Oregon Department of Transportation

Frequently Asked Questions

Rumble Strips

What is a rumble strip?

Rumble strips grab a driver's attention through vibration and noise to alert them that they are leaving the travel lane or are approaching an unexpected change in the road that needs their full attention.

There are several types of rumble strips:

- **Centerline rumble strips** – an effective countermeasure to reduce head-on collisions and opposite direction sideswipes, often referred to as cross-over or cross-center line crashes. Centerline rumble strips are primarily used to warn drivers that their vehicles are crossing center lines of two-way roads. They are primarily placed near, or on, the center striped line of the road to separate opposing traffic on undivided highways. They can reduce 44% - 64% of fatal and injury head-on and opposite direction sideswipe crashes.
- **Shoulder rumble strips** – an effective way to help reduce run-off-the-road crashes. They help to warn drivers when they have drifted from their lane. **Edge line rumble strips** are a variation on shoulder rumble strips where the striping is within the rumble strip, improving the visibility of the marking. These are more commonly used on roads with narrow shoulders. Shoulder rumble strips have shown a 13-51% reduction in single vehicle, run-off-road fatal and injury crashes on two-lane rural roads.
- **Transverse rumble strips** – are used to alert drivers to slow down or stop, or to other upcoming changes that may not be anticipated by an inattentive driver. These rumble strips are placed across the travel lane. These are typically installed approaching the intersection, work zones and at horizontal curves.
- **Sinusoidal rumble strips,** also known as mumble strips– a newer type of rumble strip that uses a sinusoidal wave pattern that makes less external noise. These rumble strips have smoother grooves than a standard rumble strip changing how the tire interacts on the road. While it's quieter outside of the vehicle, it still creates vibrations that provide the same lane departure warning for the driver.

Both centerline and shoulder rumble strips may have gaps at intersections, interchanges and across bridges.

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What is a roadway departure crash?

A roadway departure crash is defined by Federal Highway Administration (FHWA) as a crash where a vehicle crosses an edge line, a center line or leaves the traveled way. The types of crashes fitting this definition would be if a vehicle crossed the centerline or median, ran-off-the-road (on the right or left) or hit a fixed object.

Why are we installing rumble strips?

Roadway departure crashes account for 66% of all fatalities in Oregon. Federal Highway Administration (FHWA) mandates that Department of Transportations (DOTs) aim to reduce all fatal and serious injury crashes in their state. In 2010, Oregon participated with FHWA to develop a Roadway Departure Safety Implementation Plan for preventing these types of crashes. We analyzed Oregon crash data and looked at cost effective strategies at specific locations to achieve a goal to reduce 20% of roadway departure fatalities. One of these countermeasures to prevent fatalities is rumble strips.

Why are there so many roadway departure crashes?

There are many contributing factors – like driver fatigue and drowsiness – that can lead to roadway departure crashes. A drowsy driver can be just as dangerous as a drunk driver. In other cases, drivers are inattentive, careless, or distracted and drift out of the lane and off the road. Visibility can be an issue. Inclement weather such as fog, snow or smoke can also decrease the visibility of pavement markings. In these conditions, drivers may drive off the road accidentally.

What are the cost comparisons of rumble strips to guardrail or other barriers?

- $5,000 – $9,000/mile for rumble strips ($0.95 - $1.70/foot).
- $237,600/mile for guardrail ($45/foot).
- $792,000/mile for concrete barrier ($150/foot).

Will the noise be disruptive near my residence?

The noise should be infrequent and only occur when a vehicle is driving over rumble strips – meaning they're leaving their lane. Nearby residents can find this noise disruptive. We looked at some familiar noises, here's how they compare to rumble strips at 85 decibels (dB):

- 70 dB for a vacuum cleaner.
- 80 dB for a garbage disposal.
- 85 dB for rumble strips.
- 90 dB for trucks.
- 95-110 dB for motorcycles.
- 110 dB for a car horn.

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We assess each installation to avoid disturbances where possible. We refer to the ODOT Traffic Line Manual when distance exceptions are triggered.

For example, rumble strips placed within 200 - 600 feet of a neighboring residence:

- Centerline rumbles may be omitted for a passing section.
- Centerline rumbles may be omitted in locations with a tight radius curve with frequent vehicle off tracking.
- Edge line rumbles may be omitted in locations with a tight radius curve or at frequently used road approach locations where vehicle off tracking is common.

These noise exceptions considered several sources including the National Cooperative Highway Research Program Report 641 and a Minnesota DOT rumble strip noise study.

Are the rumble strips dangerous for motorcycles?

The rumble strips design has been through decades of engineering research and studies. The current design adds no measurable risk to motorcycles. Motorcycle test groups have reported noticing rumble strips but never feeling out of control when driving over them.

Are rumble strips dangerous to bicyclists?

We recognize the difficulty for bicyclists to traverse rumble strips. Shoulder rumble strip design can be narrowed, placed closer to the edge of the travel lane and will include regular gaps for bicycles to maneuver in and out of the shoulder more easily. We design the rumble strip pattern with regular gaps (every 50 feet) to provide adequate gaps for the bicyclist to move off the shoulder in case of debris or a disabled vehicle on the shoulder. We only install shoulder rumble strips where there is adequate width on the shoulder to accommodate a bicyclist comfortably (4 ft or more). On the positive side, some bicyclists have said that shoulder rumble strips not only provide a buffer between them and vehicles, it also helps them hear if a vehicle is crossing into the shoulder.

Are they dangerous for motorists and snowplows in the winter as they accumulate gravel and water/snow/ice?

Many winter weather states like Michigan and Minnesota have installed a significant amount of rumble strips and have not seen any issues or concerns surrounding the combination of winter weather and rumble strips. Tests show that vibration and the action of tires passing over the rumble strips knock debris, ice and water out of the grooves. Snowplow drivers and motorists have come to depend on shoulder rumble strips to help them find the edge of the travel lane during heavy snow and other low visibility situations.

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Won’t rumble strips deteriorate the pavement quicker?

Maintenance crews were initially concerned that heavy traffic would cause shoulder pavements with rumble strips to crumble faster, or that the freeze-thaw cycle of water collecting in the grooves would crack the pavement. These worries have proved to be unfounded. There appears to be little early deterioration of milled shoulder rumble strips on either cement concrete or asphalt pavements from either source. Where pavement conditions are less than good, we will place an asphalt seal overtop the rumble strips to help deter deterioration.

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