

Rumble Strip Implementation Fact Sheet

PAVEMENT

INSTALLING RUMBLE STRIPS ON NEW OR EXISTING PAVEMENTS

Center line, edge line, and shoulder rumble strips are extremely effective in reducing severe roadway departure crashes at a low cost. Rumble strips use both noise and vibration to alert the driver that he or she is leaving the travel path. There are many pavement-related variables that play an important role in the successful implementation of rumble strips, such as condition, age, type, thickness, location of longitudinal joints, and the type of milling equipment used for installation.



Pavement Suitability for Rumble Strip Installation

- Rumble strips are typically milled into both new and existing asphalt and Portland cement concrete (PCC) pavements.
- There appears to be little or no accelerated deterioration from milling rumble strips in asphalt or PCC pavements with a condition rating of fair or better.
- Most States have minimum pavement thickness recommendations, but these vary (see the table to the right).
- Typically, the thickness of the most recent overlay needs to exceed the depth of the rumble strip so that previous layers of pavement are not exposed, which would allow moisture to infiltrate and potentially compromise their integrity.
- Milling rumble strips into micro-surfacing and ultra-thin hot-mix asphalt has been accomplished without significant delamination. To reduce the chance for delamination, chip seals should be applied after installing rumble strips.
- A number of different materials and designs are used to create raised rumble strips in regions without snow plowing operations. Some are affixed to the pavement similar to raised pavement markers while others are encapsulated within thermoplastic pavement markings.

Required Pavement Thickness by State for Rumble Strip Installation

State	Recommended Minimum Pavement Thickness
Missouri	1.75"
New York	2.5"
Pennsylvania	Less than 1 year old – 1.5" Older – greater than 2.5"
Texas	2.5"
Washington	3"



Longitudinal Joint

Joints are an inherent weak spot in the pavement, but due to construction practices they are often the ideal location for rumble strips. Milling rumble strips into longitudinal joints was a concern expressed by many among the pavement community during the early stages of rumble strip implementation. As agencies have experimented with rumble strip installations, practitioners have generally found that longitudinal joints in good to fair condition can have rumble strips milled into them without accelerating deterioration.

Although the location of longitudinal joints is not typically a factor in determining whether or not rumble strips should be installed, various practices are used by a few States to avoid cutting rumble strips directly into the joint, such as:

- Milling two smaller rumble strips on either side of the center line joint;
- Offsetting the rumble strip to one side or the other of the joint (this is more common for edge line or shoulder rumble strips. The most typical lateral offset that States strive for is around 4 inches from the travel way or shoulder joint); or
- Offsetting the joint during pavement construction or overlay so the center line rumble strip can be placed in the center of the roadway.

Installation

Milled rumble strips are installed with a rotary cutting head that can be adjusted for the desired dimensions and spacing. There are a few issues to consider at the beginning of construction to ensure a successful installation:

- How will the rumble strip dimensions be measured? This is particularly important in crown sections or where the cross slope varies.
- What is the appropriate location of the rumble strip in relation to the pavement striping?
- How will millings be disposed of?

Installation of raised rumble strips depends on the product used. The product will determine the dimensions, but the proper location in relation to the pavement markings must still be considered. Ensuring proper adhesion to the pavement is also critical to the performance. For products that are installed within the pavement marking, spacing and coverage should be verified.

Maintenance

Milled rumble strips typically require little to no maintenance. Some agencies have used asphalt fog seals where rumble strips are milled into joints; however, most States do not perform any preventative maintenance treatments on their rumble strips. When pavement markings will be placed within the rumble strips, the marking material may seal the joint, making the fog seal superfluous. In addition, fog seals have proved to be incompatible with the thermoplastic material sometimes used for pavement markings.

Discontinuation of the Use of Fog Seals

Fog seals were commonly used over rumble strips in the past, but many States have discontinued their use as there have been no documented findings that prove increased pavement life.

FOR MORE INFORMATION

The following resources provide more details related to rumble strip use and design:

- ✓ **FHWA-SA-15-034: Rumble Strip Implementation Guide: Addressing Pavement Issues on Two Lane Roads**
- ✓ **NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips**
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_641.pdf
- ✓ **NCHRP Synthesis 339: Center Line Rumble Strip – A Synthesis of Highway Practices**
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_339.pdf
- ✓ **FHWA's Rumble Strip Website:** http://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/