 25 percent of all roadway deaths occur on curves.

YOUR ROLE AS A NEW DRIVER

The majority of roadway departure crashes are preventable, but it takes attention and knowledge to avoid them. When approaching a curve, a driver will always have to turn the wheel and in many cases will have to slow down to stay in the lane and/or avoid a crash. Drivers seeing, recognizing, and reacting to certain aspects of the roadway and roadside plays a key part in helping keep their vehicles on the road.

¹ FHWA, *Low-Cost Treatments for Horizontal Curve Safety 2016*, FHWA-SA-15 084, USDOT, Washington, DC, 2016.

WHY ARE CURVES PRONE TO MORE CRASHES?

It is important to be cautious and alert when driving through a curve. When a vehicle navigates a curve, **centrifugal force** increases the risk of the vehicle leaving the lane or road. If a car enters a curve, centrifugal force tends to keep the vehicle moving in a straight path, and not following the curved path (see figure 1).

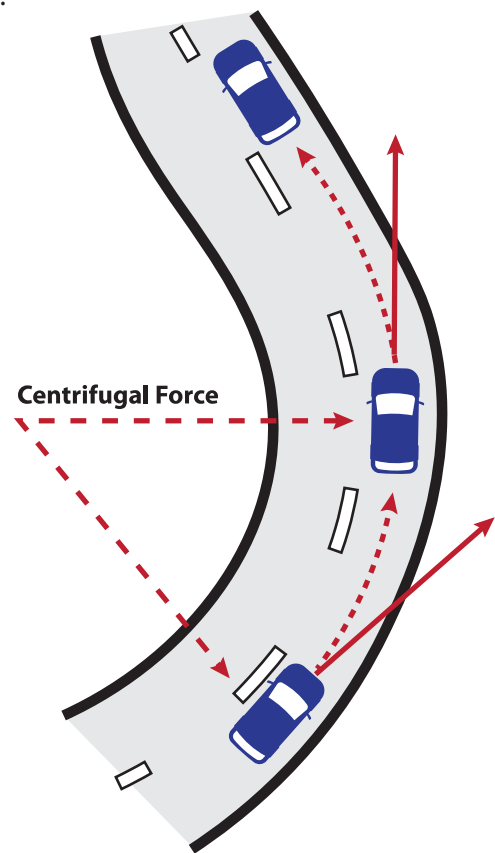


Figure 1. Physical forces affecting an automobile in motion.

Source: Texas Department of Public Safety.



Figure 2. Delineation examples: pavement marking, chevron signs, and roadside delineation.

Source: Pennsylvania Department of Transportation Safety

Driver attention plays an essential role in making sure vehicles stay in the lane, whether it curves or is straight. The road cues include:

DELINEATION. This element includes several types, like the following which are shown in figure 2.

- o *Pavement markings* refer to the yellow and white lines that help drivers see their path as they approach a curve. Pavement markings may also provide messages or instructions, as shown in figure 2.
- o *Delineators* are guidance devices on the side of the road which indicate the alignment of the roadway.
- o *Chevrons* (figure 3) are signs with arrows that point to the right or left, depending on the direction of the curve.

ADVANCE WARNING. Figure 3 is an example of signs broadly categorized as advance warning. In general, when drivers observe warning signs in advance of a curved or turning roadway, that is an indication they need to slow down to safely drive through the curve.

Advance curve warning signs (Figure 3) show the type and direction of the curve ahead.

- o *Advisory Speed Plaques* (figure 3) display the recommended speed to drive through the curve. Advisory speed plaques are often placed to supplement a warning sign where the approaching speed is higher than the speed that is safe for drivers to navigate through the curve.

o *Vehicle Speed Feedback system* is a broad category that provides interactive feedback to drivers based on current conditions. For example, if a driver approaches a curve at a higher-than-recommended speed, a speed feedback sign (as shown in figure 4) displays the vehicle's speed in real time to alert the driver to slow down.



Figure 3. Top row: three advanced curve warning signs. Bottom Row: Chevron sign and advisory speed plaque.

Source: Manual on Uniform Traffic Control Devices.



Figure 4. Dynamic speed feedback sign.

Source: Dwernertl, English Wikipedia, CC BY-SA 3.0.

DriversEd.com – This website provides young drivers with online and in-car driving lessons as they prepare for their driving tests.

Pennsylvania Department of Transportation Driver and Vehicle Services – The driving manual for the State of Pennsylvania has a section that addresses how to negotiate curves.

[Roadway Departure Safety – Federal Highway Administration \(FHWA\)](http://Roadway Departure Safety – Federal Highway Administration (FHWA)) – FHWA's RWD safety web page provides information and resources that can be useful for anyone unfamiliar with this topic.

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